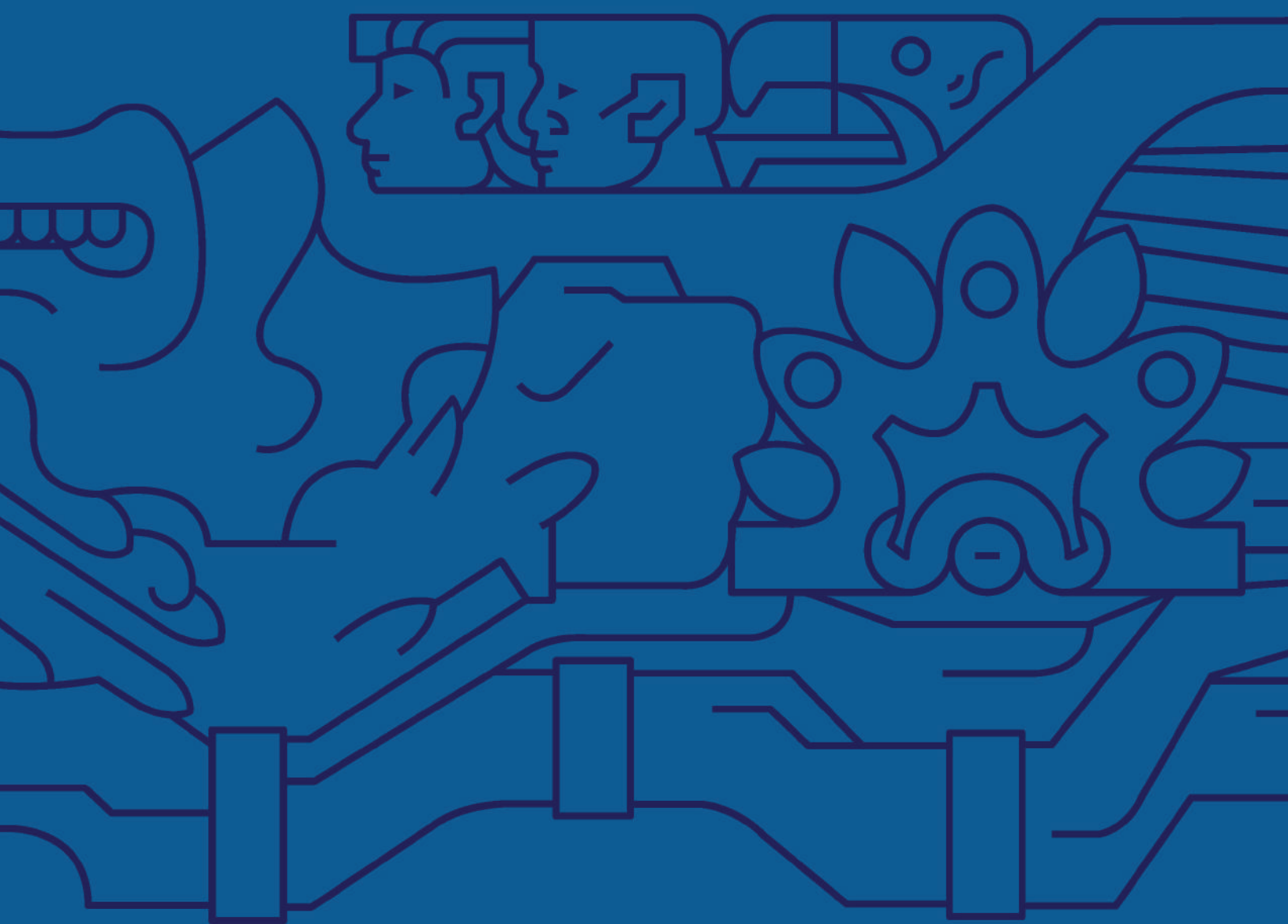


Graduate **Programs Catalogue**



GRADUATE PROGRAMS CATALOGUE

INSTITUTO TECNOLÓGICO Y DE ESTUDIOS SUPERIORES DE MONTERREY

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Message from the President of Tecnológico de Monterrey

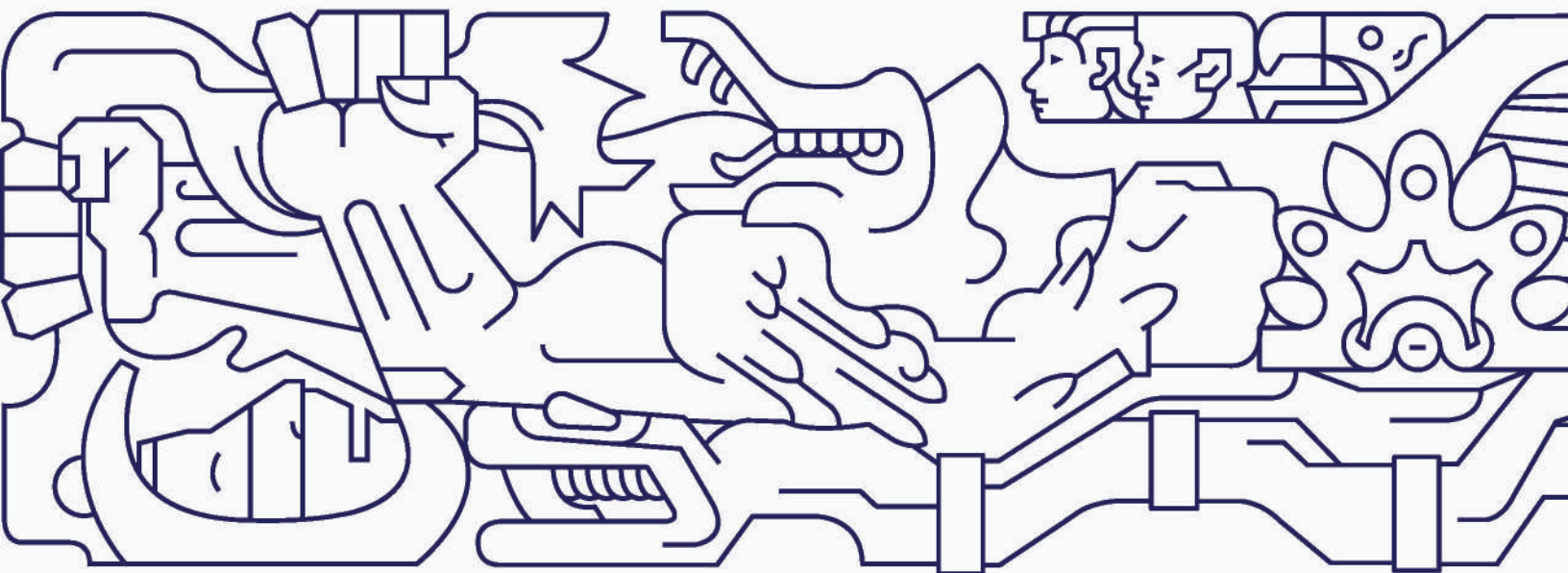


It gives me great pleasure to present the **Graduate Programs Catalogue of Tecnológico de Monterrey**. This document describes the extensive range of academic programs offered by the Institute in the areas of Agriculture and Food, Architecture, Social Sciences and Humanities, Communication and Journalism, Law, Design and Applied Art, Engineering and Science, Business and Administration, Health, and Information Technologies.

A brief description is included of our Educational Model, the structure of the curricula, the resources and media available to all our students, student life, the academic policies and regulations including the admissions process, and Educational Support and Scholarships .

The catalogue also contains a brief description of the areas of excellence and specialization topics in which faculty and students conduct research with the objective of educating, transforming, innovating and transcending.

David Noel Ramírez Padilla
Rector of Tecnológico de Monterrey
March 2016



I. EL TECNOLÓGICO DE MONTERREY



I. L TECNOLÓGICO DE MONTERREY

History and Evolution

Tecnológico de Monterrey was founded in 1943 thanks to the vision of Don Eugenio Garza Sada and a group of entrepreneurs who formed a non-profit association called Enseñanza e Investigación Superior, A. C.

Tecnológico de Monterrey is a private, non-profit, independent institution with no political and religious affiliations.

The work of Tecnológico de Monterrey and all its campuses is supported by civil associations made up of a numerous group of outstanding leaders from all over the country who are committed to quality in higher education.

Every year, the board members of these associations meet to define the goals that will guide the major decisions which will help Tecnológico de

Monterrey to meet its objective of driving the development of communities and the nation.

Tecnológico de Monterrey enjoys the support of the national community, which participates in the raffles organized by the institution to expand its scholarship program and investment in infrastructure.

Tecnológico de Monterrey enjoys the status of Free University School, which enables it to function as an educational institution.

These are some of the main events that distinguish our Institution 70 years after the foundation of Tecnológico de Monterrey:



Beginning

- 1944** | The number of students enrolled at Tecnológico de Monterrey increases from 350 to 452, while the total number of faculty members, all full-time, grows from 14 to 33. This year sees the initiation of extracurricular activities: the first student association is formed, the first basketball and soccer teams are created, and "Onda", the institution's first magazine, is published.
- 1945** | The students adopt "El Borrego" (The Ram) as their mascot.
- 1947** | The Monterrey Campus is inaugurated and has one thousand students this year. The first undergraduate degrees are awarded to eight students from the BS in Chemical Engineering program. The first raffle, known as, Sorteo Tec, is held.
- 1950** | Tecnológico de Monterrey is accredited by the Southern Association of Colleges and Schools (SACS), a US accrediting agency.
- 1954** | The Library building is opened with the mural on its façade that has become a symbol of Tecnológico de Monterrey. This mural represents the triumph of culture and work with motifs taken from pre-Cortés mythology. Later on, the Library building will become the Offices of the Presidency of Tecnológico de Monterrey.

Growth

- 1960** | Tecnológico de Monterrey has 4,458 students from 19 countries in America and all the states of Mexico.
- 1963** | At the beginning of this year, the first master's degree is awarded in Chemical Sciences. Twenty years after its foundation, Tecnológico de Monterrey begins to delve into two educational facets that will be of paramount importance: the use of electronic computers and educational television.
- 1967** | The first campus outside the city of Monterrey is founded: the Guaymas Campus.
- 1968** | This year sees the launch of the first doctoral program: the PhD in Chemistry, specializing in Organic Chemistry.
- 1973** | Two new campuses open in other Mexican cities: the Mexico City Campus and the Ciudad Obregón Campus.
- 1974** | The Saltillo Campus is founded.
- 1975** | Operations start in the Eugenio Garza Sada Campus, in Monterrey; and the Laguna, Querétaro and San Luis Potosí Campuses.
- 1976** | The Chihuahua, Estado de México and Irapuato Campuses are inaugurated.

- 1978** | Tecnológico de Monterrey now has more than 25 thousand students in 14 units throughout Mexico. The Ignacio A. Santos School of Medicine is opened next to the Hospital San José building. The León Campus becomes operational.
- 1980** | Personal computers are introduced as a higher education tool in Mexico. The Colima, Chiapas, Guadalajara, Hidalgo and Morelos (nowadays called Cuernavaca) Campuses are opened.
- 1981** | The Central de Veracruz and Tampico Campuses are inaugurated.
- 1982** | The Toluca Campus begins operating.
- 1983** | The Ciudad Juárez, Mazatlán, Sinaloa and Sonora Norte Campuses begin operating.
- 1985** | The Zacatecas Campus is inaugurated.

Consolidation

- 1986** | The mission “to prepare professionals with levels of excellence in their area of specialization” is defined, together with the general statutes. Tecnológico de Monterrey is formally incorporated as a multi-campus educational system with a new organizational structure.
- 1986** | Tecnológico de Monterrey is connected to the international inter-university communication network known as BITNET. The satellite telecommunications network is launched.
- 1989** | The Center for Advanced Technology for Production (CETEC) is opened on the Monterrey Campus. Satellite transmissions are used to teach the Master’s in Education with diverse specializations.
- 1990** | The Center for Strategic Studies (CEE) is created. Courses from the master’s degrees in Business Administration and Computer Studies are transmitted by satellite for Tecnológico de Monterrey faculty members, as well as three core courses, related to sociocultural values and professional practice.

Transformation

- 1996** | Tecnológico de Monterrey defines its mission toward 2005: To prepare individuals who are committed to the development of their communities; who are internationally competitive in their area of knowledge; and who conduct relevant research and extension studies for the development of Mexico.
- 1997** | Universidad Virtual is created. Tecnológico de Monterrey offers its academic and continuing education programs in Mexico and Latin America. The teaching-learning redesign process begins.

- 1998** The Aguascalientes Campus is inaugurated. The rule was laid down that undergraduate students' social service must benefit the community.
- 2001** Tecnológico de Monterrey, in conjunction with diverse national and international organizations and foundations, creates the Community Learning Centers. Two new campuses begin their activities: the Cumbres Campus, in Monterrey; and the Santa Fe Campus, in Mexico City.
- 2002** The Morelia Campus is inaugurated.
- 2003** The Puebla Campus is inaugurated. The Graduate School for Public Administration and Public Policy (EGAP) is opened with sites on the Mexico City, Estado de México and Monterrey Campuses. Tecnológico de Monterrey receives the Andrew Heiskell Award 2003-2004, bestowed by the United Nations Institute of International Education, in the Outstanding Faculty Program Category.
- 2004** The Council for the Accreditation of Higher Education (COPAES) of the Mexican Ministry of Education recognizes Tecnológico de Monterrey as the institution of higher education with the highest number of academic programs accredited or recognized by national and international organizations. By this year, Tecnológico de Monterrey has a network consisting of 27 Business Incubators. Prepanet activities are launched to offer online high school with a few face-to-face activities to people who need to earn their high school diploma, but who for diverse reasons were unable to do so. Two new high schools are opened: one in Matamoros, Tamaulipas, and the other in Metepec, Estado de México. The Alumni and Friends Philanthropic Network begins operating in Monterrey.
- 2005** A new Tecnológico de Monterrey Vision is defined to be fulfilled in 2015, together with the Mission and strategies that will contribute to the realization of this new vision. Tecnológico de Monterrey is awarded the accolade given by the Ministry of the Economy to institutions who provide outstanding support to the consolidation of the National System of Business Incubation. The Family Business Institute is created and developed through an agreement between the Spanish Enterprise Institute and Tecnológico de Monterrey. The Valle Alto High School begins operating in Monterrey.



- 2007** The Business Accelerator Network began operations. It was created by the Institute for Sustainable Social Development to support society in the areas of education and business creation and development; academic programs in health, nutrition and housing; and professional consulting services.
- 2008** At the initiative of Tecnológico de Monterrey alumni, the ENLACE E+E Network was created to drive Tecnológico de Monterrey's business incubators and accelerators. The FEMSA Biotechnology Center was opened at the Monterrey Campus, focusing on three areas: Bioprocess Engineering, Food Biotechnology and Pharmaceutical Biotechnology.
- 2009** With FEMSA's support, the Strategic Technology Observatory opened its doors to promote business innovation and a spirit of research. Community Learning Centers were created to take quality education to underprivileged and geographically remote communities.
- 2010** After serving as President of the Tecnológico de Monterrey System for just over 25 years, in June 2010, Dr. Rafael Rangel Sostmann tendered his resignation as President to the Board of Directors.
- The EGADE programs at the Mexico City, Monterrey and Santa Fe campuses merged to form a single national school known as EGADE Business School.
- 2011** As of October 3, Salvador Alva Gómez took over as the new Chancellor of the Tecnológico de Monterrey System. On January 1, David Noel Ramírez Padilla was appointed President of Tecnológico de Monterrey.



2012

The Zambrano Hellion Medical Center was opened in January. This new hospital center seeks to transform private medical practice in Mexico.

The Board of Directors of the Tecnológico de Monterrey System announced the appointment of José Antonio Fernández Carbajal as the new Chairman of the Board, replacing Mr. Lorenzo H. Zambrano Treviño as of February 14. Mr. Fernández Carbajal became the fourth Chairman of the Board, succeeding Eugenio Garza Sada (1943-1973), Eugenio Garza Lagüera (1973-1997) and Lorenzo H. Zambrano Treviño (1997-2012).

The Monterrey Regional Presidency established the Distinguished Professor Emeritus Prize to be awarded on May 15 every year (Teachers' Day in Mexico). The first professor to receive this honor was the architect José Luis Pineda.

The Latin American Citizenship Institute was created with the aim of replicating the best civic practices of Mexico and Latin America and orientating the entrepreneurial and humanistic capacity of Tecnológico de Monterrey.

Tecnológico de Monterrey initiates a transformation to generate cultural change and a process-based approach.

The values that govern the institution's operations are defined:

- Innovation
We generate and realize ideas, break paradigms, take risks and learn from our mistakes.
- Global outlook
We live in a global culture and foment diversity.
- Teamwork
We foster collaborative work and seek collective success above that of the individual.
- Ethics and citizenship
We respect the dignity of people and act with solidarity.
- Integrity
We behave in an ethical manner, and are honest, austere and congruent.

As Tecnológico de Monterrey collaborators, we are committed to complying with the guidelines contained in the Code of Ethics and making them part of our lives and daily activities.

- Innovation
We generate and realize ideas, break paradigms, take risks and learn from our mistakes.
- Global outlook
We live in a global culture and foment diversity.
- Teamwork



We foster collaborative work and seek collective success above that of the individual.

- Ethics and citizenship
We respect the dignity of people and act with solidarity.
- Integrity

2013

The Institution announced the new Educational Model Tec21, which will enable the development in future generations of competencies for the leaders of the 21st century. The Model is based on innovative, challenging experiences, spaces for active learning, and faculty who inspire and innovate.

The following changes were announced in the institution: the term “System” would no longer be used; Salvador Alva is now President of Tecnológico de Monterrey; there are now three instead of five regional presidencies: Northern Zone, Central-Southern Zone and Western Zone; three Vice Presidencies were created: High School, Undergraduate, and Research, Graduate and Continuing Education.

The Protein Development Research Center was created.

The Eugenio Garza Sada Institute for Entrepreneurship was founded.

2014

The Federal Government of Mexico honored Tecnológico de Monterrey with the National Entrepreneurship Award.

Education that Transforms Lives

Multi-campus University System

Nowadays, Tecnológico de Monterrey is a multi-campus university system with academic sites in the diverse regions of Mexico.

The prestige enjoyed by Tecnológico de Monterrey since its foundation, stemming from the culture of entrepreneurship, work, efficiency and responsibility that it fosters in its students, motivated its graduates, who come from diverse regions of Mexico, to promote the presence of Tecnológico de Monterrey in their hometowns.

This gave the Institution significant insight into the different needs of each region in order to prepare professionals, without uprooting them from their hometowns, with the capacity to address them. Moreover, as a nationwide, multi-campus university, Tecnológico de Monterrey accepts its responsibility to provide a valid response to the country's foremost challenges.

Some of Tecnológico de Monterrey's alumni are now directors in successful companies in Mexico and Latin America, while the presence of its graduates in key government and public administration positions is constantly growing.



Values

At Tecnológico de Monterrey, we are governed by the values of the Tecnológico de Monterrey System:



Innovation

We generate and realize ideas, break paradigms, take risks and learn from our mistakes.



Global vision

We live a global culture and foment diversity.



Teamwork

We foster collaborative work and seek collective success above that of the individual.



Sense of humanity

We respect the dignity of people and act with solidarity.



Integrity

We behave in an ethical manner, and are honest, austere and congruent.

Vision

Tecnológico de Monterrey:
We educate leaders with an entrepreneurial spirit, committed to ethics and citizenship, and who are internationally competitive.

Differentiators

The relevant characteristics that distinguish Tecnológico de Monterrey are:

- A state-of-the-art educational model, focused on developing a spirit of entrepreneurship
- Education with a sense of humanity
- The institution's prestige built on the basis of the actions of our graduates
- Relationships with alumni, companies and institutions

With these three major components (Values, Vision and Differentiators), at Tecnológico de Monterrey we recognize the need to undertake actions that will lead us toward change, to a transition targeting a better lifestyle emerging from the academic preparation of young people who care deeply about their country.

Code of Ethics

This Code of Ethics is based on the purpose of the Tecnológico de Monterrey: Education that transforms lives, and on the visions of its institutions. It is grounded in our institutional values and, in particular, a sense of humanity and integrity.

It is not, nor does it seek to be, exhaustive in relation to the ethical dilemmas that arise in the setting of our activities; therefore, it will be enriched when the requirements of daily practice so require.

As members of the organization, we are committed to channeling our actions toward the common good and the transformation of our society. Thus, all the board members, directors, faculty, doctors

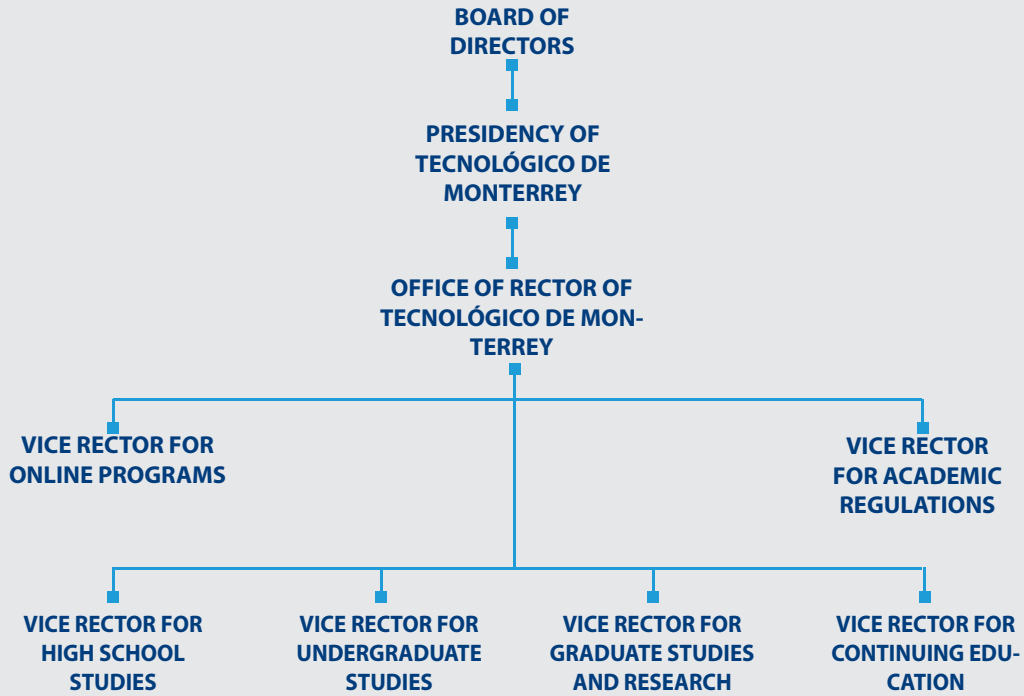


and employees of the Tecnológico de Monterrey:

1. Acknowledge the dignity of people and treat them with respect and justice.
2. Treat everybody equally and shun discrimination in every form.
3. Act with integrity, honesty, responsibility, objectiveness, congruence and impartiality.
4. Recognize and respect intellectual property and others' merit.
5. Avoid any type of conflict of interest and, if any conflicts should arise, report them to the corresponding authorities.
6. Assume data transparency as a commitment and respect the confidentiality of issues as determined by the Institution.
7. Use resources in a responsible, austere and efficient manner.
8. Protect the environment.
9. Seek the benefit of the Institution above personal benefit.
10. Comply with the laws, regulations and policies that govern our activities at institutional, national and international levels.

As Tecnológico de Monterrey collaborators, we undertake to fulfill the guidelines contained in the Code of Ethics and make them part of our lives and daily actions.

Organization of Tecnológico de Monterrey



Accreditations

The national and international academic program and institutional accreditations reflect the quality of the academic services offered and are one of the means employed by Tecnológico de Monterrey to assure and enhance its academic quality, thus consolidating its leadership position in Mexico's higher education.

Institutional Accreditations

a) International

Tecnológico de Monterrey is accredited by the Southern Association of Colleges and Schools (SACS <http://www.sacscoc.org>) to award undergraduate, master's and doctorate degrees.

For further information on Tecnológico de Monterrey's accreditation, please contact:

Southern Association of Colleges and Schools
Commission of Colleges
1866 Southern Lane
Decatur, GA. 30033-4097
Telephone: (+1) 404-679-4500

b) National

Tecnológico de Monterrey is accredited by the Federation of Mexican Private Higher Education Institutions (FIMPES, <http://www.fimpes.org.mx>).

For further information on Tecnológico de Monterrey's accreditation, please contact:

Federación de Instituciones Mexicanas Particulares de Educación Superior
Río Guadalquivir No. 50 - 4° piso, Col. Cuauhtémoc
Delegación. Cuauhtémoc. C.P. 06500
México, D.F.
Telephone: (+52) (55) 5514-5514



Program Accreditations

a) National

Several graduate programs offered at Tecnológico de Monterrey have been evaluated at Level 1 (the highest) by the Inter-institutional Committees for the Evaluation of Higher Education (CIEES), and/or have been recognized by the National Program for Quality Graduate Studies (PNPC) of the National Council of Science and Technology (CONACYT).

The following tables show the graduate programs by campus that have been evaluated and/or recognized by national agencies, at 2016.

Graduate Programs Recognized by PNPC or by CIEES

Campus	Program	Description	Agency
EGADE	DCA	Ph. D. in Business Administration	PNPC
	MBA	Master in Business Administration	PNPC / CIEES
	MAF	Master in Finance	PNPC
EGAP	DPP	Ph. D Public Policy	PNPC
	MAP	Master in Public Administration and Public Policy	PNPC
	MDI	Master in International Law	CIEES
	MPE	Master in Prospective and Strategic Studies	PNPC/ CIEES
EIC	DCI	Ph. D. Engineering Sciences	PNPC
	DBT	Ph. D. Biotechnology	PNPC
	MBI	Master of Science in Biotechnology	PNPC
	MCP	Master of Science in Quality Systems and Productivity	PNPC
	MSE	Master of Science in Electronic Engineering (Electronic Systems)	PNPC
	MIE	Master of Science in Energetic Engineering	PNPC
	MAC	Master in Engineering and Construction Management)	PNPC
	MSA	Master of Science in Environmental Systems	PNPC
	MCP	Master of Science in Quality Systems and Productivity	PNPC
	MSM	Master of Science in Manufacturing Systems	PNPC
	MIR	Master in Automotive Engineering	PNPC
MIT	Master of Science in Intelligent Systems	PNPC	
MMS	Master in Manufacturing Systems	PNPC	
MTI	Master in Information Technology Management	PNPC	
EEHCS	DCS	Ph. D. Social Sciences	PNPC
	DEE	Ph. D. Educational Innovation	PNPC
	DEH	Ph. D. in Humanistics Studies	CIEES
	MEH	Master in Humanistics Studies	PNPC
EM	DCL	Ph.D. Program in Clinical Sciences	PNPC
Programas en Línea	DEE-V	Ph. D. Educational Innovation	CIEES
	MAD-V	Master in Educational Institution Administration	PNPC
	MGN-V	Master in Enterprise Administration	PNPC / CIEES
	MEE-V	Master in Education	PNPC / CIEES
	MEH-V	Master in Humanistics Studies	CIEES
	MGP-V	Master in Public Management	PNPC / CIEES
	MID-V	Master in Innovation for Enterprise Development	CIEES
	MTE-V	Master in Educational Technology	PNPC / CIEES
	MIP-V	Master in Engineering with specialization in Quality Systems and Productivity	PNPC
	MTI-V	Master in Information Technology Management	CIEES

b) International

The Graduate School of Business Administration and Leadership (EGADE), Campus Monterrey, became the first business school in Mexico to obtain the ‘triple crown’ of international accreditations.

This means that the most important accrediting agencies in the world for business schools and programs, the American Association of Colleges and Schools of Business (AACSB), the UK-based Association of MBAs (AMBA), and the European Quality Improvement System (EQUIS), certify the quality of EGADE Monterrey.

The following list shows Tecnológico de Monterrey’s graduate programs in business administration that have been accredited by international agencies, at 2015.



Graduate Programs Accredited by International Agencies

Campus	Program	Description	Agency
EGADE Business School Sede Ciudad de México	DCA	Doctorado en Ciencias Administrativas	PNPC / AACSB / EQUIS
	DCF	Doctorado en Ciencias Financieras	AACSB
	MBA	Maestría en Administración y Dirección de Empresas	AMBA / AACSB
	MAF	Maestría en Finanzas	AACSB / EQUIS
	MMT	Maestría en Mercadotecnia	AACSB / EQUIS
EGADE Business School Sede Monterrey	DCA	Doctorado en Ciencias Administrativas	PNPC / AACSB / EQUIS
	MBA	Maestría en Administración y Dirección de Empresas	PNPC / AACSB / EQUIS / AMBA
	MBA-G	Maestría en Administración y Dirección de Empresas (GBS, doble grado con The University of North Carolina at Charlotte)	AACSB / EQUIS / AMBA
	MBE	Maestría en Dirección Global de Negocios (ONE MBA)	AACSB / EQUIS / AMBA
	MDM	Maestría en Dirección para la Manufactura	AACSB / EQUIS
	MAF	Maestría en Finanzas	PNPC / AACSB / EQUIS
	MMT	Maestría en Mercadotecnia	AACSB / EQUIS
MIB	Maestría en Negocios Internacionales	PNPC / CIEES / AACSB / EQUIS / AMBA	
EGADE Business School Sede Santa Fe	MDE	Maestría en Administración (doble grado UT)	AACSB
	MBA	Maestría en Administración y Dirección de Empresas	AACSB
	MAF	Maestría en Finanzas	AACSB / EQUIS

For further information on the accreditation of Tecnológico de Monterrey's graduate programs displayed in this table, please contact:

Association to Advance Collegiate Schools of Business (AACSB)

777 South Harbour Island Boulevard, Suite 750
Tampa, FL. 33602-5730
Telephone: (+1) 813 769 6500

European Quality Improvement System (EQUIS), de la European Foundation for Management Development (EFMD)

Rue Gachard 88 - box 3. 1050
Brussels, Belgium
Telephone: (+32) 2 629 08 10

Association of MBAs (AMBA)

25 Hosier Lane
London
EC1A 9LQ
Telephone: (+44) 0 20 7246 2657

The latest information on institutional accreditations and academic programs of Tecnológico de Monterrey is available on the institution's website: <http://www.itesm.edu>, under Nosotros- Acreditaciones.



National Graduate School Directory

The Vice Rector for Research, Graduate Studies and Continuing Education consists of four national graduate schools, listed below with their contact information.

Vice Rector for Research, Graduate Studies and Continuing Education

Vice President

Dr. Arturo Molina Gutiérrez

armolina@itesm.mx

EGADE Business School

Dean of EGADE Business School

Dra. Lourdes Dieck Assad

mldieck@itesm.mx

EGAP Gobierno y Política Pública

Dean of EGAP Government and Public Policy

Dr. Alejandro Poire Romero

alejandro.poire@itesm.mx

National Graduate School for Education, Humanities and Social Science

Dean of the National Graduate School for Education, Humanities and Social Science

Dra. Inés Sáenz Negrete

ines.saenz@itesm.mx

National Graduate School for Science, Engineering and Technologies

Dean of the National Graduate School for Science, Engineering and Technologies

Dr. Manuel Indalecio Zertuche Guerra

mzertuche@itesm.mx

School of Medicine

Dean of the School of Medicine

Dr. Jorge Eugenio Valdez García

jorge.valdez@itesm.mx



Campus Directory

Tecnológico de Monterrey has 26 campuses nationwide, which are listed below together with their contact information.

Aguascalientes Campus

Campus Director:

Agustín Mateo Arredondo Corrales

agustin.mateo@itesm.mx

Av. Eugenio Garza Sada # 1500

Aguascalientes, Aguascalientes, C.P. 20328

Telephone: +52 (449) 910-0900

<http://www.ags.itesm.mx>

Central de Veracruz Campus

Campus Director:

Mauricio García Ballinas

mauricio.garcia@itesm.mx

Av. Eugenio Garza Sada # 1

Col. Las Quintas

Córdoba, Veracruz, C.P. 94500

Telephone: +52 (271) 717-0500

<http://www.ver.itesm.mx>

Chiapas Campus

Campus Director:

Manuel de Jesús Villalobos García

mvillalobos@itesm.mx

Carretera Tapanatepec Km. 149 + 746

Col. Juan Crispín

Tuxtla Gutiérrez, Chiapas, C.P. 29020

Telephone: +52 (961) 617-6000

<http://www.chs.itesm.mx>

Chihuahua Campus

Campus Director:

Dr. Rodolfo Julio Castillo Zetina

rodolfo.castello@itesm.mx

Av. Heróico Colegio Militar # 4700

Col. Nombre de Dios

Chihuahua, Chihuahua., C.P. 31300

Telephone: +52 (614) 439 5000

<http://www.chi.itesm.mx>

México City Campus

Campus Director:

Dr. Pedro Luis Grasa Soler

grasa@itesm.mx

Calle del Puente # 222, esq. Periférico Sur

Col. Ejidos de Huipulco

Delegación Tlalpan

México, D.F., C.P. 14380

Telephone: +52 (55) 5483-2020

<http://www.ccm.itesm.mx>

Ciudad Juárez Campus

Campus Director:

Arq. Carlos Bejos Acevo

cbejos@itesm.mx

Bldv. Tomás Fernández Campos # 8945

Parque Industrial Antonio J. Bermúdez

Ciudad Juárez, Chihuahua, C.P. 32470

Telephone: +52 (656) 629-9100

<http://www.cdj.itesm.mx>

Ciudad Obregón Campus

Campus Director:

Claudia Margarita Félix Sandoval

c.felix@itesm.mx

California # 2100 Nte.

Col. Obregón Norte

Ciudad Obregón, Sonora, C.P. 85010

Telephone: +52 (644) 410-5700

<http://www.cob.itesm.mx>

Cuernavaca Campus

Campus Director:

Dr. José Carlos Miranda Valenzuela

jmiranda@itesm.mx

Autopista del Sol Km 104

Col. Real del Puente

Xochitepec, Morelos, C.P. 62790

Telephone: +52 (777) 362 0800

<http://www.cva.itesm.mx>

Estado de México Campus**Campus Director:****Dr. Pedro Luis Grasa Soler***grasa@itesm.mx*

Carretera Lago de Guadalupe Km. 3.5

Atizapán de Zaragoza

Estado de México, C.P. 52926

Telephone: +52 (55) 5864-5555

<http://www.cem.itesm.mx>**Guadalajara Campus****Campus Director:****Dr. Mario Adrián Flores Castro***adrian.flores@itesm.mx*

Ave. Gral. Ramón Corona # 2514

Col. Nuevo México

Zapopan, Jalisco, C.P. 45201

Telephone: +52 (33) 3669-3000

<http://www.gda.itesm.mx>**Hidalgo Campus****Campus Director:****Claudia Gallegos Cesaretti***cgallego@itesm.mx*

Blvd. Felipe Ángeles # 2003

Col. Venta Prieta

Pachuca, Hidalgo, C.P. 42080

Telephone: +52 (771) 717-02-14

<http://www.hgo.itesm.mx>**Irapuato Campus****Campus Director:****Javier Benavides Ornelas***javier.benavides@itesm.mx*

Paseo Mirador del Valle # 445

Col. Villas de Irapuato

Irapuato, Guanajuato, C.P. 36670

Telephone: +52 (462) 606-8000

<http://www.ira.itesm.mx>**Laguna Campus****Campus Director:****Martín López Méndez***lopezmendez@itesm.mx*

Paseo del Tecnológico # 751

Col. Ampliación la Rosita

Torreón, Coahuila, C.P. 27250

Telephone: +52 (871) 729-6363

<http://www.lag.itesm.mx>**León Campus****Campus Director:****Dr. Isaac Lucatero Castañeda***isaac.lucatero@itesm.mx*

Av. Eugenio Garza Sada S/N

Col. Cerro Gordo

León, Guanajuato, C.P. 37190

Telephone: +52 (477) 710-9000

<http://www.leo.itesm.mx>**Monterrey Campus****Campus Director:****Víctor Eduardo Gutiérrez Aladro***victor.gutierrez@itesm.mx*

Av. Eugenio Garza Sada #2501 Sur

Col. Tecnológico

Monterrey, Nuevo León, C.P. 64849

Telephone: +52 (81) 8358-2000

<http://www.mty.itesm.mx>**Morelia Campus****Campus Director:****Dr. Edgar Montalvo Escamilla***edgar.montalvo@itesm.mx*

Camino a Jesús del Monte S/N

Col. Jesús del Monte

Morelia, Michoacán, C.P. 58350

Telephone: +52 (443) 322-6800

<http://www.cmr.itesm.mx>**Puebla Campus****Campus Director:****Rashid Abella Yunes***rabella@itesm.mx*

Vía Atlíxcayotl # 2301

Col. San Andrés

Cholula, Puebla, C.P. 72800

Telephone: +52 (222) 303-2000

<http://www.pue.itesm.mx/>**Querétaro Campus****Campus Director:****Romeo Salvador Coutiño Audiffred***scoutino@itesm.mx*

Av. Epigmenio González # 500

Fraccionamiento San Pablo

Querétaro, Querétaro, C.P. 76130

Telephone: +52 (442) 238-3100

<http://www.qro.itesm.mx>

Saltillo Campus**Campus Director:****Angelberto Guardado Astorga***aguardad@itesm.mx*

Prol. Juan de la Barrera # 1241 Ote.

Col. Cumbres

Saltillo, Coahuila, C.P. 25270

Telephone: +52 (844) 411-8000

<http://www.sal.itesm.mx>**San Luis Potosí Campus****Campus Director:****Dr. Héctor Morelos Borja***hmorelos@itesm.mx*

Av. Eugenio Garza Sada # 300

Fracc. Lomas del Tecnológico

San Luis Potosí, San Luis Potosí, C.P. 78211

Telephone: +52 (444) 834-1000

<http://www.slp.itesm.mx>**Santa Fe Campus****Campus Director:****Dr. Pedro Luis Grasa Soler***grasa@itesm.mx*

Ave. Carlos Lazo # 100

Col. Lomas de Santa Fe,

Delegación Álvaro Obregón

México, D.F., C.P.01389

Telephone: +52 (55) 9177-8000

<http://www.csf.itesm.mx>**Sinaloa Campus****Campus Director:****Isidro Cavazos de León***icavazos@itesm.mx*

Blvd. Pedro Infante # 3773 Pte.

Culiacán, Sinaloa, C.P. 80100

Telephone: +52 (667) 759-1600

<http://www.sin.itesm.mx>**Sonora Norte Campus****Campus Director:****Dr. Francisco Javier Quezada Andrade***jquezada@itesm.mx*

Blvd. Enrique Mazón López # 965

Hermosillo, Sonora, C.P. 83000

Telephone: +52 (662) 259-1000

<http://www.her.itesm.mx>**Tampico Campus****Campus Director:****Marco Edgar Vargas Herrada***marco.vargas@itesm.mx*

Blvd. Petrocel Km. 1.3 Puerto Industrial

Altamira, Tamaulipas, C.P. 89600

Telephone: +52 (833) 229-1600

<http://www.tam.itesm.mx>**Toluca Campus****Campus Director:****Juan Carlos Arreola Rivas***juan.carlos.arreola@itesm.mx*

Eduardo Monroy Cárdenas # 2000

San Antonio Buenavista

Toluca, Estado de México, C.P. 50110

Telephone: +52 (722) 279-9990

<http://www.tol.itesm.mx>**Zacatecas Campus****Campus Director:****Miguel Angel Burgoin Carrera***miguel.burgoin@itesm.mx*

Ave. Pedro Coronel # 16

Col. Dependencias Federales

Guadalupe, Zacatecas, C.P. 98600

Telephone: +52 (492) 925-6820

<http://www.zac.itesm.mx>

Educational Model TEC21

The educational model of Tecnológico de Monterrey comprises a set of structured components through which the institution fulfills its students' educational goals. It integrates the aims of the institutional mission and the values it promotes, the pedagogical practices that make it operational, and the supporting mechanisms and resources.

Characteristics of the Educational Model:

- Academic content that encompasses an education in science, technology, humanism, ethics and citizenship.
- Use of teaching techniques that provide a practical approach to our students' education and offer them the opportunity to analyze and propose answers to complex real-world and work-environment problems. These techniques include: Collaborative Learning, Problem-based Learning, Project-oriented Learning, Case Method, Service Learning and Research-based Learning.
- Development of our students' capacity for self-directed research and learning, as a result of their active participation in the educational process. This will enable them to keep up-to-date throughout their professional lives.
- Use of the most advanced information technologies as learning support tools.
- A comprehensive educational approach complemented by co-curricular activities in student leadership, cultural diffusion and physical education.

Through the Educational Model Initiative Tec 21, our educational model adapts to the times, fulfilling its purpose of driving the skills of current generations, in order to educate leaders with an entrepreneurial spirit, ethics and citizenship and who are internationally competitive. This will enable our students to face up to the challenges of a world that has yet to be invented.

Characteristics that Enrich our Educational Model



Faculty who are innovative and up-to-date in their discipline, have experience in their professional practice (liaison) and incorporate technology in the teaching-learning process.

Challenging, interactive learning experiences in the new educational spaces.



Flexibility in how, when and where the teaching-learning process takes place.

The following is a description of the characteristics of the diverse programs through which Tecnológico de Monterrey educates its students; the academic processes that form the framework of their personal and professional development; the resources that support and facilitate these processes; and the quality assurance schemes for the Institution's overall academic operations.

Student Learning Development Process

The main characteristic of Tecnológico de Monterrey's educational process is the active role played by students in their own education. By becoming actively involved in this process, students develop the capacity for self-directed learning, which is indispensable for innovating and staying up to date throughout their professional lives. Moreover, while studying at the Institution, students develop a series of personal competencies that enable them to attain a comprehensive education. The following is a list of the main elements that distinguish Tecnológico de Monterrey's educational process:

◆ Active Learning

The environment at Tecnológico de Monterrey is designed to offer students multiple opportunities to participate actively in their professional and personal preparation process. Through the insti-

tution-wide use of diverse teaching techniques, such as problem-based learning, project-oriented learning, collaborative learning, service-learning, case method and research-based learning, among others, students play a purposeful, structured role in the construction of their knowledge and the development of the competencies described in the graduate profile and the Mission. In this context, students can discover, process and apply knowledge in a relevant, significant way both inside and outside the classroom.

◆ Self-regulated Learning

A key objective of Tecnológico de Monterrey's learning model is for students to develop the skills needed to achieve lifelong learning. Therefore, in their courses, they repeatedly face challenging, highly academically demanding educational situations, which motivate them to gradually develop the capacity to regulate their learning, setting goals and reflecting on their achievements.



Throughout this process, the students are constantly guided and supported by their teachers, as well as by the huge range of physical, technological and human resources offered by the Institution.

◆ Comprehensive Education

Comprehensive education is based on the idea of developing in students the diverse human dimensions. With this aim, the educational model contemplates the development of competencies for reflecting on, analyzing and evaluating the social, economic, political and ecological reality, from both personal and professional perspectives; respect for others and for the environment; and acting with solidarity and responsibility to enhance the quality of life of the country and the world. Tecnológico de Monterrey's comprehensive education is built on its academic programs, cross-curriculum strategies and a variety of co-curricular activities.

◆ Teaching Techniques

Just as the greatest care is employed when designing the programs' curricula and selecting the content, Tecnológico de Monterrey's academic activity is characterized by the use of teaching techniques that add a practical and professional approach to the students' academic training, while developing their personal competencies. Although techniques to support teaching have always been used at Tecnológico de Monterrey, the Institution formalized a faculty training program in this area to strengthen the implementation of its educational model and strongly promote its application in each of the courses offered.

There are many teaching techniques and just as many ways of classifying them. In the same way, at institutional level, the faculty select the techniques that they consider to be the most appropriate for their teaching objectives. The most commonly used techniques are:



- Collaborative Learning
- Problem-based Learning
- Project-oriented Learning
- Case Method
- Service-Learning
- Research-based Learning

◆ The Professor as a Learning Facilitator and Guide

The faculty profile underscores their outstanding preparation within their professional fields, as well as the intensive teacher training fomented by the Institution that enables the professors to design and guide carefully structured teaching processes in which students will achieve the maximum benefit of their participation.

Internationalization

Students' academic preparation is broadened with internationalization experiences that enrich their academic life by offering a more global insight.

The internationalization component helps students to enrich their academic life with more global experiences, through academic, cultural and linguistic exchange, and also to take a major step towards achieving personal maturity.

Students are offered the internationalization experience through:

- Participation in academic experiences in prestigious overseas universities and academic institutions for periods of two semesters, one semester, one summer or a specific academic trip.
- Socializing with and meeting students from other countries who are studying at one of Tecnológico de Monterrey's campuses.
- Attendance at conferences offered by qualified scholars from foreign universities who have been invited as visiting professors to Tecnológico de Monterrey or who participate in online courses.
- Participation in projects conducted in association with groups of students from foreign universities through the facilities offered online.

Resources and Media

◆ Information and Communication Technologies

In an era of major advancements in the development and use of information and communication technologies, Tecnológico de Monterrey promotes their use with the twofold aim of bringing students into contact with these tools, as a competitive advantage in their professional education and, at the same time, making the most of all the support resources available to enrich the teaching-learning process.

◆ Tecnológico de Monterrey Library Network

In order to support the learning, research and social development activities in which students and faculty participate, Tecnológico de Monterrey has a solid collection of printed and digital

information resources made available through the 32 libraries distributed in each of its campuses and a Digital Library.

As a result of the collection development program, the Tecnológico de Monterrey Library Network collection continued to be enriched during 2015 through the acquisition of 352,225 volumes (55,839 physical and 296,386 digital), reaching a total printed and digital bibliographic collection of 3.5 million volumes— 2,367,646 physical and 1,139,793 digital – available for the academic community. The collection includes books, eBooks, encyclopedias, discs, videos, magazines and journals that cover all the areas of knowledge in which Tecnológico de Monterrey offers academic programs. Moreover, in 2015, the libraries dealt with a total of 415,454 physical book loan requests, while, through the Digital Library (biblioteca.itesm.mx), an average of 2 million searches were completed every month in the electronic information resources.

◆ Vice Rector for Online Programs

The Vice Rector for Online offers graduate, continuing education and social development programs in Mexico and some Latin American countries, using innovative educational models, learning networks and advanced information technologies, to contribute to the integration and development of Spanish-speaking communities.

The online courses respond to diverse market needs. Faculty members who are experts in their fields, assisted by a team of instructional design and technology specialists, are in charge of developing these courses. Moreover, the faculty are supported by a team of tutors to manage the students' learning process.

The variety of online services spans undergraduate courses to online literacy programs for the members of the most underprivileged communities in the country, as well as a wide range of master's degrees and continuing education programs. They also include teacher training programs for both Tecnológico de Monterrey professors and

those from other educational systems in Mexico and at least ten other Latin American countries.

◆ Student Life

Tecnológico de Monterrey, in its endeavor to promote the development and comprehensive education of its students, offers diverse programs, courses, workshops and student groups that provide spaces for the development of competencies, such as leadership, self-confidence, ethics and citizenship. These competencies help students to fulfill their personal and professional goals.

The formal student-life actions include sports, cultural and student leadership activities, together with prevention and psycho-pedagogic counseling, which are offered through the healthy environment promotion program.

For further information about student life at Tecnológico de Monterrey, visit: <http://dae.itesm.mx/>.

◆ Vocational Guidance

A vocational guidance program run by expert specialists is available to students at the Tecnológico de Monterrey campuses upon request. The objective of this service is to provide high school and undergraduate students with the tools for making decisions regarding their life and career plans, such as choosing which major they are going to study, deciding whether to change majors or if they have doubts about continuing at the Institution. Students can take tests in this space to identify the skills, interests and personality characteristics that coincide with the professional profiles of the different degree programs and which are important components in this decision-making process.

◆ Dormitories

In order to provide a comprehensive service, the Guadalajara, Monterrey, Puebla and Querétaro campuses offer dormitories that promote integration and participation in co-curricular activities,

such as excursions, tournaments and trips, as well as the possibility of socializing with people from other parts of the world.



Academic Policies and Academic Regulations

Admissions

Tecnológico de Monterrey's admissions process focuses on selecting young people who have the potential to become internationally competitive leaders with a spirit of entrepreneurship and a sense of humanity, as well as the clear capacity and enthusiasm to enrich the academic and student life of the Tecnológico community. As a selective institution, every year there are more student applications than available places.

The Admission Committee is responsible for reviewing the profiles and academic records, since its members assign the admissions decisions through a comprehensive process of selection criteria, as follows:

- Application for admission
- Result of the Academic Aptitude Test
- Prior academic history
- Curriculum (academic, leadership, sports, cultural, personal accomplishments, etc.)
- Essay (which reflects the applicants' personal interests and displays their enthusiasm for belonging to our community)
- Letters of recommendation
- Result of the TOEFL or an alternative English language proficiency test
- Interview

For further details on the undergraduate admissions process, visit the Tecnológico de Monterrey website at <http://www.itesm.edu>.

Credit Transfer

The credit transfer and equivalence agreements for students enrolled in Tecnológico de Monterrey with partial studies in an academic period, completed at another educational institution, are issued by the Mexican Department of Education

based on a proposal made for each particular case by Tecnológico de Monterrey.

Tecnológico de Monterrey recognizes the results of the official examinations by area of knowledge of the International Baccalaureate (IB) and of the Advanced Placement Program (AP), for undergraduate course credit transfer.

Credit transfer applications must be completed during the admissions process for the selected undergraduate degree through the Credit and Credit Transfer Office of the corresponding campus.

The deadline for requesting credit transfer corresponds to the date specified to request a change of courses during the students' first semester at our institution.

Evaluation and Continuance

Tecnológico de Monterrey considers that from 48 to 60 units per semester is an adequate academic load. It structures its curricula and enrollment rules around these figures.

The evaluation of the students' performance in each of their courses is carried out through partial evaluations and a final evaluation. The final evaluation is compulsory.

Grades are expressed in whole numbers, on a scale of one to one hundred. The minimum pass grade is seventy.

Regarding continuance at Tecnológico de Monterrey, the students with Academic Support standing will face permanent dismissal for unsatisfactory academic performance if:

1. They fail one or more courses from the curriculum of the specialization in which they are enrolled (or 16% or more of the total work required by the curriculum), or fail two or more

courses from the curriculum of the master's degree, medical residency or doctorate in which they are enrolled.

2. Obtain final grades lower than seventy-five in two or more classes (or the equivalent) in the specialization curriculum in which they are enrolled (or in 32% or more of the total work required by the curriculum), or in three or more classes in the case of master's, medical residency or doctoral programs.

These subsections do not take into consideration students' final grades in remedial classes.

General Student Rules and Regulations

Since its foundation, Tecnológico de Monterrey defined the regulations that would guide its students regarding academic expectations and their conduct inside and outside the classroom.

The Institution, committed to its academic quality, informs the students and the community of the regulations that govern it within the framework of the principles and values stated in the Mission.

The General Student Rules and Regulations can be consulted at <http://dae.itesm.mx/rga>.

Educational Support and Scholarships

El Tecnológico de Monterrey, consciente de su responsabilidad de cooperar desde el ámbito académico para el desarrollo de las comunidades en las que opera, brinda, a través de apoyos educativos, diversas opciones a aquellos alumnos que tienen la disposición y habilidades necesarias para cursar exitosamente sus estudios en el Tecnológico de Monterrey y que requieren de ello para hacerlo

Fee Refunds

Students who withdraw from the courses in which they are enrolled will be refunded a percentage of the total corresponding fees in accordance with the cost of the program and the established policies, which are published on the official Tecnológico de Monterrey website (<http://www.itesm.edu>).

Research

For Tecnológico de Monterrey, research is a strategic activity that promotes the generation of innovative solutions for the economic, social and environmental development of Mexico. Tecnológico de Monterrey, committed to scientific and applied research oriented toward adding value to society, focuses its human, material and financial resources on priority areas, in order to drive companies' competitiveness, regional progress, the growth of technology-based businesses and its own educational model.

One of the objectives of research is to identify strategic industrial sectors in the regions of the country in which the institution's campuses are located.

Tecnológico de Monterrey has decided to center its scientific activity on eight strategic research areas in order to foster innovation, knowledge generation and knowledge transfer, endeavoring to solve problems in Mexico and across the world. These eight strategic areas are:

Strategic focus areas:

- I. Biotechnology
- II. Mechatronics
- III. Information Technologies, Electronics and Communications
- IV. Sustainable Technologies Sustentables
- V. Public Policy
- VI. Business
- VII. Medicine

Transversal Area:

- VIII. Education, Humanities and Social Science

Focusing research on areas of excellence has been defined as a strategy to accomplish the following:

- Accelerate the preparation of leading research professors in state-of-the-art topics.
- Access the frontier of knowledge through strategic liaisons with top universities.
- Train human capital in strategic areas through academic programs of excellence.
- Support national companies in achieving leadership in research, technological development and innovation.
- Develop technological solutions that transform strategic sectors.

In order to fulfill these scientific objectives, the institution has created 41 strategic groups that support the academic and research activities of the Graduate Schools and of the research-oriented academic programs.

These groups engage in generating knowledge at the forefront of their discipline, taking into consideration global technological and social megatrends. Each group is made up of a worldwide leader in the discipline, a national-level leader and research professors from the different graduate schools. Doctoral students, postdoctoral researchers, master's students and undergraduate students also participate.

The 41 focus groups enjoy the participation of 68 international and national leaders, 371 professors, 411 doctoral students, 143 master's students, and 53 postdoctoral researchers.

In addition to these focus groups, there are four strategic initiatives: Nanotechnology, Energy, Education and Entrepreneurship. The leading educational institutions in the world participate in these initiatives, in which research is conducted across the diverse schools and strategic focus groups.

Research that transforms lives is one of the seven

Strategic Initiatives of Tecnológico de Monterrey's 2020 Strategic Plan, driving the generation of innovative solutions for the sustainable economic and social development of Mexico. Eight of the projects are currently transforming Mexico, developed by the Institution's researchers in the areas of education, engineering, sustainable development, medicine, nanotechnology and security, seeking to convert scientific knowledge into socially beneficial innovative solutions, enhancing and changing people's daily lives. Multidisciplinary teams, comprised of researchers from different levels, work in alliance with national and foreign institutions on topics ranging from the creation of exoskeletons to improve the quality of life of people who, for diverse reasons, have lost the capacity for movement, to corneal grafts to restore lost vision or the rescue of marginalized communities through the adoption of productive projects. Find out more at:

http://sitios.itesm.mx/congresodeinvestigacion/proyectos_que_estan_transformando_mexico.html

Of the more than 1,100 faculty members who teach the master's and doctoral students at Tecnológico de Monterrey, 322 are research professors who belong to the National System of Researchers (SNI). The aim of this system is to recognize the work of people who are dedicated to producing scientific

and technological knowledge in Mexico by appointing them as "National Researchers", which symbolizes the quality and prestige of their scientific contributions.

The institution offers 10 doctoral programs, 36 master's programs, 5 specializations and 16 medical residencies, 63% of which have been awarded accreditation by the National Program for Quality Graduate Studies (PNPC) of the National Council of Science and Technology (CONACyT). In addition, the 16 medical specializations have been endorsed and approved by the Inter-institutional Commission for the Education of Human Resources in Healthcare, of the Mexican Department of Health (CIFRHS).

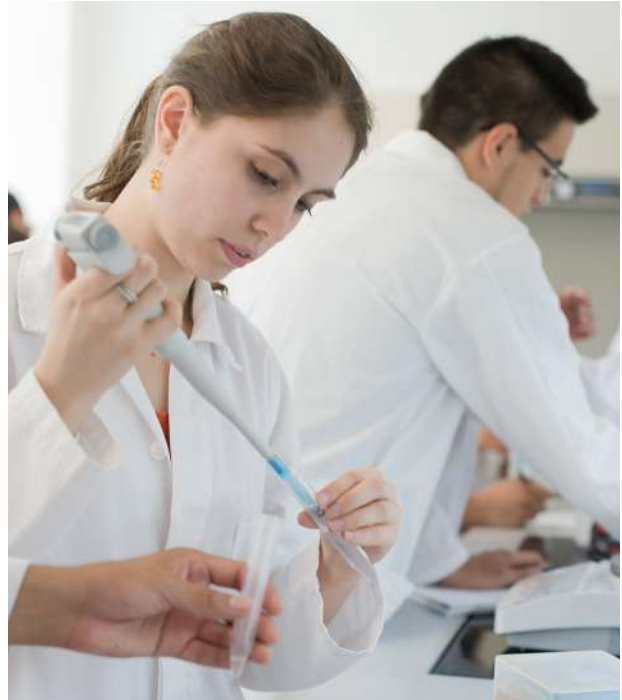
The researchers, together with the students who participate in research projects, strengthen the Patent Program which, between 2006 and 2014, accumulated 331 patent applications in Mexico and 434 in Mexico, the United States, the European Union, Asia and the PCT. A total of 76 patents were awarded in Mexico, 11 in the United States, 3 in the European Union and 4 in Asia. From 2006 through 2013, Tecnológico de Monterrey was the Mexican educational institution with the most patent applications per year. The Incubation Cell program has support about 30 entrepreneurship projects, 15 of which have been constituted as Technology-

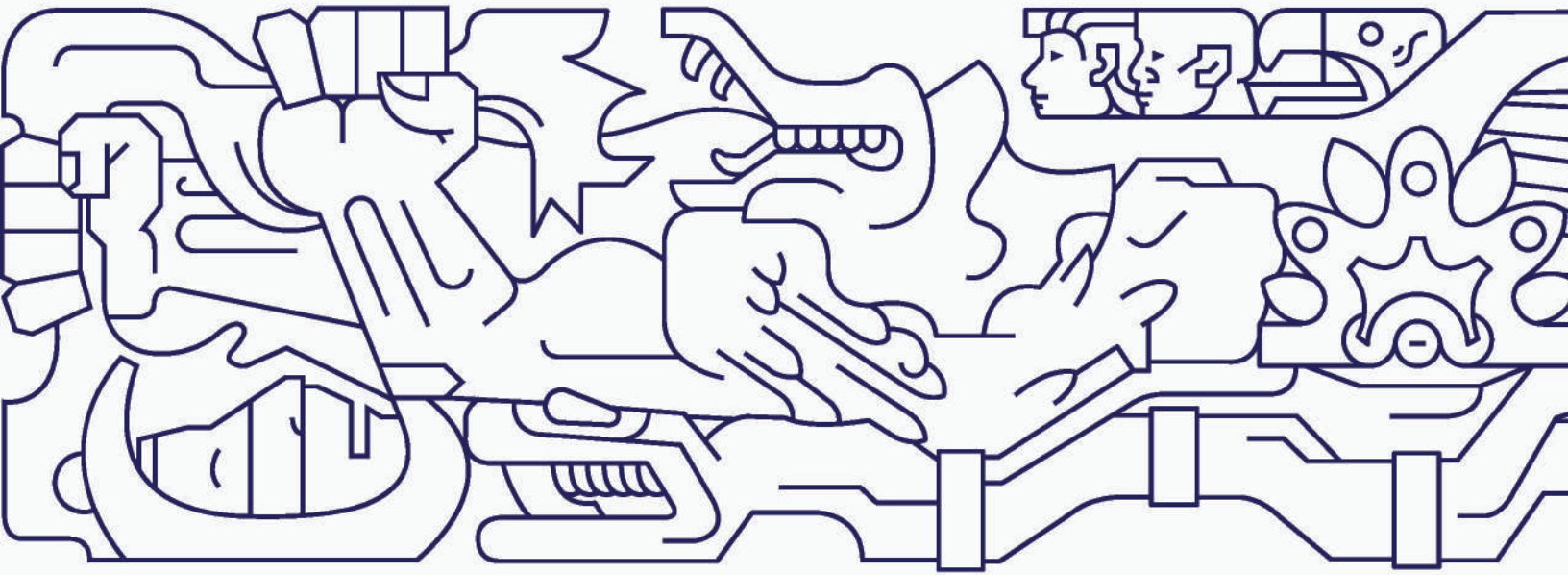


based Companies (Spinoffs). Tecnológico de Monterrey has 23 licensed patents and 1 franchise.

In short, research at Tecnológico de Monterrey fosters our students' learning process, supports the intellectual activities of our faculty, and generates the knowledge and innovative solutions that society demands.

The impact of these activities on our graduates is reflected in the 2015 Graduate Employability Rankings, a new initiative of the British firm Quacquarelli Symonds (QS), in which Tecnológico de Monterrey was ranked first for Latin American and 21st on a global level.





II. Curricula



Master's Programs Offered by Each Campus

Campus		Ciudad de México	Estado de México	Guadalajara	Monterrey	Puebla	Querétaro	Sede EGADE Monterrey	Sede EGADE Santa Fe	Sede EGAP Ciudad de México	Sede EGAP Monterrey	Sede EGAP Santa Fe	Toluca	Programas en línea	Total de Campus
MAD-V	2013													X	1
MAF	2015							X	X						2
MAF-V	2009													X	1
MAP	2009									X	X	X			3
MBA	2015			X				X	X						3
MBA-G	2009							X							1
MBE	2002							X							1
MBI	2009				X										1
MCC	2009			X											1
MCC-I	2016		X		X										2
MCP	2009			X	X										2
MDE	2009							X							1
MDI	2009									X	X				2
MEE-V	2013													X	1
MEH	2009	X			X										2
MEH-V	2009													X	1
MEM	2016		X	X	X										3
MER-V	2011													X	1
MGN-V	2010													X	1
MGP-V	2009													X	1
MID-V	2009													X	1
MIE	2009				X										1
MIP	2013						X								1
MIP-V	2013													X	1
MIR	2009					X	X						X		3
MIT	2012				X	X									2
MMS	2009						X								1
MMT-V	2009													X	1
MNT	2016		X		X										2
MPE	2009										X				1
MPJ	2014										X				1
MSE-E	2009			X	X										2
MSM	2009				X										1
MTE-V	2013													X	1
MTI-I	2012													X	1
MTI-V	2012													X	1
TOTAL		1	3	5	10	2	3	4	3	1	4	2	1	13	52

Excluye los programas que se ofrecen en línea y que no se ofrecen en ningún campus.

Specialization Programs Offered by Each Campus

	Ciudad de México	Estado de México	Santa Fe	Toluca	Sede EGADE Monterrey	Sede EGADE Santa Fe	Total de Campus
EAE 2015					x	x	2
EEN 2013	x	x					2
EIS 2011	x	x	x	x			4
ELS 2011	x	x	x	x			4
ENT 2016	x	x	x	x			4
EPY 2011	x	x	x	x			4
TOTAL	5	5	4	4	1	1	20

"x" means that the program is offered by that campus.

Programas de doctorado que se ofrecen en cada campus

	Ciudad de México	Estado de México	Monterrey	Sede EGADE Ciudad de México	Sede EGADE Monterrey	Sede EGAP EGAP Monterrey	Sede EGAP Santa Fe	Programas en Línea	Total de Campus
DBT			x						1
DCA				x	x				2
DCF				x					1
DCI	x	x	x						3
DCL			x						1
DCS			x						1
DEE			x						1
DEH	x		x						2
DPP						x	x		2
DTC		x	x						2
DEE-V								x	1
Total	2	2	7	2	1	1	1	1	17

"x" means that the program is offered by that campus.

All the Medical Residency programs are offered at the Monterrey Campus.

Profiles and Curricula of the Graduate Programs

This section contains the graduate curricula offered by Tecnológico de Monterrey.

Information on these programs and the description of the courses they include are also available at www.itesm.mx

Tecnológico de Monterrey reserves the right to change the programs described in this document.

The course descriptions are presented by academic discipline. The letters in the course codes indicate the discipline associated to the course and can be used to locate the description of the courses in the corresponding section of this document.

Course code	Course	C - L - U
BT5006	Genetic Engineering	3 - 0 - 12

The letters of the code indicate the discipline to which the course belongs. In the example, the letters BT indicate that the course corresponds to the discipline Biotechnology. All the courses of a curriculum are described in the section Course Content by Academic Discipline.

The letter "C" indicates the number of class hours per week.

The letter "L" indicates the number of laboratory or activity hours per week.

The letter "U" indicates the number of total academic units per week of the course.

In this case, the course Genetic Engineering consists of 3 class hours per week, 0 hours of experimental and/or experiential activities and a total of 12 academic units. The academic units represent the total number of hours per week on average that students should devote to the course. The



total academic units include the class hours, indicates the number of laboratory or activity hours per week and the independent work hours.

Any course requirements are listed in the course description.

One academic unit presents approximately 16 hours of work during the academic semester.



Specialization

Profiles and Curricula

Specialization in Energy Management (EAE)

General Program Objectives

The objective of this specialization is to:

- Train specialists with the knowledge and aptitudes to work in the energy sector, leading and managing energy organizations in global settings. They will be able to apply the aptitudes and knowledge acquired in this specialization regarding the energy sector, in topics such as: business administration, entrepreneurship and global markets. Their preparation extends to public and energy companies and includes all types of organizations with projects that will address the spaces derived from the Energy Reform.
- Develop outstanding professionals who will apply their skills to analyze and use assessment techniques in energy projects, in order to generate value for the organizations and their local, national and international environment.
- Prepare professionals with the skills and aptitudes to participate in jobs with project assessment groups in order to make decisions regarding their implementation and measure their impact by means of technical research, action research and field projects.
- Prepare specialists with the skills to identify and create business opportunities in the energy sector through the implementation and analysis of innovative, sustainable business models.
- Demonstrate their knowledge of project financing and market risk management.
- Put into practice their knowledge, aptitudes and skills for evaluating strategic projects from a multidisciplinary perspective and, in this way, identify business opportunities in the diverse areas of this field.
- Display the skills for applying the regulatory and contractual frameworks of the energy sector, in both project assessment and business model design.
- Assess the efficiency and environmental, economic and social sustainability of projects.
- Have the skills to generate information and make recommendations about business opportunities for the energy sector.
- Demonstrate skills and abilities in the creation of business proposals that consider the creation of sustainable value with social impacts.
- Act with professionalism, ethics and a humanistic vision.

Learning outcomes

On completing the program, students will be able to:

- Analyze and apply the legal, economic and financial bases of businesses in the energy sector, in oil, gas, electricity and renewable energy resources.
- Understand the behavior of the energy sector market.

Target Audience

Professionals from the energy sector or energy-dependent businesses who wish to develop competencies in this field. Applicants must have at least two years' professional experience and hold positions with perspectives for growth within the organization or be interested in developing innovative business models. They will also require work experience and the desire to develop and/or strengthen their administrative and managerial skills, as well as their consulting abilities on the topic of energy.

de crecimiento dentro de la organización o tienen interés en desarrollar modelos innovadores de negocio y además poseen experiencia laboral y desean desarrollar y/o fortalecer habilidades de administración y gerencia, así como de consultoría en el tema energético.

EAE Specialization in Energy Management Edition 2015

Mandatory Courses		C	L	U
AD5080	Management in Energy Markets	3.5	0	12
AD5081	Energy Law and Regulations of Energy Industries	3.5	0	12
AD5082	Risk Management in Energy Industry	3.5	0	12
		10.5	0	36

Elective Courses		C	L	U
AD5083	Sustainability and Efficiency Strategies	3.5	0	12
AD5084	Evaluation of Energy Projects	3.5	0	12
FZ5036	Energy Finance	3.5	0	12
		10.5	0	36

Project		C	L	U	
AD5085	Field Project on Energy		3.5	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is three trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Specialization in Business Strategies Based on Information Technology (EEN)

General Program Objectives

The general objective of the Master in Business Management is for students to:

- Be successful in managerial positions in multinational companies.
- Identify business opportunities.
- Design and implement innovative business processes and/or models.
- Create sustainable wealth through their own company.

Learning Outcomes

On completing the program, students will be able to:

- Design and implement innovative sustainable

business processes and/or models.

- Generate solutions with sustainable cost-effectiveness on the basis of a quantitative and qualitative analysis.
- Drive teamwork and practice leadership skills.
- Use ethical reasoning to assure the sustainable development of organizations.
- Use technologies to generate value.

Target Audience

Professionals who graduated from engineering or non-engineering undergraduate degrees and wish to gain proficiency in and correctly apply information technologies and leading-edge business strategy methodologies

EEN ESpecialization in Business Strategies Based on Information Technology

Edition 2013

Mandatory Courses		C	L	U
GI5020	Professional Certification	3.5	0	12
RH4000	Leadership and Organizational Behavior	3.5	0	12
TI4009	Strategies for Technological Competitiveness	3.5	0	12
TI4010	Managing Innovation and Business Process	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
		10.5	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is three trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Specialization in Software Engineering (EIS)

General Program Objectives

The objective of the specialization in Software Engineering is to prepare specialists who in their careers will become leaders in the conceptualization and development of software applications that will increase organizations' competitiveness, according to the technological changes of the environment.

Learning Outcomes

On completing the program, students will be able to:

- Design, develop and evaluate software in organizations using modern analysis and development methodologies together with advanced programming languages.

- Select software platforms, prioritizing requirements and quality features.
- Pursue lifelong learning and adapt to new software engineering environments.
- Work collaboratively in multidisciplinary teams to develop complex software systems.

Target Audience

Graduates from engineering degrees, related to computer science and information systems, who wish to join the productive sector providing technological solutions, covering the conceptualization, development and release stages.

EIS Specialization in Software Engineering Edition 2011

Mandatory Courses		C	L	U
GI5020	Professional Certification	3.5	0	12
TC4016	Software Analysis, Design and Construction	3.5	0	12
TC4017	Software Testing and Quality Assurance	3.5	0	12
TC4018	Managing Software Development	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
		10.5	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is three trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Specialization in Logistics and Supply Chain (ELS)

General Program Objectives

The Logistics and Supply Chain Specialization program aims to prepare specialists who use their leadership in an organization to:

- Improve an organization's competitiveness through innovations in supply chain management.
- Optimize an organization's logistics and supply chain processes through technological and administrative innovations.

Learning Outcomes

On completing the program, students will be able to:

- Design supply chains, addressing the issues related to the location of facilities, transportation

of goods, routing and inventory management.

- Strategically and efficiently manage the organizational and technological resources in the supply chain.
- Diagnose and solve supply chain management problems.
- Design efficient return flow collection models to collaborate with environmental conservation.

Target Audience

Graduates from engineering or B.A. undergraduate degrees who are conversant with probability and statistics and operations research. Decision makers in the areas of logistics, such as transportation, routing and purchasing, among others.

ELS Specialization in Logistics and Supply Chain Edition 2011

Mandatory Courses		C	L	U
AD4001	Statistical Analysis in Organizations	3.5	0	12
AD5003	Value Creation, Business and Network Models	3.5	0	12
GI5020	Professional Certification	3.5	0	12
IN5096	Transportation and Third Party Logistics	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
		10.5	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is three trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Specialization in Business Services Based on Information Technology (ENT)

General Program Objectives

This specialization aims to prepare professionals who:

- Execute leadership and innovation functions through the use and application of information technologies in organizations.
- Conceptualize, plan, develop and implement innovative solutions in IT-based organizations.

competitiveness through the appropriate, effective application of IT service processes.

- Plan ICT resources in public and private organizations to help them to gain a leadership position.
- Solve business and technology development issues using a systemic approach and working in a collaborative and multidisciplinary manner.

Learning Outcomes

On completing the program, students will be able to:

- Contribute to the enhancement of companies'

Target Audience

Professionals who graduated from engineering or B.A. undergraduate degrees and wish to gain proficiency in and correctly apply information technologies and leading-edge business service methodologies.

ENT Specialization in Business Services Based on Information Technology Edition 2011

Mandatory Courses		C	L	U
GI5020	Professional Certification	3.5	0	12
TI4007	Technology, Innovation and Knowledge	3.5	0	12
TI4008	Strategic Alignment and Business Knowledge	3.5	0	12
TI4012	IT Portfolio, Program and Project Management	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
		10.5	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is three trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Specialization in Project Management (EPY)

General Program Objectives

The Specialization in Project Management aims to prepare specialists who use their leadership in an organization to plan, execute, control, close and evaluate projects, managing human and material resources efficiently.

Learning Outcomes

On completing the program, students will be able to:

- Initiate, plan, execute, control and close pro-

jects correctly.

- Make the best project leadership decisions according to the circumstances.
- Form, integrate and develop effective project management work teams.

Target Audience

Graduates from engineering or B.A. undergraduate degrees who are conversant with this area. People who are in charge of areas that require the creation, design, implementation and monitoring of objective-oriented activities, in particular under a project-management system.

EPY Specialization in Project Management Edition 2011

Mandatory Courses		C	L	U
AD4004	Competitive Strategy and Business Design	3.5	0	12
AD5034	Project Management	3.5	0	12
FZ5011	Economic Engineering	3.5	0	12
GI5020	Professional Certification	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
		10.5	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is three trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Medical Residencies

Profiles and Curricula

Residency in Health Care Quality (RCA)

General program objectives

The aim of the Residency in Health Care Quality of Tecnológico de Monterrey is to train exceptional specialist practitioners who apply their knowledge and innovative, practices at the macro and micro healthcare levels, according to the highest quality and safety standards. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Health Care Quality Residents who graduate from this institution are outstanding leaders in local and international settings who design, implement and evaluate effective operating strategies in organizations belonging to the healthcare sector, based on investigation processes and innovation, bringing about organizational change in this sector.

Learning Outcomes

On completing the program, students will be able to:

- Drive and direct organizational change and innovation through resource and health service infrastructure management, in order to construct, transform and operate clinical and administrative healthcare processes that are centered on the patient and his/her family, constantly seeking quality, safety and self-sustainability in healthcare services.
- Develop and transform their community through the collaborative construction of knowledge; the lifelong development of their abilities and skills; professional development founded on ethical values; relevant scientific research in the clinical-systemic interface; and the ongoing consolidation of their capacity to perform in national and international settings

Research areas

Quality Management and Patient Safety. Evaluation of the quality of care at its diverse levels, focusing on structural and organizational factors and their influence on quality. Another focus is determining user perception and other methods of patient and community participation. Use of clinical protocol analysis and improvement, applying quality enhancement tools and methodologies. With the healthcare quality assessment perspective in any of its dimensions, with a patient safety management and improvement approach.

Organizational Change Processes. Derived from the assessment of people, processes and organizations, focusing on improving quality in its diverse dimensions. The general aim of this research group is to advance knowledge of health organizations in their institutional growth, expansion and diversification processes; organization, agents, governance and financing; assessment of institutional quality and public policy programs.

Target Audience

This program is aimed at physicians who have passed the national Medical Residency Applicant Examination and who have an interest and vocation in this specialty; the skills and attitudes for evaluating the quality and safety of healthcare processes and for leading improvement efforts within the framework of health organizations and services; a sense of commitment to patient safety and the provision of quality first-contact healthcare services; the capacity to read and comprehend medical literature in English. They must also be available full time to cover academic and healthcare activities in compliance with the regulations in effect.

In order to be admitted to the Residency in Health-care Quality of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RCA Residency in Health Care Quality

Edition 2013 (By Areas)

Core Courses		C	L	U	H	
ME4177	Management in Clinical Care I	3	0	12	12	
ME4179	Management in Clinical Care II	3	0	12	12	
ME4181	Management in Clinical Care III	3	0	12	12	
ME5225	Management in Clinical Care IV	3	0	12	12	
ME5227	Management in Clinical Care V	3	0	12	12	
ME5229	Management in Clinical Care VI	3	0	12	12	
		18	0	72	72	
Hospital Practice Courses		C	L	U	H	
ME4178	Hospital Practice I	0	60	12	60	
ME4180	Hospital Practice II	0	60	12	60	
ME4182	Hospital Practice III	0	60	12	60	
ME5226	Hospital Practice IV	0	60	12	60	
ME5228	Hospital Practice V	0	30	6	30	
ME5230	Hospital Practice VI	0	30	6	30	
		0	300	60	300	
Research Courses		C	L	U	H	
ME4143	Research and Innovation Methods	1.5	0	6	6	
ME4144	Thesis Project I	3	0	12	12	
ME5190	Thesis Project II	3	0	12	12	
ME5266	Thesis Defense	0	0	1	0	
		7.5	0	31	30	
Basic Courses C		L	U	H		
ME4140	Clinical Ethics	1.5	0	6	6	
ME4141	Health Sciences Education	1.5	0	6	6	
ME4142	Quality Health Care	1.5	0	6	6	
		4.5	0	18	18	
Elective Courses		C	L	U	H	
ME5191	Elective Specialty I	0	30	6	30	
ME5192	Elective Specialty II	0	30	6	30	
		0	60	12	60	

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

RCA Residency in Health Care Quality Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4177	Management in Clinical Care I	3	0	12	12
ME4178	Hospital Practice I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4179	Management in Clinical Care II	3	0	12	12
ME4180	Hospital Practice II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4181	Management in Clinical Care III	3	0	12	12
ME4182	Hospital Practice III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5225	Management in Clinical Care IV	3	0	12	12
ME5226	Hospital Practice IV	0	60	12	60
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5227	Management in Clinical Care V	3	0	12	12
ME5228	Hospital Practice V	0	30	6	30
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5229	Management in Clinical Care VI	3	0	12	12
ME5230	Hospital Practice VI	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H *Total hours.*

Residency in Cardiology (RCR)

General program objectives

The aim of the Residency in Cardiology of Tecnológico de Monterrey is to train exceptional Cardiologists who contribute to the prevention, detection, treatment and rehabilitation of cardiovascular diseases, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Cardiologists who graduate from this program are outstanding, internationally competitive leaders in their field. They conduct research in the basic areas of cardiology, clinical cardiology, cardiovascular imaging, electrocardiography, hemodynamics, interventional cardiology and endovascular treatment.

Learning Outcomes

On completing the program, students will be able to:

- Deliver medical attention and care to patients with cardiovascular problems and diseases.
- Analyze, investigate and assess the results of the clinical guides and medical protocols used for patients with cardiovascular problems and diseases.
- Communicate effectively with patients, family members, faculty, colleagues and other members of the healthcare team.
- Execute their professional duties with commitment and responsibility, adhering strictly to the ethical principles of the profession.
- Know and take into consideration the characteristics of the diverse health systems and their influence on the medical attention of patients with cardiovascular problems and diseases.

Research areas

The faculty and residents of the Residency in Cardiology participate in the Cardiology and Vascular Medicine Research Group, which focuses on characterizing the cellular and molecular mechanisms that contribute to the development of heart failure. The definition of these mechanisms offers the possibility of evaluating new experimental prevention and treatment therapies in animal models, providing the scientific bases to lead clinical studies with patients. In particular, collaboration with the Research Group will be executed in the research project Participation of proinflammatory cytokines in heart failure.

Target Audience

Applicants to the Residency in Cardiology of Tecnológico de Monterrey are graduates from the Physician and Surgeon program who have earned credit for at least two years in the Residency in Internal Medicine at hospital and university institutions belonging to the National System of Residencies in Medical Specialties. Doctors who have completed the Residency in Internal Medicine in other countries at universities that are recognized by the Tecnológico de Monterrey System can also apply to participate in this program.

In order to be admitted to the Residency in Cardiology of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RCR Residency in Cardiology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4228	Cardiology I	3	0	12	12
ME4230	Cardiology II	3	0	12	12
ME4232	Cardiology III	3	0	12	12
ME5281	Cardiology IV	3	0	12	12
ME5283	Cardiology V	3	0	12	12
ME5285	Cardiology VI	3	0	12	12
		18	0	72	72
Clinical Courses		C	L	U	H
ME4229	Medical Care in Cardiology I	0	60	12	60
ME4231	Medical Care in Cardiology II	0	60	12	60
ME4233	Medical Care in Cardiology III	0	60	12	60
ME5282	Medical Care in Cardiology IV	0	60	12	60
ME5284	Medical Care in Cardiology V	0	30	6	30
ME5286	Medical Care in Cardiology VI	0	30	6	30
		0	300	60	300
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

RCR Residency in Cardiology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4228	Cardiology I	3	0	12	12
ME4229	Medical Care in Cardiology I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4230	Cardiology II	3	0	12	12
ME4231	Medical Care in Cardiology II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4232	Cardiology III	3	0	12	12
ME4233	Medical Care in Cardiology III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5281	Cardiology IV	3	0	12	12
ME5282	Medical Care in Cardiology IV	0	60	12	60
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5283	Cardiology V	3	0	12	12
ME5284	Medical Care in Cardiology V	0	30	6	30
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
ME5285	Cardiology VI	3	0	12	12
ME5286	Medical Care in Cardiology VI	0	30	6	30
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Anesthesiology (REA)

General program objectives

The aim of the Residency in Anesthesiology of Tecnológico de Monterrey is to train exceptional Anesthesiologists who apply anesthesia and analgesia techniques, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice, outstanding leaders at local and international levels, who contribute through clinical research to generating innovations in the techniques and procedures of this specialization that will benefit patients, their families, specialists, the healthcare team and medical institutions.

Learning Outcomes

On completing the program, students will be able to:

- Applying their knowledge, abilities and skills in a collaborative, multidisciplinary manner, within a framework of safe, comprehensive patient care.
- Be creative and innovative, conducting relevant clinical research and able to perform with quality in national and international settings, consolidating their professional competency activities with solid attitudes and values.

Research areas

Patient quality and safety. Research on the application of safety standards in anesthetic procedures in the operating theater and in other hospital areas in which anesthesia is used, in order to enhance the quality of our services.

Target Audience

Applicants must be qualified physicians in compliance with all the official regulations of the Ministry of Education and the Ministry of Health. They should display high moral values, be ethical and congruent with the profession they have chosen to practice. They must also be willing to work in multidisciplinary teams, interested in conducting quality research, proficient in their native language as well as a foreign language, have a neat and tidy appearance, and show respect for patients, staff and the institution in which they work.

In order to be admitted to the Residency in Anesthesiology of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REA Residency in Anesthesiology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4234	Anesthesiology I	3	0	12	12
ME4236	Anesthesiology II	3	0	12	12
ME4238	Anesthesiology III	3	0	12	12
ME4240	Anesthesiology IV	3	0	12	12
ME5287	Anesthesiology V	3	0	12	12
ME5289	Anesthesiology VI	3	0	12	12
ME5291	Anesthesiology VII	3	0	12	12
ME5293	Anesthesiology VIII	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4235	Medical Care in Anesthesiology I	0	60	12	60
ME4237	Medical Care in Anesthesiology II	0	60	12	60
ME4239	Medical Care in Anesthesiology III	0	60	12	60
ME4241	Medical Care in Anesthesiology IV	0	60	12	60
ME5288	Medical Care in Anesthesiology V	0	30	6	30
ME5290	Medical Care in Anesthesiology VI	0	30	6	30
ME5292	Medical Care in Anesthesiology VII	0	60	12	60
ME5294	Medical Care in Anesthesiology VIII	0	60	12	60
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REA Residency in Anesthesiology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4234	Anesthesiology I	3	0	12	12
ME4235	Medical Care in Anesthesiology I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4236	Anesthesiology II	3	0	12	12
ME4237	Medical Care in Anesthesiology II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4238	Anesthesiology III	3	0	12	12
ME4239	Medical Care in Anesthesiology III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME4240	Anesthesiology IV	3	0	12	12
ME4241	Medical Care in Anesthesiology IV	0	60	12	60
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5287	Anesthesiology V	3	0	12	12
ME5288	Medical Care in Anesthesiology V	0	30	6	30
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5289	Anesthesiology VI	3	0	12	12
ME5290	Medical Care in Anesthesiology VI	0	30	6	30
		3	60	24	72
Seventh Semester		C	L	U	H
ME5291	Anesthesiology VII	3	0	12	12
ME5292	Medical Care in Anesthesiology VII	0	60	12	60
		3	60	24	72
Eighth Semester		C	L	U	H
ME5266	Thesis Defense	0	0	1	0
ME5293	Anesthesiology VIII	3	0	12	12
ME5294	Medical Care in Anesthesiology VIII	0	60	12	60
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in General Surgery (REC)

General program objectives

The aim of the Residency in Surgery of Tecnológico de Monterrey is to train exceptional surgeons who deliver clinical care to patients with a surgical pathology, according to the highest quality and safety standards. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Surgeons who graduate from this institution are outstanding leaders at national and international levels, who contribute through research to generating innovations in surgical procedures, in healthcare models and in the development of the discipline itself.

Learning Outcomes

On completing the program, students will be able to:

- Perform as experts in the comprehensive, ongoing care of surgical patients in relation to diagnoses, selection, and preoperative, operative and postoperative care, including managing the pathology and complications in the gastrointestinal tract; abdomen and its contents; mammary glands and soft tissue; head and neck; endocrine system; surgical oncology; polytraumatized patients and severely ill patients in the ER or ICU.
- Provide preoperative, operative and postoperative care for pediatric, plastic, peripheral vascular, general thoracic and transplant surgery, and also handle the most common problems in cardiac, gynecological, neurological, orthopedic and urological surgery, as well as in the administering of anesthetic agents.
- Use endoscopic techniques, in particular laparoscopy and minimally invasive surgical techniques, as well as other relevant diagnostic and therapeutic techniques.
- Act with professionalism within a framework of honesty and professional ethics, with a pro-

found sense of respect and sensitivity toward patients and the medical community.

- Communicate effectively with the patient, family members and other members of multidisciplinary healthcare teams, orally and in writing.
- Apply the analytical skills of reasoning, medical judgment and decision making to solve problems in their specialty, and use scientific method to conduct research projects that will have an impact on improving healthcare.

Research areas

Abdominal wall. Innovations in diagnostics and therapeutics of the pathology of the abdominal wall. Digestive surgery. Study of all the disorders of the digestive tract, liver, pancreas and bile duct: etiology, diagnosis and treatment.

Oncological surgery. Study of all the neoplastic disorders: diagnosis and treatment.

Vascular surgery. Innovations in managing arterial, venous and lymphatic diseases. Technological innovations in surgery. Development of techniques or materials to diagnose and treat surgical diseases.

Target Audience

This program is aimed at Mexican and foreign physicians who seek a highly competitive training program that will drive their leadership capacity in General Surgery; who are proficient in English, computer literate and have research skills. They must demonstrate their concern for social commitment, professionalism, leadership and entrepreneurial capability.

In order to be admitted to the Residency in General Surgery of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REC Residency in General Surgery

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4250	General Surgery I	3	0	12	12
ME4252	General Surgery II	3	0	12	12
ME4254	General Surgery III	3	0	12	12
ME4256	General Surgery IV	3	0	12	12
ME4258	General Surgery V	3	0	12	12
ME5302	General Surgery VI	3	0	12	12
ME5304	General Surgery VII	3	0	12	12
ME5306	General Surgery VIII	3	0	12	12
ME5308	General Surgery IX	3	0	12	12
ME5310	General Surgery X	3	0	12	12
		30	0	120	120
Clinical Courses		C	L	U	H
ME4251	Medical Care in General Surgery I	0	60	12	60
ME4253	Medical Care in General Surgery II	0	60	12	60
ME4255	Medical Care in General Surgery III	0	60	12	60
ME4257	Medical Care in General Surgery IV	0	60	12	60
ME4259	Medical Care in General Surgery V	0	60	12	60
ME5303	Medical Care in General Surgery VI	0	60	12	60
ME5305	Medical Care in General Surgery VII	0	60	12	60
ME5307	Medical Care in General Surgery VIII	0	60	12	60
ME5309	Medical Care in General Surgery IX	0	30	6	30
ME5311	Medical Care in General Surgery X	0	30	6	30
		0	540	108	540
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REC Residency in General Surgery Edition 2013 (By Periods)

First Semester		C	L	U	H	
ME4140	Clinical Ethics	1.5	0	6	6	
ME4142	Quality Health Care	1.5	0	6	6	
ME4250	General Surgery I	3	0	12	12	
ME4251	Medical Care in General Surgery I	0	60	12	60	
		6	60	36	84	
Second Semester		C	L	U	H	
ME4141	Health Sciences Education	1.5	0	6	6	
ME4143	Research and Innovation Methods	1.5	0	6	6	
ME4252	General Surgery II	3	0	12	12	
ME4253	Medical Care in General Surgery II	0	60	12	60	
		6	60	36	84	
Third Semester		C	L	U	H	
ME4144	Thesis Project I	3	0	12	12	
ME4254	General Surgery III	3	0	12	12	
ME4255	Medical Care in General Surgery III	0	60	12	60	
		6	60	36	84	
Fourth Semester		C	L	U	H	
ME4256	General Surgery IV	3	0	12	12	
ME4257	Medical Care in General Surgery IV	0	60	12	60	
ME5190	Thesis Project II	3	0	12	12	
		6	60	36	84	
Fifth Semester C		L	U	H		
ME4258	General Surgery V	3	0	12	12	
ME4259	Medical Care in General Surgery V	0	60	12	60	
		3	60	24	72	
Sixth Semester		C	L	U	H	
ME5302	General Surgery VI	3	0	12	12	
ME5303	Medical Care in General Surgery VI	0	60	12	60	
		3	60	24	72	
Seventh Semester		C	L	U	H	
ME5304	General Surgery VII	3	0	12	12	
ME5305	Medical Care in General Surgery VII	0	60	12	60	
		3	60	24	72	
Eighth Semester		C	L	U	H	
ME5306	General Surgery VIII	3	0	12	12	
ME5307	Medical Care in General Surgery VIII	0	60	12	60	
		3	60	24	72	
Ninth Semester		C	L	U	H	
ME5191	Elective Specialty I	0	30	6	30	
ME5308	General Surgery IX	3	0	12	12	
ME5309	Medical Care in General Surgery IX	0	30	6	30	
		3	60	24	72	
Tenth Semester		C	L	U	H	
ME5192	Elective Specialty II	0	30	6	30	
ME5266	Thesis Defense	0	0	1	0	
ME5310	General Surgery X	3	0	12	12	
ME5311	Medical Care in General Surgery X	0	30	6	30	
		3	60	25	72	

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Critical Care Medicine (REE)

General program objectives

The aim of the Residency in Critical Care Medicine of Tecnológico de Monterrey is to train exceptional specialist practitioners who meet the health needs of critical patients, according to the highest quality and safety standards, in public and private settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice.

Critical Care Medicine Residents who graduate from this institution are outstanding leaders locally and internationally, who generate innovation with new diagnostic and therapeutic methodologies and technologies, as well as early disease detection programs in the population under their care.

Learning Outcomes

On completing the program, students will be able to:

- Promote, prevent, diagnose, treat and rehabilitate critical care health issues.
- Practice Critical Care Medicine in public and private healthcare systems.
- Make medical decisions applying clinical reasoning, evidence-based medicine, the use of critical thinking, research methodology and the comprehensive use of statistics.
- Be creative and innovative and handle uncertainty.
- Interact effectively in multidisciplinary teams, in teaching and research activities, and the comprehensive management of a Critical Care Unit.
- Practice as a Critical Care specialists within the framework of Medical Ethics, with responsibility and respect for the dignity of individuals and of

the community where they provide these services.

Research areas

Research has become a strategic activity in ITESM and the School of Medicine. The Critical Care Medicine faculty, together with their students, are working on the following research projects, which are tied to education and the community:

Nutrition and Sepsis. Nutritional therapy in acute pancreatitis. Abdominal catastrophe management. Immunonutrition. Nutritional assessment of the critical patient. Prognostic markers.

Mechanical ventilation. Comparison of two non-conventional ventilation (HFOV vs APRV).

Critical OB/GYN patients. Use of colloids in Preeclampsia/Eclampsia. Use of a management protocol in patients with con preeclampsia to reduce the morbidity/mortality in second-level hospitals.

Target Audience

The Multicentric Critical Care Medicine Program of Tecnológico de Monterrey is aimed at graduates from the Medical Residencies in Internal Medicine, Anesthesiology or Medical-Surgical Emergencies, whose academic performance has been outstanding and who have a vocation for and clear interest in this discipline, a spirit of innovation and commitment to lifelong learning, with a genuine interest in research and teaching.

In order to be admitted to the Residency in Critical Care Medicine of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REE Residency in Critical Care Medicine Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4197	Critical Care Medicine I	3	0	12	12
ME4199	Critical Care Medicine II	3	0	12	12
ME5245	Critical Care Medicine III	3	0	12	12
ME5247	Critical Care Medicine IV	3	0	12	12
		12	0	48	48
Clinical Courses		C	L	U	H
ME4198	Medical Care in Critical Medicine I	0	60	12	60
ME4200	Medical Care in Critical Medicine II	0	60	12	60
ME5246	Medical Care in Critical Medicine III	0	30	6	30
ME5248	Medical Care in Critical Medicine IV	0	30	6	30
		0	180	36	180
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H *Total hours.*

REE Residency in Critical Care Medicine Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4197	Critical Care Medicine I	3	0	12	12
ME4198	Medical Care in Critical Medicine I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4199	Critical Care Medicine II	3	0	12	12
ME4200	Medical Care in Critical Medicine II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME5191	Elective Specialty I	0	30	6	30
ME5245	Critical Care Medicine III	3	0	12	12
ME5246	Medical Care in Critical Medicine III	0	30	6	30
		6	60	36	84
Fourth Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5192	Elective Specialty II	0	30	6	30
ME5247	Critical Care Medicine IV	3	0	12	12
ME5248	Medical Care in Critical Medicine IV	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
		6	60	37	84

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H *Total hours.*

Residency in Obstetrics and Gynecology (REG)

General program objectives

The aim of our Residency in Obstetrics and Gynecology program is to train exceptional Gynecologists who solve the health needs of women, according to the highest quality and safety standards, in hospital and ambulatory settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Gynecologists who graduate from this institution are outstanding leaders locally and internationally. They use ultrasound technology to impact their patients' health positively, by means of timely, accurate diagnoses, and also contribute to generating innovations in the use of and research on surgical techniques and the enhancement of medical and gynecological and obstetric medical treatments, ensuring a reduction in morbidity and mortality rates among the Mexican population.

Learning Outcomes

On completing the program, students will be able to:

- Complete the prevention, diagnosis and treatment of conditions that affect the gynecological and reproductive health of women throughout their life stages, applying their knowledge, abilities and clinical judgment.
- Practice their specialty with integrity, ethics and a humanistic vision, favoring the health of women in their diverse sociocultural settings.
- Collaborate with leadership in multidisciplinary teams, acting as an agent of change for women's comprehensive healthcare.
- Develop the capacity for entrepreneurship, inquiry and innovation, to become not only identifiers of new scientific trends, but also creators of new, useful knowledge that directly benefits society.

Research areas

Maternal-fetal Medicine. Determine the physiopathological, preventive and management conditions of preeclampsia, one of the leading causes of maternal deaths in Mexico. Evaluate the impact of this disease on newborns and find methods to decrease this impact. Research and innovate in new fetal therapy techniques,

aiming to be national leaders in this field. Investigate gestational diabetes, another of the leading causes of maternal-fetal morbidity-mortality in the country, seeking to increase knowledge of the physiopathological conditions and mechanisms of gestational diabetes and the best management strategies.

Child and Adolescent Gynecology. Establish the most common causes of gynecological-endocrine disorders in adolescent women, as well as the incidence, complications and ways of preventing teen pregnancies. Explain aspects related to the use of contraceptives in adolescent women.

Women's Primary Care (Menopause and Obstetrics). Determine relevant aspects of first-contact medical care in women during menopause and during pregnancy in relation to cardiovascular and metabolic diseases, among others. Investigate preventive and medical education aspects.

Reproductive Biology and Minimally-invasive Surgery. Establish the incidence in our community of reproductive diseases, principally endometriosis and polycystic ovarian syndrome, as well as issues related to their diagnosis and treatment, as well as of other reproductive conditions. Investigate aspects related to the best application and results of minimally-invasive surgical techniques.

Oncology. Determine the incidence, management and prevention of malignant diseases in women, its risk factors and best prevention methods.

Target Audience

The Residency in Gynecology and Obstetrics is designed for doctors with an outstanding academic preparation in general medicine who graduated from national and international universities. They must have a basic knowledge of biomedical science; a deep sense of humanity and professionalism with the desire to fulfill the commitment of being agents of change in society; the willingness to receive and generate new knowledge; and the capacity to write and read in English.

In order to be admitted to the Residency in Gynaecology and Obstetrics of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REG Residency in Obstetrics and Gynecology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4266	Fundamentals in Obstetrics and Gynecology I	3	0	12	12
ME4268	Fundamentals in Obstetrics and Gynecology II	3	0	12	12
ME4270	Ambulatory Care in Obstetrics and Gynecology	3	0	12	12
ME4272	Obstetrics and Gynecology Specialties I	3	0	12	12
ME5318	Obstetrics and Gynecology Specialties II	3	0	12	12
ME5320	Obstetrics and Gynecology Specialties III	3	0	12	12
ME5322	Advances in Obstetrics and Gynecology I	3	0	12	12
ME5324	Advances in Obstetrics and Gynecology II	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4267	Medical Care in Obstetrics and Gynecology I	0	60	12	60
ME4269	Medical Care in Obstetrics and Gynecology II	0	60	12	60
ME4271	Medical Care in Obstetrics and Gynecology III	0	60	12	60
ME4273	Medical Care in Obstetrics and Gynecology IV	0	60	12	60
ME5319	Medical Care in Obstetrics and Gynecology V	0	30	6	30
ME5321	Medical Care in Obstetrics and Gynecology VI	0	30	6	30
ME5323	Medical Care in Obstetrics and Gynecology VII	0	60	12	60
ME5325	Medical Care in Obstetrics and Gynecology VIII	0	60	12	60
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REG Residency in Obstetrics and Gynecology Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4266	Fundamentals in Obstetrics and Gynecology I	3	0	12	12
ME4267	Medical Care in Obstetrics and Gynecology I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4268	Fundamentals in Obstetrics and Gynecology II	3	0	12	12
ME4269	Medical Care in Obstetrics and Gynecology II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4270	Ambulatory Care in Obstetrics and Gynecology	3	0	12	12
ME4271	Medical Care in Obstetrics and Gynecology III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME4272	Obstetrics and Gynecology Specialties I	3	0	12	12
ME4273	Medical Care in Obstetrics and Gynecology IV	0	60	12	60
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5318	Obstetrics and Gynecology Specialties II	3	0	12	12
ME5319	Medical Care in Obstetrics and Gynecology V	0	30	6	30
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5320	Obstetrics and Gynecology Specialties III	3	0	12	12
ME5321	Medical Care in Obstetrics and Gynecology VI	0	30	6	30
		3	60	24	72
Seventh Semester		C	L	U	H
ME5322	Advances in Obstetrics and Gynecology I	3	0	12	12
ME5323	Medical Care in Obstetrics and Gynecology VII	0	60	12	60
		3	60	24	72
Eighth Semester		C	L	U	H
ME5266	Thesis Defense	0	0	1	0
ME5324	Advances in Obstetrics and Gynecology II	3	0	12	12
ME5325	Medical Care in Obstetrics and Gynecology VIII	0	60	12	60
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Internal Medicine (REM)

General program objectives

The aim of the Residency in Internal Medicine of Tecnológico de Monterrey is to train exceptional Internists who meet the health needs of adult patients, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Internists who graduate from this institution are outstanding leaders locally and internationally, who contribute to the continuous enhancement of healthcare processes and to generating innovations in the primary or secondary prevention of disorders that affect the adult population, in particular chronic-degenerative diseases.

Learning Outcomes

On completing the program, students will be able to:

- Apply their knowledge of Internal Medicine to diagnose, treat, prevent and rehabilitate health issues in adult patients.
- Keep their knowledge of Internal Medicine and its subspecialties up to date by consulting relevant information sources in order to provide optimal healthcare.
- Formulate significant clinical questions related to their patients' care and resolve them through clinical or bibliographic research.
- Communicate their clinical care and research ideas effectively and clearly, orally and in writing.
- Deliver medical care to patients with professionalism and the highest ethical standards.

Research areas

Chronic Renal Disease. Research on chronic research disease, centered on enhancing the quality

of life of patients and on their treatment. In relation to treatment and given the characteristics of our institution a specific area of interest comprises the results of the diverse treatment approaches, particularly transplants.

Chronic Liver Disease: Hepatic Cirrhosis, Non-alcoholic Steatohepatitis. Research on chronic liver diseases (Hepatic Cirrhosis, Non-alcoholic Steatohepatitis), focusing on gaining a better understanding of these diseases, their risk factors, physiopathological mechanisms and the repercussions of the disease, as well as its possible treatments and relationship with other chronic-degenerative diseases (metabolic syndrome).

Digestive Motility: Reflux Disease, Defecation Disorders. Research and evaluation of diverse diagnostic methods, including the pH meter, pH-impedance, manometry, biopsy and other studies, as well as obstructive constipation and disorders related to incontinence.

Hematological and Infectious Diseases: Biomarkers. Research on biomarkers, their scales and combinations, to identify the risk or severity of different diseases, including clinical, biochemical and molecular markers.

Target Audience

The Multicentric Internal Medicine Program of Tecnológico de Monterrey is aimed at graduates from the undergraduate program in Medicine, whose academic performance has been outstanding and who have a vocation for and clear interest in this discipline, with a genuine interest in research and teaching.

In order to be admitted to the Residency in Critical Care Medicine of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REM Residency in Internal Medicine

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4170	Internal Medicine I	3	0	12	12
ME4172	Internal Medicine II	3	0	12	12
ME4174	Internal Medicine III	3	0	12	12
ME4176	Internal Medicine IV	3	0	12	12
ME5218	Internal Medicine V	3	0	12	12
ME5220	Internal Medicine VI	3	0	12	12
ME5222	Internal Medicine VII	3	0	12	12
ME5224	Internal Medicine Specialties	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4169	Clinical Practice in Internal Medicine I	0	60	12	60
ME4171	Clinical Practice in Internal Medicine II	0	60	12	60
ME4173	Clinical Practice in Internal Medicine III	0	60	12	60
ME4175	Clinical Practice in Internal Medicine IV	0	60	12	60
ME5217	Clinical Practice in Internal Medicine V	0	60	12	60
ME5219	Clinical Practice in Internal Medicine VI	0	60	12	60
ME5221	Clinical Practice in Internal Medicine VII	0	30	6	30
ME5223	Clinical Practice in Internal Medicine Specialties	0	30	6	30
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REM Residency in Internal Medicine

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4169	Clinical Practice in Internal Medicine I	0	60	12	60
ME4170	Internal Medicine I	3	0	12	12
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4171	Clinical Practice in Internal Medicine II	0	60	12	60
ME4172	Internal Medicine II	3	0	12	12
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4173	Clinical Practice in Internal Medicine III	0	60	12	60
ME4174	Internal Medicine III	3	0	12	12
		6	60	36	84
Fourth Semester		C	L	U	H
ME4175	Clinical Practice in Internal Medicine IV	0	60	12	60
ME4176	Internal Medicine IV	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5217	Clinical Practice in Internal Medicine V	0	60	12	60
ME5218	Internal Medicine V	3	0	12	12
		3	60	24	72
Sixth Semester		C	L	U	H
ME5219	Clinical Practice in Internal Medicine VI	0	60	12	60
ME5220	Internal Medicine VI	3	0	12	12
		3	60	24	72
Seventh Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5221	Clinical Practice in Internal Medicine VII	0	30	6	30
ME5222	Internal Medicine VII	3	0	12	12
		3	60	24	72
Eighth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5223	Clinical Practice in Internal Medicine Specialties	0	30	6	30
ME5224	Internal Medicine Specialties	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Pediatrics (REN)

General program objectives

The aim of the Residency in Pediatrics of Tecnológico de Monterrey is to train exceptional Pediatricians who meet the healthcare needs of children and adolescents, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. To prepare pediatricians outstanding leaders in both local and international settings, who contribute to generating innovative medical practices through clinical research, related to attending to the common and complex healthcare problems of the population between the ages of 0 and 21.

Learning Outcomes

On completing the program, students will be able to:

- Apply their knowledge and skills to the attention, prevention and promotion of health in children and adolescents.
- Practice medicine with professionalism and responsibility, committing to the continuous enhancement of pediatrics.
- Participate in the development of medical practices through patient-, student- and colleague-oriented teaching.
- Communicate the results of projects and research to provide possible solutions to pediatric cases.
- Conduct clinical practices in groups of pediatric and multidisciplinary practitioners to share medical experiences.

Research areas

Ambulatory Pediatrics. Research related to infectious diseases, nutrition, accident prevention, mental health, growth and development.

Inpatient Pediatrics. Research related to care quality, patient safety, evidence-based practice and knowledge transfer in the diverse subspecialties.

Medical Education. Research on Educational Innovation, Distance Education, Evidence-based Medicine, applied to training Pediatric specialists.

Target Audience

This program is aimed at all doctors who are interested in acquiring the knowledge, skills and attitudes required to preserve and improve the health of children and adolescents.

They must be committed to their work and self-directed study, with the concern and initiative to solve the serious health issues of children through ongoing progress and updating.

Entrepreneurial doctors who are willing to improve the practice and development of Pediatrics in the environment in which they work.

REN Residency in Pediatrics

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4184	Pediatrics I	3	0	12	12
ME4186	Pediatrics II	3	0	12	12
ME4188	Pediatrics III	3	0	12	12
ME4190	Pediatrics IV	3	0	12	12
ME5232	Pediatrics V	3	0	12	12
ME5234	Pediatrics VI	3	0	12	12
ME5236	Pediatrics VII	3	0	12	12
ME5238	Pediatrics VIII	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4183	Ambulatory and Hospitalized Care in Pediatrics I	0	60	12	60
ME4185	Ambulatory and Hospitalized Care in Pediatrics II	0	60	12	60
ME4187	Ambulatory and Hospitalized Care in Pediatrics III	0	60	12	60
ME4189	Ambulatory and Hospitalized Care in Pediatrics IV	0	60	12	60
ME5231	Ambulatory and Hospitalized Care in Pediatrics V	0	60	12	60
ME5233	Ambulatory and Hospitalized Care in Pediatrics VI	0	60	12	60
ME5235	Ambulatory and Hospitalized Care in Pediatrics VII	0	30	6	30
ME5237	Ambulatory and Hospitalized Care in Pediatrics VIII	0	30	6	30
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REN Residency in Pediatrics

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4183	Ambulatory and Hospitalized Care in Pediatrics I	0	60	12	60
ME4184	Pediatrics I	3	0	12	12
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4185	Ambulatory and Hospitalized Care in Pediatrics II	0	60	12	60
ME4186	Pediatrics II	3	0	12	12
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4187	Ambulatory and Hospitalized Care in Pediatrics III	0	60	12	60
ME4188	Pediatrics III	3	0	12	12
		6	60	36	84
Fourth Semester		C	L	U	H
ME4189	Ambulatory and Hospitalized Care in Pediatrics IV	0	60	12	60
ME4190	Pediatrics IV	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5231	Ambulatory and Hospitalized Care in Pediatrics V	0	60	12	60
ME5232	Pediatrics V	3	0	12	12
		3	60	24	72
Sixth Semester		C	L	U	H
ME5233	Ambulatory and Hospitalized Care in Pediatrics VI	0	60	12	60
ME5234	Pediatrics VI	3	0	12	12
		3	60	24	72
Séptimo Semestre		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5235	Ambulatory and Hospitalized Care in Pediatrics VII	0	30	6	30
ME5236	Pediatrics VII	3	0	12	12
		3	60	24	72
Eighth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5237	Ambulatory and Hospitalized Care in Pediatrics VIII	0	30	6	30
ME5238	Pediatrics VIII	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Ophthalmology (REO)

General program objectives

The aim of the Residency in Ophthalmology of Tecnológico de Monterrey is to train exceptional Ophthalmologists, who care for the visual health and ocular diseases of the population, according to the highest quality and safety standards, in public and private inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook and spirit of service in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Ophthalmologists who graduate from this institution are outstanding leaders in both local and international settings, who contribute to generating innovation in diagnostic and therapeutic methods and techniques, as well as to implementing prevention and early detection programs for ocular diseases that are relevant in the general population.

Learning Outcomes

On completing the program, students will be able to:

- Apply the most up-to-date medical knowledge of Ophthalmology to the comprehensive care of patients with ocular problems, with ethics, professionalism and a humanistic outlook.
- Perform surgical procedures to attend to the principal ophthalmological problems prevailing in the community, such as cataracts, strabismus, refractive surgery and retinal laser surgery, assuring quality care and patient safety.
- Evaluate the ocular, systemic and external conditions of each patient and of the community, to achieve the best ocular and visual health.
- Collaborate in multidisciplinary teams in the prevention and early detection of glaucoma, diabetic retinopathy and visual problems in children, among other ocular diseases.
- Demonstrate interpersonal and communication skills that facilitate the effective exchange of information and good relations with patients and colleagues.

- Contribute to the development of Ophthalmology through the consolidation of research and teaching skills.

Research areas

Medications and eye tissue management. Means of Enrichment and Preservation of Eye Tissue (Cornea and Conjunctiva). Epithelium and Corneal Endothelium Growth and Expansion Drivers. Development of Anti-fungal and Ocular Medications. Development of Low-concentration and Preservative-free Semi-synthetic Steroids. Angiostatic and/or angiogenic factors in corneal and retinal vascularization. Restitution of the External Ocular Surface. Development of diagnostic tools in ocular surface diseases and infectious ocular diseases.

Pediatric ophthalmology. Visual development and amblyopia. Ocular Motility, new surgical procedures and techniques.

Target Audience

The Ophthalmology Program is aimed at graduates from the Medicine and Physical undergraduate program whose academic performance has been outstanding and who have a specific vocation for this specialty. They must display the following characteristics: the capacity to apply an understanding of basic clinical and social sciences as the foundation for their medical practice; clinical skills; diagnostic and therapeutic resource management; health promotion and disease prevention; effective communication, printed and electronic information management; reasoning, clinical judgement and decision making; self-directed learning; fluency in the English language; personal development, incorporation of ethical attitudes and bases; vocation and the capacity for studying.

In order to be admitted to the Residency in Ophthalmology of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REO Residency in Ophthalmology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4220	Fundamentals in Ophthalmology I	3	0	12	12
ME4222	Fundamentals in Ophthalmology II	3	0	12	12
ME4224	Oculoplastic, Pediatric Ophthalmology and Strabismus	3	0	12	12
ME4226	Glaucoma, Anterior Segment and Neurophthalmology	3	0	12	12
ME5273	Cornea, External Diseases and Refractive Surgery	3	0	12	12
ME5275	Retina and Uveitis	3	0	12	12
ME5277	Ophthalmology Specialties	3	0	12	12
ME5279	Diagnostic Procedures in Ophthalmology	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4221	Medical Care and Surgery in Ophthalmology I	0	60	12	60
ME4223	Medical Care and Surgery in Ophthalmology II	0	60	12	60
ME4225	Medical Care and Surgery in Ophthalmology III	0	60	12	60
ME4227	Medical Care and Surgery in Ophthalmology IV	0	60	12	60
ME5274	Medical Care and Surgery in Ophthalmology V	0	60	12	60
ME5276	Medical Care and Surgery in Ophthalmology VI	0	30	6	30
ME5278	Medical Care and Surgery in Ophthalmology VII	0	30	6	30
ME5280	Medical Care and Surgery in Ophthalmology VIII	0	60	12	60
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REO Residency in Ophthalmology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4220	Fundamentals in Ophthalmology I	3	0	12	12
ME4221	Medical Care and Surgery in Ophthalmology I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4222	Fundamentals in Ophthalmology II	3	0	12	12
ME4223	Medical Care and Surgery in Ophthalmology II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4224	Oculoplastic, Pediatric Ophthalmology and Strabismus	3	0	12	12
ME4225	Medical Care and Surgery in Ophthalmology III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME4226	Glaucoma, Anterior Segment and Neurophthalmology	3	0	12	12
ME4227	Medical Care and Surgery in Ophthalmology IV	0	60	12	60
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5273	Cornea, External Diseases and Refractive Surgery	3	0	12	12
ME5274	Medical Care and Surgery in Ophthalmology V	0	60	12	60
		3	60	24	72
Sixth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5275	Retina and Uveitis	3	0	12	12
ME5276	Medical Care and Surgery in Ophthalmology VI	0	30	6	30
		3	60	24	72
Seventh Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5277	Ophthalmology Specialties	3	0	12	12
ME5278	Medical Care and Surgery in Ophthalmology VII	0	30	6	30
		3	60	24	72
Eighth Semester		C	L	U	H
ME5266	Thesis Defense	0	0	1	0
ME5279	Diagnostic Procedures in Ophthalmology	3	0	12	12
ME5280	Medical Care and Surgery in Ophthalmology VIII	0	60	12	60
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Radiology and Imaging (RER)

General program objectives

The aim of the Residency in Radiology and Imaging of Tecnológico de Monterrey is to train exceptional Radiologists, who attend to the health requirements of patients, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Radiologists who graduate from this institution are outstanding leaders in both local and international settings and remain at the forefront of their specialty, generating healthcare models based on research and innovation that enable them to compete in a globalized economy.

Learning Outcomes

On completing the program, students will be able to:

- Recognize the health needs of patients, family members and society in general, as well those of medical and third-party payer institutions.
- Perform their medical practice taking into consideration the risks/benefits, costs/benefits, environmental and legal medical aspects of their professional tasks, within the framework of medical ethics.
- Investigate problems related to their professional practice in multidisciplinary teams and use the findings obtained to solve them.
- Communicate effectively and respectfully with patients, family members and other healthcare professionals.

Research areas

Cardiovascular Radiology and Imaging. Endovascular therapies in occlusive venous diseases. Clinical application of endovascular procedures, such as thrombolysis and the intravascular endoprosthesis in the treatment of occlusive venous diseases. The objective is to apply these procedures, already tested in other territories, to the venal system; evaluate the results and, if they are favorable, offer alternative therapies with a lower morbidity and the costs in occlusive venous diseases.

Oncological Radiology and Imaging. Intra-abdominal Tumors. Magnetic Resonance Diagnosis. Validation of innovative sequences in Magnetic Resonance, to study complex or undetermined intra-abdominal masses. The objective is to obtain new flow algorithms in the presumptive diagnoses and pretreatment of intra-abdominal masses, that are more reliable, safer and less expensive.

Radiological Protection of the Patient. Explore methods and procedures that offer an optimal balance between image quality and the effectiveness of the diagnostic information the radiologist obtains from these images, and the necessary dose of radiation to acquire them. This requires the analysis and application of existing knowledge on the biological effects of ionizing radiations, health exposure risk modeling in diagnostics, the design and physical principles of the functioning of imaging technologies, objective measurement of image quality and diagnostic effectiveness, as well as the measurement of doses in patients. Using a multidisciplinary approach that includes the participation of radiology specialists, this knowledge is used to solve optimization problems that result in practical contributions to enhancing the quality of radiological procedures and maximize patient safety. Some of the specific areas of interest in this research area are: optimization in pediatric and neonatal radiography and fluoroscopy, optimization of protocols in computerized tomography, optimization of radiological procedures in pregnant patients, radiological protection of patients in interventional radiology.

Target Audience

This program is aimed at graduates of the Physician and Surgeon degrees from Mexican and international universities recognized by Tecnológico de Monterrey, whose academic performance is outstanding, who display leadership skills, an interest in serving as educators and researchers, and a psychological profile that can adapt to change and innovation. In order to be admitted to the Residency in Radiology of the School of Medicine and Health Sciences of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RER Residency in Radiology and Imaging

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4205	Radiology and Image I	3	0	12	12
ME4207	Radiology and Image II	1.5	0	6	6
ME4209	Advanced Physics	1.5	0	6	6
ME4210	Radiology and Image III	3	0	12	12
ME4212	Radiology and Image IV	3	0	12	12
ME5258	Radiology and Image V	3	0	12	12
ME5260	Radiology and Image VI	3	0	12	12
ME5262	Radiology and Image VII	3	0	12	12
ME5264	Radiology and Image VIII	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4206	Medical Care in Radiology and Image I	0	60	12	60
ME4208	Medical Care in Radiology and Image II	0	60	12	60
ME4211	Medical Care in Radiology and Image III	0	60	12	60
ME4213	Medical Care in Radiology and Image IV	0	60	12	60
ME5259	Medical Care in Radiology and Image V	0	60	12	60
ME5261	Medical Care in Radiology and Image VI	0	60	12	60
ME5263	Medical Care in Radiology and Image VII	0	30	6	30
ME5265	Medical Care in Radiology and Image VIII	0	30	6	30
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

RER Residency in Radiology and Imaging

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4205	Radiology and Image I	3	0	12	12
ME4206	Medical Care in Radiology and Image I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4207	Radiology and Image II	1.5	0	6	6
ME4208	Medical Care in Radiology and Image II	0	60	12	60
ME4209	Advanced Physics	1.5	0	6	6
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4210	Radiology and Image III	3	0	12	12
ME4211	Medical Care in Radiology and Image III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME4212	Radiology and Image IV	3	0	12	12
ME4213	Medical Care in Radiology and Image IV	0	60	12	60
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5258	Radiology and Image V	3	0	12	12
ME5259	Medical Care in Radiology and Image V	0	60	12	60
		3	60	24	72
Sixth Semester		C	L	U	H
ME5260	Radiology and Image VI	3	0	12	12
ME5261	Medical Care in Radiology and Image VI	0	60	12	60
		3	60	24	72
Seventh Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5262	Radiology and Image VII	3	0	12	12
ME5263	Medical Care in Radiology and Image VII	0	30	6	30
		3	60	24	72
Eighth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5264	Radiology and Image VIII	3	0	12	12
ME5265	Medical Care in Radiology and Image VIII	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Neurology (REU)

General program objectives

The aim of the Residency in Neurology of Tecnológico de Monterrey is to train exceptional Neurologists, who meet the needs of patients with neurological pathologies, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practices, while strictly adhering to ethical principles and the standards of professional practice. Neurologists who graduate from this institution are internationally competitive leaders, who contribute to the generation of knowledge on the frontiers of Neurology and transfer this knowledge through teaching. They are also committed to lifelong learning in medicine.

Learning Outcomes

On completing the program, students will be able to:

- Diagnose, treat and promote the health of patients with neurological diseases in a comprehensive, effective manner on the basis of scientific evidence, using resources appropriately, demonstrating research- and analysis-oriented thought, with knowledge and applications specific to basic and clinical neurological sciences in the face of clinical situations;
- Respect the dignity of human beings and the ethical principles of their profession as neurologists; Effectively coordinate the healthcare team that participates in the clinical, rehabilitation and palliative care of the patient with neurological disorders;
- Apply their knowledge to the planning, design, statistical analysis, discussion, conclusion and publication of clinical studies aimed at assessing diagnostic and therapeutic effectiveness in their specialization;
- Participate in the development of clinical research and basic protocols, particularly in the areas of abnormal movements, neurodegenerative diseases and neoplasia of the central nervous system;
- Communicate their knowledge effectively to patients, family members and medical colleagues, as well as to other healthcare professionals, displaying an attitude of information, listening, caring, compassion and respect toward the patient and his or her family members, including the patient's preference in the formulation of disease management plans and practicing their specialty in a cost efficient manner, without compromising the quality of the care provided.

Research areas

Neurodegenerative diseases. Strategic alliance with the Cellular Therapy and Regenerative Medicine Group of Researchers to create protocols of basic and clinical research in motor-neuron diseases, specifically Amyotrophic Lateral Sclerosis, in the research and search for new alternatives for the non-pharmacological handling of this type of pathology.

Movement disorders. Models for experimenting with dopaminergic stem cell implants in Parkinson models in rats, with the subsequent transfer of findings to clinical studies on patients with Parkinson's disease, in the search for treatment based on cellular substitution therapy.

Neoplasias of the nervous system. Search for major mutations; currently a research project is being carried out with the biggest national bank of glioblastoma multiforme DNA, in order to determine the frequency of mutations and subsequently to compare the results with other populations. This project also involves an analysis of the incidence of brain tumors over the past 10 years in the base hospital, in order to have a reference for basic research and then to transfer it to clinical research into this type of pathology.

Target Audience

The Residency in Neurology program of Tecnológico de Monterrey is aimed at doctors who have a deep sense of social responsibility; are willing to receive new knowledge; have the capacity and the desire to acquire skills to seek knowledge in the area of neurological science and, subsequently, the capacity to generate new knowledge within this branch of neuroscience.

In order to be admitted to the Residency in Neurology of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

REU Residency in Neurology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4214	Neurology I	3	0	12	12
ME4216	Neurology II	3	0	12	12
ME4218	Neurology III	3	0	12	12
ME5267	Neurology IV	3	0	12	12
ME5269	Neurology V	3	0	12	12
ME5271	Neurology VI	3	0	12	12
		18	0	72	72
Clinical Courses		C	L	U	H
ME4215	Medical Care in Neurology I	0	60	12	60
ME4217	Medical Care in Neurology II	0	60	12	60
ME4219	Medical Care in Neurology III	0	60	12	60
ME5268	Medical Care in Neurology IV	0	60	12	60
ME5270	Medical Care in Neurology V	0	30	6	30
ME5272	Medical Care in Neurology VI	0	30	6	30
		0	300	60	300
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

REU Residency in Neurology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4214	Neurology I	3	0	12	12
ME4215	Medical Care in Neurology I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4216	Neurology II	3	0	12	12
ME4217	Medical Care in Neurology II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4218	Neurology III	3	0	12	12
ME4219	Medical Care in Neurology III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5267	Neurology IV	3	0	12	12
ME5268	Medical Care in Neurology IV	0	60	12	60
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5269	Neurology V	3	0	12	12
ME5270	Medical Care in Neurology V	0	30	6	30
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
ME5271	Neurology VI	3	0	12	12
ME5272	Medical Care in Neurology VI	0	30	6	30
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Geriatrics (RGE)

General program objectives

The principal aim of the Residency in Geriatrics of Tecnológico de Monterrey is to train exceptional Geriatricians who meet the healthcare needs of the elderly, according to the highest quality and safety standards, in inpatient, outpatient and prolonged-care settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Geriatricians who graduate from this institution are outstanding leaders in both local and international settings, and contribute to designing strategies and generating innovations to solve problems related to the health of the elderly.

Learning Outcomes

On completing the program, students will be able to:

- Develop geriatric care models for institutional and private environments, based on the human being and the social and family environment, within the framework of medical ethics;
- Coordinate the actions of interdisciplinary healthcare teams for the medical and gerontological care of their patients, constantly seeking to improve their quality of life;
- Conduct clinical research projects in geriatrics;
- Provide the highest quality healthcare based on state-of-the-art geriatrics within a framework of ethics and professionalism;
- Educate healthcare personnel and the community on the attention and care of elderly patients.

Research areas

Fragility, transitional states and their determinants. Validation of diagnostic methodologies for fragility and the study of the intermediate states between strength and fragility, in order to determine who will tend to become more fragile, as well as the study of the determinants of fragility: nutrition, physical activity, physical condition, sarcopenia, comorbidity, allostatic load, mental problems and support networks. The final objective is to identify a series of actions that would prevent and/or revert the process of fragilization.

Altered cognoscitive state, determinants and consequences. Validation of screening and diagnostic tests for cognoscitive problems in our population across the different educational strata (from those who are unable to read to those with maximum levels of education), identification of modifiable risk factors in our population and the observation of the response to the modification of the said risk factors, as well as the determination of the individual, family and social consequences of cognoscitive disorders. The final objective is to identify a series of actions that would prevent and minimize the consequences of different cognitive disorders.

Target Audience

This program is aimed at general doctors who have a deep social commitment and an interest in providing quality care for senior citizens from a holistic perspective, identifying the patient as the protagonist of this care.

In order to be admitted to the Residency in Geriatrics of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RGE Residency in Geriatrics

Edition 2013 (By Areas)

Core Course		C	L	U	H
ME4170	Internal Medicine I	3	0	12	12
ME4172	Internal Medicine II	3	0	12	12
ME4174	Internal Medicine III	3	0	12	12
ME4176	Internal Medicine IV	3	0	12	12
ME5249	Geriatrics and Gerontology I	3	0	12	12
ME5251	Geriatrics and Gerontology II	3	0	12	12
ME5253	Geriatrics and Gerontology III	3	0	12	12
ME5255	Geriatrics and Gerontology IV	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4201	Medical Care in Geriatrics and Gerontology I	0	60	12	60
ME4202	Medical Care in Geriatrics and Gerontology II	0	60	12	60
ME4203	Medical Care in Geriatrics and Gerontology III	0	60	12	60
ME4204	Medical Care in Geriatrics and Gerontology IV	0	60	12	60
ME5250	Medical Care in Geriatrics and Gerontology V	0	60	12	60
ME5252	Medical Care in Geriatrics and Gerontology VI	0	30	6	30
ME5254	Medical Care in Geriatrics and Gerontology VII	0	60	12	60
ME5257	Medical Care in Geriatrics and Gerontology VIII	0	30	6	30
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

RGE Residency in Geriatrics

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4170	Internal Medicine I	3	0	12	12
ME4201	Medical Care in Geriatrics and Gerontology I	0	60	12	60
		4.5	60	30	78
Second Semester		C	L	U	H
ME4142	Quality Health Care	1.5	0	6	6
ME4172	Internal Medicine II	3	0	12	12
ME4202	Medical Care in Geriatrics and Gerontology II	0	60	12	60
		4.5	60	30	78
Third Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4174	Internal Medicine III	3	0	12	12
ME4203	Medical Care in Geriatrics and Gerontology III	0	60	12	60
		4.5	60	30	78
Fourth Semester		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4176	Internal Medicine IV	3	0	12	12
ME4204	Medical Care in Geriatrics and Gerontology IV	0	60	12	60
		4.5	60	30	78
Fifth Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME5249	Geriatrics and Gerontology I	3	0	12	12
ME5250	Medical Care in Geriatrics and Gerontology V	0	60	12	60
		6	60	36	84
Sixth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5251	Geriatrics and Gerontology II	3	0	12	12
ME5252	Medical Care in Geriatrics and Gerontology VI	0	30	6	30
		3	60	24	72
Seventh Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5253	Geriatrics and Gerontology III	3	0	12	12
ME5254	Medical Care in Geriatrics and Gerontology VII	0	60	12	60
		6	60	36	84
Eighth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5255	Geriatrics and Gerontology IV	3	0	12	12
ME5257	Medical Care in Geriatrics and Gerontology VIII	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Neonatology (RNE)

General program objectives

The aim of the Residency in Neonatology of Tecnológico de Monterrey is to train exceptional Neonatologists who are experts in the healthcare of newborns, meeting the highest standards of quality and patient safety, in public and private healthcare institutions. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Neonatologists who graduate from this institution are outstanding leaders able to execute superior work in national and international settings. They are committed to the development and transformation of their communities through programs and actions to enhance the healthcare of newborns. They are creative and innovative, contributing to the generation and practice of clinical research that impacts the health of newborns.

Learning Outcomes

On completing the program, students will be able to:

- Assess, diagnose and care for the health of newborns in critical, medical or surgical conditions, with integrity, responsibility and a sense of humanity;
- Be competent in the evaluation, diagnosis, monitoring and treatment techniques used in the clinical care of the newborn in critical, medical or surgical conditions;
- Identify the psychosocial implications of disease in their patients, as well as the repercussions on the family environment and/or that of substitute caregivers;
- Identify high-risk pregnancies and their subsequent repercussions on the birth process and pathologies in the newborn, and undertake the clinical supervision and monitoring of these patients;
- Make the best use of their patients databases as a guide for making the necessary clinical decisions and understanding the administrative procedures that expedite neonatal medical care;
- Apply and transfer knowledge of the basic medical disciplines in relation to the pregnancy process, the fetus and the newborn;
- Conduct clinical research in their field of specialization and communicate the findings efficiently, both orally and in writing.

Research areas:

Molecular Biology, Oxidative Damage and Bio-protection; Generation and application of knowledge focused on the study of phenomena related to the oxidative stress involved in human pathologies at the perinatal stage;

Biomarkers in Perinatal Medicine; Generation and application of knowledge focused on the study of possible protein and molecular markers with the potential to be diagnostic tools for pathologies of the perinatal stage;

Pharmacology in Perinatal Medicine; Generation and application of knowledge focused on the study of the pharmacokinetics of the different medications used in the treatment of sicknesses in the newborn and the possible variations associated with genetic polymorphism;

Epidemiology in Perinatal Medicine; Generation and application of knowledge focused on the study and epidemiological characterization of different sicknesses of the newborn;

Bioethics in Perinatal Medicine; and the Application of knowledge focused on the study of, and reflection on, the ethical dilemmas that occur on a daily basis in the specialty area.

Target Audience

This program is aimed at Pediatricians with the knowledge, skills, attitudes and values expected of a specialist in Pediatrics, whose academic performance is outstanding and who displays a vocation for and interest in Neonatology, with a genuine conviction for conducting research and who demonstrates fluency in conversational English.

In order to be admitted to the Residency in Neonatology of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RNE Residency in Neonatology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4192	Neonatology I	3	0	12	12
ME4194	Neonatology II	3	0	12	12
ME4196	Neonatology III	3	0	12	12
ME5240	Neonatology IV	3	0	12	12
ME5242	Neonatology V	3	0	12	12
ME5244	Neonatology VI	3	0	12	12
		18	0	72	72
Clinical Courses		C	L	U	H
ME4191	Medical Care in Neonatology I	0	60	12	60
ME4193	Medical Care in Neonatology II	0	60	12	60
ME4195	Medical Care in Neonatology III	0	60	12	60
ME5239	Medical Care in Neonatology IV	0	60	12	60
ME5241	Medical Care in Neonatology V	0	30	6	30
ME5243	Medical Care in Neonatology VI	0	30	6	30
		0	300	60	300
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H *Total hours.*

RNE Residency in Neonatology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4191	Medical Care in Neonatology I	0	60	12	60
ME4192	Neonatology I	3	0	12	12
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4193	Medical Care in Neonatology II	0	60	12	60
ME4194	Neonatology II	3	0	12	12
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4195	Medical Care in Neonatology III	0	60	12	60
ME4196	Neonatology III	3	0	12	12
		6	60	36	84
Fourth Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5239	Medical Care in Neonatology IV	0	60	12	60
ME5240	Neonatology IV	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5241	Medical Care in Neonatology V	0	30	6	30
ME5242	Neonatology V	3	0	12	12
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5243	Medical Care in Neonatology VI	0	30	6	30
ME5244	Neonatology VI	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Pediatric Neurology (RNP)

General program objectives

The principal aim of the Residency in Pediatric Neurology of Tecnológico de Monterrey is to train exceptional Pediatric Neurologists, who meet the healthcare needs of children and adolescents with neurological disorders, according to the highest quality and safety standards, in public and private healthcare institutions. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Pediatric Neurologists who graduate from this institution are outstanding leaders in both local and international settings; they contribute to the development and transfer of knowledge in their specialty, through publications and active participation in academic and professional forums; and they collaborate with the training of specialists in this discipline through teaching and continuing education activities.

Learning Outcomes

On completing the program, students will be able to:

- Plan, coordinate and execute, based on science and with a humanistic orientation, the comprehensive care of children and adolescents with neurological disorders;
- Act as a consultant to other specialists or general practitioners and, after a full, appropriate evaluation of their patient, immediately request the collaboration of other specialists if necessary;
- Design, implement or collaborate in educational programs aimed at their own professional development, the healthcare team to which they belong, and the patients and their family members;
- Apply the scientific method when researching problems in their professional practice and use the findings obtained to solve them.

Research areas

Epilepsy; retrospective, prospective, transversal and comparative studies on epilepsy;

Pervasive developmental disorders; retrospective, prospective, transversal and comparative studies on pervasive developmental disorders (autism, Asperger).

Target Audience

The Residency in Pediatric Neurology of Tecnológico de Monterrey is aimed at graduates from the residency in pediatrics, whose academic performance is outstanding and who have a vocation for and interest in the discipline, research and teaching, and who are committed to lifelong learning.

In order to be admitted to the Residency in Pediatric Neurology of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RNP Residency in Pediatric Neurology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4260	Pediatric Neurology I	3	0	12	12
ME4262	Pediatric Neurology II	3	0	12	12
ME4264	Pediatric Neurology III	3	0	12	12
ME5312	Pediatric Neurology IV	3	0	12	12
ME5314	Pediatric Neurology V	3	0	12	12
ME5316	Pediatric Neurology VI	3	0	12	12
		18	0	72	72
Clinical Courses		C	L	U	H
ME4261	Medical Care in Pediatric Neurology I	0	60	12	60
ME4263	Medical Care in Pediatric Neurology II	0	60	12	60
ME4265	Medical Care in Pediatric Neurology III	0	60	12	60
ME5313	Medical Care in Pediatric Neurology IV	0	60	12	60
ME5315	Medical Care in Pediatric Neurology V	0	30	6	30
ME5317	Medical Care in Pediatric Neurology VI	0	30	6	30
		0	300	60	300
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H *Total hours.*

RNP Residency in Pediatric Neurology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4260	Pediatric Neurology I	3	0	12	12
ME4261	Medical Care in Pediatric Neurology I	0	60	12	60
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4262	Pediatric Neurology II	3	0	12	12
ME4263	Medical Care in Pediatric Neurology II	0	60	12	60
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4264	Pediatric Neurology III	3	0	12	12
ME4265	Medical Care in Pediatric Neurology III	0	60	12	60
		6	60	36	84
Fourth Semester		C	L	U	H
ME5190	Thesis Project II	3	0	12	12
ME5312	Pediatric Neurology IV	3	0	12	12
ME5313	Medical Care in Pediatric Neurology IV	0	60	12	60
		6	60	36	84
Fifth Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5314	Pediatric Neurology V	3	0	12	12
ME5315	Medical Care in Pediatric Neurology V	0	30	6	30
		3	60	24	72
Sixth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5266	Thesis Defense	0	0	1	0
ME5316	Pediatric Neurology VI	3	0	12	12
ME5317	Medical Care in Pediatric Neurology VI	0	30	6	30
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H *Total hours.*

Residency in Psychiatry (RPS)

General program objectives

The aim of the Residency in Psychiatry of Tecnológico de Monterrey is to train exceptional psychiatrists who successfully meet the healthcare needs of mental health patients in the public and private sectors. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research activities, while strictly adhering to ethical principles and the standards of professional practice. Psychiatrists who graduate from this institution are outstanding leaders in both local and international settings. They are creative and innovative, promoting the development of mental health in the community and conducting relevant clinical research.

Learning Outcomes

On completing the program, students will be able to:

- Proficiency in psychopathology, psychiatric nosology and psychiatric treatment methods; the ability to define, apply, perform and interpret diverse psychiatric diagnostic tests and therapeutic methodologies;
- Proficiency in each of the basic learning units related to the specialty, including psychopathology, neuroanatomy and neurophysiology, psychopharmacology, psychotherapies, diagnostic and treatment methodologies, and basic knowledge related to psychiatric subspecialties (children and adolescents, the elderly, addictions, eating disorders, and the oncological patient);
- The capacity to manage administrative issues, quality control and development of a mental health system (from the consulting room to the clinic), planning, organizing, coordinating and supervising the activities of the professional technical and auxiliary staff of a mental health system;
- The capacity to collaborate with practitioners from other specialties to establish the diagnosis, prognosis and treatment of patients, as well

as the required preventive measures; the ability to carry out teaching and research activities applied to psychiatry;

- Decision-making skills based on ethical principles, responsibility, professionalism and citizenship.

Research areas

Migrants. Psycho-social and psycho-pathological aspects in relation to the migratory travel of Central Americans without official papers through Mexico are being studied.

Psychodermatosis. Psycho-social, personality and psycho-pathological aspects related to the diseases psoriasis, acne and atopic dermatitis are being studied. University performance.

Psycho-pathological aspects related to student performance in universities are being studied, particularly the psychopathological problems related to poor student performance in students who are passed to the PAA academic support program of Tecnológico de Monterrey, Monterrey Campus.

Target Audience

This program is aimed at doctors who have a vocation for studying Psychiatry; display the highest moral values; are committed to the ethical practice of their profession; are willing to work in multidisciplinary teams; and display an interest in the field of research.

In order to be admitted to the Residency in Psychiatry of Tecnológico de Monterrey, applicants must satisfactorily meet the graduate admission requirements stipulated by ITESM and the Mexican Ministry of Health.

RPS Residency in Psychiatry

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4146	Psychiatry I	3	0	12	12
ME4148	Psychiatry II	3	0	12	12
ME4150	Psychiatry III	3	0	12	12
ME4152	Psychiatry IV	3	0	12	12
ME5194	Psychiatry V	3	0	12	12
ME5196	Psychiatry VI	3	0	12	12
ME5198	Psychiatry VII	3	0	12	12
ME5200	Psychiatry VIII	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4145	Medical Care in Psychiatry I	0	60	12	60
ME4147	Medical Care in Psychiatry II	0	60	12	60
ME4149	Medical Care in Psychiatry III	0	60	12	60
ME4151	Medical Care in Psychiatry IV	0	60	12	60
ME5193	Medical Care in Psychiatry V	0	60	12	60
ME5195	Medical Care in Psychiatry VI	0	60	12	60
ME5197	Medical Care in Psychiatry VII	0	30	6	30
ME5199	Medical Care in Psychiatry VIII	0	30	6	30
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

RPS Residency in Psychiatry

Editon 2013 (By Periods)

First Semester		C	L	U	H	
ME4140	Clinical Ethics	1.5	0	6	6	
ME4145	Medical Care in Psychiatry I	0	60	12	60	
ME4146	Psychiatry I	3	0	12	12	
		4.5	60	30	78	
Second Semester		C	L	U	H	
ME4141	Health Sciences Education	1.5	0	6	6	
ME4147	Medical Care in Psychiatry II	0	60	12	60	
ME4148	Psychiatry II	3	0	12	12	
		4.5	60	30	78	
Third Semester		C	L	U	H	
ME4142	Quality Health Care	1.5	0	6	6	
ME4149	Medical Care in Psychiatry III	0	60	12	60	
ME4150	Psychiatry III	3	0	12	12	
		4.5	60	30	78	
Fourth Semester		C	L	U	H	
ME4143	Research and Innovation Methods	1.5	0	6	6	
ME4151	Medical Care in Psychiatry IV	0	60	12	60	
ME4152	Psychiatry IV	3	0	12	12	
		4.5	60	30	78	
Fifth Semester C		L	U	H		
ME4144	Thesis Project I	3	0	12	12	
ME5193	Medical Care in Psychiatry V	0	60	12	60	
ME5194	Psychiatry V	3	0	12	12	
		6	60	36	84	
Sixth Semester		C	L	U	H	
ME5190	Thesis Project II	3	0	12	12	
ME5195	Medical Care in Psychiatry VI	0	60	12	60	
ME5196	Psychiatry VI	3	0	12	12	
		6	60	36	84	
Seventh Semester		C	L	U	H	
ME5191	Elective Specialty I	0	30	6	30	
ME5197	Medical Care in Psychiatry VII	0	30	6	30	
ME5198	Psychiatry VII	3	0	12	12	
		3	60	24	72	
Eighth Semester		C	L	U	H	
ME5192	Elective Specialty II	0	30	6	30	
ME5199	Medical Care in Psychiatry VIII	0	30	6	30	
ME5200	Psychiatry VIII	3	0	12	12	
ME5266	Thesis Defense	0	0	1	0	
		3	60	25	72	

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

Residency in Urology (RUR)

General program objectives

The aims of the Residency in Urology of Tecnológico de Monterrey are to train exceptional urologists who meet the needs of patients with urological disorders, according to the highest quality and safety standards, in both inpatient and outpatient settings. It also seeks to prepare individuals with integrity and a humanistic outlook in their clinical, teaching and research practice, while strictly adhering to ethical principles and the standards of professional practice. Urologists who graduate from this institution are nationally and internationally competitive leaders who head the development of preventive action strategies, cost-effective diagnostic strategies, and innovative, successful treatments, in public and private institutions.

Learning Outcomes

On completing the program, students will be able to:

- Deliver medical and surgical care for patients with urological disorders, with professionalism and in compliance with ethical principles;
- Apply their knowledge of urology, clinical judgment and the bases of contemporary scientific evidence for medical decision making;
- Communicate knowledge of this specialty effectively to patients, family members, medical colleagues and other healthcare professionals;
- Manage inpatient clinical information by integrating scientific files that will have a positive impact on healthcare in urology.

Research areas

Urology-Oncology. Clinical research into prostate, kidney and testicular cancer.

Target Audience

The Multicentric Urology Program of Tecnológico de Monterrey is aimed at graduates from the bachelor's degree in Medicine, whose academic performance is outstanding; who are innate leaders with the capacity for growth and discovery of new frontiers in themselves, in medicine and in their profession; with a spirit of innovation and commitment to lifelong learning, hard work on a daily basis, and the strength to constantly provide top-quality care; with a genuine interest in the pursuit of research and teaching.

RUR Residency in Urology

Edition 2013 (By Areas)

Core Courses		C	L	U	H
ME4162	General Urology I	3	0	12	12
ME4164	General Urology II	3	0	12	12
ME4166	General Urology III	3	0	12	12
ME4168	General Urology IV	3	0	12	12
ME5210	General Urology V	3	0	12	12
ME5212	General Urology VI	3	0	12	12
ME5214	General Urology VII	3	0	12	12
ME5216	General Urology VIII	3	0	12	12
		24	0	96	96
Clinical Courses		C	L	U	H
ME4161	Medical Care in Urology I	0	60	12	60
ME4163	Medical Care in Urology II	0	60	12	60
ME4165	Medical Care in Urology III	0	60	12	60
ME4167	Medical Care in Urology IV	0	60	12	60
ME5209	Medical Care in Urology V	0	60	12	60
ME5211	Medical Care in Urology VI	0	60	12	60
ME5213	Medical Care in Urology VII	0	30	6	30
ME5215	Medical Care in Urology VIII	0	30	6	30
		0	420	84	420
Research Courses		C	L	U	H
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4144	Thesis Project I	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		7.5	0	31	30
Basic Courses		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4141	Health Sciences Education	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
		4.5	0	18	18
Elective Courses		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5192	Elective Specialty II	0	30	6	30
		0	60	12	60

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.

RUR Residency in Urology

Edition 2013 (By Periods)

First Semester		C	L	U	H
ME4140	Clinical Ethics	1.5	0	6	6
ME4142	Quality Health Care	1.5	0	6	6
ME4161	Medical Care in Urology I	0	60	12	60
ME4162	General Urology I	3	0	12	12
		6	60	36	84
Second Semester		C	L	U	H
ME4141	Health Sciences Education	1.5	0	6	6
ME4143	Research and Innovation Methods	1.5	0	6	6
ME4163	Medical Care in Urology II	0	60	12	60
ME4164	General Urology II	3	0	12	12
		6	60	36	84
Third Semester		C	L	U	H
ME4144	Thesis Project I	3	0	12	12
ME4165	Medical Care in Urology III	0	60	12	60
ME4166	General Urology III	3	0	12	12
		6	60	36	84
Fourth Semester		C	L	U	H
ME4167	Medical Care in Urology IV	0	60	12	60
ME4168	General Urology IV	3	0	12	12
ME5190	Thesis Project II	3	0	12	12
		6	60	36	84
Fifth Semester		C	L	U	H
ME5209	Medical Care in Urology V	0	60	12	60
ME5210	General Urology V	3	0	12	12
		3	60	24	72
Sixth Semester		C	L	U	H
ME5211	Medical Care in Urology VI	0	60	12	60
ME5212	General Urology VI	3	0	12	12
		3	60	24	72
Seventh Semester		C	L	U	H
ME5191	Elective Specialty I	0	30	6	30
ME5213	Medical Care in Urology VII	0	30	6	30
ME5214	General Urology VII	3	0	12	12
		3	60	24	72
Eighth Semester		C	L	U	H
ME5192	Elective Specialty II	0	30	6	30
ME5215	Medical Care in Urology VIII	0	30	6	30
ME5216	General Urology VIII	3	0	12	12
ME5266	Thesis Defense	0	0	1	0
		3	60	25	72

C Number of class hours per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

H Total hours.



Business Administration and Finance

Master's Degree Profiles and Curricula

Master in Finance (MAF)

General program objectives

The general objective of the Master in Finance is to prepare professionals:

- Business leaders specialized in finance who generate value in organizations by formulating innovative financial strategies and applying them in business settings that are characteristically globalized, uncertain and complex.
- Internationally competitive and capable of interacting in multicultural organizations, negotiating in globalized market settings and making appropriate financial decisions through the combination of knowledge, application of advanced financial methodologies and intensive use of technology to increase the value of the company by optimizing its resources.
- Act according to the highest ethical standards of the profession and are socially responsible by making decisions that, apart from generating economic benefits, contribute to the sustainable development of their communities.

Learning outcomes

On completing the program, students will be able to:

- Analyze business information and, consistent with its relevance, detect opportunities and threats for organizations that compete in globalized markets.
- Use technology intensively as a means of improving their work and employing the company's resources more efficiently.
- Generate innovative financial models that add value to organizations and consider uncertain and complex competitive environments.
- Formulate and apply innovative financial strategies in the organization, considering business processes in globalized markets.
- Interact effectively and efficiently in multicultural organizations that operate in globalized settings.

Target audience

This program targets professionals who are working in:

- The accounting and finance departments of medium-sized and large enterprise in the manufacturing and service sectors.
- Companies in the financial sector.
- National and international official institutions related to the financial sector.

MAF Master in Finance

Edition 2015

Remedial Trimester		C	L	U
EC4018	Strategic Economics for Finance	1.5	0	6
FZ4012	Managerial Analysis for Financial Information	1.5	0	6
FZ4013	Statistical Foundations for Finance	1.5	0	6
MA4018	Mathematical Foundations for Finance	1.5	0	6
		6	0	24
First Trimester		C	L	U
EC4009	Financial Econometrics	3.5	0	12
FZ4014	Macrofinance	3.5	0	12
FZ4015	International Financial Analysis	3.5	0	12
		10.5	0	36
Second Trimester		C	L	U
FZ4016	Asset Valuation	3.5	0	12
FZ5037	Financial Modeling	3.5	0	12
FZ5038	Modern Corporate Finance	3.5	0	12
		10.5	0	36
Third Trimester		C	L	U
FZ5039	Investments	3.5	0	12
FZ5040	Derivatives and Risk Management	3.5	0	12
OP5053	Elective I	3.5	0	12
		10.5	0	36
Fourth Trimester		C	L	U
AD5103	Negotiation Skills	1.5	0	6
CR5000	Communication Skills	1.5	0	6
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
		10	0	36
Fifth Trimester		C	L	U
AD4027	Corporate Governance and Ethics	1.5	0	6
DS4005	Corporate Sustainability	1.5	0	6
FZ5004	Finance Project	3.5	0	12
		3.5	0	12

-
- C Number of class hour per week
 - L Number of laboratory hours or activities per week
 - U Study hours that must be dedicated to the course (class hours included)

Master in Business Administration (MBA)

General program objectives

The objective of the Master in Business Administration is to prepare professionals that:

- Manage organizations that operate in global environments, making effective and ethical decisions supported in cutting-edge techniques and management models.
- Lead strategic projects that add value to the organization and its local, national and international environment, applying leadership skills, systemic understanding of the organization and global vision.
- Identify opportunity areas in business environment and, accordingly, design and develop innovative and sustainable business models applying analytical and financial tools.
- Contribute to the economic, social and environmental development of their community through innovative and sustainable projects.

Learning Outcomes

On completing the program, students will be able to:

- Make business decisions based on ethical reasoning, applying concepts and ethical principles and taking their stakeholders into consideration.
- Identify and evaluate opportunities that allow them to innovate and undertake profitable business models using analytical techniques that contribute to sustainable development of their communities.
- Apply knowledge and skills for effective systemic functioning of the organization, through the application of management methodologies to explore opportunities and adaptation of environmental challenges.
- Lead effective teams, valuing diversity and being competent in management processes that enable the implementation of organizational changes
- Strengthen a global vision of business to function in international environments incorporat-

ing the cultural, political, economic and social context.

Target audience

Applicants are professionals with at least three years of professional experience and are interested in one of the following criteria for their professional development profile:

- Occupy leadership positions with organizational growth opportunities, considering as important the systematic understanding of the organization and the use of methodologies to support the decision making process.
- Experienced professionals with interest in developing innovative business models, seeking to increase the competitiveness of the company or create new business through the knowledge application, use of tools and cutting-edge management models.
- With work experience who wish to develop and/or strengthen consulting skills to support continuous improvement, competitiveness and sustainability of organizations in the region through the application of diagnostic methodologies generating innovative and effective solutions.
- With leadership potential showing passion for learning, critical thinking and professional growth to impact value creation in organizations, using leadership skills and knowledge, techniques and effective management tools.

MBA Master in Business Administration

Edition 2009

Remedial Courses (1)		C	L	U
AD4001	Statistical Analysis in Organizations	3.5	0	12
AD4002	Economic Environment for the Organization	3.5	0	12
FZ4000	Introduction to Financial Information for Decision Making	3.5	0	12
		10.5	0	36
Quality Development Course		C	L	U
OP4036	Quality Development Course	3.5	0	12
		3.5	0	12
Basic Courses		C	L	U
CD4000	Operations Management	3.5	0	12
EC4005	Managerial Economics	3.5	0	12
FZ4001	Corporate Finance	3.5	0	12
MT4001	Marketing Management	3.5	0	12
RH4000	Leadership and Organizational Behavior	3.5	0	12
		17.5	0	60
Core Courses		C	L	U
AD4004	Competitive Strategy and Business Design	3.5	0	12
AD4005	Entrepreneurship and Intrapreneurship	3.5	0	12
AD5000	Negotiations and Decisions in Multicultural Environments	3.5	0	12
AD5001	Seminar in Transnational Management and Corporate Strategy	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48

(1) The faculty of the academic program, through the director, establishes appropriate criteria for accreditation.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

MBA in Global Business Administration and Strategy (MBA-G)

General program objectives

The Master in Business Administration, Concentration in Global Business Strategy, is a double degree program between the EGADE Business School of Tecnológico de Monterrey and The Belk College of Business Administration at The University of North Carolina at Charlotte. The MBA-GBS is a lock-step program and the courses are offered in English. The objective of the Master in Business Administration is to prepare professionals for:

- Direct organizational change and transformation processes.
- Generate sustainable value for the organization in the context of diverse countries and regions.
- Design and implement solutions to complex problems with analytical methods, displaying commitment, leadership, determination, a sense of duty and ethical reasoning, complemented by the use of new technologies.
- Think with creativity and innovation, this is reflected in the exposition of new ideas and knowledge, expanding the vision, leadership perspective and exposure to a multicultural setting in order to develop a collaborative work environment.
- Leadership positions in global, complex organizations with the visionary, integrative, transformative and humanitarian outlook of individuals who can interact with specialists from all of the company's functional areas to define business strategies that help to create competitive advantages.
- Apply and promote teamwork, generating interdisciplinary work, and developing their capacity for strategic thinking in order to understand the organization's systems and the industry as a whole.

Learning outcomes

The MBA program is conceptualized as a conversion program, to give a new direction to the professional careers of students with the knowledge

and skills necessary to be successful in global business environments.

On completing the program, students will be able to:

- Act with ethical reasoning
- Design sustainable business models.
- Act in accordance with ethics and sustainable development.
- Manage new information technologies with expertise.
- Apply and promote interdisciplinary and collaborative work.
- Identify new business opportunities in order to transform their own reality and/or that of their company.
- Generate sustainable solutions to business issues through the integration of knowledge, skills, attitudes and values.
- Communicate effectively.

Learning Outcomes

The MBA program is conceptualized as a conversion program, to give a new direction to the professional careers of students with the knowledge and skills necessary to be successful in global business environments.

- On completing the program, students will be able to:
- Act with ethical reasoning
- Design sustainable business models.
- Act in accordance with ethics and sustainable development.
- Manage new information technologies with expertise.
- Apply and promote interdisciplinary and collaborative work.
- Identify new business opportunities in order to transform their own reality and/or that of their company.
- Generate sustainable solutions to business issues through the integration of knowledge, skills, attitudes and values.
- Communicate effectively.

MBA-G MBA in Global Business Administration and Strategy

Edition 2009

Remedial Courses (1)		C	L	U
AD4001	Statistical Analysis in Organizations	3.5	0	12
AD4002	Economic Environment for the Organization	3.5	0	12
FZ4000	Introduction to Financial Information for Decision Making	3.5	0	12
		10.5	0	36
Quality Development Courses		C	L	U
OP4036	Quality Development Course	3.5	0	12
		3.5	0	12
Basic Courses		C	L	U
CD4000	Operations Management	3.5	0	12
EC4005	Managerial Economics	3.5	0	12
FZ4001	Corporate Finance	3.5	0	12
MT4001	Marketing Management	3.5	0	12
RH4000	Leadership and Organizational Behavior	3.5	0	12
		17.5	0	60
Core Courses		C	L	U
AD4004	Competitive Strategy and Business Design	3.5	0	12
AD4005	Entrepreneurship and Intrapreneurship	3.5	0	12
AD5000	Negotiations and Decisions in Multicultural Environments	3.5	0	12
AD5001	Seminar in Transnational Management and Corporate Strategy	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48

(1) The accreditation of the Remedial courses may be credits based on the candidate career.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Business Administration Executive Program (MBE)

General program objectives

The overall objective of the Executive MBA is to prepare professionals to:

- Be successful in managerial position in multinational companies.
- Identify business opportunities.
- Design and implement innovative business processes and/or models.
- Create sustainable wealth through their own company.

Learning outcomes

On completing the program, students will be able to:

- Establish the vision, management and allocation of resources and infrastructure, in order to meet the new demands of a global economy.
- Act as an agent of organizational change in traditional companies that wish to access international markets.
- Compete internationally and possess a solid conceptual grounding and practical knowledge of the reality of the best way to do business in national and international contexts.

MBE Master in Business Administration Executive Program Edition 2002

Remedial Course		C	L	U
GA4025	Fundamental Administrative Environment	2	0	8
		2	0	8
Fundamental Courses		C	L	U
GA4027	Analytical Tools for Decision Making and Macroeconomics for Managers	3	0	11
GA4028	Leadership, Organization and Change	2	0	8
GA4029	Global Operations Management	2	0	8
GA4030	General Management and Strategy	1	0	5
GA4032	Financial & Managerial Accounting	2	0	10
GA4033	Corporate Finance	3	0	12
GA4034	Advanced Marketing Strategy	2	0	10
GA4035	Micro and Strategic Economics	2	0	9
		17	0	73
Specialty Advanced Courses		C	L	U
GA5026	Strategic Thinking and Change	3	0	11
GA5027	Ethics and Business Environment	3	0	13
GA5028	International Finance and Strategic Technology	2	0	9
		8	0	33
International Learning Module		C	L	U
GA4026	Global Business Environment	3	0	6
GA4031	Logistics and Sustainability	3	0	6
GA5025	Globalization of Finance and Cultural Marketing	3	0	6
GA5029	Adaptation to Dynamic Business Environments	3	0	6
		12	0	24

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Business Administration (MDE)

General program objectives

The overall objective of the Master of Business Administration is to prepare professionals to:

- Be successful in managerial position in multinational companies.
- Identify business opportunities.
- Design and implement innovative business processes and/or models.
- Create sustainable wealth through their own company.
- Consolidate competencies in the functional areas of the organization.
- Understand the role they play in the political, economic and social responsibility dimensions in a global setting.
- Improve the individual and group performance of the people.

Learning outcomes

- Leadership role in organizations.

MDE Master in Business Administration

Edition 2009

Enterprise Organization and Businesses		C	L	U
CD96302	Managerial Data and Decision Analysis	3	0	12
CD96303	Operations Management	3	0	12
OR96205	Strategic Management	3	0	12
OR96206	Topics in the Legal Environment	3	0	12
OR96207	Corporate Diversification and Renewal	3	0	12
OR96208	Emerging Issues in Global Management	3	0	12
RH96301	Interpersonal Behavior in Organizations	3	0	12
		21	0	84
Accounting and Finances		C	L	U
CF96300	Financial Accounting Issues	3	0	12
CF96301	Managerial Accounting	3	0	12
EC96300	Managerial Microeconomics	3	0	12
FZ96302	Case Problems in Financial Management	3	0	12
FZ96303	Applications of Investment Theory	3	0	12
		15	0	60
Marketing and Technologies of Information		C	L	U
MT96306	Advanced Marketing Management	3	0	12
SI96300	Information Technology	3	0	12
		6	0	24

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Humanities and Social Science

Master's Degree Profiles and Curricula

Master in Public Administration and Public Policy (MAP)

General program objectives

It is now evident that for the development of any State worldwide, institutions that are truly effective in determining and solving its citizens' problems are indispensable. Therefore, a country's development depends largely on whether or not it has the strategic and administrative capacity to implement public policies that will contribute to the full social, political and economic coexistence of the diverse actors that participate in the formation of a State.

Considering this, the aim of this master's program is to prepare responsible, analytical and rigorous world-class leaders in public policy analysis, design, implementation and evaluation in the different levels and areas of government. In this sense, the Master in Public Administration and Public Policy contributes to the generation of experts, whose critical thinking enables them to pinpoint public issues, in a diversity of levels and settings, and propose solutions, using analytical schemes, approaches and methodologies with the highest scientific rigor.

Learning outcomes

On completing the program, students will be able to:

- Use analytical tools and methodologies for designing, implementing and evaluating public policies with the highest possible technical requirements
- Design structural reforms and drive institutional change processes.
- Commit to generating, designing, implementing, managing, defending and upholding responsible public policies Understand and use analytical frameworks in formulating and evaluating public policy, as well as rigorous empirical analyses in public policy applications.
- Significantly influence the decision-making process that affects public policies.

Target Audience

- Mid- and upper-level federal, state and municipal public officials.
- Individuals who are interested in participating in elected office positions in federal, state and municipal governments.
- Individuals who are interested in non-elective positions in federal, state and municipal public administrations.
- Professionals involved in analyzing government actions.
- Political party leaders and officials.
- Private-sector professionals seeking to improve their proficiency in government-enterprise relations management.
- Students and specialists who want to improve their analytical skills and capacities for making decisions on public policy issues.

MAP Master in Public Administration and Public Policy

Edition 2009

Quality Development Courses		C	L	U
NB4001	Leadership and Ethics in the Exercise of Public Service	3	0	12
		3	0	12
Basic Courses		C	L	U
NB4002	Civil Society and Government	3	0	12
NB4003	Political System and Public Administration in Mexico	3	0	12
NB4004	Quantitative Methods Applied to Social Sciences	3	0	12
		9	0	36
Core Courses		C	L	U
AP4001	Public Policy Analysis	3	0	12
AP4003	Macroeconomics and Public Policy	3	0	6
AP4004	Qualitative Methods	3	0	6
AP4005	Strategic Management of Public Organization	3	0	12
AP4006	Economics for Public Policy	3	0	12
		15	0	48
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Courses		C	L	U
AP5001	Applied Research Project	3	0	12
		3	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in International Law (MDI)

General program objectives:

The practice of law has become increasingly global. Law professionals need to speak diverse legal languages to communicate with clients and colleagues from other latitudes when carrying out complex business transactions or participating in conflict resolution involving parties in different jurisdictions in the world. The aim of the program is to prepare globally competitive law professionals who can speak and understand diverse languages.

Learning outcomes

On completing the program, students will be able to:

- Perform legal analyses of international issues.
- Interpret the diverse existing national and international regulations, applying the comparative law method.
- Participate in strategic decision making and formulating contracts and other transnational transactions.
- Perform law-related international political and administrative activities.
- Comprehend Mexico's role in the new international context.

Target Audience

- Graduates from Law, Economics, International Relations, International Commerce and Political Science degrees, who are interested in international transactions and their governing laws.
- Lawyers from public institutions and private enterprise.
- Specialists in international logistics and imports and exports.
- Partners or associates in consulting offices or firms.
- Company executives involved in international transactions.
- Mid- and upper-level federal, state and municipal public officials.
- Individuals who are interested in serving in international organizations.
- Legal advisors and analysts.
- Private-sector professionals seeking to improve their proficiency in government-enterprise relations management.
- Professors related to the area of Law.

MDI Master in International Law

Edition 2009

Quality Development Course		C	L	U
NB4001	Leadership and Ethics in the Exercise of Public Service	3	0	12
		3	0	12
Basic Course		C	L	U
NB4005	Legal Research and Writing in English	3	0	12
		3	0	12
Core Courses		C	L	U
DI4021	International Regulation of Trade	3	0	12
DI4022	Principles of International Public Law and Conflicts Resolution	3	0	12
DI4023	International Law of Human Rights	3	0	12
DI4024	International Contractual Law	3	0	12
DI4025	International Arbitration and Litigation	3	0	12
DI4026	Advanced Topics of International Law	3	0	12
		18	0	72
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Course		C	L	U
DI5001	Applied Research Project	3	0	12
		3	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Humanistics Studies (MEH)

General program objectives

The new world order and democratic society require a strong, proactive, committed and articulate civil society, in which a dialogue can be held among the diversity of voices, mentalities and stances. Therefore, the program's objective is to educate social subjects who are committed to an analytical vision drawn from the bases of philosophy and who adopt interpretive methodologies that enable them to analyze their own and others' discourse clearly.

Learning outcomes

On completing the program, students will be able to:

- Design an innovative response to educational demands in the areas of History, Ethics, Literature and Discourse, and Science and Culture.
- Manage humanistic projects in public and private institutions.
- Be a social subject with the necessary critical judgment to participate in the construction of possible solutions to human issues, such as poverty, war and environmental deterioration.
- Direct the implementation of codes of ethics in the academic, public, business and government arenas.
- Include respect and tolerance for differences in codes of ethics.
- Problematize current moral action, reflect on it, interpret and legitimize rationally another moral action proposal so as not to neglect its purposes and functions of safeguarding social wellbeing, equity and justice.
- Instrument community-oriented projects that go beyond economic and personal fulfillment interests.
- Complete consulting projects in the public, private and academic sectors, as well as in civil society, on topics related to organizational ethics, the growth and professionalization of civil society, public policy, and science and technology, among others.
- Explore and/or formulate proposals for consideration with a view to achieving a critical understanding of the present-day reality and in the areas of specialization offered by the program.
- Offer an innovative teaching response to educational demands in the areas of Ethics, History, Literature and Discourse, and Science and Culture.

Target Audience

This program is intended for:

- Public- and private-sector human resource managers.
- Academics and teachers within the humanistic area.
- CEOs who wish to expand and renew their company's social responsibility constantly.
- Consultants, strategists and politicians who are committed to constructing a national project with the purest, most updated knowledge of humanity, philosophy, ethics, and world and Mexican literature and history.
- Experts in the organizational climates of companies.
- Company executives who wish to recover the humanistic dimension in an environment that favors production and productivity.
- Young people who are interested in research and in developing the capacity to explore and/or put forward reflective proposals, in order to attain a critical understanding of the current reality and in the specialization areas offered by the program.
- NGO leaders and collaborators who promote the understanding of humans in relation to technological and productive processes.
- Humanists who seek to reconsider their paradigm from new perspectives.
- Humanists who promote a transdisciplinary exchange and wish to practice, within an academic framework, the reality they must face outside this context.

MEH Master in Humanistics Studies

Edition 2009

Quality Development Course		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Core Courses		C	L	U
OP4002	Basic Course I	3	0	12
OP4003	Basic Course II	3	0	12
OP4004	Basic Course III	3	0	12
OP4005	Basic Course IV	3	0	12
OP4018	Basic Course V	3	0	12
		15	0	60
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
		12	0	48
Research Courses		C	L	U
H4012	Research Methods	3	0	12
H5022	Research Seminar	3	0	12
		6	0	24

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Prospective and Strategic Studies (MPE)

General program objectives

This program aims to prepare responsible leaders with a global, interdisciplinary outlook, capable of making strategic prospective decisions, by designing scenarios that will enable them to keep ahead of future social, economic, political technological, cultural and environmental change.

Learning outcomes

On completing the program, students will be able to:

- Influence decision making that models the future of public, private and civil society organizations and institutions.
- Analyze the local, national and/or international economic and sociopolitical environment within a framework of prospective and strategic reflection, with the aim of planning ahead for the future and influencing decision making.
- Advise business, government and civil society agencies on planning and decision-making processes.
- Improve the strategic project planning and management processes in public, private and civic institutions.
- Contrast the major global and national trends, reflecting on the factors of change.
- Use time series prediction through the analysis of quantitative forecasts.
- Formulate scenarios, strategies, policies and decision-making processes through the dynamic modeling of complex phenomena.
- Identify trends, opportunities and threats for technological innovations.
- Explore possible futures for land in relation to its comparative advantages, endogenous weaknesses, key actors and catalyst projects.
- Conceptualize environmental management based on the association and participation of actors in sustainability.
- Analyze strategic situations regarding interdependence in the decision process among sever-

- al agents within the framework of game theory.
- Identify resolution factors of disputes in public policy and of conflicts between diverse actors on private, public and civil scales.

Target Audience

The program is designed for:

- People who are involved in strategic business planning, leadership and innovation processes.
- Public administrators involved in the planning processes of municipal, state and federal administrations or departments.
- Consultants and strategists engaged in public- and private-sector planning processes.
- Analysts of industrial- and/or service-sector perspectives in regional and global settings.
- Company executives who wish to enhance their decision-making processes.

MPE Master in Prospective and Strategic Studies

Edition 2009

Quality Development Course		C	L	U
NB4001	Leadership and Ethics in the Exercise of Public Service	3	0	12
		3	0	12
Basic Courses		C	L	U
RE4000	Introduction to Strategic Prospective	3	0	12
RE4010	Global Vision and World Trends	3	0	12
		6	0	24
Core Courses		C	L	U
RE4011	Prospective Methods	3	0	12
RE4012	Strategic Planning	3	0	12
RE4013	Forecast Methods for Time Series	3	0	12
RE4014	Scenario Modeling	3	0	12
		12	0	48
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Courses		C	L	U
MP4000	Research Qualitative Methods	3	0	12
RE5001	Applied Research Project	3	0	12
		6	0	24

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Transnational Legal Practice (MPJ)

General program objectives

Law-related education should train professionals to compete in a global environment. Latin America's proximity to the United States of America creates the need to understand the bases of American law, as well as to comprehend and handle international law topics. The vast diversity of topics encompassed in contemporary international law, which derive from globalization processes, require a solid preparation with a transnational-focused legal education as its core. Therefore, this program is designed for professionals who:

- Are legal experts in international organizations.
- Are international law consultants in the USA and Latin American countries.
- Serve as international arbitrators for dispute resolution.
- Lead complex legal transactions in public and private settings.

Learning outcomes

On completing their studies, graduates will be able to:

- Participate in solving transnational legal disputes as an arbitrator or litigator.
- Understand diverse legal systems and traditions.
- Lead negotiations in key international law issues.
- Be fluent in legal English.
- Litigate complex cases in transnational settings.
- Lead legal processes against international organizations.

Target Audience

The program is designed for professionals who work as:

- Practicing independent lawyers who have earned an undergraduate degree in Law in Mexico and Latin America.
- Lawyers from public institutions and private enterprise.
- Partners or associates in consulting offices and firms.
- Company executives involved in international transactions.
- Mid- and upper-level federal, state and municipal public officials.
- Legal advisers and analysts.

MPJ Master in Transnational Legal Practice Edition 2014

Quality Development Course		C	L	U
DI4032	Leadership and Ethics in the Public Service	6	0	24
		6	0	24
Basic Courses		L	U	
DI4029	Civil Procedure in the United States of America	6	0	24
DI4030	Contracts in the United States of America	6	0	24
DI4031	International Contractual Law	6	0	24
		18	0	72
Core Courses		L	U	
DI5007	Professional Responsibility	6	0	24
DI5008	Negotiation	4	0	16
DI5009	Regulation of International Trade and Investment	6	0	24
		16	0	64
Elective Courses		L	U	
OP5081	Elective I	6	0	24
OP5082	Elective II	6	0	24
OP5083	Elective III	6	0	24
OP5084	Elective IV	6	0	24
		24	0	96
Cursos de Integrador		C	L	U
DI5010	International Arbitration and Litigation	6	0	24
		6	0	24

-
- C Number of class hour per week
 - L Number of laboratory hours or activities per week
 - U Study hours that must be dedicated to the course (class hours included)



Engineering

Master's Degree Profiles and Curricula

Master of Science in Biotechnology (MBI)

General program objectives

The program's objective is to educate professionals who will practice in the agricultural, health and industrial sectors, incorporating biotechnological techniques into the production and manufacture of satisfiers; who are committed to their communities, on social, ethical and economic levels; aware of the need to create new sustainable technologies; and with an outstanding entrepreneurial and innovative spirit.

Learning outcomes

On completing the program, students will be able to:

- Work in the areas of new biotechnological product and process research and development.
- Serve in academic or business settings, participating actively in the development of biotechnological processes at laboratory level and their implementation at industrial level, thus acquiring a competitive advantage in the professional environment.

Target Audience

This master's degree is designed for graduates from areas related to biology, agronomy, chemistry, biochemistry, food industries, medicine and biochemical engineering, among others.

MBI Master of Science in Biotechnology

Edition 2009

Quality Development Courses		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Courses		C	L	U
IN5058	Design and Analysis of Experiments	3	0	12
		3	0	12
Core Courses		C	L	U
BT4004	Instrumental Analysis in Biotechnology	3	0	12
BT4005	Cell Biology and Physiology	3	0	12
BT5005	Selected Topics in Biotechnology	3	0	12
BT5006	Genetic Engineering	3	0	12
		12	0	48
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
		12	0	48
Research Courses		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
GI5007	Thesis I	3	0	12
GI5008	Thesis II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Engineering and Construction Management (MCP)

General program objectives

The aim of this master's program is to prepare specialized professionals who have the capacity to found and maintain companies in the construction and real-estate sector, and also solve industry-related problems in an innovative, ethical and sustainable manner, through the efficient use of computer tools and information technologies.

Construction management specialists will be able to direct construction and real estate projects and companies, in both the public and private sectors. Specialists in structures will be able to direct structural engineering projects and companies with high-performance designs.

Learning outcomes

On completing the program, students will be able to:

- Design solutions for problems in the construction industry, integrating innovation, quality, sustainability and information technologies, as well as formulating business plans that drive the economy of the construction sector.
- Students with specialization in construction management will be able to design, plan and manage technological innovation projects and to manage the technical-commercial cycle of real-estate and construction projects.
- Students with specialization in structural engineering will be able to design high-performance structures using modern computer tools to simulate their behavior and employing the most appropriate construction materials.

Target Audience

This program targets professionals who graduated from majors in civil engineering and architecture. Although work experience is not a requirement, it is highly recommended, in particular for the area of construction management. For the high-performance materials and structures track, architecture graduates will need to complete remedial courses.

MCP Master in Engineering and Construction Management

Edition 2012

Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Course		C	L	U
OP4006	Elective Course I	3	0	12
		3	0	12
Core Courses		C	L	U
CV4001	Innovation Management in Construction	3	0	12
CV5000	Information Technology for Engineering	3	0	12
		6	0	24
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
OP5046	Elective V	3	0	12
		15	0	60
Integrating Courses		C	L	U
CV5019	Research Project I	1.5	0	6
CV5020	Research Project II	1.5	0	6
CV5021	Research Project III	1.5	0	6
		4.5	0	18

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Engineering Management (MEM)

General program objectives

The aim of the Master in Management Engineering is to develop leaders and project managers, specialists in their area of expertise.

Learning outcomes

During the duration of the program students will have the opportunity not only to interact with distinguished professors in the specialty areas of the program, and also have extensive experience in solving engineering problems in industry, but also to interact with students from different areas of expertise, who work or have worked in small or multinational companies from different regions of the country. This interaction is one of the great strengths of this master's program. This program is designed to give students the necessary preparation and to make a person a leader in their engineering professional skills.

It is expected that after a few years of practice, a graduate of this program will have achievements such as:

- Having led high impact engineering projects
- Being leader of technical or engineering area of multinational companies
- Having led consulting projects in administration and management of engineering projects in their area of specialty

In addition, after graduation of the program students will be able to:

- Demonstrate and use a high level of theoretical and methodological knowledge of engineering management solution for engineering projects.
- Analyze, manage and lead improvement processes that can be applied to areas such as information technology, process optimization, statistical engineering, supply

chain, logistics, among others.

- Communicate results of their professional work in a clear, effective and efficient manner.
- Work in the professional community of their area of expertise with leadership, in an efficient, collaborative and ethical manner.

Target Audience

The Master of Engineering Management is directed to graduates of a bachelor degree in science or engineering, who have a keen interest in the development of engineering skills in project management and key business processes in management technology or entrepreneurship. Similarly, it is aimed at future technological leaders in industrial management, high technology management, R & D or business management with high technology and start-up companies.

Likewise, this program is aimed at professionals in engineering who require, in their work areas, identify critical issues, generate solutions, evaluate alternatives, make decisions, and implement actions, leading multidisciplinary teams.

MEM Master in Engineering Management

Edition 2016

First Trimester		C	L	U
IN4029	Engineering Project Management	3.5	0	12
IN4030	Financial Analysis for Innovation and Technology Projects	1.5	0	6
IN5111	Project Design I	1.5	0	6
OP4036	Quality Development Course	3.5	0	12
		1.5	0	6
Second Trimester		C	L	U
IN4028	Statistical Methods and Visualization	3.5	0	12
IN4031	Economic Analysis for Business	1.5	0	6
IN4032	Risk Analysis Project Management	1.5	0	6
IN4033	Innovation and Product Development	1.5	0	6
IN5112	Project Design II	1.5	0	6
		9.5	0	36
Third Trimester		C	L	U
IN4034	Legal Aspects in Managing Engineering	1.5	0	6
IN5121	Business Innovation Project I	2	0	6
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
		10.5	0	36
Fourth Trimester		C	L	U
IN5122	Business Innovation Project II	2	0	6
IN5123	Business Innovation Project III	2	0	6
IN5124	Business Innovation Project IV	2	0	6
IN5125	Business Innovation Project V	2	0	6
OP5055	Elective III	3.5	0	12
		11.5	0	36
Fifth Trimester		C	L	U
N5126	Business Innovation Project VI	2	0	6
IN5127	Business Innovation Project VII	2	0	6
OP5056	Elective IV	3.5	0	12
		7.5	0	24

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- C Number of class hour per week
 - L Number of laboratory hours or activities per week
 - U Study hours that must be dedicated to the course (class hours included)

Master of Science in Energetic Engineering (MIE)

General program objectives

- To prepare highly qualified professionals in relevant topics for the conversion, transmission, distribution, storage, conservation and efficient use of energy, including clean and renewable sources.
- To develop professionals with capacities in the technical aspects of the area and motivated to keep up to date permanently in order to resolve current problems and apply engineering to any problems that might arise in the future.
- To train professionals who are interested in applied research and technological development activities, solving relevant problems in the field of energy by means of courses with up-to-date content and a strategic vision of the evolution of energy-related technologies.

Learning outcomes

On completing the program, students will be able to:

- Solve problems related to the efficient use of energy in relation to both thermal and electrical engineering.
- Evaluate the different alternative sources of energy and assure the proper management of energy resources needed to achieve sustainable development.
- Understand the impacts produced by energy-sector technologies on the environment.
- Explore promising new alternatives in the area of energy, considering economic limitations and current regulations, and with an awareness of the country's sustainable development requirements.

Target Audience

Energy Engineers, Chemical Engineers, Electrical Engineers, Mechanical Engineers or Physics Engineers. In special cases, students from other areas of engineering can be admitted if they can demonstrate sufficient knowledge or otherwise are willing to study additional courses.

MIE Master of Science in Energetic Engineering

Edition 2009

Quality Development Courses		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Courses		C	L	U
OP4006	Elective Course I	3	0	12
OP4007	Elective Course II	3	0	12
		6	0	24
Core Courses		C	L	U
TE4010	Efficient Use of Electric Energy	3	0	12
TE4011	Cogeneration and Alternate Sources of Energy	3	0	12
TE4012	Regulations and Financing of Energy Resources	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
		12	0	48
Research Courses		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
GI5007	Thesis I	3	0	12
GI5008	Thesis II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Engineering with specialization in Quality Systems and Productivity(MIP)

General program objectives

- To develop highly specialized talent, capable of designing, implementing and leading high-impact initiatives in the generation of added value in the operations of a manufacturing and/or service organization.
- To train experts who organize the participation of the human resource an use, and even create, new approaches in administrative and social sciences that enhance quality and comprehensive productivity in manufacturing and service organizations. They will also promote the strategic, efficient participation of organizational and technological resources.
- To prepare professionals who contribute to their company's competitiveness and innovation in terms of market share growth, increase in earnings before taxes, decrease in costs and improvement in user perception.
- To prepare leaders who will apply new methodologies, and comprehensively improve existing systems as well as the enhancement and innovation processes of a company's productive systems in order to drive its competitiveness.

Learning outcomes

On completing the program, students will be able to:

- Design, evaluate and improve management systems for the service and production areas, on the basis of the principles and philosophies of quality, innovation and competitiveness.
- Design, execute and evaluate experimental processes that generate tangible solutions for operational optimization.
- Design, evaluate and improve production systems, on the basis of contemporary production and manufacturing principles and philosophies, supported by the use of statistical and process optimization tools
- Design rules, procedures and methodologies for the efficient integration of the supply chain.
- Integrate the participation of the human resource as a key component in the operation of organizational management and production processes, as well as the efficient administration of organizational and technological resources.

Target Audience

Graduates from the Bachelor of Arts or Bachelor of Science degrees who are familiar with probability and statistics and operations research. If they do not meet these requirements, candidates can complete remedial courses.

MIP Master in Engineering with specialization in Quality Systems and Productivity

Edition 2013

Quality Development Courses		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Basic Courses		C	L	U
OP4006	Elective Course I	3	0	12
OP4007	Elective Course II	3	0	12
		6	0	24
Core Courses		C	L	U
IN4017	Production Engineering	3	0	12
IN4018	Supply Chain Management	3	0	12
IN4019	Quality Management and Competitiveness	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Reserach Courses		C	L	U
GI5010	Research and Innovation Methods	3	0	12
		3	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Automotive Engineering (MIR)

General program objectives

- Prepare leaders in the design and enhancement of automotive systems, contributing to the technological development in the mechanical aspects of design and manufacturing, electronics and automotive vehicle power systems.
- Train professionals who carry out engineering and research projects that lead to the development of technology and/or knowledge in the areas of automotive engineering.
- Through the development of its graduates, drive the creation of service, manufacturing or technical consulting businesses related to the automotive industry.
- Train professionals who are in a position to successfully complete subsequent studies in specific areas of knowledge in relation to mechanical design, advanced manufacturing, electronics and power systems.

Learning outcomes

On completing the program, students will be able to:

- Develop multidisciplinary engineering projects to solve industrial problems through the generation, integration or innovation of technologies in the areas of automotive design and manufacturing, vehicle instrumentation systems, production media optimization and performance in vehicle power systems.
- Participate actively in industrial or research work in collaborative national and international networks.
- Design strategies and processes focused on increasing the competitiveness of existing companies by optimizing production systems, instrumentation, logistics and product lifecycles.

Target Audience

This program is designed for mechanical, mechatronics, electronic and industrial engineers.

MIR Master in Automotive Engineering

Edition 2009

Remedial Course		C	L	U
M1002	Computer Drawing	2	2	8
		2	2	8
Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Course		C	L	U
OP4006	Elective Course I	3	0	12
		3	0	12
Core Courses		C	L	U
M4008	Product Design	3	0	12
M4011	Internal Combustion Engines	3	1	12
TE4001	Instrumentation	3	0	12
		9	1	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
OP5046	Elective V	3	0	12
		15	0	60
Integrating Courses		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
M5047	Integration Project I	3	0	12
M5048	Integration Project II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Manufacturing Systems (MMS)

General program objectives

To train professionals for industry, who, as agents of change, will be capable of technological development, innovation and technology transfer, in new product, manufacturing materials and productive process design settings.

Learning outcomes

On completing the program, students will be able to:

- Consolidate companies' competitiveness through the development and integration of design and manufacturing technology in order to increase productivity, enhance quality, reduce costs and ensure their reliability.
- Plan, manage and execute technological development projects in the area of high added-value product design and manufacturing, taking into consideration their technical, economic and social impact.
- Independently update their knowledge in order to continue to be an agent of technological change and development in the manufacturing industry.

Target Audience

This program is aimed at engineers from all disciplines. Given its interdisciplinary nature, for the development and technological enhancement of manufacturing systems, the interaction of multiple areas of knowledge is required.

MMS Master in Manufacturing Systems

Edition 2009

Remedial Courses		C	L	U
M1002	Computer Drawing	2	2	8
M2006	Mechanics of Materials I	3	1	8
M2010	Materials Behavior	3	1	8
		8	4	24
Quality Development Courses		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Courses		C	L	U
OP4006	Elective Course I	3	0	12
		3	0	12
Core Courses		C	L	U
M4008	Product Design	3	0	12
M4009	Advanced Materials in Manufacturing	3	1	12
M4010	Automation in Manufacturing Systems	3	1	12
		9	2	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
OP5046	Elective V	3	0	12
		15	0	60
Research Courses		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
M5047	Integration Project I	3	0	12
M5048	Integration Project II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Manufacturing Systems (MNT)

General program objectives

Train professionals for industry and academia, who, as agents of change, be able to do applied research, technological development, innovation, and technology transfer in the areas of nanotechnology.

Learning outcomes

At the end of the program students will be able to:

- Demonstrate a high level of theoretical and methodological knowledge of Nanotechnology in any professional situation.
- Perform research in their area of expertise to provide knowledge relevant to the advancement of nanotechnology.
- Communicate their professional work results in a clear, effective and efficient manner.
- Work in their professional community of their area of expertise with efficient leadership, collaborative and ethical manner.

Target Audience

The master's program in Nanotechnology is aimed at professionals in areas of engineering and natural sciences mainly interested in conducting high-impact research to contribute to the knowledge of any of the specialty areas of Nanotechnology. Students entering this program should have excellent academic background, vocation in the generation of knowledge, fluency of communication, working professionally under strict ethical standards who are open to new ways of assimilation of knowledge and professional practice and intellectually curious.

MNT Master in Manufacturing Systems

Edition 2016

First Semestre		C	L	U
F4002	Computer Simulations	3	0	12
GI5000	Research and Innovation Methods	1.5	0	6
MA4007	Partial Differential Equations	3	0	12
OP4000	Quality Development Course	1.5	0	6
		9	0	36
Second Semestre		C	L	U
MA4009	Statistical Methods	3	0	12
NT5011	Thesis I	3	0	12
Q4001	Thermodynamics of Materials	3	0	12
		9	0	36
Third Semestre		C	L	U
NT5012	Thesis II	3	0	12
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
		9	0	36
Fourth Semestre		C	L	U
NT5013	Thesis III	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
		9	0	36

-
- C Number of class hour per week
 - L Number of laboratory hours or activities per week
 - U Study hours that must be dedicated to the course (class hours included)

Master of Science in Manufacturing System (MSM)

General program objectives

The objective of this program is to train professionals for industry, who, as agents of change, will be capable of technological development, innovation and technology transfer, in new product, manufacturing materials and productive process design settings.

Learning outcomes

On completing the program, students will be able to:

- Consolidate companies' competitiveness through the development and integration of design and manufacturing technology in order to increase productivity, enhance quality, reduce costs and ensure their reliability.
- Plan, manage and execute technological development projects in the area of high added-value product design and manufacturing, taking into consideration their technical, economic and social impact.
- Interact with national and international multidisciplinary working groups for research, development and innovation in relation to new products and manufacturing processes.
- Independently update their knowledge in order to continue to be an agent of technological change and development in the manufacturing industry.

Target Audience

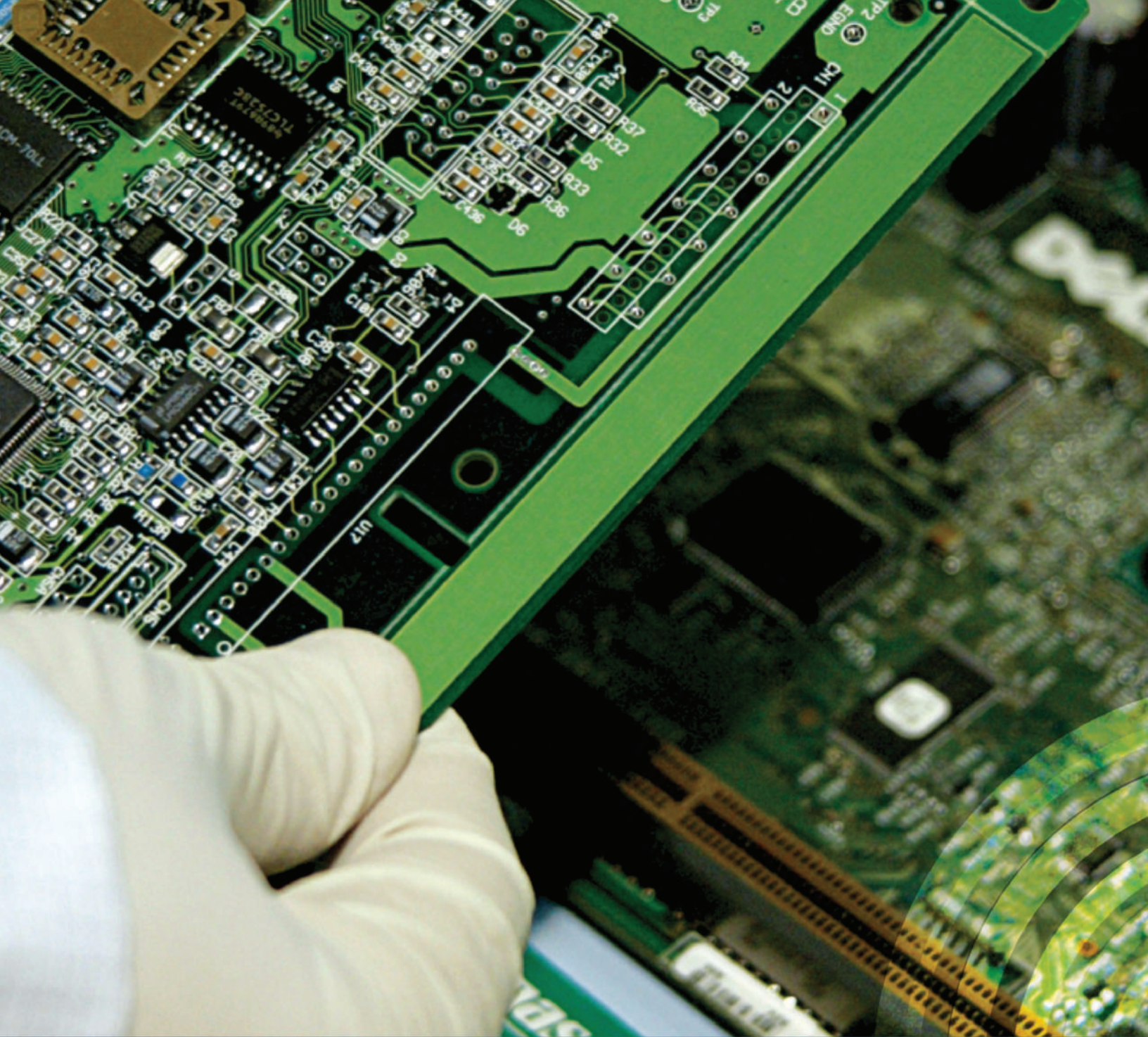
This program is aimed at engineers from all disciplines. Given its interdisciplinary nature, for the development and technological enhancement of manufacturing systems, the interaction of multiple areas of knowledge is required.

MSM Master of Science in Manufacturing System Edition 2009

Remedial Courses		C	L	U
M1002	Computer Drawing	2	2	8
M2010	Materials Behavior	3	1	8
M4000	Analysis and Synthesis of Mechanical Systems	3	0	12
		8	3	28
Quality Development Courses		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Courses		C	L	U
OP4006	Elective Course I	3	0	12
		3	0	12
Core Courses		C	L	U
M4008	Product Design	3	0	12
M4009	Advanced Materials in Manufacturing	3	1	12
M4010	Automation in Manufacturing Systems	3	1	12
		9	2	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
OP5046	Elective V	3	0	12
		15	0	60
Research Courses		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
GI5007	Thesis I	3	0	12
GI5008	Thesis II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Information Technologies and Electronics

Master's Degree Profiles and Curricula

Master of Science in Computer Science (MCC)

General program objectives

- To prepare successful Computer Science specialists who will contribute to solving problems in productive and/or research settings.
- To prepare leaders who will act as agents of change in their field of work.
- To prepare innovative, entrepreneurial professionals who generate patents, products and technology-based companies.

Learning outcomes

On completing the program, students will be able to:

- Be literate in cutting-edge computer science technologies and methodologies.
- Fulfill lifelong self-directed learning and adapt to new environments.
- Generate scientific-practical computer science research projects in multidisciplinary teams.
- Depending on the selected area of specialization, students will also be able to:
- Analyze, model and develop computer systems that have the capacity to represent real agents in virtual worlds. They will be experts in creating computer images applied to the entertainment, modeling, videogame and exploration industries, among others.
- Develop intelligent computer systems that can be used to solve diverse problems, such as: process optimization, intelligent data searches, and the development of control, diagnostic and monitoring.
- Analyze, model, design and maintain computer networks, using state-of-the-art technologies. They will be experts in the design and exploitation of distributed systems, high-performance computing and security.
- Design, develop and evaluate software for industries, using modern software development methodologies and advanced programming languages.

Target Audience

Computer scientists, consultants, instructors or researchers who wish to deepen or update their knowledge of the theory and techniques of this field.

Professionals from related areas (electronics, electricity, communications, mathematics, and physics, among others, who can demonstrate they have the basic knowledge required for the successful completion of this program) who wish to complement their education with studies in the area of computer science.

MCC Master of Science in Computer Science

Edition 2009

Remedial Course		C	L	U
TC4000	Programming Techniques	3	0	12
		3	0	12
Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Core Courses		C	L	U
IA4000	Intelligent Systems	3	0	12
TC4001	Computing Fundamentals	3	0	12
TC4002	Software Analysis, Design and Construction	3	0	12
TC4003	Distributed Systems	3	0	12
		12	0	48
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
OP5046	Elective V	3	0	12
		15	0	60
Research Courses		C	L	U
GT4000	Research and Innovation Methods	1.5	0	6
GT5000	Thesis I	3	0	12
GT5001	Thesis II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master of Science in Computer Science (MCC-I)

General program objectives

Prepare professionals for industry and academia who, as agents of change, are able to do applied research, technological development, innovation, and technology transfer in the areas of computer science.

Learning outcomes

At the end of the program, students will be able to:

- Demonstrate a high level of theoretical and methodological knowledge of Computer Science in any professional situation.
- Conduct research in their area of expertise to provide knowledge relevant to the advancement of Computer Science.
- Communicate results of their professional work in a clear, effective and efficient manner.
- Work in the professional community in their area of specialty with leadership in an efficient, collaborative and ethical way.

Target Audience

Graduates from areas of computer science, engineering and exact sciences, interested in conducting high-impact research to contribute to the knowledge of one of the specialty areas of Computer Science. Students entering this program should have excellent academic background, vocation in the generation of knowledge and fluency of communication. Moreover, this program is for those who professionally work under strict ethical standards, who are open to new ways of assimilation of knowledge and professional practice and who are intellectually curious.

MCC-I Master of Science in Computer Science

Edition 2016

First Semester		C	L	U
CS4000	Intelligent Systems	3	0	12
CS4012	Computing Fundamentals	3	0	12
GI5000	Research and Innovation Methods	1.5	0	6
OP4000	Quality Development Course	1.5	0	6
		9	0	36
Second Semester		C	L	U
CS4013	Machine Learning	3	0	12
CS4014	Applied Mathematics	3	0	12
CS5058	Thesis I	3	0	12
		9	0	36
Third Semester		C	L	U
CS5059	Thesis II	3	0	12
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
		9	0	36
Fourth Semester		C	L	U
CS5060	Thesis III	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
		9	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Science in Intelligent Systems (MIT)

General program objectives

This master's degree aims to prepare professionals who are:

- Successful intelligent systems specialists who are capable of contributing to solving problems in production and/or research settings.
- Capable of working effectively and collaboratively in multidisciplinary working groups.
- Leaders who will act as agents of change in their field of work.
- Innovators and entrepreneurs who can generate technology-based patents, products and companies.
- Capable of adapting to technological and methodological change in computer science.

Learning outcomes

On completing the program, students will be able to:

- Raise complex problems and formulate solutions based on mathematical and knowledge models.
- Use artificial intelligence techniques to formulate and solve problems.
- Integrate the solutions obtained in existing environments and systems.
- Calculate the cost/benefit of the solutions implemented.
- Solve relevant problems in their professional fields, as intelligent systems specialists, in the fields of knowledge technology, computer intelligence, robotics and vision.
- Be proficient in and know how to use cutting-edge technologies and methodologies correctly in computer science.

Target Audience

Computer science practitioners, consultants, instructors or researchers who wish to deepen or update their knowledge of the theory and techniques of Artificial Intelligence.

Professionals from related areas (electronics, electricity, communications, mathematics, and physics, among others, who can demonstrate they have the basic knowledge required for the successful completion of this program) who wish to complement their education with studies in the area of Artificial Intelligence.

MIT Master in Science in Intelligent Systems Edition 2012

Remedial Course		C	L	U
TC4000	Programming Techniques	3	0	12
		3	0	12
Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Core Courses		C	L	U
IA4000	Intelligent Systems	3	0	12
IA4002	Uncertainty Systems	3	0	12
IA4004	Agent-Based Systems	3	0	12
IA4005	Robotics	3	0	12
IA5005	Connectionist and Evolutionary Systems	3	0	12
TC4001	Computing Fundamentals	3	0	12
		18	0	72
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Courses		C	L	U
GT4000	Research and Innovation Methods	1.5	0	6
GT5000	Thesis I	3	0	12
GT5001	Thesis II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Science in Electronic Engineering (Electronic Systems)(MSE-E)

General program objectives

- To equip competent, capable telecommunications professionals to generate the knowledge-based technological development of society.
- To prepare professionals who are capable of supporting the development and acquisition of technology to detonate, with telecommunications applications and services, the productive sectors that use them.
- To train professionals to design and operate these applications and services, together with the infrastructure that delivers them, evolving in accordance with international technological advancements.

Learning outcomes

On completing the program, students will be able to:

- Analyze design and evaluate communications systems using measurement instruments and equipment, and computer tools to support appropriate decision-making.
- Manage, plan and operate communications systems and networks using analytical and computer tools to streamline the services of organizations that use such systems.
- Digitally process information to integrate user applications such as services based on localization and online multimedia, voice, audio and video applications, among others.

Target Audience

This program targets professionals from the areas of electronic engineering, control, electronic systems, biomedical engineering, industrial physics and related areas. It is also designed for professionals who wish to contribute to the advancement of electronic and computer technologies and acquire in-depth knowledge of current technologies and their trends, in order to create innovative solutions that will benefit society and the country's industry.

MSE-E Master in Science in Electronic Engineering (Electronic Systems)

Edition 2009

Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Basic Courses C		L	U	
F4002	Computer Simulations	3	0	12
TE4000	Advanced Mathematics for Electronics Engineering	3	0	12
		6	0	24
Fundamental Courses		C	L	U
TE4001	Instrumentation	3	0	12
TE4002	Stochastic and Random Processes	3	0	12
		6	0	24
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
OP5046	Elective V	3	0	12
		15	0	60
Research Courses		C	L	U
GT4000	Research and Innovation Methods	1.5	0	6
GT5000	Thesis I	3	0	12
GT5001	Thesis II	3	0	12
		7.5	0	30

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Business Administration and Finance

Doctorate Profiles and Curricula

PhD in Business Administration (DCA)

General program objectives

Prepare researchers who are capable of analyzing and documenting organizational issues, and contributing knowledge to further the development of competitive, innovative businesses.

- Prepare exceptional researchers in the field of business administration, who focus on research in the areas of Entrepreneurship, International Competitiveness, Leadership and Organizational Behavior, and Strategy.
- Cultivate research groups in administrative science.

Learning outcomes

On completing the program, students will be able to:

- Generate critical original knowledge, with the ability to develop theoretical and empirical administrative science models
- Generate cutting-edge knowledge of the theoretical and empirical advancements in administrative science.
- Apply in-depth knowledge of the theoretical and empirical advancements in administrative science (according to their area of specialization).
- Design and analyze measurement instruments for the identification and diagnosis of administrative science topics and issues.
- Report and publish research findings in order to design, lead and assess research projects.
- Have a positive attitude to assess and act with honesty and responsibility in highly complex and ambiguous research situations.

Research Areas (Monterrey Site):

1. Entrepreneurship
2. International Competitiveness
3. Leadership and Organizational Behavior
4. Strategy

Associated Research Groups at EGADE, Monterrey:

1. Entrepreneurship
 - Technology-based Enterprise
 - SMEs
2. International Competitiveness
 - Innovation Models and New Business Models
 - International Business
 - International Competitiveness
 - Strategies in Regulated Industries
3. Leadership and Organizational Behavior
 - Organizational Behavior and Leadership
 - Culture, Human Resources and Humanistic Society
 - Business Management
4. Strategy
 - Market Strategy and Financial Institutions, Applied Finance (Corporate), Consumer Behavior, Knowledge Management, Business Social Responsibility

Research areas

(Ciudad de México Campus Site):

Finance, Marketing, Competitiveness and Economics; Associated Research Groups at EGADE, Ciudad de México Campus - Finance: Risk Management and Corporate Finance; Marketing: Consumer, Brand and Competitiveness; and Economics: Business Models in the Knowledge Economy, Regulation and Economic Indicators, Logistics and Supply Chains.

Target Audience

- Interesados en desarrollar un liderazgo intelectual en las ciencias administrativas.
- Con habilidad demostrada hacia la investigación e interesada en el desarrollo científico de las ciencias administrativas
- Con antecedentes educativos en las ciencias administrativas o afines.
- Con dominio del idioma Inglés.
- Orientadas a la búsqueda de retos intelectuales derivados de una conciencia de su entorno y de sus problemáticas.

DCA PhD in Business Administration

Edition 2011

Quality Development Courses		C	L	U
AD4018	Business Policy, Ethics and Corporate Social Responsibility	3	0	12
		3	0	12
Basic Courses		C	L	U
H5014	Philosophy of Science	3	0	12
MA4009	Statistical Methods	3	0	12
MA4011	Matrix Algebra and Optimization	3	0	12
		9	0	36
Quality Development Courses		C	L	U
AD4019	Fundamentals of Management	3	0	12
EC5004	Fundamental Economics	3	0	12
MT4014	Design of Research Measurement Instruments	3	0	12
MT4015	Multivariate Analysis	3	0	12
		12	0	48
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
		15	0	60
Research Proposal		C	L	U
AD4020	Research Methodology	3	0	12
GD5002	Research Proposal I	3	0	12
GD5003	Research Proposal II	3	0	12
GD5004	Research Proposal III	3	0	12
		12	0	48
Research Seminar		C	L	U
GD5005	Research Seminar I	1	0	4
GD5006	Research Seminar II	1	0	4
GD5007	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
GD5008	Assisted Research I	3	0	12
GD5009	Assisted Research II	3	0	12
GD5010	Assisted Research III	3	0	12
GD6017	Doctoral Research I	3	0	12
GD6018	Doctoral Research II	3	0	12
GD6019	Doctoral Research III	3	0	12
GD6020	Doctoral Research IV	3	0	12
GD6021	Doctoral Research V	3	0	12
GD6022	Doctoral Research VI	3	0	12
GD6023	Doctoral Research VII	3	0	12
GD6024	Doctoral Research VIII	3	0	12
GD6025	Doctoral Research IX	3	0	12
GD6026	Doctoral Research X	3	0	12
GD6027	Doctoral Research XI	3	0	12
GD6028	Doctoral Research XII	3	0	12
		45	0	180
Doctoral Defense		C	L	U
GD6000	Doctoral Defense	0	0	1
		0	0	1

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is nine semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Ph. D. Financial Science (DCF)

General program objectives

Prepare researchers who applied research in higher education teaching activities and/or consulting work, extending the limits of their financial and economic science knowledge, to solve complex problems in the areas of risk management and corporate finance in companies, organizations and institutions, as advisors or executive decision makers in the development of sustainable businesses.

Learning outcomes

On completing the program, students will be able to:

- Apply theoretical knowledge to generate innovative financial models that add value to organizations, markets and/or the economic system, considering the complexity and uncertainty inherent to financial activities.
- Analyze business and financial information to diagnose and propose innovative business models and financial strategies in organizations that compete in globalized marketplaces, to improve their efficiency, sustainability and competitiveness.
- Use information technologies intensively, to diagnose, simulate and generate problems that compromise or endanger the competitiveness and/or sustainable development of organizations and to improve their financial management.
- Interact effectively and efficiently with individuals who have different cultural characteristics and work in organizations that operate in globalized settings.

Target Audience

This program is designed for people with: The desire and capacity for conducting research and expanding the borders of knowledge in the fields of financial science.

The discipline and intellectual curiosity to ask fundamental questions and conduct research that will contribute to creating and disseminating original, innovative knowledge and/or practices in the context of financial theory, management and economics.

The intention of studying a program that will position them as opinion leaders and generators of trends of thought in the areas of finance and economics.

DCF Ph. D. Financial Science

Edition 2011

Quality Development Courses		C	L	U
AD4018	Business Policy, Ethics and Corporate Social Responsibility	3	0	12
		3	0	12
Basic Courses		C	L	U
EO4011	Advanced Microeconomics	3	0	12
FZ5002	Financial Information and Decision Making	3	0	12
MA4016	Calculus and Linear Algebra	3	0	12
MA4017	Probability and Statistics	3	0	12
		12	0	48
Quality Development Courses		C	L	U
EO4009	Open Macroeconomics	3	0	12
FZ5024	Investment Theory	3	0	12
FZ5026	Mathematics for Finance	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
		15	0	60
Research Proposal		C	L	U
AD4020	Research Methodology	3	0	12
GF5019	Research Proposal I	3	0	12
GF5020	Research Proposal II	3	0	12
GF5021	Research Proposal III	3	0	12
		12	0	48
Reserach Seminar		C	L	U
GF5022	Research Seminar I	1	0	4
GF5023	Research Seminar II	1	0	4
GF5024	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
GF5025	Assisted Research I	3	0	12
GF5026	Assisted Research II	3	0	12
GF5027	Assisted Research III	3	0	12
GF6027	Doctoral Research I	3	0	12
GF6028	Doctoral Research II	3	0	12
GF6029	Doctoral Research III	3	0	12
GF6030	Doctoral Research IV	3	0	12
GF6031	Doctoral Research V	3	0	12
GF6032	Doctoral Research VI	3	0	12
GF6033	Doctoral Research VII	3	0	12
GF6034	Doctoral Research VIII	3	0	12
GF6035	Doctoral Research IX	3	0	12
GF6036	Doctoral Research X	3	0	12
GF6037	Doctoral Research XI	3	0	12
GF6038	Doctoral Research XII	3	0	12
		45	0	180
Doctoral Defense		C	L	U
GF6000	Doctoral Defense	0	0	1
		0	0	1

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- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Health Science

Doctorate Profiles and Curricula

Ph.D. Program in Clinical Science (DCL)

General program objectives

The Ph.D. Program in Clinical Sciences will develop experts in clinical research that:

- Are recognized nationally and / or internationally for its ability to generate medical knowledge in three possible dimensions: individual, institution or society.
- Generate scientific production based on ethical principles, relevant to understanding human - health and disease, care systems and / or public health.
- Are leaders in prestigious organizations in the implementation of strategies to reduce inequity in health care and increase the use of resources based on best evidence.
- Obtain results of their research with critical - scientific thinking establishing clearly the potential application, as well each of its limitations and areas of opportunity.
- Transfer knowledge through scientific products such as: articles, patents or technological developments that allow reducing the gap between scientific knowledge relevant and valid and its application at the patient's bedside.
- Develop protocols or clinical trials that comply with current regulations in bioethics, quality and safety, ensuring the integrity and dignity of patients and their families as well as the intellectual property of the findings.

Learning outcomes

On completing the program, students will be able to:

- Apply in expert level strategies of search, selection and analysis of relevant knowledge in the area of expertise regarding aspects such as: mechanisms of disease (pathogenesis); detection, diagnosis or history of disease; therapeutic interventions, including trials with medicines or drugs; primary and secondary prevention and health promotion; human behavior; health services and epidemiology, among others.
- Use qualitative and quantitative research methods and statistical tools for the development of scientific research to provide knowledge for regional or national issues in their field of expertise.

Target Audience

This program is designed for graduates of one of the Medical Residencies offered by Tecnológico de Monterrey, or by any other prestigious universities approved by the Interinstitutional Commission for the Education of Human Resources for Healthcare, in areas related to the program. Participants wish to continue their academic preparation in research applied to subjects such as Cardiology, Hematology and Cancer, Ophthalmology, Neuroscience and Mental Health, and, therefore, train as scientists to develop clinical research projects in the areas of healthcare.

DCL Ph.D. Program in Clinical Sciences

Edition 2012

Quality Development Course		C	L	U
DS4000	Leadership for Sustainable Development	1.5	0	6
		1.5	0	6
Specialization Courses		C	L	U
ME6000	Bioethics and Regulations in Research	3	0	12
ME6001	Methodological Structure and Statistics in Biomedical and Clinical Research	3	0	12
ME6002	Epidemiological Research	3	0	12
		9	0	36
Dissertation Proposal		C	L	U
ME5183	Doctoral Research Proposal I	3	0	12
ME5184	Research and Innovation Methods	1.5	0	6
ME5185	Doctoral Research Proposal II	3	0	12
ME5186	Doctoral Research Proposal III	3	0	12
		10.5	0	42
Research Seminars		C	L	U
ME5187	Research Seminar I	1	0	4
ME5188	Research Seminar II	1	0	4
ME5189	Research Seminar III	1	0	4
		3	0	12
Doctoral Research		C	L	U
ME6003	Doctoral Research I	3	0	12
ME6004	Doctoral Research	3	0	12
ME6005	Doctoral Research III	3	0	12
ME6006	Doctoral Research IV	3	0	12
ME6007	Doctoral Research V	3	0	12
ME6008	Doctoral Research VI	3	0	12
ME6009	Doctoral Research VII	3	0	12
ME6010	Doctoral Research VIII	3	0	12
ME6011	Doctoral Research IX	3	0	12
ME6012	Doctoral Research X	3	0	12
ME6013	Doctoral Research XI	3	0	12
ME6014	Doctoral Research XII	3	0	12
ME6015	Doctoral Research XIII	3	0	12
ME6016	Doctoral Research XIV	3	0	12
ME6017	Doctoral Research XV	3	0	12
ME6018	Doctoral Research XVI	3	0	12
ME6019	Doctoral Research XVII	3	0	12
		51	0	204
Doctoral Defense		C	L	U
ME6020	Doctoral Defense	0	0	1
		0	0	1

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- U Study hours that must be dedicated to the course (class hours included)



Humanities and Social Science

Doctorate Profiles and Curricula

Ph. D. Social Sciences (DCS)

General program objectives

- Prepare researchers with the capacity to apply the leading trends of thought in social sciences by means of command of methodological and analytical tools.
- Produce scientific knowledge that contributes to explaining contemporary social phenomena, particularly in the areas of Social Development and Regional and International Studies.
- Participate, through the generation of relevant, significant knowledge, in the design of projects that will have a positive impact on society in academia, civil organizations and (or) government settings.
- Promote the implementation and consolidation of social science research in northeastern Mexico by training human resources in teaching and research.

- Analyze the impact of social dynamics and of regionalization processes within the framework of globalization, and disseminate this knowledge to the academic community and to society in general. Support the design of social projects and programs that promote regional and national development.

Their values and attitudes will be:

- A reflexive attitude and critical spirit to rethink the social reality.
- The pursuit of dialogue and intra- and inter-disciplinary meeting points by through projects.
- Commitment to the dissemination of knowledge to society.
- Contribution to the development of civic responsibility, based on higher education, and increasing the awareness of the new generations.

Learning outcomes

On completing the program, students will be able to:

- Theoretical frameworks and methods specific to Social Sciences that enable them to participate and play a major role in interdisciplinary debates.
- Methods and techniques that deliver scientific rigor to social research.
- Manage issues related to development and regional and globalization studies.

They will have the competencies and skills to:

- Generate new knowledge through an analysis resulting from original research.

Target Audience

The PhD in Social Science is designed for applicants who:

- Show an interest in studying social phenomena linked to social development, regional studies and globalization.
- Have an academic background (bachelor's and/or master's degree) in disciplines related to the program.
- Demonstrate experience in research through published works or a thesis.
- Possess the capacities for analysis and critical thinking.
- Have verbal and logic and mathematics skills.
- Demonstrate oral and written proficiency in English.
- Express their exclusive dedication to the program.
- Possess teamwork skills.

DCS Ph. D. Social Sciences Edition 2011

Quality Development Courses		C	L	U
DS4001	Leadership for Sustainable Development	3	0	12
		3	0	12
Specialization Courses		C	L	U
CO4004	Quantitative Research in Social Sciences	3	0	12
EC5009	International Economic Politic	3	0	12
H4003	Theory of Knowledge	3	0	12
H4005	Discourse Analysis	3	0	12
SO5012	Development and Social Change	3	0	12
SO5017	Theory and Contemporary Social Thinking	3	0	12
SO5018	Political and Social Organizations Theory	3	0	12
SO5019	Classical Theory and Social Thought	3	0	12
		24	0	96
Research Proposal		C	L	U
GO6031	Thesis Seminar I	3	0	12
GO6032	Thesis Seminar II	3	0	12
GO6033	Thesis Seminar III	3	0	12
GO6034	Thesis Seminar IV	3	0	12
SO5001	Qualitative Methods in Social Research	3	0	12
SO5023	Research Proposal I	3	0	12
SO5024	Research Proposal II	3	0	12
		21	0	84
Reserach Seminar		C	L	U
GO5000	Research Seminar I	1	0	4
GO5001	Research Seminar II	1	0	4
GO5002	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
GO5003	Assisted Research I	3	0	12
GO5004	Assisted Research II	3	0	12
GO5005	Assisted Research III	3	0	12
GO6016	Doctoral Research I	3	0	12
GO6017	Doctoral Research II	3	0	12
GO6018	Doctoral Research III	3	0	12
GO6019	Doctoral Research IV	3	0	12
GO6020	Doctoral Research V	3	0	12
GO6021	Doctoral Research VI	3	0	12
GO6022	Doctoral Research VII	3	0	12
GO6023	Doctoral Research VIII	3	0	12
GO6024	Doctoral Research IX	3	0	12
GO6025	Doctoral Research X	3	0	12
GO6026	Doctoral Research XI	3	0	12
GO6027	Doctoral Research XII	3	0	12
GO6028	Doctoral Research XIII	3	0	12
		48	0	192
Doctoral Defense		C	L	U
GO6030	Doctoral Defense	0	0	1
		0	0	1

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- U Study hours that must be dedicated to the course (class hours included)

Ph. D. Educational Innovation (DEE)

General program objective

The aim of the PhD in Educational Innovation comprises:

- The preparation of individuals who are capable of contributing, through research, to the theoretical-practical knowledge of education; and of increasing the efficiency and effectiveness of educational projects, seeking to innovate and achieve positive change in organizations.
- The preparation of leaders and agents of change who examine today's society, from individual, organizational, systemic and social perspectives, in order to examine, define, reformulate, plan and facilitate the process of educational change.

Target Audience

This program's target audience consists of graduate-level academics who are interested in a career as researchers in a public or private higher education institution and/or educational or social science research centers, and, to a lesser degree, as educational managers in higher education institutions that require administrators who hold a doctoral degree. At present, and at least in the immediate future (the next 50 years), the number of professors with a doctorate in the area of education that Mexico and other Latin American countries will need simply to assure the minimum accreditation of institutions that offer graduate programs in education is so vast that the demand is more than 15 times greater than the supply. If all the current doctoral programs in education were to accept students at full capacity, the institutional requirements in the nation's faculties for doctors in education would not be met even over the next 25 years.

The deficit of doctors in education is even greater in Latin America.

Participants in this program should have the following characteristics:

1. The commitment to be an academic researcher, working in an educational institution and performing scientific teaching, research and dissemination activities in their local community.
2. A critical-strategic spirit, with the desire to innovate in their field, focusing on achieving the ongoing enhancement of the educational environment.
3. An interest in conducting research in one of the areas currently offered by the program: a) Administration and management of educational change; b). The student as a learner; c). The role of the professor and of learning in the educational process; d) The social impact of innovative educational models; e) Education in physics and mathematics
4. A commitment to improving the social and political environment of Latin American countries and enhancing the quality of life of its inhabitants through education across all its aspects.
5. The openness for internationalization, to know what is being done in other countries and to learn from them, sharing what their own country is doing, seeing the world as a whole, all nations with the same principal goals of providing a quality education for its people.
6. The ability to receive and produce influential information in Spanish and English; to read research reports and papers from scientific publications; and profit from texts and articles in both languages.
7. The desire to act as an agent of change by examining, redefining and motivating people to act.

DEE Ph. D. Educational Innovation

Edition 2015

Quality Development Course		C	L	U
ED4022	Technology and Innovation in Education	3	0	12
		3	0	12
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
OP5067	Elective VI	3	0	12
OP5068	Elective VII	3	0	12
OP5069	Elective VIII	3	0	12
OP5070	Elective IX	3	0	12
OP5071	Elective X	3	0	12
OP5072	Elective XI	3	0	12
		33	0	132
Research Proposal		C	L	U
ED5075	Research Proposal I	3	0	12
ED5076	Research Proposal II	3	0	12
ED5077	Research Proposal III	3	0	12
		9	0	36
Research Seminars		C	L	U
ED5078	Research Seminar I	1	0	4
ED5079	Research Seminar II	1	0	4
ED5080	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
ED5081	Assisted Research I	3	0	12
ED5082	Assisted Research II	3	0	12
ED5083	Assisted Research III	3	0	12
ED6033	Doctoral Research I	3	0	12
ED6034	Doctoral Research II	3	0	12
ED6035	Doctoral Research III	3	0	12
ED6036	Doctoral Research IV	3	0	12
ED6037	Doctoral Research V	3	0	12
ED6038	Doctoral Research VI	3	0	12
ED6039	Doctoral Research VII	3	0	12
ED6040	Doctoral Research VIII	3	0	12
ED6041	Doctoral Research IX	3	0	12
ED6042	Doctoral Research X	3	0	12
ED6043	Doctoral Research XI	3	0	12
ED6044	Doctoral Research XII	3	0	12
ED6045	Doctoral Research XIII	3	0	12
ED6046	Doctoral Research XIV	3	0	12
		51	0	204
Doctoral Defense		C	L	U
ED6000	Doctoral Defense	0	0	1
		0	0	1

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Ph. D. Humanistic Studies (DEH)

General program objectives

- Prepare researchers with a state-of-the-art vision in the field of the humanities who can respond to the challenges of contemporary society in the field of the humanities.
- Prepare experts who are capable of relating research to teaching, in the area of humanistic studies.
- Train people who are able to conduct interdisciplinary research that will be published in indexed and international-spectrum journals.
- Develop in academics the knowledge and skills to design and implement solutions to the complex problems of contemporary society using analytical methods in conjunction with a sense of commitment, leadership, determination and duty, together with ethical reasoning.
- Foment in students the capacity to lead processes of social change and transformation in diverse contexts in relation to the humanities.
- Foment the capacity for reflection in current debates on the area of the humanities by means of a solid grounding in their area of specialization.

Learning outcomes

On completing the program, students will be able to:

- Conduct applied research in the areas of Ethics, Literature and Discourse, Science, Technology and Society, and Communication, from the perspective of cultural studies.
- Have the theoretical-methodological bases for working as academics and researchers in undergraduate and graduate programs and research centers in the areas of specialization included in this doctorate.

- Work in institutions of higher education and consulting centers.
- Analyze and research the diverse manifestations of social and cultural phenomena.

Moreover:

- Graduates from the science, technology and culture concentration will be able to analyze the relationships between science, technology and culture, and their contribution to the development of society.
- Graduates from the communication and cultural studies concentration will be trained to identify the implications of the content and the reception processes of the mass media and the digital media for audiences, focusing on the transformation of society.
- Graduates from the ethics concentration will be trained to analyze and diagnose the characteristics of contemporary society and generate proposals that contribute to the development of society.
- Literature and discourse graduates will have the conceptual tools required to formulate a critical analysis of the diverse forms of discourse, using the discipline's most recent theoretical and methodological proposals.

DEH Ph. D. Humanistic Studies

Edition 2011

Quality Development Course		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Specialization Courses		C	L	U
H6012	Argumentation Theory	3	0	12
H6013	Humanistic Debates	3	0	12
H6014	Cultural Studies	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
		9	0	36
Research Seminars		C	L	U
H6015	Research Seminar I	1	0	4
H6016	Research Seminar II	1	0	4
H6017	Research Seminar III	1	0	4
		3	0	12
Research Proposal Courses		C	L	U
H4012	Research Methods	3	0	12
H6018	Research Project I	3	0	12
H6019	Research Project II	3	0	12
H6020	Research Project III	3	0	12
		12	0	48
Research Courses		C	L	U
H6021	Thesis Seminar I	3	0	12
H6022	Thesis Seminar II	3	0	12
H6023	Thesis Seminar III	3	0	12
H6024	Doctoral Research I	3	0	12
H6025	Doctoral Research II	3	0	12
H6026	Doctoral Research III	3	0	12
H6027	Doctoral Research IV	3	0	12
H6028	Doctoral Research V	3	0	12
H6029	Doctoral Research VI	3	0	12
H6030	Doctoral Research VII	3	0	12
H6031	Doctoral Research VIII	3	0	12
H6032	Doctoral Research IX	3	0	12
H6033	Doctoral Research X	3	0	12
		9	0	156
Doctoral Defense		C	L	U
H6034	Doctoral Dissertation: Defense Research Seminar	0	0	1
		0	0	1

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- U Study hours that must be dedicated to the course (class hours included)

Ph. D. Public Policy (DPP)

General program objectives

- Train specialized human capital in public policies with a high level of technical rigor in economic analysis and the sophistication of organizational and institutional analysis.
- Prepare world-class specialists who contribute to the democratization and effectiveness of public administration processes and foster the State-Society relationship.
- Prepare leaders who will participate in international civil society organizations and autonomous bodies that support institutional processes of change.
- Prepare researchers who will generate cutting-edge knowledge in the field of public policy.

Target Audience

This program is aimed at:

- Public officials from different government branches and levels who are interested in deepening their knowledge in the areas of public administration and public policy.
- Private-sector professionals who wish to specialize in government-enterprise relations.
- Researchers and professionals from the area of social studies who are interested in generating cutting-edge knowledge in the fields of public administration and policy.

Learning outcomes

On completing the program, students will be able to:

- Design, implement and evaluate public policies in the diverse government branches and areas.
- Propose government-civil society-enterprise liaison strategies.
- Propose and execute leadership in research related to the field of public policy based on their theoretical, analytical and instrumental grounding in public policy processes, with a multidisciplinary approach underpinned by legal, economic and public administration insights.

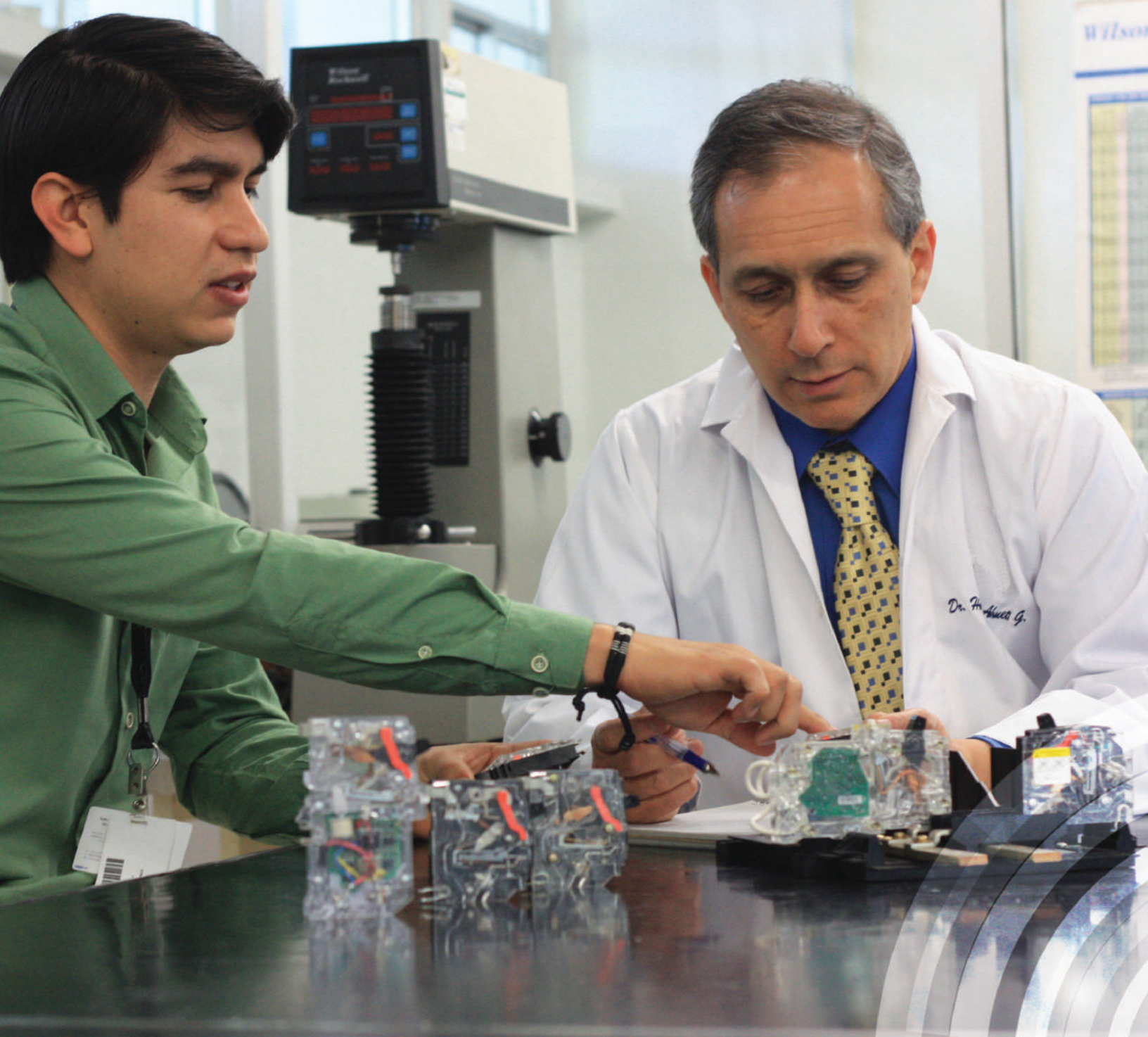
DPP Ph. D. Public Policy

Edition 2011

Quality Development Course		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Specialization Courses		C	L	U
GP6000	Theory of Public Organizations and of Public Administration	3	0	12
GP6001	Analytical Processes of Public Policy	3	0	12
GP6003	Public Administration System of Competencies	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
		9	0	36
Research Proposal Courses		C	L	U
GP5000	Research Proposal I	3	0	12
GP5001	Research Proposal II	3	0	12
GP5002	Research Proposal III	3	0	12
GP6035	Research Methodology	3	0	12
		12	0	48
Research Courses		C	L	U
GP6021	Doctoral Research I	3	0	12
GP6022	Doctoral Research II	3	0	12
GP6023	Doctoral Research III	3	0	12
GP6024	Doctoral Research IV	3	0	12
GP6025	Doctoral Research V	3	0	12
GP6026	Doctoral Research VI	3	0	12
GP6027	Doctoral Research VII	3	0	12
GP6028	Doctoral Research VIII	3	0	12
GP6029	Doctoral Research IX	3	0	12
GP6030	Doctoral Research X	3	0	12
GP6031	Doctoral Research XI	3	0	12
GP6032	Doctoral Research XII	3	0	12
GP6033	Doctoral Research XIII	3	0	12
		39	0	156
Research Seminars		C	L	U
GP5003	Research Seminar I	1	0	4
GP5004	Research Seminar II	1	0	4
GP5005	Research Seminar III	1	0	4
		3	0	12
Doctoral Defense		C	L	U
GP6034	Doctoral Defense	0	0	1
		0	0	1

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- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Engineering and Architecture

Doctorate Profiles and Curricula

Ph. D. Biotechnology (DBT)

General program objectives

- Educate scientists who produce innovative biological knowledge to generate state-of-the-art technologies that are relevant for the food and pharmaceutical sectors, and understand basic phenomena within the field of life science.
- Prepare leaders who will participate in national and international research groups related to areas such as nutraceuticals, biopharmaceuticals, bioinformatics, bioprocesses, cancer, cardiovascular sciences, stem cell biology, biomedical devices, biophysics, immunology and metabolism, among others.

Target Audience

Participants will have earned a bachelor's degree from Tecnológico de Monterrey, or any other prestigious universities, in areas related to the program. They have a vocation for science and wish to train as scientists in the areas of biotechnology or health.

Learning outcomes

On completing the program, students will be able to:

- Understand the application of basic sciences and research methodology techniques on areas of cell biology, physiology, biochemistry and bioprocesses engineering.
- Use research skills including translational research, critical evaluation, laboratory safety and experimental planning.
- Design experiments from the identification of the problems to the interpretation of results.
- Analyze critically results and data with advanced statistics tools, such as bioinformatics and data mining.
- Communicate effectively orally and in writing with their peers: mentors, research community, society and grantsmanship.
- Make decisions with scientific judgment and critical thinking in their practice as researchers following legal, ethical and official government regulations.

DBT Ph. D. Biotechnology

Edition 2011

Quality Development		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
OP5067	Elective VI	3	0	12
OP5068	Elective VII	3	0	12
OP5069	Elective VIII	3	0	12
OP5070	Elective IX	3	0	12
OP5071	Elective X	3	0	12
OP5072	Elective XI	3	0	12
		33	0	132
Research Proposal		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
GI5011	Research Proposal I	3	0	12
GI5012	Research Proposal II	3	0	12
GI5013	Research Proposal III	3	0	12
		10.5	0	42
Research Seminars		C	L	U
GI5014	Research Seminar I	1	0	4
GI5015	Research Seminar II	1	0	4
GI5016	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
GI5017	Assisted Research I	3	0	12
GI5018	Assisted Research II	3	0	12
GI5019	Assisted Research III	3	0	12
GI6021	Doctoral Research I	3	0	12
GI6022	Doctoral Research II	3	0	12
GI6023	Doctoral Research III	3	0	12
GI6024	Doctoral Research IV	3	0	12
GI6025	Doctoral Research V	3	0	12
GI6026	Doctoral Research VI	3	0	12
GI6027	Doctoral Research VII	3	0	12
GI6028	Doctoral Research VIII	3	0	12
GI6029	Doctoral Research IX	3	0	12
GI6030	Doctoral Research X	3	0	12
GI6031	Doctoral Research XI	3	0	12
GI6032	Doctoral Research XII	3	0	12
GI6033	Doctoral Research XIII	3	0	12
GI6034	Doctoral Research XIV	3	0	12
		51	0	204
Doctoral Defense		C	L	U
GI6000	Doctoral Defense	0	0	1
		0	0	1

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C Number of class hour per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

Ph. D. Engineering Sciences (DCI)

General program objectives

- Prepare independent researchers with the knowledge and skills to identify opportunities, and develop and direct original research projects on the frontier of knowledge.
- Develop people's talent to work in research, teaching, and technology development and management.
- Prepare experts who can innovate, develop and apply new technologies in industrial and service processes.
- Disseminate the findings of this research and apply the knowledge generated to the country's technological development. Be recognized as a high-impact engineering program in the productive, educational-academic and social sectors of the country.

Target Audience

Participants in this program will have the proven academic capacity, creativity, motivation and potential to conduct research in the form of original work that contributes to enriching the field of technology.

DCI's mechanism for selecting candidates considers the relevant aspects for identifying the academic and research profile necessary for achieving an outstanding performance.

DCI Ph. D. Engineering Sciences

Edition 2011

Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
OP5067	Elective VI	3	0	12
OP5068	Elective VII	3	0	12
OP5069	Elective VIII	3	0	12
OP5070	Elective IX	3	0	12
OP5071	Elective X	3	0	12
OP5072	Elective XI	3	0	12
		33	0	132
Research Proposal		C	L	U
GI5000	Research and Innovation Methods	1.5	0	6
GI5011	Research Proposal I	3	0	12
GI5012	Research Proposal II	3	0	12
GI5013	Research Proposal III	3	0	12
		10.5	0	42
Research Seminars		C	L	U
GI5014	Research Seminar I	1	0	4
GI5015	Research Seminar II	1	0	4
GI5016	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
GI5017	Assisted Research I	3	0	12
GI5018	Assisted Research II	3	0	12
GI5019	Assisted Research III	3	0	12
GI6021	Doctoral Research I	3	0	12
GI6022	Doctoral Research II	3	0	12
GI6023	Doctoral Research III	3	0	12
GI6024	Doctoral Research IV	3	0	12
GI6025	Doctoral Research V	3	0	12
GI6026	Doctoral Research VI	3	0	12
GI6027	Doctoral Research VII	3	0	12
GI6028	Doctoral Research VIII	3	0	12
GI6029	Doctoral Research IX	3	0	12
GI6030	Doctoral Research X	3	0	12
GI6031	Doctoral Research XI	3	0	12
GI6032	Doctoral Research XII	3	0	12
GI6033	Doctoral Research XIII	3	0	12
GI6034	Doctoral Research XIV	3	0	12
		51	0	204
Doctoral Defense		C	L	U
GI6000	Doctoral Defense	0	0	1
		0	0	1

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is nine semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Ph. D. Nanotechnology (DNT)

General program objectives

- Prepare independent researchers with the knowledge and skills to identify opportunities, and develop and direct original research projects on the frontier of knowledge.
- Develop people's talent to work in research, teaching, and technology development and management.
- Prepare experts who can innovate, develop and apply new technologies in industrial and service processes.
- Disseminate the findings of this research and apply the knowledge generated to the country's technological development. Be recognized as a high-impact engineering program in the productive, educational-academic and social sectors of the country.

Target Audience

Participants in this program will have the proven academic capacity, creativity, motivation and potential to conduct research in the form of original work that contributes to enriching the field of technology.

DCI's mechanism for selecting candidates considers the relevant aspects for identifying the academic and research profile necessary for achieving an outstanding performance.

DNT Ph. D. Nanotechnology

Edition 2016

First Semestre		C	L	U
GI6041	Research Seminar I	1	0	2
GI6051	Research Workshop I	1	0	4
NT6021	Guided Research I	3	0	12
NT6022	Guided Research II	3	0	12
NT6025	Integrated Exam	1.5	0	6
		9.5	0	36
Second Semestre		C	L	U
GI6042	Research Seminar II	1	0	2
GI6052	Research Workshop II	1	0	4
NT6031	Research Proposal I	3	0	12
NT6032	Research Proposal II	3	0	12
NT6035	Research Proposal Defense	1.5	0	6
		9.5	0	36
Third Semestre		C	L	U
GI6043	Research Seminar III	1	0	2
GI6053	Research Workshop III	1	0	4
NT6041	Research Integration I	1.5	0	6
NT6101	Doctoral Research I	3	0	12
NT6102	Doctoral Research II	3	0	12
		9.5	0	36
Fourth Semestre		C	L	U
GI6044	Research Seminar IV	1	0	2
GI6054	Research Workshop IV	1	0	4
GI6061	Scientific Product I	1.5	0	6
NT6103	Doctoral Research III	3	0	12
NT6104	Doctoral Research IV	3	0	12
		9.5	0	36
Fifth Semestre		C	L	U
GI6045	Research Seminar V	1	0	2
GI6055	Research Workshop V	1	0	4
NT6042	Research Integration II	1.5	0	6
NT6105	Doctoral Research V	3	0	12
NT6106	Doctoral Research VI	3	0	12
		9.5	0	36
Sixth Semestre		C	L	U
GI6046	Research Seminar VI	1	0	2
GI6056	Research Workshop VI	1	0	4
GI6062	Scientific Product II	1.5	0	6
NT6107	Doctoral Research VII	3	0	12
NT6108	Doctoral Research VIII	3	0	12
		9.5	0	36
Seventh Semestre		C	L	U
NT6109	Doctoral Research IX	3	0	12
NT6110	Doctoral Research X	3	0	12
NT6111	Doctoral Research XI	3	0	12
		9	0	36
Eighth Semestre		C	L	U
NT6112	Doctoral Research XII	3	0	12
NT6113	Doctoral Research XIII	3	0	12
NT6114	Doctoral Research XIV	3	0	12
NTNT6120	Doctoral Defense	0	0	1
		9	0	37

This Ph.D program have as requirement a master degree program.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Information Technologies and Electronics

Doctorate Profiles and Curricula

Ph. D. Computer Sciences (DCC)

General program objectives

Prepare independent researchers with competences, knowledge and skills to identify opportunities, develop and conduct original research projects at the frontier of knowledge.

Disseminate the results of research and apply the generated knowledge in the technological development of the country. To be recognized as a Computer Science program with high impact on the productive, educational/academic and social sectors of the country.

Target audience

The PhD program in Computer Science is designed for candidates with proven academic ability, creativity, motivation and potential to carry out research projects that culminate in original works that contribute to enrich the field of information technology and computer science.

In the case of DCC, there is an adequate mechanism for selecting applicants that considers the relevant aspects to identify the academic and research profile, necessary for an outstanding performance.

Learning Outcomes

Graduates of the PhD in Computer Science are researchers who can generate new knowledge, contributing to the development of the state of the art in their respective areas. They are people who can work in research, teaching, development and technology management.

The structure of the curriculum promotes the preparation of students as experts in their area through venturing and exploring the border of the state of the art of their specialty. This is achieved by a series of complement research courses that foster the acquisition of tools and knowledge that allow students to begin the process as a researcher.

Finally, research courses allow students to cultivate their creativity and innovation in problem solving or new technologies development that will culminate in the preparation and defense of their doctoral dissertation.

DCC Ph. D. Computer Sciences

Edition 2016

First Semester		C	L	U
CS6021	Guided Research I	3	0	12
CS6022	Guided Research II	3	0	12
CS6025	Integrated Exam	1.5	0	6
GI6041	Research Seminar I	1	0	2
GI6051	Research Workshop I	1	0	4
		9.5	0	36
Second Semester		C	L	U
CS6031	Research Proposal I	3	0	12
CS6032	Research Proposal II	3	0	12
CS6035	Research Proposal Defense	1.5	0	6
GI6042	Research Seminar II	1	0	2
GI6052	Research Workshop II	1	0	4
		9.5	0	36
Third Semester		C	L	U
CS6041	Research Integration I	1.5	0	6
CS6101	Doctoral Research I	3	0	12
CS6102	Doctoral Research II	3	0	12
GI6043	Research Seminar III	1	0	2
GI6053	Research Workshop III	1	0	4
		9.5	0	36
Fourth Semester		C	L	U
CS6103	Doctoral Research III	3	0	12
CS6104	Doctoral Research IV	3	0	12
GI6044	Research Seminar IV	1	0	2
GI6054	Research Workshop IV	1	0	4
GI6061	Scientific Product I	1.5	0	6
		9.5	0	36
Fifth Semester		C	L	U
CS6042	Research Integration II	1.5	0	6
CS6105	Doctoral Research V	3	0	12
CS6106	Doctoral Research VI	3	0	12
GI6045	Research Seminar V	1	0	2
GI6055	Research Workshop V	1	0	4
		9.5	0	36
Sixth Semester		C	L	U
CS6107	Doctoral Research VII	3	0	12
CS6108	Doctoral Research VIII	3	0	12
GI6046	Research Seminar VI	1	0	2
GI6056	Research Workshop VI	1	0	4
GI6062	Scientific Product II	1.5	0	6
		9.5	0	36
Seventh Semester		C	L	U
CS6109	Doctoral Research IX	3	0	12
CS6110	Doctoral Research X	3	0	12
CS6111	Doctoral Research XI	3	0	12
		9	0	36
Octavo Semestre		C	L	U
CS6112	Doctoral Research XII	3	0	12
CS6113	Doctoral Research XIII	3	0	12
CS6114	Doctoral Research XIV	3	0	12
CS6120	Doctoral Defense	0	0	1
		9	0	36

El Tecnológico de Monterrey considera que una carga adecuada para alumnos de tiempo completo en el nivel de posgrado es entre 36 y 48 unidades por periodo académico. Este programa se ofrece en periodos semestral y la duración esperada es de cuatro semestres.

- C Número de horas por semana
- L Número de horas de laboratorio o actividades por semana
- U Horas de estudio que se deben dedicar a la materia (incluye horas de clase)

Ph. D. Information Technology and Communications (DTC)

General program objectives

The objective of the DTC program is to prepare researchers who:

- Will influence the education of future professionals in the diverse areas of Information and Communication Technologies
- Propose, develop and advise research projects, in their area of specialization
- Identify and solve relevant issues of national and international interest, and contribute to the development of Intelligent Systems, Computer Science, Electronics, Optics or Telecommunications.
- Foster research in companies that can be translated into cutting-edge technology with distinctive, patentable characteristics in the international arena.

Learning outcomes

On completing the program, students will be able to:

- Generate new knowledge in Information and Communications Technologies.
- Identify and formulate solutions to highly complex problems using ICT techniques and area-specific knowledge.
- Modify, expand and adapt existing knowledge to solve problems.
- Disseminate the knowledge generated in journals and conferences related to their specialization.
- Disseminate knowledge related to their area to benefit society through the media, outreach conferences and events for the general public.
- Identify opportunities to apply knowledge in order to propose high-impact solutions for the economy and society.
- Propose, develop and advise national and international research projects, in their area of specialization, including all the stages from obtain-

ing funds to the successful completion of the project.

Target Audience

The program is designed for professionals from the areas of engineering, informatics, administration, education and exact sciences who are interested in conducting high-impact research to contribute to knowledge in one of the specialty areas, such as Intelligent Systems, Computer Science, or Electronics and Telecommunications. The program emphasizes existing research in each specialty that is strongly supported by the research groups and projects associated with DTC.

DTC Ph. D. Information Technology and Communications Edition 2011

Quality Development Course		C	L	U
OP4000	Quality Development Course	1.5	0	6
		1.5	0	6
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
OP5067	Elective VI	3	0	12
OP5068	Elective VII	3	0	12
OP5069	Elective VIII	3	0	12
OP5070	Elective IX	3	0	12
OP5071	Elective X	3	0	12
OP5072	Elective XI	3	0	12
		33	0	132
Research Proposal		C	L	U
GT4000	Research and Innovation Methods	1.5	0	6
GT5002	Research Proposal I	3	0	12
GT5003	Research Proposal II	3	0	12
GT5004	Research Proposal III	3	0	12
		10.5	0	42
Research Seminars		C	L	U
GT5005	Research Seminar I	1	0	4
GT5006	Research Seminar II	1	0	4
GT5007	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
GT5008	Assisted Research I	3	0	12
GT5009	Assisted Research II	3	0	12
GT5010	Assisted Research III	3	0	12
GT6028	Doctoral Research I	3	0	12
GT6029	Doctoral Research II	3	0	12
GT6030	Doctoral Research III	3	0	12
GT6031	Doctoral Research IV	3	0	12
GT6032	Doctoral Research V	3	0	12
GT6033	Doctoral Research VI	3	0	12
GT6034	Doctoral Research VII	3	0	12
GT6035	Doctoral Research VIII	3	0	12
GT6036	Doctoral Research IX	3	0	12
GT6037	Doctoral Research X	3	0	12
GT6038	Doctoral Research XI	3	0	12
GT6039	Doctoral Research XII	3	0	12
GT6040	Doctoral Research XIII	3	0	12
GT6041	Doctoral Research XIV	3	0	12
		51	0	204
Doctoral Defense		C	L	U
GT6000	Doctoral Defense	0	0	1
		0	0	1

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is nine semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)



Online Program

Profiles and Curricula

Master in Educational Institution Administration (MAD-V)

General program objective

The objective of the Master of Educational Institution Management is to::

- Educate leaders in the field of educational management.
- Educate professionals who execute their academic and administrative work through planning, management and evaluation strategies in order to meet the institutional goals effectively and efficiently.
- Educate professionals who apply their research skills to solve current academic and administrative problems.

Target Audience

Candidates for the Master in Educational Institution Management program must have completed a bachelor's degree in an area related to education, administration or similar, and, preferably, have reading comprehension skills in the English language. Moreover, applicants should, if possible, have some work experience involving school management and/or student affairs scenarios in the diverse academic levels.

Learning outcomes

On completing the program, students will be able to:

- Exercise leadership to promote the mobilization of members of the educational community towards achieving organizational goals.
- Plan, implement and evaluate academic and administrative management strategies.
- Manage human, material and financial resources effectively and efficiently in educational institutions.
- Promote a value based organizational culture within the educational institution which respects diversity and is open to community outreach.
- Promote academic and administrative innovation in educational institutions.
- Conduct educational research projects that provide knowledge about various phenomena of academic and administrative nature.

MAD-V Master in Educational Institution Administration Edition 2013

Quality Development Course		C	L	U
ED4022	Technology and Innovation in Education	3	0	12
		3	0	12
Education Basic Course		C	L	U
ED4032	Comparative Education	3	0	12
		3	0	12
Obligatory Courses by Accentuation		C	L	U
OP4006	Elective Course I	3	0	12
OP4007	Elective Course II	3	0	12
OP4008	Elective Course III	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
		6	0	24
Research Courses		C	L	U
ED4034	Applied Research Project I: Identifying Study Problems	3	0	12
ED4035	Applied Research Project II: Methodological Approaches	3	0	12
ED5084	Applied Research Project III: Analysis of Results	3	0	12
		9	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is nine semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Finance (MAF-V)

General program objective

The general objective of the Master in Finance is to prepare professionals who are:

- Business leaders specialized in finance who generate value in organizations by formulating innovative financial strategies and applying them in business settings that are characteristically globalized, uncertain and complex.
- Internationally competitive and capable of interacting in multicultural organizations, negotiating in globalized market settings and making appropriate financial decisions through the combination of knowledge, application of advanced financial methodologies and intensive use of technology to increase the value of the company by optimizing its resources.
- Act according to the highest ethical standards of the profession and are socially responsible by making decisions that, apart from generating economic benefits, contribute to the sustainable development of their communities.

Learning outcomes

On completing the program, students will be able to:

- Analyze business information and, consistent with its relevance, detect opportunities and threats for organizations that compete in globalized markets.
- Use technology intensively as a means of improving their work and employing the company's resources more efficiently.
- Generate innovative financial models that add value to organizations and consider uncertain and complex competitive environments.
- Formulate and apply innovative financial strategies in the organization, considering business processes in globalized markets.
- Interact effectively and efficiently in multicultural organizations that operate in globalized settings.

Target Audience

This program responds, in particular, to the interests of candidates who are already working in or intend to work in:

- The accounting and finance areas in medium- and large-sized firms in the manufacturing or service sectors.
- Companies in the financial sector.
- Official national and international institutions related to the financial sector.

MAF-V Master in Finance

Edition 2009

Remedial Courses		C	L	U
CD4001	Introduction to Statistical Finance	3.5	0	12
EC4008	Economics	3.5	0	12
FZ4004	Financial Information Analysis	3.5	0	12
MA4000	Introduction to Mathematics for Finance	3.5	0	12
		14	0	48
Quality Development Courses		C	L	U
OP4036	Quality Development Course	3.5	0	12
		3.5	0	12
Basic Courses		C	L	U
EC4009	Financial Econometrics	3.5	0	12
FZ4005	Financial Economics	3.5	0	12
FZ4006	Introduction to Corporate Finance	3.5	0	12
FZ4007	Advanced Corporate Finance	3.5	0	12
FZ4008	Investments	3.5	0	12
		17.5	0	60
Quality Development Courses		C	L	U
FZ5000	International Financial Management	3.5	0	12
FZ5001	Markets and Financial Derivatives Valuation	3.5	0	12
FZ5003	Capstone Seminar in Finance	3.5	0	12
		10.5	0	36
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48
Research Courses		C	L	U
FZ5004	Finance Project	3.5	0	12
		3.5	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is nine semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Education (MEE-V)

General program objectives

The objective of the Master of Education is to:

- Prepare leaders in the area of education who propose and execute innovative educational projects and programs that will contribute to the improvement of their institution's services and show, through their teaching practice, respect for the dignity of students, parents and colleagues, regardless of whether they are members of the educational community or the community at large.
- Prepare professionals who use teaching-learning strategies to meet the curricular objectives efficiently and effectively.
- Prepare professionals who apply their research skills to solve current educational problems.

Learning outcomes

On completing the program, students will be able to:

- Express a vision regarding the contemporary, local, regional and global educational reality, enabling them to contribute to processes of educational change.
- Base their teaching practice on their knowledge of educational science.
- Conduct research as a professional practice tool in educational settings.
- Generate new ideas, methods and techniques in order to identify opportunities and implement solutions in conjunction with various stakeholders.
- Incorporate their concept of education into the specific areas of concentration.

Target Audience

Candidates for the Master in Education program must have completed a bachelor's degree in an area related to education, administration or similar, and, preferably, have reading comprehension skills in the English language. Moreover, applicants should, if possible, have some work experience involving school management scenarios in the diverse academic levels or work in private enterprise, focusing on the respective business training programs.

MEE-V Master in Education

Edition 2013

Quality Development Course		C	L	U
ED4022	Technology and Innovation in Education	3	0	12
		3	0	12
Education Basic Courses		C	L	U
ED4032	Comparative Education	3	0	12
ED4033	Learning Theories in the Educational Context	3	0	12
		6	0	24
Obligatory Course by Accentuation		C	L	U
OP4006	Elective Course I	3	0	12
		3	0	12
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Courses		C	L	U
ED4034	Applied Research Project I: Identifying Study Problems	3	0	12
ED4035	Applied Research Project II: Methodological Approaches	3	0	12
ED5084	Applied Research Project III: Analysis of Results	3	0	12
		9	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is nine semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Humanistics Studies (MEH-V)

General program objectives

The new world order and democratic society require a strong, proactive, committed and articulate civil society, in which a dialogue can be held among the diversity of voices, mentalities and stances. Therefore, the program's objective is to educate social subjects who are committed to an analytical vision drawn from the bases of philosophy and who adopt interpretive methodologies that enable them to analyze their own and others' discourse clearly.

Learning outcomes

On completing the program, students will be able to:

- Design an innovative response to educational demands in the areas of History, Ethics, Literature and Discourse, and Science and Culture.
- Manage humanistic projects in public and private institutions.
- Be a social subject with the necessary critical judgment to participate in the construction of possible solutions to human issues, such as poverty, war and environmental deterioration.
- Direct the implementation of codes of ethics in the academic, public, business and government arenas.
- Include respect and tolerance for differences in codes of ethics.
- Problematize current moral action, reflect on it, interpret and legitimize rationally another moral action proposal so as not to neglect its purposes and functions of safeguarding social wellbeing, equity and justice.
- Instrument community-oriented projects that go beyond economic and personal fulfillment interests.
- Complete consulting projects in the public, private and academic sectors, as well as in civil society, on topics related to organizational ethics, the growth and professionalization of civil society, public policy, and science and technology, among others.
- Explore and/or formulate proposals for consideration with a view to achieving a critical understanding of the present-day reality and in the areas of specialization offered by the program.
- Offer an innovative teaching response to educational demands in the areas of Ethics, History, Literature and Discourse, and Science and Culture.

Target Audience

This program is intended for:

- Public- and private-sector human resource managers.
- Academics and teachers within the humanistic area.
- CEOs who wish to expand and renew their company's social responsibility constantly.
- Consultants, strategists and politicians who are committed to constructing a national project with the purest, most updated knowledge of humanity, philosophy, ethics, and world and Mexican literature and history.
- Experts in the organizational climates of companies.
- Company executives who wish to recover the humanistic dimension in an environment that favors production and productivity.
- Young people who are interested in research and in developing the capacity to explore and/or put forward reflective proposals, in order to attain a critical understanding of the current reality and in the specialization areas offered by the program.
- NGO leaders and collaborators who promote the understanding of humans in relation to technological and productive processes.
- Humanists who seek to reconsider their paradigm from new perspectives.
- Humanists who promote a transdisciplinary exchange and wish to practice, within an academic framework, the reality they must face outside this context.

MEH-V Master in Humanistics Studies

Edition 2009

Quality Development Courses		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Core Courses		C	L	U
OP4002	Basic Course I	3	0	12
OP4003	Basic Course II	3	0	12
OP4004	Basic Course III	3	0	12
OP4005	Basic Course IV	3	0	12
OP4018	Basic Course V	3	0	12
		15	0	60
Elective Courses (1)		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
OP5045	Elective IV	3	0	12
		12	0	48
Research Courses		C	L	U
H4012	Research Methods	3	0	12
H5022	Research Seminar	3	0	12
		6	0	24

(1) To register Elective Courses, the students must have accredited the Quality Development Courses and five Core Courses. Also, to register H5030 Elective Course, the students must have accredited three Concentration Elective Courses.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Energy Management and Renewable Sources (MER-V)

General program objectives

- Educate professionals able to optimize energy use, both in private and public sector
- Educate skilled professionals for energy management including the use of alternative and conventional sources

Target Audience

Professionals with responsibilities in energy planning and management processes, and in the development, implementation and assessment of energy management policies.

Learning outcomes

On completing the program, students will be able to:

- Solve optimization problems in energy use
- Innovate in planning and energy management
- Evaluate alternatives to the use of renewable sources of energy
- Generate strategic plans of energy that ensure sustainable development

MER-V Master in Energy Management and Renewable Sources Edition 2011

Remedial Course		C	L	U
IQ4002	Fundamentals for Energy Analysis	3	0	12
		3	0	12
Quality Development Courses		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Basic Courses		C	L	U
EC4010	Environmental Economics	3	0	12
TE4014	Industrial Applications of Renewable Energy	3	0	12
		6	0	24
Core Courses		C	L	U
TE4011	Cogeneration and Alternate Sources of Energy	3	0	12
TE4015	Management and Efficient Use of Electrical Energy	3	0	12
TE4016	Legislation and Funding of Energy Resources	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Courses		C	L	U
GI5010	Research and Innovation Methods	3	0	12
		3	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is four semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Enterprise Administration (MGN-V)

General program objectives

- Educate professionals who will design and implement ethical, socially responsible solutions to complex business problems, through the use of analytical methods and innovative technologies.
- Prepare leaders with creative, innovative thinking who will act as agents of change in multicultural environments.
- Make students capable of designing and implementing innovative business processes and/or models that generate sustainable value for the organization and its community, with a global perspective of competitiveness.

Learning outcomes

On completing the program, students will be able to:

- Act based on analytical thinking
- Design sustainable business's models
- Act ethically
- Manage and use the new information technologies
- Apply and promote interdisciplinary and collaborative work
- Identify new business's opportunities with the goal of transforming their own reality and/ or the one of their business
- Generate sustainable solutions to business's problems through the integration of knowledge, abilities, attitudes and values
- Communicate effectively
- Establish networking
- Self-learning
- Be sensitive to multicultural environments

Target Audience

Profesionistas y ejecutivos con deseos de enriquecer su formación con una perspectiva global del mundo de los negocios en empresas del sector privado, público y organizaciones sin fines de lucro, con la finalidad de progresar en su carrera y ocupar puestos gerenciales y directivos.

Consultores y emprendedores interesados en iniciar o fortalecer su negocio de forma creativa e innovadora.

MGN-V Master in Enterprise Administration

Edition 2010

Remedial Courses (1)		C	L	U
AD4001	Statistical Analysis in Organizations	3.5	0	12
AD4002	Economic Environment for the Organization	3.5	0	12
FZ4000	Introduction to Financial Information for Decision Making	3.5	0	12
		10.5	0	36
Quality Development Course		C	L	U
OP4036	Quality Development Course	3.5	0	12
		3.5	0	12
Basic Courses		C	L	U
EC4014	Economics for Decision Making	3.5	0	12
FZ4009	Finance Management	3.5	0	12
MT4013	Marketing Management	3.5	0	12
RH4000	Leadership and Organizational Behavior	3.5	0	12
TI5008	Managing the Value Chain	3.5	0	12
		17.5	0	60
Specialty Advanced Courses		C	L	U
AD4008	Management and Strategies of Entrepreneurship	3.5	0	12
AD5059	Strategic Planning and Organizational Structures	3.5	0	12
EC5008	Innovation and Prospective	3.5	0	12
		10.5	0	36
Elective Courses (2)		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48
Integrating Course		C	L	U
AAD5060	Management and Corporate Governance Seminar	3.5	0	12
		3.5	0	12

(1) The faculty of the academic program, through the director, establishes appropriate criteria for accreditation.

(2) The foundation courses must have been completed, together with any prerequisites for each elective course.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is five trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Public Management (MGP-V)

General program objectives

Graduates from the Master in Public Management will be able to practice efficiently, applying state-of-the-art methodologies oriented toward the enhancement of society. They will also be able to generate, design and implement reforms to drive institutional change processes at state and municipal levels; influence government decision-making processes positively; direct the efficient management of financial, material and human resources in public management; and use analytical frameworks and empirical methods to formulate and evaluate effective public management.

Learning outcomes

On completing the program, students will be able to:

- Practice efficiently, applying state-of-the-art methodologies oriented toward the enhancement of society.
- Generate, design and implement reforms to drive institutional change processes at state and municipal levels and influence government decision-making processes positively.
- Direct the efficient management of financial, material and human resources in public administration, and use analytical frameworks and empirical methods to formulate and evaluate effective public management.

Target Audience

- Mid- and upper-level federal, state and municipal public officials.
- Students and specialists who want to improve their analytical skills and decision-making capacities regarding local public administration issues.
- Individuals who are interested in participating in elected office positions in the different spheres of government within the executive and legislative branches.
- Leaders and collaborators of political parties and non-governmental organizations who wish to strengthen their planning and decision-making processes.
- Professionals involved in analyzing government actions.
- Private-sector professionals seeking to enhance their knowledge of public administration.

MGP-V Master in Public Management Edition 2009

Quality Development Courses		C	L	U
NB4006	Leadership and Ethics in Public Administration	3.5	0	12
		3.5	0	12
Basic Courses		C	L	U
AP4013	Quantitative Applied Methods	3.5	0	12
AP4014	Public Administration Law	3.5	0	12
AP4026	Public Finance	3.5	0	12
AP5003	Government and Citizenship Participation	3.5	0	12
		14	0	48
Core Courses		C	L	U
AP4015	Federalism and Inter governmental Relations	3.5	0	12
AP4016	Public Administration Planning and Management	3.5	0	12
AP4017	Municipal and State Law	3.5	0	12
AP5017	Evaluation and Financing of Social Projects	3.5	0	12
		14	0	48
Elective Courses		C	L	U
OP5049	Elective I	3.5	0	12
OP5050	Elective II	3.5	0	12
OP5051	Elective III	3.5	0	12
OP5052	Elective IV	3.5	0	12
		14	0	48
Research Courses		C	L	U
AP5002	Applied Research Project	3.5	0	12
		3.5	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Innovation for Enterprise Development (MID-V)

General program objectives

- To prepare entrepreneurial leaders with a culture of innovation, through practical methodologies, in order to develop high-value businesses and create value within established organizations, targeting professionals and entrepreneurs.
- To prepare professionals who promote a culture of innovation to generate sustainable competitive advantages.

Target Audience

Professionals from the areas of Administration, Technology, Engineering, Health, Humanities and Social Science who are interested in acquiring the knowledge required to drive innovation within their organizations.

Consultants who offer services in the area of innovation.

MID-V Master in Innovation for Enterprise Development Edition 2009

Remedial Course		C	L	U
AD4016	Administration	3.5	0	12
		3.5	0	12
Quality Development Courses		C	L	U
DS4002	Leadership for Sustainable Development	3.5	0	12
		3.5	0	12
Core Courses		C	L	U
AD4013	Financial Impact of Innovation in Organizations	3.5	0	12
AD4014	Management and Evaluation of Innovation Projects	3.5	0	12
AD4015	Culture and Innovation Management in Corporations	3.5	0	12
TI4000	Legal Aspects of Technology	3.5	0	12
TI4004	Mental Models and Innovation Methodologies	3.5	0	12
TI4005	Innovation Process and Techniques	3.5	0	12
TI4006	Design of Technological Products and Services	3.5	0	12
		24.5	0	84
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48
Research Courses		C	L	U
AD5036	Innovation and Creativity Seminar	3.5	0	12
AD5037	Innovation Project	3.5	0	12
		7	0	24

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Engineering with specialization in Quality Systems and Productivity (MIP-V)

General program objectives

The objective of the Master of Engineering in Quality Systems and Productivity is to contribute decisively to the development of highly specialized talent, capable of designing, implementing and leading high-impact initiatives in added-value generation in an organization's manufacturing and/or service operations. This is achieved by training professionals with the skills and knowledge to:

- Organize the participation of the human resource and use or create new approaches that enhance quality and comprehensive productivity in manufacturing or service organizations. They will also promote the strategic, efficient participation of organizational and technological resources.
- Contribute to their company's competitiveness and innovation through the following factors: market share growth, increase in earnings before taxes, decrease in costs and improvement in user perception.
- Apply new methodologies, improve existing systems and exercise leadership oriented toward driving the process of change and its subsequent implementation.
- Have a solid educational background to develop a managerial career in the areas of quality, engineering management, statistics engineering, production systems and logistics.

Learning outcomes

On completing the program, students will be able to:

- Design, oversee, evaluate and improve management systems for the service and production areas, on the basis of the principles and philosophies of quality, innovation and competitiveness.
- Design, oversee, execute and evaluate experimental processes that generate tangible solutions for operational optimization.
- Comprehensively lead the continuous enhancement and innovation process in a company's production systems, thus increasing its competitiveness.
- Design, oversee, evaluate and improve production systems, on the basis of contemporary production and manufacturing principles and philosophies, supported by the use of statistical and process optimization tools.
- Integrate the participation of the human resource as a key component in the operation of organizational management and production processes, as well as the efficient administration of organizational and technological resources.

Target Audience

Egresados de carreras profesionales ya sea ingeniería o licenciatura, con conocimientos de probabilidad y estadística e investigación de operaciones.

MIP-V Master in Engineering with specialization in Quality Systems and Productivity

Edition 2013

Quality Development Courses		C	L	U
OP4037	Quality Development Course	3	0	12
		3	0	12
Basic Courses		C	L	U
OP4006	Elective Course I	3	0	12
OP4007	Elective Course II	3	0	12
		6	0	24
Core Courses		C	L	U
IN4017	Production Engineering	3	0	12
IN4018	Supply Chain Management	3	0	12
IN4019	Quality Management and Competitiveness	3	0	12
		9	0	36
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Reserach Courses		C	L	U
GI5010	Research and Innovation Methods	3	0	12
		3	0	12

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Marketing (MMT-V)

General program objectives

The objective of the Master in Marketing is to prepare professionals who are capable of achieving a competitive advantage in the development of marketing strategies that enable them to:

- Identify high-potential markets and segments.
- Generate and apply market intelligence to determine consumer purchasing processes and understand the mechanisms that govern their decisions in diverse markets.
- Develop strategies for positioning, launching and marketing products and services.
- Apply the ideal tools for forming relationships with clients and generating brand and company loyalty.
- Generate brand value that translates into high earnings.

Learning outcomes

On completing the program, students will be able to:

- Understand the effect of local and global consumer trends through the analytical use of market intelligence tools.
- Identify relevant and actionable market opportunities and segments for the company.
- Develop innovative processes and strategies that translate into profitability and sustainability for companies:
 - Brand and product strategies.
 - Pricing and profitability strategies.
 - Distribution and marketing strategies.
 - Comprehensive communication strategies.
 - Sales strategies and customer relations.
- Design, implement and manage competitive strategic marketing plans.

Research areas

- Consumer behavior analysis.
- Marketing strategies.

Target Audience

Egresados de carreras profesionales ya sea ingeniería o licenciatura, con conocimientos de probabilidad y estadística e investigación de operaciones.

MMT-V Master in Marketing

Edition 2009

Remedial Courses		C	L	U
AD4001	Statistical Analysis in Organizations	3.5	0	12
FZ4000	Introduction to Financial Information for Decision Making	3.5	0	12
		7	0	24
Quality Development Courses		C	L	U
OP4036	Quality Development Course	3.5	0	12
		3.5	0	12
Core Courses		C	L	U
MT4004	Consumer Client Behavior Analysis	3.5	0	12
MT4005	Marketing Intelligence Systems	3.5	0	12
MT4006	Pricing Strategy and Profitability	3.5	0	12
MT4007	Marketing Communication	3.5	0	12
MT4008	Commercial Strategies	3.5	0	12
MT4009	Brands, Products and Services: Innovation and Management	3.5	0	12
MT4010	Selling and Negotiation Systems	3.5	0	12
		24.5	0	84
Elective Courses		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48
Reserach Courses		C	L	U
MT5001	Applied Marketing Project	3.5	0	12
MT5005	Strategic Marketing Planning	3.5	0	12
		7	0	24

(1) The faculty of the academic program, through the director, establishes appropriate criteria for accreditation.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is four trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Educational Technology (MTE-V)

General program objective

The objective of the Master of Educational Technology (MTE) program is to:

- Develop the potential of education professionals through digital learning environments.
- Professionalize the didactic practice of teachers and training professionals based on innovative pedagogical, technological and management models that will enhance their educational environments.
- Prepare leaders in the field of education who will propose and execute innovative educational and technological programs that contribute to improving the service provided.

Target Audience

Candidates for the Master in Educational Technology program must have completed a bachelor's degree in an area related to education, administration or similar, and, preferably, have reading comprehension skills in the English language. Moreover, applicants should, if possible, have some work experience involving school management scenarios in the diverse academic levels.

MTE-V Master in Educational Technology

Edition 2013

Quality Development		C	L	U
ED4022	Technology and Innovation in Education	3	0	12
		3	0	12
Education Basic Courses		C	L	U
ED4032	Comparative Education	3	0	12
ED4033	Learning Theories in the Educational Context	3	0	12
		6	0	24
Obligatory Course by Accentuation		C	L	U
OP4006	Elective Course I	3	0	12
		3	0	12
Elective Courses		C	L	U
OP5042	Elective I	3	0	12
OP5043	Elective II	3	0	12
OP5044	Elective III	3	0	12
		9	0	36
Research Courses		C	L	U
ED4034	Applied Research Project I: Identifying Study Problems	3	0	12
ED4035	Applied Research Project II: Methodological Approaches	3	0	12
ED5084	Applied Research Project III: Analysis of Results	3	0	12
		9	0	36

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is three semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Information Technology Management (MTI-I)

General program objectives

The objective of the Master in Information Technology Management is to prepare professionals with the capacity for driving, with a strategic organizational vision, the generation of value through information and communication technologies (ICT).

Learning outcomes

On completing the program, graduates will be able to:

- Design and manage technological projects, including the ethical aspects of handling information.
- Model and optimize business processes in which human capital and information technologies interact.
- Propose the alignment of technological strategy with business strategy.
- Generate innovative initiatives based on business opportunities and technological solutions focused on organizational competitiveness.

Target Audience

The MTI-I program targets people with majors in three different disciplines: Information Technologies, Business Administration or Engineering.

Program participants with an undergraduate degree in ICT will be able to specialize in technology management, gaining insight into the value of technologies for organizations, while mastering the techniques needed for their management and for business opportunity searches.

The program enables engineering specialists to study information and communication technologies in depth as a tool for transforming organizational processes and activities.

For Business or Business Administration specialists, MTI-I offers the opportunity to understand the complexity of technology and master the techniques for managing companies within the new paradigm of knowledge societies.

MTI-I Master in Information Technology Management Edition 2012 CHECAR EL PLAN ANTES 08

Remedial Courses		C	L	U
OR00204	Administration	3	0	12
SI00268	Introduction to IT	3	0	12
		6	0	24
Quality Development Course		C	L	U
DS00204	Leadership for Sustainable Development	3	0	12
		3	0	12
Basic Courses		C	L	U
SC00208	Strategy for Technological Competitiveness	3	0	12
SC00227	Introduction to Knowledge Management	3	0	12
SI00213	Organizational Architecture for the New Economy	3	0	12
SI00219	Modeling Dynamic Systems	3	0	12
SI00227	Organizational Dynamics	3	0	12
SI00228	Information and Telecommunications Technology	3	0	12
		18	0	72
Specialty Advanced Courses (1)		C	L	U
OP00201	Elective I	3	0	12
OP00202	Elective II	3	0	12
OP00203	Elective III	3	0	12
		9	0	36
Elective Courses		C	L	U
OP00221	Advanced Topics I	3	0	12
OP00222	Advanced Topics II	3	0	12
		6	0	24
Research Courses (2)		C	L	U
SC00221	Innovation and Creativity Seminar	3	0	12
SC00492	Thesis I	3	0	12
SC00494	Thesis II	3	0	12
SC00496	Thesis III	3	0	12
		12	0	48

(1) Select three courses according to the student's personal interest and based in the courses offer.

(2) Thesis courses can be revalidated with courses that include projects (Graduation Requirement Courses). Students must complete either the option of writing a thesis or of taking the graduation requirement courses (they are mutually excluding). In order to take the graduation requirement courses, students must have completed all the basic courses and two electives. The Seminar on Innovation and Creativity can be taken during the same period as the graduation requirement courses. The graduation requirement courses that substitute the Thesis courses will be defined solely by the graduate program to which the master's degree belongs.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is five trimesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Master in Information Technology Management (MTI-V)

General program objective

- To prepare professionals who manage and strategically apply innovative information technologies to address the productivity, sustainability and social responsibility challenges faced by businesses and organizations.
- To prepare professionals with a strategic vision to generate new ways of assimilating and applying knowledge through information technologies.
- Prepare leaders who will transform conventional processes and strategies.

Target Audience

The MTI-V program targets people with majors in three different disciplines: Information Technologies, Business Administration or Engineering.

Program participants with an undergraduate degree in ICT will be able to specialize in technology management, gaining insight into the value of technologies for organizations, while mastering the techniques needed for their management and for business opportunity searches.

The program enables engineering specialists to study information and communication technologies in depth as a tool for transforming organizational processes and activities.

For Business or Business Administration specialists, MTI-V offers the opportunity to understand the complexity of technology and master the techniques for managing companies within the new paradigm of knowledge societies.

MTI-V Master in Information Technology Management Edition 2012

Remedial Courses (1)		C	L	U
AD4016	Administration	3.5	0	12
TI4011	Introduction to Information Technology	3.5	0	12
		7	0	24
Quality Development Courses		C	L	U
OP4036	Quality Development Course	3.5	0	12
		3.5	0	12
Core Courses		C	L	U
AD4022	Project, Program and Portfolio Management	3.5	0	12
RH4002	Human Capital Management	3.5	0	12
TI4015	Business Technology Architecture	3.5	0	12
TI4016	Information Technology Governance	3.5	0	12
TI4017	Strategic Enterprise Performance Management	3.5	0	12
TI5024	Dynamic Systems Modeling	3.5	0	12
		21	0	72
Elective Courses (2)		C	L	U
OP5053	Elective I	3.5	0	12
OP5054	Elective II	3.5	0	12
OP5055	Elective III	3.5	0	12
OP5056	Elective IV	3.5	0	12
		14	0	48
Research Courses (3)		C	L	U
AD5036	Innovation and Creativity Seminar	3.5	0	12
OP5059	Degree Course I	3.5	0	12
OP5060	Degree Course II	3.5	0	12
		10.5	0	36

(1) The faculty of the academic program, through the director, establishes appropriate criteria for accreditation.

(2) For elective courses must have completed 50% of the material basis and respect the requirements of each option.

(3) The alternative certification options that are chosen are either complete (they are mutually exclusive).

The student will conduct the election in conjunction with the program director.

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in trimestral periods and the expected completion timeframe is five trimesters.

C Number of class hour per week

L Number of laboratory hours or activities per week

U Study hours that must be dedicated to the course (class hours included)

Ph. D. Educational Innovation (DEE-V)

General program objective

The aim of the PhD in Educational Innovation comprises:

- The preparation of individuals who are capable of contributing, through research, to the theoretical-practical knowledge of education; and of increasing the efficiency and effectiveness of educational projects, seeking to innovate and achieve positive change in organizations.
- The preparation of leaders and agents of change who examine today's society, from individual, organizational, systemic and social perspectives, in order to examine, define, reformulate, plan and facilitate the process of educational change.

Target Audience

This program's target audience consists of graduate-level academics who are interested in a career as researchers in a public or private higher education institution and/or educational or social science research centers, and, to a lesser degree, as educational managers in higher education institutions that require administrators who hold a doctoral degree. At present, and at least in the immediate future (the next 50 years), the number of professors with a doctorate in the area of education that Mexico and other Latin American countries will need simply to assure the minimum accreditation of institutions that offer graduate programs in education is so vast that the demand is more than 15 times greater than the supply. If all the current doctoral programs in education were to accept students at full capacity, the institutional requirements in the nation's faculties for doctors in education would not be met even over the next 25 years.

The deficit of doctors in education is even greater in Latin America.

Participants in this program should have the following characteristics:

1. The commitment to be an academic researcher, working in an educational institution and performing scientific teaching, research and dissemination activities in their local community.
2. A critical-strategic spirit, with the desire to innovate in their field, focusing on achieving the ongoing enhancement of the educational environment.
3. An interest in conducting research in one of the areas currently offered by the program: a) Administration and management of educational change; b). The student as a learner; c). The role of the professor and of learning in the educational process; d) The social impact of innovative educational models; e) Education in physics and mathematics
4. A commitment to improving the social and political environment of Latin American countries and enhancing the quality of life of its inhabitants through education across all its aspects.
5. The openness for internationalization, to know what is being done in other countries and to learn from them, sharing what their own country is doing, seeing the world as a whole, all nations with the same principal goals of providing a quality education for its people.
6. The ability to receive and produce influential information in Spanish and English; to read research reports and papers from scientific publications; and profit from texts and articles in both languages.
7. The desire to act as an agent of change by examining, redefining and motivating people to act.

DEE-V Ph. D. Educational Innovation

Edition 2010

Quality Development Course		C	L	U
ED4022	Technology and Innovation in Education	3	0	12
		3	0	12
Elective Courses		C	L	U
OP5062	Elective I	3	0	12
OP5063	Elective II	3	0	12
OP5064	Elective III	3	0	12
OP5065	Elective IV	3	0	12
OP5066	Elective V	3	0	12
OP5067	Elective VI	3	0	12
OP5068	Elective VII	3	0	12
OP5069	Elective VIII	3	0	12
OP5070	Elective IX	3	0	12
OP5071	Elective X	3	0	12
OP5072	Elective XI	3	0	12
		33	0	132
Research Proposal		C	L	U
ED5075	Research Proposal I	3	0	12
ED5076	Research Proposal II	3	0	12
ED5077	Research Proposal III	3	0	12
		9	0	36
Research Seminars		C	L	U
ED5078	Research Seminar I	1	0	4
ED5079	Research Seminar II	1	0	4
ED5080	Research Seminar III	1	0	4
		3	0	12
Research Courses		C	L	U
ED5081	Assisted Research I	3	0	12
ED5082	Assisted Research II	3	0	12
ED5083	Assisted Research III	3	0	12
ED6033	Doctoral Research I	3	0	12
ED6034	Doctoral Research II	3	0	12
ED6035	Doctoral Research III	3	0	12
ED6036	Doctoral Research IV	3	0	12
ED6037	Doctoral Research V	3	0	12
ED6038	Doctoral Research VI	3	0	12
ED6039	Doctoral Research VII	3	0	12
ED6040	Doctoral Research VIII	3	0	12
ED6041	Doctoral Research IX	3	0	12
ED6042	Doctoral Research X	3	0	12
ED6043	Doctoral Research XI	3	0	12
ED6044	Doctoral Research XII	3	0	12
ED6045	Doctoral Research XIII	3	0	12
ED6046	Doctoral Research XIV	3	0	12
		51	0	204
Doctoral Defense		C	L	U
ED6000	Doctoral Defense	0	0	1
		0	0	1

At Tecnológico de Monterrey, an academic load of between 36 and 48 units per academic period is considered adequate for full-time graduate students. This program is offered in semestral periods and the expected completion timeframe is eight semesters.

- C Number of class hour per week
- L Number of laboratory hours or activities per week
- U Study hours that must be dedicated to the course (class hours included)

Course content by academic discipline

En esta sección se presenta la descripción general de los cursos que integran los planes de estudio de los programas de posgrado ofrecidos por el Tecnológico de Monterrey, ordenados por disciplina académica. Esta información también se encuentra disponible en la página de la Vicerrectoría de Normatividad Académica y Asuntos estudiantiles (http://sitios.itesm.mx/va/planes_de_estudio/) siguiendo la ruta: Planes de estudio / Posgrado

AD Management

AD4001 Statistical Analysis in Organizations

(3.5 0 12. Prerequisites: None. ELS11, MBA09, MBA09G, MGN10V, MMT09, MMT09V)

Equivalence: CD96207, GA00201, GA4009

This is an introductory course in the area of administration. This course requires previous knowledge of mathematics. As learning outcome the student will be able to solve cases where he uses the statistical analysis tools to support decision making in the business environment.

General objective: The student will be able to manage work information and quantitative foundations for an accurate and timely decision making, with a global business vision and within a context of competitive, international environments; to use efficiently statistical and computer tools to clarify decision making processes with an attitude of honesty (towards information management) and responsibility (towards the impact of the actions to undertake).

Key words: Descriptive statistics. Statistical inference. Probability and probability distributions. Simple and multiple linear regression, curvilinear relationships. Simple and multiple linear regression using time variables.

Bibliography: * Anderson, David R. / Sweeney, Dennis J. / Williams, Thomas A., Estadística para Administración y Economía, 10ma. Edición, Cengage Learning.

AD4002 Economic Environment for the Organization

(3.5 0 12. Prerequisites: None. MBA09, MBA09G, MGN10V)

Equivalence: EC96235, GA00200, GA4008, GA4087

This is a basic course in the knowledge area of administration. This course requires previous knowledge of algebra, mathematics and statistics. As learning outcome the student will be able to resolve cases and exercises where he would understand basic economic theories, and be able to apply them to "real world" issues and problems.

General objective: The student will be able to know and apply the knowledge in micro and macroeconomics; to apply them to "real world" issues and problems.

Key words: Macroeconomics. Markets. Microeconomics. National accounts. Demand.

Bibliography: * Case, Karl E., Principios de microeconomía/Karl E. Case, Ray C. Fair; tr. María del Pilar Carril Villarreal, 8va. Edición, México: Pearson/Educación, 2008, México, 2008, español, [9702610788],[9789702610786].

AD4004 Competitive Strategy and Business Design

(3.5 - 0 - 12. Prerequisites: None. EPY11, MBA09, MBA09G)

Equivalence: AD5059, GA00234, GA5075

This is a basic level course that has the intention of design and model organizational processes using efficiently information and technology to make strategic and organizational decisions. This course requires previous knowledge of organizational behavior. As learning outcome the student will be able to elaborate a project where he designs, evaluates and implement competitive strategies for companies in complex and changing environments, generating value for the organization, its clients and society as a whole.

General objective: The student will be able to design and model organizational processes using efficiently information and technology to make strategic and organizational decisions; Promote and underline honesty and responsibility with continuous innovation, and the generation of a work culture with clear conscience of the country's needs, as well as its sustainable development; to work in an environment of self-learning and critical thinking through collaborative work, and the analysis, synthesis and assessment of organizational and strategic processes.

Key words: Mission and vision statements. External environment analysis (complex versus stable settings). Internal environment analysis. Strategic formulation: strategy design and modeling. Strategic implementation: organizational process design and modeling.

Bibliography: * Michael A. Hitt, R. Duane Ireland y Robert E. Hoskisson, Strategic Management: Competitiveness and globalization. Concepts and cases, Octava.

AD4005 Entrepreneurship and Intrapreneurship

(3.5 - 0 - 12. Prerequisites: [MT4001 , CD4000 , FZ4001]. MBA09, MBA09G)

Equivalence: None

This is a basic course in knowledge area of adminis-

tration. This course requires previous knowledge of management. As learning outcome the student will be able to develop a strategic plan to demonstrate his entrepreneurial potential.

General objective: The student will be able to develop ideas and identify business opportunities to create new businesses or new projects or divisions inside an organization through the elaboration of a strategic plan.

Key words: Creativity. Personal profile as an entrepreneur. Filters for analyzing business ideas. Business plan workshop. Interviewing entrepreneurs.

Bibliography: * Timmons, Jeffry A., New venture creation: Entrepreneurship for the 21st century/Jeffry A. Timmons and Stephen Spinelli, Jr, 8th. Edition, Boston: McGraw-Hill/Irwin, c2009, [9780073381558 (papel alcalino)], [0073381551 (papel alcalino)].

AD4006 Organizational Change in Leadership Skills

(3.5 - 0 - 12. Prerequisites: None. MDM09)

Equivalence: None

Course aim: This preliminary course generates written and verbal communication skills so that students will be able to present projects successfully to an organization's board of directors; to generate the leadership skills that will help the organization to move towards the successful completion of projects. Prerequisite: Prior knowledge of business administration. Learning outcome: the student will be able to present projects to an organization's directors that will be accepted and successfully implemented by the students.

General objective: Students will be able to identify and develop leadership and organizational change management skills on projects that incorporate continuous improvement and radical change in organizations seeking to improve their competitive advantage.

Key words: Organizational development. Effective presentations. Change management.

Bibliography: * Blanchard, Kenneth H., Leading at a higher level. Español\Liderazgo al más alto nivel:

Cómo crear y dirigir organizaciones de alto desempeño/Ken Blanchard; traducción Efraín Sánchez.” Bogotá; México: Grupo Editorial Norma, 2007, Colombia, 2007, español, [9789580499558],[9580499551].

AD4007 Business and Product Innovation

(3.5 - 0 - 12. Prerequisites: None. MA 09)

Equivalence: None

This is a basic knowledge management course. Course aim: To equip the student with knowledge of the process and components that comprise an innovation strategy for business, product and service models, as well as the tools used for this purpose. Prerequisite: Grounding in the functional areas of business administration. Learning outcome: The student will be able to create proposals for innovation opportunities in the organization (business, product and service models).

General objective: Students will be able to distinguish a business model innovation from a product innovation, analyze the innovation process and tools for new products and business models, and evaluate different innovation models and processes for distinct products and services.

Key words: Process of innovation in business. Product and service innovation. Culture of innovation for the development and creation of value. Impact on product and business innovation. Best-practice areas ranging from new product strategy through to climate and culture. Innovation mindset.

Bibliography: *Thomas Kuczmar, Innovation .

AD4008 Management and Strategies of Entrepreneurship

(3.5 - 0 - 12. Prerequisites: [EC4006, EC4007, FZ4003, MT4011], [TI5008 , FZ4009]. MA 09, MGN10V)

Equivalence: None

Course aim: This advanced course seeks to provide the student with the tools and methodologies used for recognizing investment opportunities through innovative strategies that generate sustainable value. Prerequisite: Basic, fundamental knowledge of

the functional areas of business. As a result the student is expected to write a report that demonstrates his capacity to identify and assess new business opportunities and to plan the organization's growth efficiently.

General objective: Upon completion of this course, students will be able to identify and develop business opportunities in viable and sustainable organizations, develop their own analytical approaches, using guidelines and natural entrepreneurial skills, create and earn value for the organization's stakeholders, as well as innovate and generate sustainable concepts and business models.

Key words: Entrepreneurship. Identification of opportunities. Business plan. Entrepreneurial strategies. New businesses.

Bibliography: * Burns, Paul, 1949-, Corporate entrepreneurship: Building an entrepreneurial organization/Paul Burns, New York: Palgrave Macmillan, 2005, [1403908095 (rústica)],[9781403908094 (rústica)].

AD4013 Financial Impact of Innovation in Organizations

(3.5 - 0 - 12. Prerequisites: None. MID09V)

Equivalence: None

It is a basic level course in the area of industrial engineering that requires prior knowledge in the administration area. As a learning product the student will calculate and interpret key financial indicators for decision making on investment in innovation.

General objective: At the end of this course the student will be able to determine the factors contributing to the success of a product or service, and beyond the specifications of the product or service that relate to the company's strategy, market competitiveness and how the product or service will meet customer requirements and will be included in the current process of the company.

Key words: Markets. Competitiveness. Strategy of the company. Customer requirements.

Bibliography: * Metrick, Andrew, Venture capital and the finance of innovation/Andrew Metrick, Hobo-

ken, N. J.: John Wiley & Sons, c2007, [0470074280 (tela)], [9780470074282 (tela)].

AD4014 Management and Evaluation of Innovation Projects

(3.5 - 0 - 12. Prerequisites: None. MID09V)

Equivalence: None

This is a basic course in the area of management, which requires prior knowledge of business management fundamentals area. As a result of learning the student will define and manage a useful and feasible innovative project with emphasis on the issues of finance, planning and implementation of a technology innovation project.

General objective: At the end of this course the student will learn the process of managing and control innovation projects, and its impact on all organizational levels using different techniques of project management applied to innovation leveraging Technology.

Key words: Innovation project. Project management process. Techniques for the control of projects. Development and application of diverse professional abilities. Organizational levels.

Bibliography: * Frame, J. Davidson, THE NEW PROJECT MANAGEMENT. Tools for an age of rapid change., 1st. Edition, San Francisco: Jossey-Bass , 1994, inglés, [155542662X].

AD4015 Culture and Innovation Management in Corporations

(3.5 - 0 - 12. Prerequisites: None. MID09V)

Equivalence: SC4012

This is a basic business administration course that requires prior basic knowledge of business administration. Learning outcome: the student will complete a project that will allow him to put forward and assess the key elements that affect the development of the value generation processes in companies.

General objective: Student will be able to create a plan towards value generation in Mexican corpora-

tions, in order to satisfy the different stakeholders related to innovation: clients, suppliers, government, workers, and stockholders. This plan will be done through the study of the characteristics of the organization and the obstacles that can be found in a very competitive environment.

Key words: Change management. Organizational culture. Business innovation.

Bibliography: * Christiansen, James, Building the innovative organization: Management systems that encourage innovation/James Christiansen, Basingstoke: Macmillan, 2000, England, 2000, eng, [033380483X (hc)], [0312232837 (cloth)].

AD4016 Administration

(3.5 - 0 - 12. Prerequisites: None. MID09V, MTI12, MTI12V)

Equivalence: OR00204, OR95204, OR98204, OR99204

This is a basic business administration course. Course aim: to present the basic elements of business administration and organization to be used with other innovation elements in order to propose innovative solutions for administrative processes. Prerequisite: None. Learning outcome: the student will solve cases and exercises by applying the elements of administration and innovation to propose solutions.

General objective: Students will be able to understand the different schools of administrative thought and identify their tendencies. They will be able to establish, learn about, and analyze, from an integral perspective, the administrative process and each of its stages: identifying, describing, and analyzing the functional areas of a modern company.

Key words: Management.

Bibliography: * Daft, Richard L., Management/Richard L. Daft, 5th. Edition, Fort Worth: Dryden Press, c2000, Texas, 2000, eng, [0030264863].

AD4018 Business Policy, Ethics and Corporate Social Responsibility

(3 - 0 - 12. Prerequisites: None. DCA11, DCF11)
Equivalence: AD4003

This is a basic business administration course. Course aim: to equip the student with a structure of ethical reasoning and social responsibility in order to promote decision making based on sustainability criteria and multicultural environments. Prerequisite: grounding in the functional areas of business administration. Learning outcome: the student will be able to solve exercises and cases following a process to make excellent, well founded decisions, with clear goals, on whom the participants are, who will benefit and how and when to evaluate the results. This will all be carried out with ethical reasoning to guide the implementation of strategies. He will also generate a business policy that is consistent with the needs of today's world.

General objective: Students will be able to develop and perfect their skills in the systematic use of reason-based analysis to interpret experience, or past learning, in order to decide on determine which values are worthwhile and select both the weighting criterion and the rules that govern behavior; define the standard used to make decisions on the basis of sustainability criteria; use ethical reasoning to establish the rules and guidelines that will guide the implementation of a strategy; formulate a company policy that is consistent with the needs of today's world.

Key words: Corporate strategy. Decision on ethical dilemmas, concepts, principles and human rights. Business policy. Political involvement of businesses, marketing reasons and methods. Guide for businesses and control mechanisms.

AD4019 Fundamentals of Management

(3 - 0 - 12. Prerequisites: None. DCA11)
Equivalence: None

This is a basic course aiming that the student learns the basic principles of management. It includes the study of the origins of the discipline and its evolution.

The course introduces the student in the field of the critical management thought for challenging basic assumptions in which most management approaches are based. This will allow the student to compare basic principles with more advance ones. The course requires previous knowledge in the general areas of management and leadership. As a learning outcome of this course it is expected that the student will apply management concepts to the understanding of today's phenomena through a conceptual research paper.

General objective: At the end of this course the student would be able to integrate the management thought from a multidisciplinary perspective. The student will be able to analyze classic management paradigms and will compare them with contemporary developments in the management field. The student should have learned the evolution of the diverse schools of thought based on psychology, sociology, anthropology and economy.

Key words: Research. Management.

Bibliography: * Barry, D., y Hansen, H., The SAGE Handbook of New Approaches in Management and Organization.

AD4020 Research Methodology

(3 - 0 - 12. Prerequisites: None. DCA11, DCF11)
Equivalence: None

This course is fundamental and aims that the doctoral student identifies basic concepts and processes of research methodology. The course includes the analysis and discussion of the quantitative and qualitative scientific research paradigms and methods derived from them. The course requires previous knowledge on project design and management. As a learning outcome, it is expected that the student designs his/her doctoral research proposal, develops his/her research competencies for designing, conducting and evaluating own and others original research.

General objective: At the end of this course the student should be able to understand and apply the fundamental research concepts to a research project; from the production of the idea to its publication. This course focuses on defining the theoretical

framework, the literature review, research questions and hypothesis formulation, and research design. In this course, the main research paradigms are discussed, which facilitate to the student the differentiation between quantitative and qualitative research projects and their limitations. The course includes the study of research concepts such as internal validity, construct validity, external validity, reliability, construct operationalization and ethics in the business administration and management research field.

Key words: Research. Methods. Analysis.

Bibliography: * Creswell, J. W., *Research design: Qualitative & quantitative approaches*, Sage Publications.

AD4022 Project, Program and Portfolio Management

(3.5 - 0 - 12. Prerequisites: None. MT112, MT112V)
Equivalence: None

This is a basic course intending that students acquire knowledge and develop skills in the application of strategies techniques and tools to manage resources, activities and project portfolios of all types and particularly those related to information technology. Sufficient knowledge is required around the utilization of office suite type software, technology based tools used to expedite communication, mobile technology and basic concepts on the management of project teams. As a result of the learning process, the student will be able to propose the necessary strategies, resources and processes to establish organizational formal project management practices.

General objective: After completing the course students will be able to identify problems, design, solve and optimize project management processes therefore raising their professional potential to be able to lead projects, programs and portfolios.

Key words: Project management. Project portfolio management.

Bibliography: * Levine, Harvey A., *Project portfolio management : a practical guide to selecting projects, managing portfolios, and maximizing benefits* / Har-

vey A. Levine ; foreword by Max Wideman., 1st ed., San Francisco : Jossey-Bass, c2005., [0787980846].

AD4024 Business Analytics Foundations

(3.5 - 0 - 12. Prerequisites: None. MBA15)
Equivalence: None

It is a basic level course, which is intended for the student to learn and apply statistical techniques for the analysis and evaluation of problems of organizational management, basic tools of accounting and finance, cost analysis, and managerial accounting; develop skills of analysis and interpretation of global business environment, supporting their ability to make strategic decisions regionally and globally. As a result, the student will acquire with the initial analytical basis for making strategic decisions in a global competitive business environment. Requires prior knowledge of algebra and using spreadsheets.

General objective: Upon completion of this course the student will be able to understand, analyze, and interpret financial statements, statistical data, and the main characteristics of the global business environment, including economic, political, financial, cultural, and social aspects of the emerging and developed regions. Also, the student will handle statistical techniques and computer tools to enhance the decision making process.

Key words: Business statistics and quantitative analysis. Globalization and economy of 21st century. Fundamentals of financial accounting.

Bibliography: * Daniels, Radenbaugh, and Sullivan, *International Business*, Prentice Hall.

AD4025 Managerial Skills I

(1 0 4. Prerequisites: None. MBA15)
Equivalence: None

The purpose of this basic level course is to introduce students to the functioning of organizations and the skills needed by executives of organizations to address the complex business environment. Addition-

ally, the course provides an overview of the program and the skills to be developed through this. No prior knowledge is required.

General objective: Upon completion of the course, students will be able to:

- Understand the systemic functioning of organizations and support activities that promote a timely response to the changing environment.
- Recognize the importance of developing skills to support decision making supported in ethical reasoning, effectively leading teams, meet its national and international environment, design and develop innovative and sustainable models of business, and developing a global vision.
- Develop systemic and creative thinking to help make reasoned decisions based on evidence to address complex business environments.
- Develop communication skills and effective presentation of ideas in business context.

Key words: decision making process. Effective communication. Critical Thinking.

Bibliography: * Justin Menkes, Executive Intelligence.

AD4026 Business Intelligence (1.5 0 6. Prerequisites: [AD4024]. MBA15) **Equivalence: None**

The intention of this basic level course is that, based on the comprehension of the quantitative and qualitative research methodologies, the student will use their managerial abilities to plan and design business intelligence activities. In order to accomplish this, the student must have previous knowledge of Consumer behavior and Marketing courses. This course also requires previous knowledge in Business Statistics.

General objective: At the end of this course, the student will understand the importance of business intelligence as a key component in marketing decision making of a company and its planning activities.

Key words: Marketing research. Data analysis. Ethics in marketing research.

Bibliography: * McDaniel, C. & Gates, R., Investigación de Mercados

AD4027 Corporate Governance and Ethics

(1.5 0 6. Prerequisites: None. MAF15)
Equivalence: None

The intent of this basic level course is for students to reflect on what and ethical business management implies and in particular, promote analysis and discussion around three key issues: The negative impact that unethical behavior of policyholders decision has on the social legitimacy of business by damaging the trust that different stakeholders place in it, the importance of the corporate governance system has in making ethical decisions, particularly in the proper handling of ethical dilemmas arising from situations where a decision, practice or company policy may be the best from a financial perspective but not from an ethical perspective and the impact it has on business ethics opportunities for profitable growth and sustained business. As a result of learning, students develop a final research project on ethical business management. This course requires no previous knowledge.

General objective: After completing the course, the student will be able to handle ethical dilemmas in the business context after learning the theoretical framework, from an ethical perspective to analysis of the relationships between the company and its stakeholders: employees, competitors, consumers, shareholders, community, and the environment for managing business ethics and understanding the importance of the corporate governance system has in ethical decision making and the creation of "shared value".

Key words: Corporate governance. Ethics in business. Code of Ethics.

Bibliography: * Raufflet, E; Lozano, J]F; Barrera, E; Garcia de la Torre, C., Responsabilidad Social Empresarial, Pearson Educación.

AD4028 Operations Management (3.5 0 12. Prerequisites: [AD4024]. MBA15].) Equivalence: CD4000

The intention of this basic level course is to analyze situations that are common in most organizations. These situations are related to the transformation of supplies into goods or services. The course is designed to relate the most important functions of a company with all the areas of it: finance, marketing, human resources. In order to increase the effectiveness and competitiveness, the interdependent relationship between a company and its clients and suppliers is also explored. As learning outcome the student will complete an innovative project and solve business cases where suggests solutions considering the effect that these could have in every area of the company.

General objective: By the end of this course the student should be able to identify trends and managerial challenges of manufacturing operations and services, and should also know the role of the strategy to improve the company's strengths in global markets.

Key words: Operations strategy. Services and manufacturing processes. Supply chain. Quality assurance.

Bibliography: * Krajewski, Ritzman, and Malhortra, Operations Management, process and value chains, 9th, Pearson International.

AD4027

AD5000 Negotiations and Decisions in Multicultural Environments (3.5 - 0 - 12. Prerequisites: [MT4001, CD4000]. MBA09, MBA09G) Equivalence: GA00933

This is an advanced course in the field of Management, with the intention of providing students global and multi-cultural negotiation skills. It requires previous knowledge on economics and marketing. As a learning outcome the student will be able to resolve negotiation disputes, solve conflicts, provide best scenario solutions and propose strategies to help increase the value of an organization in positive terms.

General objective: The student will be able to de-

velop and improve multi-cultural negotiation skills in every environment.

Key words: Negotiation: key competence in management and its principal myths. Preparation: What should you do before a negotiation?. Distributive negotiation and win-win strategies for distributing and expanding the pie. Negotiation styles: hard versus soft negotiators. Cross-cultural negotiations and their key challenges.

Bibliography: * Thompson, Leigh L., The Mind and the Heart of the Negotiator, Cuarta Edición, Prentice Hall.

AD5001 Seminar in Transnational Management and Corporate Strategy

(3.5 - 0 - 12. Prerequisites: [AD4004]. MBA09, MBA09G)
Equivalence: GA00911, GA5077

This is an advanced course in the field of management. This seminar prepares students to integrate a portfolio of businesses and to define a strategy to participate in multinational as well as national contexts. Students will prepare a final project where they propose a corporate or multinational strategy for a firm within the context of ethics, sustainability and learning. This course requires previous knowledge of business-level strategy

General objective: Students will be able to make informed decisions that will contribute to the long-term performance of the firm in contexts of multinational competition, creating value to the different stakeholders. To do that, students will need to analyze and to make a synthesis of relevant environmental information and to propose strategies that will gain the preference of the firm in its relevant markets.

Key words: Corporate strategy. Sustainability. Business policy. Multinational strategy. Corporate governance.

Bibliography: * Montgomery. Cynthia A. y Collis, David J., Corporate Strategy: Resource Based Approach, Second Edition, McGraw-Hill .

AD5003 Value Creation, Business and Network Models

(3.5 - 0 - 12. Prerequisites: None. ELS11, MA 09)
Equivalence: None

This is an advanced business administration course. Course aims: To teach students about the strategy and quantitative tools for creating value in the organizational and global business context. Prerequisite: Basic knowledge of business administration, commerce and finance. Learning outcome: Students will be able to solve cases and use simulators to define operational strategies aimed at generating value in the organization.

General objective: Students will be able to understand the process of value creation and its management, analyze the strategic frameworks of value chains, identify and propose strategies for value creation, and apply optimization decisions to operational management processes.

Key words: Value chain. Value. Value management. Value chain management. Value chain strategies.

Bibliography: * Chopra, Sunil, 1960-, Supply chain management: Strategy, planning, and operation/ Sunil Chopra, Peter Meindl, 3rd. Edition, Upper Saddle River, N. J.: Pearson/Prentice Hall, c2007, New Jersey, 2007, eng, [0131730428],[9780131730427].

AD5012 Field Project

(3.5 0 12. Prerequisites: None. MBA15)
Equivalence: GA00900, GA00901, GA00902, GA00903, GA00906, GA5076

An advanced course in knowledge area of administration. This course requires previous knowledge of management, economics, finance, strategy and organizational behavior. As learning outcome the student will be able to elaborate a project based on research and consulting activities oriented to strategic and/or operative issues of a company.

General objective: The student will be able to analyze and assess Mexican organizations from the public and private sectors.

The student will encounter different corporate issues which he must solve based on strategic plans that incorporate such factors as clients, resources, regional and organizational culture, business environment, trends, threats and opportunities, among others through a field project which will require highly efficient collaborative work and commitment, as well as leadership, negotiation and decision making skills; to reinforce his managerial knowledge and consulting skills to solve complex problems facing an organization.

Key words: Consulting. Diagnosis. Problem solving. Business administration. Field project.

AD5034 Project Management

(3.5 - 0 - 12. Prerequisites: None. EPY11)
Equivalence: GA00986

In this advanced business administration course, the student acquires the knowledge and skills required to select, plan, implement and control diverse types of projects within organizations, such as investment, continuous improvement, innovation and development projects, etc. Prerequisite: prior knowledge of probability and statistics as well as basic decision models (linear programming and decision analysis). Learning outcome: the student will write a report on project planning and management.

General objective: At the course conclusion, the student will be able: to use modern project management methods required for an adequate coordination of the evaluation, selection, planning and implementation phases of a project; to handle some of the tools and techniques available for effective risk management, time and cost of the projects activities; and to apply the concepts, criteria and project management methods through computer software allowing to obtain precise, practical, accessible and easy to communicate results to the project's team members.

Key words: Critical path method. Cost estimation. Risk analysis. Strategic project selection.

Bibliography: * Gray, Clifford F., Project management: The managerial process, Boston: Irwin/McGraw-Hill, c2000, [007365812X (alk. paper)], [007234685X (CD-ROM)].

AD5036 Innovation and Creativity Seminar

(3.5 - 0 - 12. Prerequisites: None. MID09V, MTI12, MTI12V)

Equivalence: SC00221

It is a basic level course in the area of business and requires knowledge from all the courses. As a learning product the student will define the proposal for the wrap-up-project in which the knowledge acquired throughout the master program would be integrated.

General objective: At the end of this course the student will be able to apply techniques and tools of innovation and creativity to identify areas of research in their area of expertise, and set the subject on which to develop research. The student exercises and applies its innovative capacity, critical thinking, skills and knowledge acquired during the master program in the development of the research proposal. Throughout the course, the student will require a description and clear approach to solving the problem, the technological context of the contribution of their work, their limitations and propositions and the methodology to be used to conduct the research project.

Key words: Methodology. Thesis. Creativity and innovation techniques. Lines of investigation. Research proposal.

Bibliography: * Gill, John, 1930-, Research methods for managers/John Gill and Phil Johnson, 2nd. Edition, London: Paul Chapman Pub. Ltd., c1997, [185396350X].

AD5037 Innovation Project

(3.5 - 0 - 12. Prerequisites: None. MID09V)

Equivalence: None

It is a basic course of the administration area, which requires prior knowledge of the administrative area, and technology as it will be necessary for the implementation of the wrap-up project. As a learning product, the student will perform a viable and useful innovation in a product, process or service based on the various skills acquired during the master's program.

General objective: At the end of this course the student will be able to apply to a real project all the knowledge acquired through the master's program.

Key words: Organizational culture. Feasibility analysis. Project. Product and service design. Finance.

AD5059 Strategic Planning and Organizational Structures

(3.5 - 0 - 12. Prerequisites: [EC4014 , FZ4009], MGN10V)

Equivalence: AD4004, GA5075

As a learning result, the student will develop a project which includes the design, evaluation and implementation of competitive strategies for an organization that is embedded in complex and changing environments. This design must be able to generate value for the company, for its clients and for society. This is an advance management course with the main intention to efficiently design and model organizational processes using information and technologies for strategic and organizational decision making. The student requires previous knowledge of organizational behavior.

General objective: The student will be able to: 1. Design and model organizational processes using, in an efficient manner, its information and technologies for strategic and organizational decision making. 2. Promote and emphasize honesty and responsibility for continuous innovation seeking; and to generate working culture towards a clear consciousness of the country's and regional's needs, as well as its sustainable development. 3. Work in self-learning, critical thinking environment, using collaborative work and analysis, synthesis and evaluation of organizational and strategic processes.

Key words: Mission and vision statements. External environment analysis (complex versus stable settings). Internal environment analysis. Strategic formulation: strategy design and modeling. Strategic implementation: organizational process design and modeling.

Bibliography: *Thompson, Arthur A., 1940-, Crafting and executing strategy: The quest for competitive

advantage: Concepts and cases/Arthur A. Thompson, Jr., A.J. Strickland III, John E. Gamble, 17th. Edition, Boston: McGraw-Hill/Irwin, c2010, [9780073530420 (papel alcalino)], [0073530425 (papel alcalino)].

AD5060 Management and Corporate Governance Seminar

(3.5 - 0 - 12. Prerequisites: None. MGN10V)

Equivalence: None

It is an advanced course. As a learning product the student will be able to make decisions and to implement corporate multinational strategies in dynamic and complex business environments, using an efficient corporate government management.

General objective: At the end of the course the student will be able: 1. To make informed decisions that contributes to reaching the permanence of an entrepreneurial group through the time in multinational competitive contexts, adding value to different groups of interest. 2. For the decision making, the student must be based on the leadership, supervision, models of supervision and the design of a good corporate government. As for corporate government, it can be understood to be a group of practices, principles and norms to assure that architectural power of companies is useful to their stakeholders and properly assure the representation of their legitimate interests, understanding that stockholders cannot be represented properly without taking into account at the same time the interests of employees, customers, suppliers and society in general.

Key words: Innovation. Corporate governance. Corporate and multinational strategy. Entrepreneurship.

Bibliography: * Monks, Robert A. G., 1933-, Corporate governance/Robert A.G. Monks, Nell Minow, 2nd. Edition, Oxford; Malden, Mass.: Blackwell, 2001, [0631222634 (hard : alk. paper)], [0631222642 (pbk. : alk. paper)].

AD5080 Management in Energy Markets

(3.5 0 12. Prerequisites: None. EAE15)

Equivalence: None

The intention of this advanced level course is to provide students with theoretical and practical knowledge about the analysis of energy markets in transition, new regulations in Mexico in its various sectors, as well as studying strategic spaces for new businesses, both in conjunction with the public sector and within the national and international private sector. The course makes use of businesses in mature markets in other economies as a comparative base for calculating the viability of energy projects in Mexico and other countries. The course will also deal with aspects of the geopolitics of energy. Previous specialized knowledge is not required.

General objective: Upon completion of the course, the student will be familiar with and able to: Provide a general theoretical framework about markets in energy transition; be familiar with the reasoning behind energy reform in Mexico; analyze the different market structures: gas, petroleum, coal and electricity. Explain risk management of energy from a perspective of supply and demand.

Key words: Market structures. Renewable energies. Intelligent networks. Comparative Markets. Price Volatility.

Bibliography: * Kirschen, Daniel & Strbac, Goran, Fundamentals of Power System Economics., University of Manchester

Institute of Science & Technology: United Kingdom

AD5081 Energy Law and Regulations of Energy Industries

(3.5 0 12. Prerequisites: None. EAE15)

Equivalence: None

The intention of this advanced level course is to provide students with theoretical and practical knowledge about the analysis of energy markets in transition, new regulations in Mexico in its various sectors, as well as studying strategic spaces for new businesses, both in conjunction with the public sector and within the national and international private sector. The course makes use of businesses in mature markets in other economies as a comparative base for calculating the viability of energy projects in Mexico and other countries. The course will also deal with aspects of the geopolitics of energy. Previous specialized knowledge is not required.

AD5081 Energy Law and Regulations of Energy Industries

(3.5 0 12. Prerequisites: None. EAE15)

Equivalence: None

The intention of this advanced level course is to provide students with theoretical and practical knowledge about the legal, economic and structural aspects of energy, as well as to provide the tools to overcome critical problems. Along these lines, the course concentrates on in depth study of the elements of sectorial regulations and their strong and weak implications, applied to recent Mexican regulations in the industries of petroleum exploration and extraction, oil by products, petrochemicals, gas, gas transport, commercialization of petroleum, by products and gas, as well as electricity from fossil and renewable energy sources. From regulatory analysis are derived ecosystems of public private, and private businesses in all their sectors and environmental sustainability. Previous specialized knowledge is not required.

General objective: Upon completion of the course, the student will be able to: Understand the general theoretical framework related to energy law and the regulations of the energy industry. Analyze the reasoning behind the Mexican laws that transformed the energy sector into its 21 executive legal orders.

Analyze the different legal, economic and structural aspects of energy markets.

Key words: Monopoly. Costs of Regulation. Traditional Fuels. Resources and Regulations. Energetic Efficiency.

Bibliography: * Tomain, Joseph P., 1948 , Energy law in a nutshell / by Joseph P. Tomain, Hon. Richard D. Cudahy., [Rev. ed.], St. Paul, MN : Thomson/West, c2004., [0314150587 (pbk. : alk. paper)].

AD5082 Risk Management in Energy Markets

(3.5 0 12. Prerequisites: None. EAE15)

Equivalence: None

The intention of this advanced level course is to provide students with theoretical and practical knowledge about the definition of regulatory, financial and market risk. Subsequently, the course will analyze the determinants of said risks in energy projects, and they will be applied to non stochastic or deterministic risk models, as well as stochastic models. Alternative funding for projects and the measurement of their risks will also be analyzed. Subsequently the course will analyze player conduct within alternative projects, which generate potential market risks in energy industries. Finally, the course will deal with aspects of environmental risk. Previous specialized knowledge is not required.

General objective: Upon completion of the course, the student will be able to understand the dynamic nature of the field of risk management, be familiar with the current topics of risk from a long term perspective, analyze effective risk management in commercial partnerships of the energy industry.

Key words: Losses and Opportunities. Risk Measurement. Basic Tools. Energy Contracts. Risk of Property Management.

Bibliography: * Baranoff, Etti; Brockett, Patrick Lee & Kahane, Yehuda, Risk Management for Enterprises and Individuals, Flat World.

AD5083 Sustainability and Efficiency Strategies

(3.5 0 12. Prerequisites: None. EAE15)
Equivalence: None

The intention of this advanced level course is to provide students with theoretical and practical knowledge about industries' strategies and activities of high energy consumption, how to develop a framework for action and measuring efficiencies, energy savings, as well as the administration of ancillary services. Additionally, the course will deal with management strategies related to the topic of the environment and its proposal as a business. From the perspective of the technological nucleus of the business, technology, learning and innovation are analyzed; purchasers of green businesses and individual consumers; the economy of the competitive environment and of sustainability; policy and its implementation. Previous specialized knowledge is not required.

General objective: Upon completion of the course, the student will be able to analyze processes in the organizations making use of the principles of sustainability. Understand the sector of clean energy, through knowledge of wind, solar, water and bio-diesel energy, batteries, and other clean technologies. Examine the strategies of the industries in order to reduce their high consumption of energy and measure the changes of processes that increase energy efficiency. Design plans to make use of related/ ancillary measurements.

Key words: Sustainability. Clean energy. Efficiency. Measurable connectivity. Ancillary Services.

Bibliography: * Uberoi, N.K., Environmental Management, Excel Books.

AD5084 Evaluation of Energy Projects (3.5 0 12. Prerequisites: None.)

Equivalence: None

The intention of this advanced level course is to provide students with theoretical and practical knowledge about the economic, financial and social evaluation of projects, along with the study of statistical methods of prediction and quantitative analysis for energy projects. The pre requisites for this course are as follows: Energy Administration, Energy Law and Regulations in the Energy Industry, and Risk Administration in the Energy Industry.

General objective: Upon completion of the course, the student will be able to apply his or her abilities and aptitudes to the application of methods and models for evaluating energy projects and to analyze energy projects with financial and economic tools.

Key words: Risk analysis. Prospective Energy Models. Finance Analysis. Project Evaluation Criteria. Energy Models.

Bibliography: * Donnelly, William, The Econometrics of Energy Demand: A Survey of Applications, University of Maryland.

AD5085 Field Project on Energy

(3.5 0 12. Prerequisites: None.)
Equivalence: None

The academic intention of this course of advanced level is for students to hold theoretical and practical knowledge about Evaluation of Energy Projects, of Energy Efficiency, of energy Savings in Industries and other realms so that they can generate proposals and recommendations to improve the energy firm, industry, or sector. It has as a requisite to previously take the following courses: Energy Administration; Energy Law and Regulations of Energy Industry; Risk Administration of Energy Industry; energy Projects Evaluation, and Energy Finance.

General objective: Upon finishing this course, the student will be able to include in a systemic fashion the concepts, techniques for project evaluation, and analytical methodologies about energy reviewed

along the previous courses. Simultaneously, students will apply leadership abilities in identifying business opportunities and problem solutions within the organization.

Key words: Project evaluation. Energy efficiency. Economic Impact of Projects. Environmental Impact of Projects. Social Impact of Projects.

AD5086 Strategic Management (3.5 0 12. Prerequisites: [EC4005]. MBA15) **Equivalence: AD4004**

The intent of this advanced course is to provide to the student tools and methodologies for the design and implementation of effective strategies in order to achieve the objectives of the organization in a changing environment. It is also an intention that the student knows and applies the concepts of competitive advantage, innovation and strategic flexibility, while developing critical thinking and consulting skills. Statistical knowledge is required.

General objective: At the end of the course, students will be able to understand and apply the concepts on which a process of strategic management is based, and how relevant has become in for organizations operating in dynamic and turbulent environments. Strategic management process allows the organization to determine the vision, mission, carry out the analysis of the industry, the macro environment and identifying their strengths and weaknesses; which enable it to respond quickly to the demands of the changing environment by designing and implementing effective and ethical strategies.

Key words: Dynamic Capabilities. Competitive advantage. Strategic planning. Internal and external analysis.

Bibliography: * Deimler, M. and Reeves, M, Thriving under adversity: Strategies for growth in the crisis and beyond., Boston Consulting Group.

AD5087 Strategy and Negotiations in Multicultural Environments (3.5 0 12. Prerequisites: None. MBA15) **Equivalence: None**

The intent of this advanced course is to develop negotiation skills, strategic planning and decision making in multicultural environments and multinational businesses. It is required to have taken Business Strategy course.

General objective: Upon completion of this course, students will be able to perform effectively in multicultural environments based on activities of international negotiation and the design of corporate and global strategies. This objective will be achieved through professor presentations, case discussions, collaborative learning, problem based learning, project oriented learning and use of simulator X Culture.

Key words: Multicultural strategy. Cross cultural management. Negotiations in international business.

Bibliography: * Barton, D., & Wong, S. C. Y., Improving board performance in emerging markets., McKinsey Quarterly.

AD5088 Service Management (1.5 0 6. Prerequisites: [AD4028]. MBA15) **Equivalence: AD5005**

This is an advanced course which is intended for the student to understand service as new business logic instead of only "customer service" concept. This course requires previous knowledge of operations management. As learning outcome, the student will be able to elaborate an applied project on a service driven organization.

General objective: The student will develop vision, knowledge and skills to understand business logic based on customer and service oriented in order to design and implement strategies for value creation that benefits to stakeholders.

Key words: Service management. Base of the Pyramid (BoP) Services. Service Dominant Logic.

Bibliography: * Benjamin Schneider and David Bowen, *Winning the Service Game*, Harvard Business School Press.

AD5089 Innovation and Entrepreneurship

(3.5 0 12. Prerequisites: [AD5086]. MBA15)
Equivalence: None

The intention of this course of advanced level is to develop student's entrepreneurial and innovation ability in order to foster the creative potential and change the way to solve business problems. As a learning outcome the student will develop a business idea. It requires previous knowledge on statistic and business strategy.

General objective: The student will be able to identify and analyze business opportunities in order to create new business ideas in connection with the market needs in order to develop an entrepreneurial proposal.

Key words: Design Thinking. Business model design. Methodology "Nail It then Scale It".

Bibliography: * Nathan Furr y Paul Ahlstrom, *Nail It then Scale It: The Entrepreneur's Guide to creating and managing breakthrough innovatio*, 1 ed.

AD5090 Managerial Skills II

(1 0 4. Prerequisites: [AD4025]. MBA15)
Equivalence: None

This advanced course is intended to provide a space for the student to integrate the knowledge gained through the program and systematically apply it on the development of solutions to complex organizational situations. Through this process, students will develop skills and consulting skills. Required to have completed the basic and core subjects of the program.

General objective: Upon completion of the course, students will be able to incorporate systemically concepts, techniques and methodologies of the different

organizational processes being analyzed throughout the program, while apply leadership skills in the identification of business opportunities and organizational problems solution.

The course fosters holistic view of organizations and promotes the involvement of technical, human and strategic decision making aspects.

Key words: Consulting process . Methodology of Organizational Diagnosis. Innovation and value creation.

Bibliography: * Sadler, P., *Management Consultancy: a handbook for best practice*, Kogan Page Publishers.

AD5103 Negotiation Skills

(1.5 0 6. Prerequisites: None. MAF15)
Equivalence: None

General objective: At the end of the course the student will be able to design and implement negotiation strategies and conflict resolution in multicultural environment.

Bibliography:* Lewicki, Roy J., *Negotiation* / Roy J. Lewicki, David M. Saunders, Bruce Barry., Seventh edition., , [9780078029448].

AM Environmental Engineering

AM4002 Fundamentals in Environmental Science

(3 - 0 - 12. Prerequisites: None. MSA09)

Equivalence: RN99149

This basic course provides students with the conceptual tools required to understand the basic principles of ecology and engineering and their application in air, water and soil pollution problems; the risks that they represent for human health and the ecosystems; and the sustainable use of ecosystems. Learning outcome: Students will understand the challenges of human-environment interaction problems.

General objective: Upon completion of this course, students will be able to analyze the structure and operation of ecosystems, as well as understand the transfer processes of energy and matter within ecosystems in order to comprehend the dynamics of economic systems and the importance of energy flow to generate sustainability. In addition, the students will understand the way in which human beings take ownership of these resources and they will recognize the environmental impact of productive activities from all sectors as well as the associated ecological and economic cost.

Key words: Structure and function of ecosystems. Appropriation of natural resources. Human impact on the environment.

Bibliography: * Brown, L. R., Eco-Economy, Building an Economy for the Herat, Earth Policy Institute.

AM4003 Environmental Modeling and Climate Change

(3 - 0 - 12. Prerequisites: None. MSA09)

Equivalence: None

This basic course teaches the student about the basic modeling tools needed to describe the behavior and transport of pollutants in the different environmental media and their impact at urban, regional and global scales, as well as the basic principles for evaluating the vulnerability of the different sectors in the face of climate change, general mitigation and adaptation strategies. As a result, the Student will be able to use modeling tools to analyze the impact of human activities on the environment and the possible consequences, as well as the general climate change mitigation strategies.

General objective: Students will be able to identify the sources and types of pollutants in the environment, analyze the multimedia interactions of contaminants in the environment and their impact at urban, regional, and global level. They will be able to apply basic mathematical models to evaluate the processes that occur in the environment and define strategies to reduce both the emission of contaminants and their impact on the environment.

Key words: Environmental pollution. Climate change. Alternative and renewable energy.

Bibliography: * Deaton, L. M., Winebrake J.J., Dynamic modeling of environmental systems, Springer.

AP Public Administration

AP4001 Public Policy Analysis (3 - 0 - 12. Prerequisites: None. MAP09) Equivalence: P 99102

The academic aim of this advanced course is for the student to learn about the nature of public policy and the environment in which they are conceived and structured. No prior knowledge is required, though the student must be willing to read the set of texts before each class to generate a critical, analytical discussion of the studied topics. Learning outcome: the student will have a firm understanding of the main approaches in public policy design and implementation and their relation to economic and social development models.

General objective: The objective of this course is to introduce the students into the origin and nature of the public policy discipline and to get them familiar with the most common methods used in the analysis of public policy. At the end of the course, the students will be capable of providing solid analytical and interdisciplinary recommendations on how to improve the decisions made by government and their impact on society.

Key words: Public policy design. Public policy analysis. Implementation of public policies. Public policy evaluation.

Bibliography: * Shafritz, Jay M., Hyde, Albert C., *Clásicos de la Administración Pública*, Fondo de Cultura Económica, México D.F., 1999.

AP4003 Macroeconomics and Public Policy

(3 - 0 - 6. Prerequisites: None. MAP09)
Equivalence: None

The academic aim of this basic course is for the student to learn about the link that exists between macroeconomic variables and public policy design. Prerequisite: None. The course is designed to develop in the student the skills needed to understand and assess a country's or region's macroeconomic evolution

and the impact of such an evolution on the design of specific public policies. Learning outcome: the student will design, with methodological rigor, public policy models that take into account the macroeconomic environment.

General objective: In this course the student will learn how to use the basic macroeconomic policy tools, and the way in which they can be applied to real-world economic policy. The student will understand how to evaluate macroeconomic conditions, such as unemployment, inflation and growth. In addition, the students will understand the way through which monetary and fiscal policies have been used to influence the country's economic policy.

Key words: Macroeconomics. Economic policy. Monetary policies. Public policies.

Bibliography: * Mankiw, N. Gregory, *Macroeconomics*/ N. Gregory Mankiw, 5th. Edition, New York: Worth Publishers, c2003, New York, c2003, eng, [0716752379].

AP4004 Qualitative Methods (3 - 0 - 6. Prerequisites: None. MAP09) Equivalence: None

The aim of this basic course is to present the use and application of the principal qualitative analysis techniques within social research. Prerequisite: None. The course is designed to develop in the student the specific qualitative research skills. he/ she will also become familiar with the main theories and problems of this type of social research. Learning outcome: the student will be able to analyze, with critical, methodological rigor, social phenomena and create proposals for improving them.

General objective: Qualitative methods are essential for evaluating and conducting research on public policies. This course takes the student into the theory and qualitative research techniques (such as interviews, focus groups and observation) through readings, class discussions and practice. By the end of the course, students will be able to develop specific skills

for data gathering, qualitative data analysis and design of qualitative research projects.

Key words: Public policy evaluation. Techniques of qualitative research. Gathering and the analysis of qualitative data.

Bibliography: * Emerson, Robert M., Writing ethnographic fieldnotes/Robert M. Emerson, Rachel I. Fretz, Linda L. Shaw, Chicago: University of Chicago Press, 1995, Illinois, 1995, eng, [0226206815 (paper : acid-free paper)],[0226206807 (cloth)].

AP4005 Strategic Management of Public Organization

(3 - 0 - 12. Prerequisites: None. MAP09)

Equivalence: None

The academic aim of this advanced course is for the student to examine the different theoretical trends in contemporary strategic management, as well as the connection between public bureaucracies and political restriction in the heart of democracy. Prerequisite: None. This class is in seminar format and therefore the student must read the class materials beforehand in order to participate in the same. Learning outcome: the student will acquire theoretical knowledge and will be able to use organizational behavior techniques in public entity studies.

General objective: This course focuses on strategic management in the public sectors of democratic societies. It critically examines and applies the assumptions, concepts, and tools of the new approaches to public management that are being applied around the world. Important strategic decisions that will be examined in the course include: formulating and articulating a mission and vision; formulating and internalizing in the organization a set of long term objectives; translating objectives into measures of performance; designing production systems and organizational structures, and shaping organizational culture. Most class meetings are case discussions, supplemented by some presentation of conceptual materials.

Key words: Political initiative. Implementation of programs and policies. Measurements of performance in

public administration. Organizational structure design.

Bibliography: * Osborne, David, 1951-, Banishing bureaucracy: The five strategies for reinventing government/David Osborne and Peter Plastrik, Reading, Mass.; México: Addison Wesley Pub. Co., c1997 (1996 printing), Massachusetts, 1997, eng, [0201626322],[9780201626322].

AP4006 Economics for Public Policy

(3 - 0 - 12. Prerequisites: None. MAP09)

Equivalence: EC99103

The academic aim of this advanced course is for the student to understand and develop his knowledge of basic microeconomic theoretical tools and their link to public policy analysis. Prerequisite: None. Learning outcome: the student will apply microeconomic concepts and analytical instruments to public-sector problems.

General objective: This class applies the principles of microeconomic theory to topics related to the public sector in a practical way. Through class discussions of case studies and the writing of short policy essays, the student will develop the analytical and presentation skills needed for decision making based on economic grounds. That is, at the end of the course, the student will feel comfortable to apply economic tools for the analysis of public policy. No background on Economics is needed.

Key words: Principles of microeconomic theory. Decision making based on economic foundations. Economic tools for the analysis of public policy.

Bibliography: * N. Gregory Mankiw, Principles of Microeconomics, Second edition, South-Western College Pub, 2000.

AP4013 Quantitative Applied Methods

(3.5 - 0 - 12. Prerequisites: None. MGP09V)

Equivalence: None

The aim of this basic course is for the student to acquire or reaffirm his/her knowledge of the basic sta-

tistical tools that support the analysis of information in the context of public administration. The course is designed in two parts. The first part corresponds to cross-sectional data analysis and the second to time series data analysis. Prerequisite: Prior knowledge of basic mathematics and basic statistics. Learning outcome: the student will make decisions based on numerical information and on its quantitative analysis when practicing his/her profession. Moreover, the student will develop skills in data collection, IT management, quantitative information processing and writing reports with conclusions based on the use and practice of statistics.

General objective: The main objective of this course is to introduce students to the most important basic and advanced techniques of quantitative reasoning in order to analyze the socioeconomic reality of states and municipalities of the country. The course focuses on illustrating and applying the wide array of quantitative tools. The participants will learn to focus on problems, information and relevant data bases for the social, economic and public policy analysis at the regional and national levels.

Key words: Statistics. Time series. Analysis and interpretation of results. Forecasts.

Bibliography: * Stock, James H., Introduction to econometrics/James H. Stock, Mark W. Watson, Boston, MA : Addison Wesley, 2003, [201715953].

AP4014 Public Administration Law (3.5 - 0 - 12. Prerequisites: None. MGP09V) **Equivalence: None**

This is a basic course that requires no prior knowledge. Course aim: through the latest doctrine, effective laws and jurisprudence, the students will learn about the legal framework in which public administration operates. Learning outcome: the student will become familiar with the legal foundation of public administration through practical situations applied to the context of Mexican and Latin-American public administration and will be able to use these bases for decision-making.

General objective: The objective of the course is to provide students with the notion that all public enti-

ties are subject to the principle of legality. This notion sets the importance for the public administrators to be informed of the legal framework guiding all their actions and principle of authority. At the end of the course the students will be able to work with the legal framework in the analysis and solution of specific situations of the government's decision making process at the state and municipal level. The students will also be able to have an active participation in the definition of public policies, having the legal framework as a vital and relevant reference.

Key words: The state and its functions. Public rights and sub-national governments. State and municipal public rights. Administrative structure of the states and municipalities. State constitution and municipal legislation.

Bibliography: * Gámiz Parral, Máximo N., Derecho constitucional y administrativo de las entidades federativas / Máximo N. Gámiz Parral, 3ra. Edición, México, D. F.: Instituto de Investigaciones Jurídicas, Universidad Nacional Autónoma de México, 2003, México, 2003, español, [970320743X].

AP4015 Federalism and **Inter-governmental Relations** (3.5 - 0 - 12. Prerequisites: None. MGP09V) **Equivalence: None**

This basic course requires prior knowledge of Law and Public Administration. The course Federalism and Intergovernmental Relations (IGR) analyzes the interaction process that occurs between the different levels of government through the division of duties carried out by the Constituent Power. Learning outcome: the student will understand the constant interaction between the different government levels and apply to decision-making the dimension of intergovernmental relations that go beyond a merely legal aspect to political and administrative aspects that lead to an understanding of the actual way in which this interaction works.

General objective: Develop an in-depth and practical knowledge on Federalism and the IGR among the different governmental levels. Acquire and process the information to develop self-study and collective reflection on federalism and intergovernmental

relations. Distinguish the differences between government organs, function and act, and conflicts that arise because of competencies' invasion between the different government levels.

Key words: Federalism. Intergovernmental relations. Intergovernmental finances. Public policies.

Bibliography: * Wright, Deil Spencer, 1930-, Para entender las relaciones intergubernamentales/Deil S. Wright; traducción de María Antonieta Neira Bigorra, 1era. Edición, México: Colegio Nacional de Ciencias Políticas y Administración Pública: Universidad Autónoma de Col, México, 1997, español, [9681646169],[4681646169],[9789681646165].

AP4016 Public Administration Planning and Management

(3.5 - 0 - 12. Prerequisites: None. MGP09V)

Equivalence: None

This is a basic course that requires no prior knowledge. The course Public Policy Planning and Management studies the system observed by state and municipal civil servants. In order to analyze the relationship between the government and its work team, the course focuses on the goal of achieving an efficient administration in the context of a liberal democratic political system that promotes a quality, legitimate government. Learning outcome: the student will use a set of instruments and methodologies that allow him to construct interrelated planning processes to achieve a more efficient and effective management process.

General objective: The imperative demands of a competitive world imply creating innovative processes of planning and management. The public sector is not isolated from such demands. Therefore, now a days through strategic planning and prospective tools, government have strengthened their operational and decision-making processes. This course will provide students with a set of methodological and instrumental tools to be applied in the interrelated planning processes in order to provide a more efficient and effective way of management.

Key words: Government and society. Strategic Prospective. Public policies. Strategic planning.

Bibliography: * Godet, Michel, De la anticipación a la acción: Manual de prospectiva y estrategia/Michel Godet; traducción de Emilia Pagés i Buisán y Jaime Gavaldá Posiello, México: Alfaomega, 1995, México, 1995, español, [9701500288].

AP4017 Municipal and State Law (3.5 - 0 - 12. Prerequisites: None. MGP09V) **Equivalence: None**

This basic course requires prior knowledge of Law and Public Administration. The Municipal Civil Service System studies labor and professional relations of the people who work for local governments. Learning outcome: the student will understand the system that regulates relations between the local public authorities and civil servants who are professionally active in the same and will be able to guide decision-making.

General objective: This course analyzes the system in which public servants are ruled. Relationships between public policies and local public servant's performance are included in the legal system of the public function. Topics include: an analysis of law and regulations that rules human resources management such as recruiting, hiring, professional development, promotions and benefits among others. The legal framework regarding public servants, political staff, union staff and professional developments in the public sector are addressed. The regime of public local function, involves the study of labor and professional relationships provided to local governments. This course will pursue the study of the most recently published: "Professional Services Career of Federal Public Administration Law", using it as a fundamental resource in this course.

Key words: Democracy. Power autonomy. Judicial-political-electoral organization of the democratic government. Agency theory to explain the behavior of the public servants. Total organizational and municipal quality.

Bibliography: * Haro Bélchez, Guillermo, El derecho de la función pública / Guillermo Haro Bélchez, 1ra. Edición, México: ECASA , 1993, Sin información, 1993, español, [9706170766].

AP4026 Public Finance
(3.5 - 0 - 12. Prerequisites: None. MGP09V)
Equivalence: None

This basic course seeks to train people to be able to direct the financial management of public resources ethically and efficiently and acquire an understanding of the organization of sub-national public finances in Latin-American and international contexts. Students will be able to analyze the way in which diverse local government entities organize public finance management, from the perspective of legal and administrative legislation. Learning outcome: Students will provide a practical demonstration of the organization and functioning of public finances at sub-national and federal levels.

General objective: Upon the completion of this course students will be able to: Acquire the general knowledge of the structure and operation of public resources in local and federal government.

Key words: Public finance. Budgeting. Income. Current spending. Investment. Transparency. Performance measurement. Countable harmonization.

AP5001 Applied Research Project
(3 - 0 - 12. Prerequisites: [AP4005]. MAP09)
Equivalence: None

The aim of this advanced course is for the student to write a dissertation or research project using theoretical and methodological tools from the discipline that corresponds to their line of research. The project must integrate the knowledge acquired during the master's program. Learning outcome: the student will compile pertinent information, analyze a specific problem and integrate the findings in a project that offers alternative solutions.

General objective: During this seminary, the student will apply the knowledge acquired during the master's studies to a real life situation, that is to a specific problem that originates in an institution related to the public, private or civil society sector. The student will assume the role of "consultant" while "working" for the institution and he or she will make a formal presentation solving the "client's" problem.

This process is lead and monitored by EGAP professors and its orientation and theoretical foundation will be in accordance with the program to which the student belongs.

AP5002 Applied Research Project
(3.5 - 0 - 12. Prerequisites: None. MGP09V)
Equivalence: None

This advanced course consists of a research project. Prerequisite: To have completed at least 10 courses from the curriculum. the student will apply the knowledge acquired during the master's program to the analysis of a real-life situation corresponding to public, private or civil society institutions. Learning outcome: the student will complete a project in which he proposes a solution to a real-life situation in the setting of his choice. The project begins with the description of the problem or situation, the development of a bibliographic compilation on the topic, proposition and analysis of alternative solutions, assessment of the advantages and disadvantages of the same, and the social, financial and political implication of the proposed solutions.

General objective: A research course where students will apply the theory and practice learned in the Master's program in a real situation pertaining local government. The project has several phases: problem definition, literature review, solution proposals and alternatives, advantage and disadvantage assessment, and social, financial, and political implications of the research proposal.

Key words: Applied investigation project. Problematic election. Work proposal. Methodological framework. Theoretical framework.

Bibliography: * Elifson, Kirk W., 1943-, Fundamentals of social statistics/Kirk W. Elifson, Richard P. Runyon and Audrey Haber, 3rd. Edition, Boston: McGraw-Hill, c1998, Massachusetts, 1998, eng, [0070215790 (alk. paper)].

AP5003 Government and Citizenship Participation

(3.5 - 0 - 12. Prerequisites: None. MGP09V)
Equivalence: None

This basic course analyzes the participation of civil society in public affairs at local, regional or sub-national levels. Learning outcome: the student will involve civil society players in the public administration process through the analysis and evaluation of the different types of civil participation existing worldwide and in Latin America.

General objective: The objective of this course is to analyze citizenship participation in local and regional issues. To obtain this goal , analysis of the evolution and current status of different forms of citizenship participation and its relationship with local governments will be included. In this course community participation such as society's role in the generation of plans and programs, social benefits through community funding and the role of society in the public administration will be analyzed. In this context some Mexican and Latin American cases will be analyzed.

Key words: Government. Citizens' participation. Actors networks. Social participation in Mexico and Latin America. Social networks.

Bibliography: * Luiz Carlos Bresser Pereira, Nuria Cunill Grau (editores); María Inés Barreto .. [et al.], Lo público no estatal en la reforma del estado, 1ra. Edición, Buenos Aires, Argentina: Paidós; Caracas, Venezuela: CLAD, 1998, Argentina, 1998, español, [9501289052].

AP5017 Evaluation and Financing of Social Projects

(3.5 - 0 - 12. Prerequisites: None. MGP09V)
Equivalence: None

This advanced course requires prior knowledge of public finance. The course puts forward the need to evaluate public investment projects from economic and social perspectives and to identify the different sources of financing that a government administration can use. Learning outcome: the student will complete a project that promotes social and economic development, applying a broad vision of the social and economic context, considering the investment and financial requirements.

General objective: Upon completion of this course, students will be able to: Apply the tools and techniques required to obtain and evaluate information in order to make strategic decisions for projects that have a high impact on society.

Key words: Evaluation of social projects focused on sustainable development. Public and private financing.

BT**Biotechnology****BT4004 Instrumental Analysis in Biotechnology****(3 - 0 - 12. Prerequisites: None. MBI09)****Equivalence: None**

The aim of this basic course is to introduce students to the fundamental concepts of operating the most commonly used analytical techniques in the context of biotechnology research. Learning outcome: Students will effectively implement the most commonly used analytical techniques in their research work.

General objective: Students will study the bases, applications, and limitations of the principal instrumental analyses to identify, study, and confirm the presence of the main biomolecules or organic compounds obtained by biotechnological methods. The aim is to provide students with the ability to apply concepts and analytical criteria so that they can distinguish between different tools and methods in existence and then select those that best suit the application, sensitivity, and power of resolution required to solve experimental problems related to scientific investigation, technology, and law within this discipline. Students will identify and analyze the critical points and limitations of these as well as their potential application for diagnosis and process control when obtaining primary metabolites or secondary metabolites obtained by biotechnology. All this contributes to a culture of high quality in investigation and greater market opportunities for current and future developments in biotechnological products.

Key words: Instrumental analysis. Chemical and biological applications. Chromatography. Mass spectrometry. Spectroscopy.

BT4005 Cell Biology and Physiology**(3 - 0 - 12. Prerequisites: None. MBI09)****Equivalence: None**

This basic course provides the student with a general knowledge of cell structure, the relationship of said structure with cell physiology, and of the behavior of specific cells. Mastery of this material is basic for

a biotechnologist and allows the student to better understand the topics included in more advanced courses.

General objective: Upon completion of the course, students will be able to revise the main concepts of cellular structure, function, and physiology, study control mechanisms and cellular communication, and analyze recent publications that describe the relationship between structure and function within cells and the implication of physiological responses.

Key words: Cell structures and functions. Cellular physiology. Biochemistry. Cellular organelles.

BT5005 Selected Topics in Biotechnology**(3 - 0 - 12. Prerequisites: None. MBI09)****Equivalence: None**

This course focuses on the latest knowledge, concepts and tools in specific areas of biotechnology: Pharmaceutical and Medical Biotechnology, Food Biotechnology, Bioenergetics, Biochemical Engineering, Medicine. In this general course, students are exposed to diverse topics related to the lines of investigation of the faculty's researchers. The course helps students to define field of research.

General objective: Understand concepts related to frontier areas in Biotechnology. Analyze scientific literature related to cutting edge fields in Biotechnology. Discuss social, economic, and ethical aspects of topical issues in Biotechnology.

Key words: Biosciences and biotechnology. Social implications. Social, economic and ethical implications of biotechnology. Frontier areas of biotechnology.

BT5006 Genetic Engineering

(3 - 0 - 12. Prerequisites: None. MBI09)

Equivalence: None

Genetic engineering is one of the pillars of modern biotechnology. This course reviews the principles and application of genetic engineering in both microbial and eukaryote systems, providing the post-graduate student with state-of-the-art knowledge and skills in the field of genetic engineering. This material provides the student with the conceptual and procedural tools needed to understand and implement recombination technologies in the context of his thesis research and/or future professional activities.

General objective: Review principles of genetic engineering. Review and understand the main tools used in molecular biology and today's genetic engineering. Analyze the special features of genetic engineering when applied to prokaryotes and eukaryotes. Analyze scientific literature from the field of genetic engineering.

Key words: Genetic engineering. Recombinant DNA. Proteic expression. DNA.

Bibliography: * Glick, Bernard R., Molecular biotechnology: Principles and applications of recombinant DNA/Bernard R. Glick, Jack J. Pasternak, 3rd. Edition, Washington, D. C.: ASM Press, c2003, [1555812244 (encuadrado)], [1555812694 (rústica)].

CD Administrative Sciences

CD4000 Operations Management (3.5 - 0 - 12. Prerequisites: [AD4001]. MBA09, MBA09G)

Equivalence: GA00232, GA5073

A basic course in knowledge area of administration science. This course requires previous knowledge of statistics. As learning outcome the student will be able to resolve cases and elaborate a report showing the analysis of the situation and propose an improvement in the business processes.

General objective: The student will be able to know and simulate the transformation process of inputs into goods and services and the logistics of getting inputs from suppliers and final products to customers; to make decisions about market and clients processes and organization's human processes as well as economic and financial decisions (business processes value chain); to apply quantitative and qualitative modeling tools to support problem analysis and decision making.

Key words: Strategic operational decisions. Manufacturing and service process design. Process quality and performance. Supply chain strategies. Inventory management.

Bibliography: * Chase, Jacobs y Aquilano, Operations Management for Competitive Advantage, 11th. Edition, McGraw-Hill.

CD4001 Introduction to Statistical Finance

(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: None

This basic administrative science course aims to provide students with the quantitative bases for incorporating information into decision-making processes. Prerequisite: Prior knowledge of business administration, statistics and finance. Learning outcome: Students will be able to make decisions by constructing and analyzing forecasts in diverse economic-administrative disciplines, in order to make recommendations or create a simple business strategy.

General objective: Students will be able to use statistical and computational tools effectively in order to systematically develop processes for decision-making, construction, and analysis of prognostic factors in different economic-administrative disciplines, whilst handling information in an honest and responsible manner.

Key words: Descriptive statistics. Mathematical statistics. Statistical inference.

Bibliography: * TRIOLA, Mario F., Elementary Statistics, 10th. Edition, Addison Wesley.

CD96302 Managerial Data and Decision Analysis

(3 - 0 - 12. Prerequisites: None. MDE09)
Equivalence: None

General objective: Today's managers must be able to extract information from data and make decisions with imperfect information. Towards this goal, the basic concepts and methods of data and decision analysis are introduced. These include statistical control and random processes, probability and statistical inference, regression analysis, decision making under certainty, and risky decision making.

CD96303 Operations Management

(3 - 0 - 12. Prerequisites: None. MDE09)
Equivalence: None

General objective: Process analysis, quality management, technology management, and operations strategy are explored to understand how the operations function reinforces competitive position. An integrative approach to operations management is presented so that all functions of business can achieve coordination.

Bibliography: * Krajewski, Lee J., Operations management: Strategy and analysis/Lee J. Krajewski, Larry P. Ritzman, 4th. Edition, Reading, Mass.: Addison-Wesley, c1996, Massachusetts, 1996, eng, [0201607158 (encuadernado)], [0201822938 (disquete)].

CF **Financial and Administrative Accounting****CF96300 Financial Accounting Issues****(3 - 0 - 12. Prerequisites: None. MDE09)****Equivalence: None**

General objective: Accounting is used as a vehicle of financial communication by which results of business decisions are reported. Historical cost models are contrasted with accounting models appropriate for describing highly inflationary environments.

CF96301 Managerial Accounting**(3 - 0 - 12. Prerequisites: [CF96300]. MDE09)****Equivalence: None**

General objective: In this course, the student will learn how to construct information about the costs of products and activities under competing systems of cost measurement. This will provide an understanding of the rich set of information available to business decision-makers beyond the information presented in traditional cost systems.

CO **Communication****CO4004 Quantitative Research in
Social Sciences****(3 - 0 - 12. Prerequisites: None. DCS11)****Equivalence: CO4006**

General objective: Statistical analysis and research methods for quantitative studies in the field of communication. Sample size and types, the questionnaire, field work planning and supervision, data entry and statistical analysis of data.

Bibliography: * Wimmer, Roger D., Introducción a la investigación de medios masivos de comunicación/ Roger D. Wimmer, Joseph R. Dominick; traducción Carlos Arenas Monreal, 6ta. Edición, México: Thomson, c2001, español, [9706860290].

CR | **Organizational Communication and Public Relations****CR5000 Communication Skills****(1.5 0 6. Requisitos: No tiene. MAF15)****Equivalence: None**

The intention of this course of medium level, is for students to learn how to use communication tools, both oral and written, to impact diverse audiences. It does not require previous knowledge; however, it is useful for students to have taken the basic and fundamental courses previously, so that they produce better quality documents.

As a learning outcome, students will elaborate and present in an effective way a topic of their professional interest, and will be able to compose documents about state of the art themes in business, works related to their master program or relevant for their professional job

Objetivo general: At the end of the course the student will be able to lead, in small and large audiences, groups of executives in critical thinking and problem solutions in the area of finance, with convincing arguments and solid skills of analysis, synthesis and conclusions. Furthermore, the student will be equipped to do world class presentations in the realm of markets, economics and global firms, applying state of the art communication and technological tools to express his or her ideas in a professional and persuasive manner.

Bibliography: * HYNES, Geraldine E., Managerial Communication: Strategies and Applications, 6, SAGE Publications, english, [9781483358550].

CS Ciencias Computacionales

CS4000 Sistemas inteligentes

(3 0 12. Prerequisites: None. MCC16I)

Equivalencias: None

It is a basic graduate course in the area of Computer Science, which emphasizes the application of techniques of knowledge representation, searching and reasoning to solving problems both academic and real situations, with the intention to develop in the student, the ability to identify problems in their professional work whose solution can be obtained using Artificial Intelligence methods. The course integrates various types of intelligent agents, each of which has characteristics that distinguish them from others, both in the type of problems they can solve, as in the techniques they use to do it. The course requires basic knowledge of computational mathematics and computer programming.

General objective: After completing the course, students will be able to:

- Recognize problems that need to be solved with artificial intelligence methods.
- Understand the operating scheme of different classes of intelligent agents that have more application at present, their methods and models to solve complex problems.
- Identify the characteristics of intelligent agents in cases, situations and real problems, through the use of various tools.
- Represent knowledge involved in complex problems and select appropriate methods of searching and reasoning required to solve them.
- Develop intelligent systems that involve the use of various types of intelligent agents
- Assess the contributions and limits of artificial intelligence technologies when confronted with humans and vice versa.

Key words: Artificial intelligence. Intelligent agents. Search algorithms. Heuristics. Knowledge Representation.

Bibliography: * Russell, Stuart J. (Stuart Jonathan), Artificial intelligence : a modern approach / Stuart J. Russell and Peter Norvig ; contributing writers, Ernest Davis .. [et al.], 3rd ed., Upper Saddle River, N.J. ; México : Prentice Hall, c2010., [9780136042594],[0136042597].

CS4012 Computing Fundamentals

(3 0 12. Prerequisites: None. MCC16I)

Equivalence: None

This is a basic course in the área of computer science which aims at teaching the student the fundamentals of computing from the perspective of the design of algorithms and their complexity analysis, when considering various computational problems. The course integrates different concepts and examples that justify the usage of computational complexity in order that the student includes his own view when developing algorithms or software for solving problems. The course requires basic background in discrete mathematics, integral calculus and programming skills. The course learning outcomes include tools to perform the computational complexity of algorithms, various techniques for designing efficient algorithms, and the application of those techniques for a variety of problems such as sorting, graph, matrix multiplication, NP problems, and parallel algorithms.

Objetivo general: After completing the course, students will be able to:

- Perform an effective analysis of the computational complexity of a variety of algorithms.
- Use various techniques for the design of efficient algorithms.
- Identify different types of computational problems to establish their complexity.
- Identify the features of NP problems and develop a set of heuristics to solve them.
- Design efficient parallel algorithms to solve computational problems.

Key words: Analysis of algorithms. Computational complexity. Problem difficulty. Efficient algorithms. NP problems, parallelism..

Bibliography:* Introduction to algorithms / Thomas H. Cormen .. [et al.], 3rd ed., Cambridge, MA : The MIT Press, 2009., [9780262033848 (encuadernado : papel alcalino)], [9780262533058 (rústica : papel alcalino)].

CS4013 Machine Learning (3 0 12. Prerequisites: None. MCC16I) Equivalence: None

It is a graduate basic course of the area of Computer Science, which aims for the student to explain the scope, the goals, and the limitations of Machine Learning; understanding the different sub disciplines in this field; describing the techniques which are covered in this course, as well as recognizing the structure of the discipline where these techniques fit in; comparing critically, contrasting and evaluating the Machine Learning techniques in terms of their applicability in different problems; given a dataset and a problem, properly using a computational package and correctly applying the techniques covered by the course, and solving problems; applying a systemic and systematic approach for conducting experimental research and evaluating scientific hypotheses. The course requires strong knowledge of computer programming and basic knowledge of discrete mathematics, calculus, probabilities, and linear algebra. As a result of the learning process the student will get the elements for analyzing a dataset, building machine learning models to solve problems, or evaluating scientific hypotheses.

General objective: After completing the course, the student will be able to apply the main techniques related to machine learning, such as regression, supervised learning, unsupervised learning, and others; by means of a software package that allows the student to perform experiments with these techniques..

Key words: Regression. Supervised Learning. Unsupervised Learning. Evaluation of Hypothesis.

Bibliography: * Mitchell, Tom M. (Tom Michael), 1951 , Machine Learning / Tom M. Mitchell., New York

: McGraw Hill, c1997., [0070428077].

CS4014 Applied Mathematics (3 0 12. Prerequisites: None. MCC16I) Equivalence: None

It is a basic graduate course (Ph.D. and Master) in Computer Science, which overviews the main themes of Mathematics as applied to Computer Science. These themes include Discrete Mathematics, Logic, Probability, Statistics, Linear Optimization and Linear Algebra. The names themes are illustrated by its application to Computer Science problems, like Algorithms, Data Structures, Inference, Computability, Computer Networks, and Programming Languages. The course requires basic knowledge of Mathematics, Calculus, and Algebra.

General objective: After completing the course, students will be able to:

- Know the main topics of Mathematics employed by Computer Scientists.
- Understand the way in which mathematical methods are employed in Computer Science problems.
- Apply the main mathematical methods to Computer Science problems to analyze their solution.
- Use mathematical software to define and solve mathematical problems in Computer Science.

Key words: Logic. Probability. Statistics. Graph Theory. Discrete Mathematics.

Bibliography * Hunter, J. David, (David James), 1968 , Essentials of discrete mathematics / David J. Hunter., Boston, Massachusetts : Jones and Barlett Publishers, 2009., [0763748927], [9780763748920].

CS5058 Thesis I (3 0 12. Prerequisites: None. MCC16I) Equivalence: None

It is a graduate research course designed to instruct students to develop and report progress of the research project showing the domain specific knowledge area and appropriate to the Masters level. In addition, during the course the student will

participate in the activities of the program seminar and submit a timetable of activities and deliverables for the development of his/her thesis. As a result of learning the student will acquire the skills to build a thesis proposal in which the research question, hypothesis and objectives are specified.

General objective: On completion of the course, students will be able to develop a thesis proposal in writing, specifying the research question, hypothesis and objectives.

Key words: Thesis. Hypothesis. Thesis Proposal. Research Question. Objectives.

Bibliografía: * Burden, Richard L., Numerical analysis / Richard L. Burden, J. Douglas Faires., 8th ed., Belmont, CA ; México : Thomson Brooks/Cole, 2005., [0534392008 (ed. estudiante : papel no ácido)], [0534404995 (ed. international estudiante : papel no ácido)], [9780534404994 (ed. international estudiante : papel no ácido)].

CS5059 Thesis II

(3 0 12. Prerequisites: None.. MCC16I)

Equivalence: None

It is a graduate research course for a Master degree designed for the student to gather experimental data for his/her research. In addition, the student will participate in the research seminar of the program. As a learning outcome, the student must present the gathered data, as well as a preliminary analysis for the development of the thesis.

General objective: On completion of the course, students will be able to have data gathered for the thesis and a preliminary analysis of such data.

Key words: Data analysis. Thesis. Experimentation. Experimental Data. Data Gathering Techniques.

Bibliography:* Weiss, Mark Allen., Data structures & algorithm analysis in Java / Mark Allen Weiss., Reading, Mass. : Addison Wesley, c1999., [0201357542].

CS5060 Thesis III

(3 0 12. Prerequisites: None. MCC16I)

Equivalence: None

It is a graduate research course for a Masters degree designed to enable the student to write the Master's thesis. In addition, the student will present his/her research results before the audience of the research seminar of the program. As a learning outcome, the student must present and defend his/her Master's thesis.

General objective: On completion of the course, students will be able to have the thesis in written and defend it before the committee.

Key words: Thesis Writing. Presentation Results. Presentation of Conclusions. Defense before Committee.

Bibliografía: * Langsam, Yedidyah, 1952, Estructuras de datos con C y C++ / Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum ; traducción Miguel Ángel Martínez Sarmiento., 1a ed. en español., México : Prentice Hall, 1997., spaeng, [9688807982].

CS6021 Guided Research I

(3 0 12. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate research course intended for the student, guided by the professor, to study the specific topics that contribute on the preparation of his line of research. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present evidence of learning on the topic of the line of research assigned.

Key words: Scientific Research. Line of Research. Scientific Topics. Scientific Training. Topic Guidance.

Bibliografía: * Gasser, Morrie, 1947, Building a secure computer system / Morrie Gasser., New York : Van Nostrand Reinhold Co., c1988., [0442230222:], [\$34.95].

CS6022 Guided Research II (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended for the student, guided by the professor, to study the specific topics that contribute on the preparation of his line of research. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present evidence of learning on the topic of the line of research assigned

Key words: Scientific Research. Line of Research. Scientific Topics. Scientific Training. Topic Guidance.

Bibliography: * Bass, Len., Software architecture in practice / Len Bass, Paul Clements, Rick Kazman., Reading, Mass. : Addison Wesley, c1998., [0201199300 : HRD],[47.95].

CS6025 Integrated Exam (1.5 0 6. Prerequisites: None. DCC16) Equivalence: None

It is a graduate course intended for the student to develop a written report that integrates his(her) research abilities and present a written exam before the Integrated Examination Committee. As a learning outcome the student will present the integrated exam that will permit him(her) to continue with the following research work in the program.

General objective: On completion of this course, the student will be able to integrate his(her) acquired knowledge that allows him(her) to continue the research work.

Key words: Scientific Training. Research Line. Knowledge Exam. Research Abilities. Integrated Examination Committee.

Bibliography: * Stallings, William., Data and computer communications / William Stallings., 8th ed., Upper Saddle River, N.J. : Pearson/Prentice Hall, c2007., [0132433109],[9780132433105].

CS6031 Research Proposal I (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate course intended to allow the student to define his/her proposal for a doctoral research project and to publically present his/her progress in a collective discussion context. Furthermore, preliminary results will be defined as evidence for the proposal's viability. As a learning outcome it is expected that the student will start to plan for a project.

General objective: On completion of this course, the student will be able to define the development of his research project, assessed by a research professor and submitting progress reports periodically.

Key words: Research proposal. Methodological framework. Research questions. Theoretical framework. Research Objectives.

Bibliografía: * Jonathan Lazar, Jinjuan Heidi Feng, Harry Hochheiser, Research Methods in Human Computer Interaction, First edition, Wiley, [978 0470723371].

CS6032 Research Proposal II (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate course intended to allow the student to finish his/her proposal for a doctoral research project and to publically present his/her progress in a collective discussion context. Furthermore, preliminary results will be defined as evidence for the proposal's viability. As a learning outcome it is expected that the student will finish to plan for a project.

General objective: On completion of this course, the student will be able to define the development of his research project, assessed by a research professor and submitting progress reports periodically.

Key words: Research proposal. Methodological framework. Research questions. Theoretical framework. Research Objectives.

Bibliography: * Peter Bock, Getting It Right: R&D Methods for Science and Engineering, First edition, Academic Press, [000 0121088529].

CS6035 Research Proposal Defense

(1.5 0 6. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate course intended for the student to develop and present his doctoral research proposal to the thesis committee. As a learning outcome the student will present the proposal that will lead the following research work.

General objective: On completion of this course, the student will be able to integrate his(her) doctoral research proposal that will be the base for his(her) dissertation work.

Key words: Thesis committee. Scientific Research. Scientific Training. Research Line. Research Topics.

Bibliography: * Knuth, Donald Ervin, 1938 , The art of computer programming / Donald E. Knuth., Upper Saddle River, NJ : Addison Wesley, 2005 , [0201853922 (v. 1, fasc. 1)], [0201853930 (v. 4, fasc. 2)], [0201853949 (v. 4, fasc. 3)], [0321335708 (v. 4, fasc. 4)], [968162288X (tomo 3)], [9681627822 (tomo 3, encuadernada)], [9780321534965 (v. 4, fasc. 0)], [9780201853933 (v. 4, fasc. 2)], [9780201853940 (v. 4, fasc. 3)], [9780321335708 (v. 4, fasc. 4)].

CS6041 Research Integration I

(1.5 0 6. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate research course intended for the student to integrate in evidential documents the development of his academic research experience. As a learning outcome the student will present the needed documentation to a committee defined by the academic program.

General objective: On completion of this course, the student will be able to integrate his(her) research work with evidential documents.

Key word: Scientific Research. Scientific Product. Digital Portfolio. Interaction and Collaboration Networks. Scientific Databases.

Bibliografía: * Silvia Domínguez, Betina Hollstein , Mixed Methods Social Networks Research: Design and Applications, Cambridge University Press.

CS6042 Research Integration II

(1.5 0 6. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate research course intended for the student to integrate in evidential documents the development of his academic research experience. As a learning outcome the student will present the needed documentation to a committee defined by the academic program

General objective: On completion of this course, the student will be able to integrate his(her) research work with evidential documents.

Key words: Scientific Research. Scientific Product. Digital Portfolio. Interaction and Collaboration Networks. Scientific Database.

Bibliography: * Charles Kadushin , Understanding Social Networks: Theories, Concepts, and Findings, 1, Oxford University Press.

CS6101 Doctoral Research I

(3 0 12. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate research course intended to start the student's doctoral research through his work and the feedback on his research proposal, according to the work plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research proposal. Research Progress. Work Plan. Scientific Research. Doctoral Thesis.

Bibliography * Davenport, Wilbur B., Probability and random processes ; an introduction for applied scientists and engineers / Wilbur B. Davenport, Jr., New York : McGraw Hill, 1987., [0070154406].

CS6102 Doctoral Research II (3 0 12. Prerequisites: None. DCC16) **Equivalence: None**

It is a graduate research course intended to start the student's doctoral research through his work and the feedback on his research proposal, according to the work plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research proposal. Research Progress. Work Plan. Doctoral Thesis. Scientific Research.

Bibliography: * Papoulis, Athanasios, 1921 , Probability, random variables, and stochastic processes / Athanasios Papoulis, S. Unnikrishna Pillai., 4th ed., Boston : McGraw Hill, c2002., [0073660116],[0071122567].

CS6103 Doctoral Research III (3 0 12. Prerequisites: None. DCC16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Vahid, Frank., Embedded system design : a unified hardware/software introduction / Frank Vahid, Tony Givargis., New York : Wiley, c2002., [0471386782 (encuadernado : papel alcalino)].

CS6104 Doctoral Research IV (3 0 12. Prerequisites: None. DCC16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: n completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis..

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography * Johns, David, 1958 , Analog integrated circuit design / David Johns, Ken Martin., New York : John Wiley & Sons, c1997., [0471144487 (cloth : alk. paper)].

CS6105 Doctoral Research V (3 0 12. Prerequisites: None. DCC16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. At this stage, a decision should be made whether to change the research plan or continue as it is. As a learning

outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Jantsch, Axel., Modeling embedded systems and SoC's [recurso electrónico] : concurrency and time in models of computation / Axel Jantsch., San Francisco : Morgan Kaufmann, c2004., [9780080511825 (electronic bk.)],[0080511821 (electronic bk.)],[9781558609259],[1558609253].

CS6106 Doctoral Research VI (3 0 12. Prerequisites: None DCC16) Equivalence: None

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. At this stage, a decision should be made whether to change the research plan or continue as it is. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Jim Cooling, Software Engineering for Real Time Systems, Addison Wesley, Inglés, [0201596202].

CS6107 Doctoral Research VII (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Goldsmith, Andrea, 1964 , Wireless communications / Andrea Goldsmith., Cambridge ; New York : Cambridge University Press, 2005., [0521837162],[9780521837163]

CS6108 Doctoral Research VIII (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliografía: * Seybold, John S. , Introduction to RF propagation, Wiley, Inglés, [978 0 471 65596 1].

CS6109 Doctoral Research IX (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers in their review of scientific articles. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key word: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Chen, Hsiao Hwa., The next generation CDMA technologies / Hsiao Hwa Chen., Chichester, England ; Hoboken, NJ : John Wiley, c2007., [0470022949 (tela)], [9780470022948 (tela)].

CS6110 Doctoral Research X (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers in their review of scientific articles. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliografía: * De Morais Cordeiro, Carlos., Ad hoc & sensor networks : theory and applications / Carlos

de Morais Cordeiro, Dharma Prakash Agrawal., Hackensack, NJ : World Scientific Publishing Co., c2006., [9812566813],[9812566821 (rústica)].

CS6111 Doctoral Research XI (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers in their review of scientific articles. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Crovella, Mark., Internet measurement : infrastructure, traffic, and applications / Mark Crovella, Balachander Krishnamurthy., Chichester, England ; Hoboken, NJ : Wiley, c2006., [047001461X (encuadernado)], [9780470014615 (encuadernado)].

CS6112 Doctoral Research XII (3 0 12. Prerequisites: None. DCC16) Equivalence: None

It is a graduate research course intended to finish the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers. As a learning outcome, the student must present relevant research progress for the completion of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the completion of the doctoral thesis.

Key words: Work Plan. Doctoral Thesis. Scientific Research. Scientific Products. Completion of Thesis.

Bibliography: * Bertsekas, Dimitri P., Data networks / Dimitri Bertsekas, Robert Gallager., 2nd ed., Englewood Cliffs, N.J. ; México : Prentice Hall, 1992., [0132009161].

CS6113 Doctoral Research XIII

(3 0 12. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate research course intended to finish the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers. As a learning outcome, the student must present relevant research progress for the completion of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the completion of the doctoral thesis.

Key words: Work Plan. Doctoral Thesis. Scientific Research. Scientific Products. Completion of Thesis.

Bibliography: * Gutiérrez Alonso, Mario A. (Mario Arturo), 1976 , Stepping into virtual reality / Mario A. Gutiérrez A., Frédéric Vexo, Daniel Thalmann., London : Springer, 2008., [9781848001169 (rústica)], [1848001169 (rústica)].

CS6114 Doctoral Research XIV

(3 0 12. Prerequisites: None. DCC16)

Equivalence: None

It is a graduate research course intended to finish the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers. As a learning outcome, the student must present relevant research progress for the completion of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the completion of the doctoral thesis.

Key words: Work Plan. Doctoral Thesis. Scientific Research. Scientific Products. Completion of Thesis.

Bibliography: * Bertsekas, Dimitri P., Data networks / Dimitri Bertsekas, Robert Gallager., 2nd ed., Englewood Cliffs, N.J. ; México : Prentice Hall, 1992., [0132009161].

CS6120 Doctoral Defense

(0 0 1. Prerequisites: None. DCC16)

Equivalence: None

This is the last course of the graduate program and is intended for the student to present the doctoral research developed during his doctoral program to the thesis committee. As a learning outcome the student will present the proposal of his thesis to the thesis committee. General objective: On completion of this course, the student will be able to demonstrate researcher skills through the defense of his doctoral thesis.

Key words: Thesis committee. Doctoral thesis. Scientific Research. Scientific Training. Research Results.

Bibliography:

CV Civil Engineering

CV4001 Innovation Management in Construction

(3 - 0 - 12. Prerequisites: None. MAC12)

Equivalence: None

This basic course presents the principles of innovation and its management tools and innovation process models within the context of the construction industry. Learning outcome: the students will understand the technological innovation process and will be able to design and to manage innovation processes in the construction industry.

General objective: To examine the process of technological innovation and the tools, models, and methods to manage this process. To manage technological innovation projects in the construction industry, identify areas of opportunity in the field of technological innovation in the construction industry, as well as sources for financing projects, subsequent security, and operation.

Key words: Technological innovation. Innovation management. Construction industry.

Bibliography: * García S., Manual de Gestión de la Innovación Tecnológica en la Construcción.

CV5000 Information Technology for Engineering

(3 - 0 - 12. Prerequisites: None. MAC12)

Equivalence: None

This advanced course presents the information technologies that are used to develop and improve the processes developed by project and company directors and managers. Learning outcome: the student will understand the challenges facing engineers and his new role in company and project management.

General objective: To apply Information Technology to different processes during a project, from design up to the delivery and operational process; to adapt and/or design or redesign processes from an IT perspective; to identify the impact, needs, opportunities, and influence of Information Technology in the

organization of projects and businesses within the industry; and to choose, recommend, and apply different information technologies to projects and businesses within the industry.

Key words: Project management. Information Technology (IT). Business administration.

Bibliography: * Trefor Williams, Information Technologies for Construction Managers, Architects and Engineers.

CV5019 Research Project I

(1.5 - 0 - 6. Prerequisites: None. MAC12)

Equivalence: None

The student will demonstrate his technical capacity and his skills with the knowledge acquired in his Master's studies in the solution of an applied research or a technological development project.

General objective: Start the applied research or technological development project. A proposal is developed under the advice of a professor. Several progress reports are elaborated during the course.

Key words: Technological development. Applied research.

CV5020 Research Project II

(1.5 - 0 - 6. Prerequisites: None. MAC12)

Equivalence: None

The student will demonstrate his technical capacity and his skills with the knowledge acquired in his master's studies in the solution of an applied research or technological development project.

General objective: Develop the applied research or technological development project under the advice of a professor. Several advance reports are elaborated.

Key words: Technological development. Applied research.



CV5021 Research Project III
(1.5 - 0 - 6. Prerequisites: None. MAC12)
Equivalence: None

The student will demonstrate his technical capacity and his skills with the knowledge acquired in his Master's studies in the solution of an applied research or technological development project.

General objective: Complete the applied research or technological development project under the advice of a professor. A final report document is elaborated.

Key words: Technological development. Applied research.

DI International Law

DI4021 International Regulation of Trade

(3 - 0 - 12. Prerequisites: None. MDI09)
Equivalence: D 97212

It is a basic course with the intention of providing a general panorama of the legal frame of the world exchange of goods, services, capitals, as well as of the persons' transnational movement for business reasons. In the first stage of this course, a study is realized in the evolution process of the General Agreement on Tariffs and Trade (GATT) from its origins to the moment before the creation of the World Trade Organization (WTO) in the Uruguay Round. In a second stage, the following will be analyzed: the most important regional mechanisms (NAFTA, EU, MERCOSUR), the interrelationship among trade and investment, environment, economic competition, trade unfair practices and other important topics. As a learning result, the student will understand and analyze the main institutions and procedures that govern the international trade and Mexico's foreign investment law. Due to its structure, it is recommended that the student should have previous knowledge in trade and / or law.

General objective: To analyze the juridical institutions which regulate the international trade on the basis of their economic origin. To realize a critical analysis of the procedure and institutions and the form of interpretation used by them for different conflict resolution.

Key words: International trade. Foreign investment. The GATT and the WTO. Trade arrangements. Unfair trade practices.

Bibliography: * Trebilcock, M. J., Regulation of international trade. The regulation of international trade [recurso electrónico]/Michael J. Trebilcock and Robert Howse, 3rd. Edition, London: Routledge, 2005, [0203799798],[0203799798 (libro electrónico)],[9780203799796 (libro electrónico)].

DI4022 Principles of International Public Law and Conflicts Resolution

(3 - 0 - 12. Prerequisites: None. MDI09)
Equivalence: D 97241, DI4008

This is a basic course which does not require previous specialized knowledge. At the beginning of this course, we pretend to prepare the student in the main principles of the international public law and the restriction which exercises in the international relations among States and its consequences when they breach it. This course studies political mechanisms such as the negotiation or consultations, conciliation, mediation and good offices; as well as juridical mechanisms like the arbitration and the judicial arrangement in specific cases before the International Court of Justice. In the second part of the course there is studied the performance that the individuals have in the International Law; the role that the United Nations develops in its peace keeping operations, as the resolutions that arise from the General Assembly and from the Security Council, studying its organization and functioning. Obtaining as a learning achievement, the understanding of the student in the concepts and fundamental principles that govern the international public law and the different mechanisms for the pacific arrangement of disputes among subjects of international law.

General objective: To understand the particularity that the public international law brings over the responsibility of the States in the fulfillment of its obligations. To identify and to analyze the methods of solution of controversies in the International Law. To analyze new elements of the international public law as the involvement of the individuals. To analyze the role of the United Nations in the Solution of Controversies.

Key words: Solution of international controversies. International Court of Justice. Subjects of international law.

DI4023 International Law of Human Rights

(3 - 0 - 12. Prerequisites: None. MDI09)
Equivalence: None

This is a basic course that focuses in the execution, fulfillment and practice of the Human Rights procedure in different countries. The course studies the development of the civil right on the human rights (includes basic international instruments and the international common law, the international and regional systems of execution and the continuous growth of the human rights role in the international relations. Obtaining as a learning achievement, the student capacity to deeply know the Inter-American System of Human Rights, its function, approaches and limits. Also the student will be able to propose alternatives to the effective protection and solution of the Human Rights.

General objective: To identify and to analyze the functioning of the different systems of the human rights protection. To determine and to know the human rights considered in diverse agreements and conventions of the International Law, with special emphasis to civil and political laws.

Key words: Human rights. Torture. Judicial guarantees. Freedom of speech. The Inter-American Court of Human Rights. Universal system of human rights.

Bibliography: * Derecho internacional de los derechos humanos/Claudia Martin, Diego Rodríguez-Pinzón, José A. Guevara B., compiladores; prólogo por Claudio Grossman, 1era. Edición, México, D. F.: Universidad Iberoamericana: Distribuciones Fontamara; Washington, D. C.: Academia de , México, 2004, español, [9684764901],[9789684764903].

DI4024 International Contractual Law

(3 - 0 - 12. Prerequisites: None. MDI09)
Equivalence: D 97215

Basic course of specialty where there are analyzed the topics of operation and regulation that face the international business, for example, the agreements on international franchises or the agreements for development of technology. The above mentioned topics will include problems related to the interna-

tional contracting of goods and services, transnational financing (financing across bank, transactions on the markets of the capital, letters of credit and assurances of political risks), international mergers and other investments. Being the learning achievement, the students' knowledge and understanding of the documentation and regulation which is applicable to the contracting of the operations and international transactions and the most relevant practical aspects. The course requires constant review of the principal national laws and international conventions which are applicable to the contracts, and basic knowledge of law.

General objective: The depth knowing of different types of contracts between individuals of different jurisdictions. To analyze the international conventions and the principal national dispositions that affects the international contracts. To acquire the necessary practical skills for the draft of the most important international contracts in Spanish and in English.

Key words: International contracts.

DI4025 International Arbitration and Litigation

(3 - 0 - 12. Prerequisites: None. MDI09)
Equivalence: None

Basic course in which the student needs previous knowledge of questions of law, because by means of this course, the student will obtain the essential skills that a law professional needs in the context of globalization, in which the disputes between individuals are not necessarily restricted to the national borders. The student will have a general approximation to the principal transnational aspects of litigation and arbitration and the complexity of its practice, through cases and relevant doctrine. The course's purpose is that the student will acquire the knowledge of the most common mechanisms that are in use in the most important juridical systems, and to face disputes that involve geographical factors making them juridical complex. As a learning outcome, the student will have the necessary tools to know, face and give advice for the process and procedure of the litigation and arbitration; the student will be able to speak different legal languages and understand and compare the legal systems that the daily practice of Interna-

tional Law requires, mastering the different concepts, doctrines, principles, sentences and case law used in transnational disputes.

General objective: To acquire as knowledge the procedural aspects of private international law. Be able to manage and apply the mechanisms to solve international controversies which are derived from the relations between individuals, giving special emphasis on the commercial controversies. To analyze and identify the types of controversies which arise inside the commercial / contractual area.

Key words: International dispute settlement. International arbitration. Recognition and enforcement of foreign judgments. Forum Non Conveniens Doctrine.

Bibliography: * Carbonneau, Thomas E., Cases and materials on international litigation and arbitration/ Thomas E. Carbonneau, St. Paul, MN: Thomson/West, c2005, Minnesota, 2005, eng, [0314159762].

DI4026 Advanced Topics of International Law

(3 - 0 - 12. Prerequisites: None. MDI09)

Equivalence: None

This basic course offers those students having a special interest in international public law the opportunity to explore the advanced topics of present importance inside of this subject matter: The efficiency of the actual juridical order on the context of economic globalization and the transcendence of the threat that represents terrorism; the nature of sovereignty; the role of the new sui generis actors; the use of force; the actual matter on international environmental law, etc. The learning achievement is that at the end of the course the student is capable of realizing juridical analyses that contemplate political, economic and social factors and which need a juridical opinion and a better regulation. The context of the class involves the application or study of actual matters of international law and because of this they could be in constant change and for that the course does not require a previous and specialized knowledge on the topic.

General objective: To analyze the most current areas of study of the international law and the pro-

blems that one faces in the world. To identify the international conventions and its interaction with the national legislation in relation to the environmental law. To compare and analyze relevant and current aspects that affect the international criminal law. To propose possible solutions for the principal problems and manage alternatives of solutions for the incorporation and validity of the international law in the national areas.

Key words: Subjects of international law. International conventions and treaties. International community. International relations.

DI4029 Civil Procedure in the United States of America

(6 0 24. Prerequisites: None. MPJ14)

Equivalence: None

This basic course provides an overview about the main characteristics of the civil litigation process in the USA. As a result of the learning process the student will demonstrate that understand the elements in a civil litigation process such as: procedural posture, the pre trial practice, the trial, and the rules of appeal.

General objective: After completing the course the student will have the necessary skills to read and analyze U.S. judicial decisions.

Key words: Litigation. Civil Procedure. Judicial decisions.

Bibliography: * Jack H. Friedenthal, Arthur R. Miller, John E. Sexton, and Helen Hershkoff, Civil Procedure: Cases and Materials, 11th, West Publishing, 2013, [9780314184023].

DI4030 Contracts in the United States of America

(6 0 24. Prerequisites: None. MPJ14)
Equivalence: None

This basic course provides an overview of the main characteristics of contracts in the United States of America for lawyers whose first degree is not in the USA. As a result of the learning process the student will learn the basic principles of contract theory and the different types of contracts in the USA

General objective: After completing the course the student will be able to interpret different kinds of contracts and to draft a contract applying contract theory.

Key words: Contracts. Contracts theory. Types of contracts.

Bibliography: * Ian Ayers & Gregory M. Klass, Studies in Contract Law, 8th, West Publishing, 2012, Inglés, [9781609301170].

DI4031 International Contractual Law

(6 0 24. Prerequisites: None. MPJ14)
Equivalence: None

This basic course analyzes international contractual law under a legal and economic perspective. As a result of the learning process the students will demonstrate mastery in the necessary tools to carry out a contract that involve people from different countries, under principles of private international law.

General objective: After completing the course the student will be able to analyze international conventions and the principal national dispositions that affects the international contracts.

Key words: International private law. Legal and economic perspective of contractual law. Drafting international contracts.

Bibliography: * Adame Goddard, Jorge., El contrato de compraventa internacional, México : McGraw Hill, 1999, Español, [9701005074].

DI4032 Leadership and Ethics in the Exercise of Public Service

(6 0 24. Prerequisites: None. MPJ14)
Equivalence: None

This basic course, offers students introductory knowledge of ethics and leadership. As a result of the learning process, the student will use conceptual tools to critically analyze real leadership and ethics case studies in the public and private spheres and in civil society, as well as to design strategies promoting efficient and ethical leadership whose objective is the common good.

General objective: After completing the course the student will be able to examine the historical view of leadership and the ethical implications of its use. Build a conceptual basis for the critical analysis of cases based on leadership theories and classical and contemporary ethics. Develop a thoughtful and proactive approach to ethics in the area of public, corporate and social leadership.

Key words: Ethics doctrines applied to public service. Leadership in the public sector. Ethical leaders.

Bibliography: * edited by Bryan W. Van Norden., Confucius and the Analects [recurso electrónico] : new essays , Oxford ; New York : Oxford University Press, 2002.

DI5001 Applied Research Project
(3 - 0 - 12. Prerequisites: [NB4005]. MDI09)
Equivalence: None

The aim of this advanced course is for the student to write a dissertation or research project using theoretical and methodological tools from the discipline that corresponds to their line of research. The project must integrate the knowledge acquired during the master's program. Learning outcome: the student will compile pertinent information, analyze a specific problem and integrate the findings in a project that offers alternative solutions.

General objective: During this seminary, the student will apply the knowledge acquired during the master's studies to a real life situation, that is to a specific problem that originates in an institution related to the public or private sector, or a non-governmental organization. The student will assume the role of "consultant" while "working" for the institution and he or she will make a formal presentation solving the "client's" problem. This process is lead and monitored by EGAP professors and its orientation and theoretical foundation will be in accordance with the program to which the student belongs.

Bibliography: * Nino, Carlos S., Algunos Modelos Metodológicos de "Ciencia" Jurídica, 3ª. Ed, Distribuciones Fontamara, 1999.

DI5007 Professional Responsibility
(6 0 24. Prerequisites: None. MPJ14)
Equivalence: None

This advanced course provides an overview of the ethical and legal principles under which a law professional should practice law. The course will address the ABA Model Rules of Professional Conduct, the California Rules of Professional Conduct, relevant sections of the California Business and Professions Code, and will also consider ethical duties arising under common law and other sources of authority. As a result of the learning process the student will demonstrate knowledge of the ethical principles about: the nature and types of lawyer regulation, client attorney relationships, confidentiality rules, conflicts of interest, duties to courts, adversaries and third parties, client solicitation and billing, and access to legal services.

General objective: After completing the course the student will be prepared to face ethical dilemmas they will face as practicing lawyers based on the professional values of providing competent legal representation, improving the legal profession, and promoting justice and fairness.

Key words: Professional responsibility. Ethical principles. Practicing lawyer.

Bibliography: * Stephen Gillers, Regulation of Lawyers: Problems of Law and Ethics, Wolters Kluwer, 2012, [9781454802990].

DI5008 Negotiation
(4 0 16. Prerequisites: None. MPJ14)
Equivalence: None

This advanced course offers negotiation skills to conduct a negotiation process with the intention of obtaining a win win agreement and emphasizes learning the skills of negotiation by simulations, lectures, and exercises in which students will negotiate and watch their classmates and experts negotiate. As a result of the learning process the students will conduct at least three negotiations during the course – a sales contract, a retainer agreement between an attorney and a client, and a complex multi-party dispute.

General objective: After completing the course the student will be able to conduct a negotiation and achieve a win-win outcome for the involved parties.

Key words: Negotiations skills. Negotiation simulations. Win-win solutions.

Bibliography: * Fisher, Roger, Getting to yes : negotiating agreement without giving in, 3rd ed., rev. ed., New York : Penguin, 2011, Ingles, [9780143118756].

DI5009 Regulation of International Trade and Investment

(6 0 24. Prerequisites: None. MPJ14)

Equivalence: None

This advanced course provides the necessary knowledge of the rules, principles and institutions governing international trade. As a result of the learning process the student will be able to analyze the legal institutions and rules of the international trade based on their economic background from the perspective of international economic law.

General objective: After completing the course the student will be able to understand the legal institutions that regulate international trade on the basis of their economic origin and will be able to do a critical analysis of the norms and institutions and how these are interpreted for conflict resolution

Key words: Rules of international trade. International economic law. Trade conflict resolution.

Bibliography: * Trebilcock, Michael J., The Regulation of International Trade., New York, N. Y., Routledge, 1995, English, [0415081637].

DI5010 International Arbitration and Litigation

(6 0 24. Prerequisites: None. MPJ14)

Equivalence: None

This advanced course provides the student the necessary knowledge on arbitration and international litigation. As a result of the learning process, the student will demonstrate knowledge of the international law principles related to dispute resolution, and therefore would be able to participate as an advisor in a litigation process.

General objective: After completing the course the student will be able to apply mechanisms to solve international controversies that resulted from the relations between individuals, with special emphasis on commercial controversies.

Key words: International law principles. Dispute re-

solution. Commercial controversies.

Bibliography: * Carbonneau, Thomas E., Cases and materials on international litigation and arbitration , St. Paul, MN : Thomson/West, 2005, Inglés, [0314159762],[9780314159762].

DS Sustainable Development

DS4000 Leadership for Sustainable Development

(1.5 - 0 - 6. Prerequisites: None. DCL12)
Equivalence: DS00205, DS99205

General objective: This course is oriented toward raising awareness of global environmental changes, the risks implicit in global imbalance, the importance of life diversity and the imperatives of living within limits, emphasizing in graduates the appropriate vision for confronting the challenges of the 21st century and redirecting the planet toward sustainability.

Bibliography: * Erast A. Bugger y Eduardo Lizarno, Ecoeficiencia.

DS4001 Leadership for Sustainable Development

(3 - 0 - 12. Prerequisites: None. DCS11)
Equivalence: DS00204, GA00920, GS95204

General objective: This course is oriented to strengthen the consciousness about the global environmental changes, the implicit risks for a planet unbalance, the importance of life diversity and the need of living according to the limits, making emphasis on the appropriate vision to afford the XXI century challenges and changing the planet direction towards sustainability.

Bibliography: * Manual de Lecturas elaborado por el Centro de Apoyo al Desarrollo Sostenible.

DS4002 Leadership for Sustainable Development

(3.5 - 0 - 12. Prerequisites: None. MID09V)
Equivalence: DS00204, GA00920, GA4053

This is a basic course in the knowledge of sustainable development. This course requires previous knowledge of business management. As a learning result, the student will be able to resolve cases and exercises in which he follows a process to make well-reasoned decisions that define the goals, the stakeholders, those who are benefitted and performance evaluation.

General objective: This course is oriented to creating awareness of global environmental changes, the implicit risks to a planet's imbalance, the importance of life diversity and the need of living according to the limits, giving emphasis to the student on the appropriate vision for facing the XXI century's challenges and changing the planet's direction towards sustainability.

Bibliography: * Mainiero, Lisa A., Developing managerial skills in organizational behavior: Exercises, cases, and readings/Lisa A. Mainiero and Cheryl L. Tromley, 2nd. Edition, Englewood Cliffs, N. J.: Prentice Hall, c1994, New Jersey, 1994, eng, [0132081903].

DS4005 Corporate Sustainability

(Prerequisites: [AD4027 Corequisite , AD4027].
MAF15)

Equivalence: None

The intent of this advanced course is to develop in students a sustainable vision that helps them make better decisions in the future and corporate environment. It has a prerequisite knowledge of corporate governance and ethics. As a result, students must develop a corporate sustainability strategy for a company.

General objective: This course complements the ongoing corporate and government ethics, therefore, their objectives are complementary.

Upon completion of this course, students will understand the definition and basic sustainability challenges facing businesses.

The student will develop a view that corporate sustainability is increasingly linked essentially to business competitiveness.

Students will learn sustainable business management approaches to understand that there is no single approach to addressing the challenges facing companies to incorporate sustainability into business strategies and operations, and to apply them to the decision making.

Students will be able to: link the “sustainable competitiveness” to the disruptive innovation made, and to the entrepreneurship developed inside and outside of the company.

Key words: Ethical decision making. Sustainable competitiveness. Entrepreneurship and sustainability.

Bibliography: * Blackburn, W.R., The Sustainability Handbook: The Complete Management, Environmental Law Institute.

EC

Economics

EC4005 Managerial Economics

(3.5 - 0 - 12. Prerequisites: [AD4002 , FZ4000], MBA09, MBA09G)

Equivalence: EC4014, EC96239, GA00212, GA00250, GA4092

This is a basic course in the area of economics. This course requires previous knowledge of micro- and macro-economy. As a learning result, the student will be able to resolve cases and exercises where she evaluates the analytical tools related with consumption, production, costs and market structures.

General objective: The student will be able to analyze and evaluate problems facing organizations in the process of creation and globalization, with a deep, current and technical knowledge of Economics.

Key words: Administrative economics. Demand analysis. Cost analysis. Forecasting.

Bibliography: * Viscencio Brambila, Héctor, Economía para la toma de decisiones/Héctor Viscencio Brambila, México, D. F.: Thomson, c2002, México, 2002, español, [9706862137],[9789706862136].

EC4006 Managerial Economics

(3.5 - 0 - 12. Prerequisites: None. MA 09)

Equivalence: EC4014, EC96239, GA00212, GA00250, GA4092

The aim of this basic economics course is to provide students, by studying and analyzing macroeconomics, with the tools used in making decisions on company operations. Prerequisite: prior knowledge of economics, statistics and financial information. Learning outcome: the student will be able to solve cases and exercises in which he can analyze the decisions made by consumers and producers that affect the daily life of companies.

General objective: Students will be able to apply microeconomic tools and the required analytical skills to make strategic decisions related to the operations of a business and its environment.

Key words: Decision making. Economics. Demand and consumption. Competition.

Bibliography: * Baye, Michael, Managerial Economics and Business Strategy, McGraw Hill.

EC4008 Economics

(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)

Equivalence: None

The aim of this basic economics course is to provide the student with the concepts and tools needed to analyze the behavior of the macroeconomic environment and its impact on the application of monetary policy and fiscal policy. Prerequisite: None. Learning outcome: the student will be able to use variables, such as interest, inflation, economic growth and unemployment rates, among others, to analyze the economic situation and its impact.

General objective: Students will be able to analyze the behavior of the macroeconomic environment and the impact that the application of monetary and fiscal policy has on it. They will study variables that affect daily activities in the financial arena, such as interest rates, inflation, economic growth, and unemployment, among others, using models such as IS/LM and Aggregate Supply and Demand.

Key words: Production and consumption functions. Market economy (perfect competition to monopolies). General equilibrium.

Bibliography: * Bernanke, Ben; Frank, Robert, Principles of Macroeconomics, 3rd. Edition, McGraw-Hill.

EC4009 Financial Econometrics
(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: None

The aim of this basic economics course is to provide the student with the econometric estimation tools and techniques applicable to the most common financial models. Prerequisite: prior knowledge of economics, mathematics and statistics. Learning outcome: the student will complete a project containing an analysis of the results and inference of econometric models and their concrete financial application.

General objective: Students will be able to use tools and econometric estimation techniques applicable to the estimation of financial models. They will be able to generate and analyze the results and inferences of econometric models and their concrete financial applications, and will also be able to critique the empirical findings in relevant research journals.

Key words: Economic and financial relationships relevant to the decision-making setting. Estimation methodologies based on statistical concepts.

Bibliography: * Gujarati, Damodar , Basic Econometrics, 5th. edition, McGraw Hill.

EC4010 Environmental Economics
(3 - 0 - 12. Prerequisites: None. MER11V, MSA09)
Equivalence: EC99101

This basic course presents the theoretical and conceptual framework related to market failures and property rights, considering the interrelation existing among the efficient use of natural resources and the local dynamics, supply, renewal, consumption and extinction of some of the main natural resources. Learning outcome: the student will be able to make an economic assessment of the environmental impact of efficient resource management, focusing on improving institutional capacity for decision-making and creating environmental policies.

General objective: Integrate the concepts and tools of economic theory with ideas and problems related to natural resources and the environment, apply quantitative methods for economic assessment of

environmental impact, and support decision making processes and policy design orientated towards solving environmental problems.

Key words: Environmental economics. Environmental value. Environmental policy.

Bibliography: * Carabias, Julia, Economía de la Biodiversidad, INE-SEMARNAT.

EC4014 Economics for Decision Making
(3.5 - 0 - 12. Prerequisites: [AD4002 , FZ4000]. MGN10V)
Equivalence: EC4005, EC4006, EC96239, GA00212

This is a microeconomics course applied to decision making process in businesses. The student will learn about economic models that explain consumer and producer behavior in different market structures. The course requires previous knowledge on statistics and macroeconomic environment. As a learning outcome, the student should be able to understand and describe a market according to the main factors that influence supply and demand of a product or service, including governmental strategies to influence prices.

General objective: This course provides students with the basic knowledge of microeconomics and the impact on business operations, and develops the skills for analysis and decision making in business situations.

Key words: Consumer behavior, analysis of production and costs, market structures, competition strategies, strategies of price formation.

Bibliography: * Baye, Michael R., 1958-, Managerial economics & business strategy /Michael R. Baye, 3rd. Edition, Boston: Irwin/McGraw-Hill, c2000, mau, eng, [0072289171 (papel alcalino)], [0071169334 (ed. internacional : papel alcalino)], [0072358386 (libro)], [007228918X (guía)].

EC4018 Strategic Economics for Finance

(1.5 0 6. Prerequisites: None. MAF15)
Equivalence: None

At the end of the course the student will be able to participate in decision making processes from the understanding of the economic environment of business that surround the organization.

Bibliography: * Davis, Morris A., 1972 , Macroeconomics for MBAs and masters of finance / Morris A. Davis., Cambridge, UK ; New York : Cambridge University Press, 2009., [9780521762472],[0521762472].

EC5004 Fundamental Economics
(3 - 0 - 12. Prerequisites: None. DCA11)
Equivalence: None

This is a graduate course for grad students to understand and apply economic scientific foundations, given that he/she is not an economics expert. The historical evolution of these principles and foundation, and applications of economic theory will be presented. It is expected that the student will understand the contributions of economics in the socio-economic development of a country, as well as being capable of integrating economic analysis into his research project.

General objective: In this course the student will be able to become versed in the basic principles of the economic Science, its historical evolution and its status in the field of the microeconomics and modern macroeconomics. Although the emphasis of the course is theoretical, the study of these principles occurs within the framework of the analysis of diverse problems and present real situations.

Key words: Economic theory. Microeconomics. Macroeconomics.

EC5008 Innovation and Prospective
(3.5 - 0 - 12. Prerequisites: [EC4014 , FZ4009]. MGN10V)
Equivalence: None

This is an advanced course in the knowledge area of administration. This course requires previous knowledge of the three basic courses. As a learning

outcome the student will be able to create innovation systems in which prospective methods and tools are used to improve the competitiveness of the industry in which the company participates.

General objective: At the end of the course the student will be able to: learn prospective methods, quantitative regional tools for the identification of sectorial opportunity innovations systems; Identify components of innovation's systems for decisions that contribute to the generation of business alternatives in their environments for the establishment, consolidation and business initiatives; developing alternatives with a product creation focus and value added services connected to the global trade reality approach, systems development tools and increasing the competitiveness of the industry in which it participates; the student must operate and use prospective tools and analyze information generated for the implementation of proposals to consolidate strategic development through innovations in their sectorial-regional reality.

Key words: Regional development. Prospective methods. Innovation systems. Business strategies.

Bibliography: * Alfred Allen Marcus, Alfred Marcus , Strategic Foresight: A New Look at Scenarios, Palgrave Macmillan, [[0230611729].

EC5009 International Economic Politic
(3 - 0 - 12. Prerequisites: None. DCS11)
Equivalence: None

In this course, the alumni will study the different interactions between economics and politics in the international environment, and how these come in several forms of expression. International economics policy (PEI, in Spanish) studies the politics behind economic relationships between peoples and nations in order to evaluate both their wealth as their relative power. PEI centers its focus in the elements that feature the complex relationship of interdependence in the majority of the most pressing current problems. This course's principal objective is to deepen in the analysis of the consequences that business and financial policies have upon welfare.

General objective: At the end of the course, the

student will be able to analyze and evaluate both policies and strategies coming from the interaction between the State and the markets, which are translated into certain international institutional structures. The student will comprehend the motives for boom and boost of some sectors with economic and trade activities. The student will understand the multinational corporations' role in economic development and the way wealth is distributed at a worldwide scale given the predominant power structure.

Key words: Politic economy. Economic politics. North-South relation.

EC96300 Managerial Microeconomics

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: None

General objective: Microeconomics organizes the studies of the firm and the industry to understand the forces of supply and demand, strategies of rival firms, game theory, and international economics.

ED Education

ED4022 Technology and Innovation in Education

(3 - 0 - 12. Prerequisites: None. DEE10V, MAD13V, MEE13V, MTE13V)

Equivalence: None

This is a basic course (sello). Its intention is to examine how to properly use technology as a means of innovation and change in education, to identify strategies that facilitate the integration of technology in the education as a means to improve the educational service and to understand the importance of technology and innovation as a prerequisite for improving the quality of education. As an expected learning outcome, students will learn to work collaboratively and to communicate by using information technology and dialogue and argumentation to achieve the social construction of knowledge and acquire the information literacy skills that are required in a distance graduate program. Also, the student shall elaborate notes of collaborative work and reach a team proposal that includes strategies for innovation and change using technology.

General objective: Upon the completion of the course the student will be able to: Using computational tools efficiently, to interact with classmates and teachers in a virtual learning environment. Understand the demands that society makes to school in the XXI century to propose strategies to address them properly. Understanding the importance of technology and innovation as a prerequisite for improving the quality of education. Identify strategies that facilitate the integration of innovations in education as a means to improve the educational service. Build a solid conceptual basis to distinguish the role of the teacher as an agent of change in society. Develop a critical attitude to educational innovation and the use of technology in education to achieve a significant change in institutions. Develop an attitude of respect and tolerance for divergent views to create a friendly learning environment.

Key words: Educational technology. Educational change. Educational innovation.

Bibliography: * Fullan, Michael G., New meaning of educational change. Español\“El cambio educativo: Guía de planeación para maestros/Michael G. Fullan; Suzanne M. Stiegelbauer; traducción, María Elisa Moreno Canalejas”, 1ra. Edición en español, México, D. F.: Trillas, C1997, México, 1997, español, [9682455405].

ED4032 Comparative Education

(3 - 0 - 12. Prerequisites: None. MAD13V, MEE13V, MTE13V)

Equivalence: None

This is a basic course that includes concepts like globalization, multicultural, intercultural, internationalization, and education for a knowledge-based society. The expected outcomes are that the student develops competencies to adopt and adapt experiences from educational institutions from other countries to the one in which he or she works, interact in intercultural contexts, and relate in a respectfully and assertively with others considering everyone’s rights, interests, and limitations. Also, the student shall develop innovative designs and reports that take into account multicultural environments, based on comparing and contrasting both national and international educational systems.

General objective: At the end of the course the student should:

- Adopt and adapt experiences of educational institutions from other counties to the one in which the student works.
- Interact assertively with people from different cultural groups, recognizing the diversity, rights, and interests of the members.
- To identify a group or international organizations that directly or indirectly have an impact on the educational system of the country where the student lives; and promote through such organizations, initiatives oriented to enhance the quality of education.

Key words: Multicultural. Globalization. Comparative Education. Knowledge-based society. Intercultural.

Bibliography: * , Identidad y ciudadanía : un reto a la educación intercultural / Margarita Bartolomé Pina, coord. ; Flor A. Cabrera Rodríguez .. [et al.], [autores] ; prólogo de Ezequiel Ander-Egg., Madrid : Narcea, c2002., [8427713886].

ED4033 Learning Theories in the Educational Context

(3 - 0 - 12. Prerequisites: None. MEE13V, MTE13V)
Equivalence: None

This is a basic course. It aims to analyze different theories that have explained learning and to apply this knowledge in designing teaching strategies. It includes concepts like learning, cognitive, constructivism, and learning taxonomies. Also, the course requires basic previous knowledge on learning. The expected outcomes include interpretation of diverse phenomena such as learning in daily life and inside a classroom, and to be able to design adequate learning experiences. As a result of learning, the student shall design learning experiences applying theory principles; students will also elaborate a monograph on one of the learning taxonomies, and write a case study about self-management or the impact of motivation on the emotional process of learning.

General objective: At the end of the course the student will be able to:

- Critically interpret the learning phenomena through different theoretical approaches.
- Identify and modify the student's own beliefs about learning and his or her posture regarding teaching; achieve an enriched vision about the teaching-learning process .
- Apply in an innovative and efficient way the general principles derived from a theoretical approach with the purpose of enhancing the student's leaning.

Key words: Learning. Conduct modification. Information processing. Significant learning. Reception and discovery learning.

Bibliography: * Marzano, R. y Kendall, J., The new taxonomy of educational objectives, 2nd edition., Corwin Press., Inglés.

ED4034 Applied Research Project I: Identifying Study-Problems

(3 - 0 - 12. Prerequisites: None. MAD13V, MEE13V, MTE13V)

Equivalence: None

This is a basic course about applied research that aims for the student to develop competences related to: identifying problematic situations or themes to be studied; follow methodic criteria to choose study-problems; seek to add value to professional practice; and use a formal scientific vocabulary during the investigation processes. Also, in order to disseminate knowledge, the student will be asked to write based on a set of accepted standards of academic communities for the production of documents. The course promotes critical-thinking competences, which will be noticed through the evaluation of adequacy, consistency, and coherence of the information to construct arguments. At the same time, it will evaluate the inference processes that lead to conclusions about the study-problem. The concepts of educational applied-research and competences for academic writing will be addressed. Previous knowledge about the specific subject to be investigated and basic scientific methodologies is required. As a result of learning, the student will complete the first two thesis chapters: Problem statement and Theoretical framework.

General objective: At the end of the course the student should:

- Identify the epistemological approaches, study-problems, situations and subjects that would add value to the the practice if investigated.
- Use an acceptable vocabulary by the immediate scientific community during the research processes.
- Write documents according to accepted academic standards in order to disseminate knowledge.

Key words: Scientific method. Applied-research projects.

Bibliography: * Valenzuela González, Jaime Ricardo., Fundamentos de investigación educativa [recurso electrónico]. Volumen I, Ciencia, investigación y educación / Jaime Ricardo Valenzuela González, Manuel Flores Fahara., Monterrey, México : Editorial Digital del Tecnológico de Monterrey, 2011., [9786075010717].

ED4035 Applied-Research Project II: Methodological Approaches

(3 - 0 - 12. Prerequisites: [ED4034]. MAD13V, MEE13V, MTE13V)

Equivalence: None

This is a basic course about applied research that aims for the student to develop competences related to: identifying problematic situations or themes to be studied; follow methodic criteria to choose study-problems; seek to add value to professional practice; and use a formal scientific vocabulary during the investigation processes. Also, in order to disseminate knowledge, the student will be asked to write based on a set of accepted standards of academic communities for the production of documents. The course promotes critical-thinking competences, which will be noticed through the evaluation of adequacy, consistency, and coherence of the information to construct arguments. At the same time, it will evaluate the inference processes that lead to conclusions about the study-problem. The concepts of educational applied-research and competences for academic writing will be addressed. Previous knowledge about the specific subject to be investigated and basic scientific methodologies is required. As a result of learning, the student will complete the third thesis chapter: Methodology: instruments for data collection and its application.

General objective: At the end of the course the student should:

- Apply the scientific method in an active and reflexive way on research processes, knowing research paradigms.
- Use technological tools applicable to research in order to systematize and analyze data that results in findings about reality.
- Respect the integrity, ideology, and identity of the research participants.
- Use an accepted vocabulary by the immediate scientific community during the research processes.
- Write documents according to accepted academic standards in order to disseminate knowledge.

Key words: Scientific method. Applied-research projects.

Bibliography: *Valenzuela González, Jaime Ricardo., Fundamentos de investigación educativa [recurso electrónico]. Volumen I, Ciencia, investigación y educación / Jaime Ricardo Valenzuela González, Manuel Flores Fahara., Monterrey, México: Editorial Digital del Tecnológico de Monterrey, 2011., [9786075010717].

ED5075 Research Proposal I

(3 - 0 - 12. Prerequisites: None. DEE10V)

Equivalence: None

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: At graduation, students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information; initiate the development of an applied research project or technological development with advice from a teacher researcher and submit periodic reports of progress; define a work plan and budget for the project.

Key words: Methodology. Dissertation proposal. Theoretical framework.

Bibliography: * Walliman, N, y Buckler, S., Your Dissertation in Education, SAGE, Inglés.

ED5076 Research Proposal II

(3 - 0 - 12. Prerequisites: None. DEE10V)

Equivalence: None

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his/her project through achievements in his/her presentations.

General objective: Upon completion of this course, students will further develop their research project with advice from a researcher and submit periodic reports of progress.

Key words: Methodology. Dissertation proposal. Theoretical framework.

Bibliography: * Walliman, N, y Buckler, S., Your Dissertation in Education, SAGE, Inglés.

ED5077 Research Proposal III (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his/her project through achievements in his/her presentations.

General objective: At the end of the course, students will be able to justify the relevance of a research topic, identifying the progress on the topic selected based on a literature review using various sources of information; initiate the development of an applied research project or technological development with advice from a researcher and submit periodic reports of progress; define a work plan and budget for the project.

Key words: Methodology. Dissertation proposal. Theoretical framework.

Bibliography: * Walliman, N, y Buckler, S., Your Dissertation in Education, SAGE, Inglés.

ED5078 Research Seminar I (1 - 0 - 4. Prerequisites: None. DEE10V) **Equivalence: None**

In this research course, the students continue working on their doctoral research project and present a progress report publicly within the framework of collective discussions. As a result the students will consolidate a critical position regarding their project

proposal and demonstrate it through their accomplishments in the presentations.

General objective: The aim of this course is that students make public presentations of the progress of their doctoral research.

Key words: Methodology. Dissertation proposal. Theoretical framework.

Bibliography: * Walliman, N, y Buckler, S., Your Dissertation in Education, SAGE, Inglés.

ED5079 Research Seminar II (1 - 0 - 4. Prerequisites: None. DEE10V) **Equivalence: None**

In this research course, the students continue working on their doctoral research project and present a progress report publicly within the framework of collective discussions. As a result the students will consolidate a critical position regarding their project proposal and demonstrate it through their accomplishments in the presentations.

General objective: The aim of this course is that students give public presentations of the progress of doctoral research.

Key words: Methodology. Dissertation proposal. Theoretical framework.

Bibliography: * Walliman, N, y Buckler, S., Your Dissertation in Education, SAGE, Inglés.

ED5080 Research Seminar III (1 - 0 - 4. Prerequisites: None. DEE10V) **Equivalence: None**

In this research course, the students continue working on their doctoral research project and present a progress report publicly within the framework of collective discussions. As a result the students will consolidate a critical position regarding their project proposal and demonstrate it through their accomplishments in the presentations.

General objective: The aim of this course is that students give public presentations on the progress of their doctoral research.

Key words: Methodology. Dissertation proposal. Theoretical framework.

Bibliography: * Walliman, N, y Buckler, S., Your Dissertation in Education, SAGE, Inglés.

ED5081 Assisted Research I (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

This is a research course that is intended for the students, guided by a research professor, to study specific topics that will help them in the development of their research project. As a result, the students will be able to develop a presentation that support the research project.

General objective: Choosing a topic of study conducted and applied on a specific domain of interest advised by a professor in that area.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED5082 Assisted Research II (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

This is a research course that is intended for the students, guided by a research professor, to study specific topics that will help them in the development of their research project. As a result, the students will be able to develop a presentation that support the research project.

General objective: Choosing a topic of study conducted and applied on a specific domain of interest advised by a professor in that area.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED5083 Assisted Research III (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

This is a research course that is intended for the students, guided by a research professor, to study specific topics that will help them in the development of their research project. As a result, the students will be able to develop a presentation that support the research project.

General objective: Choosing a topic of study conducted and applied on a specific domain of interest advised by a professor in that area.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED5084 Applied-Research Project III: Analysis of Results (3 - 0 - 12. Prerequisites: [ED4035]. MAD13V, MEE13V, MTE13V) **Equivalence: None**

This is an advanced course about applied research that aims for the student to develop competences related to: identifying problematic situations or themes to be studied; follow methodic criteria to choose study-problems; seek to add value to professional practice; and use a formal scientific vocabulary during the investigation processes. Also, in order to disseminate knowledge, the student will be asked to write based on a set of accepted standards of academic communities for the production of documents. The course promotes critical-thinking competences, which will be noticed through the evaluation of adequacy, consistency, and coherence of the information to construct arguments. At the same time, it will evaluate the inference processes that lead to conclusions about the study-problem. The concepts of educational applied-research and competences

for academic writing will be addressed. Previous knowledge about the specific subject to be investigated and basic scientific methodologies is required. As a result of learning, the student will complete the last two thesis chapters: Results analysis and Conclusions.

General objective: At the end of the course the student should:

- Apply the scientific method in an active and reflexive way on research processes, knowing research paradigms.
- Use technological tools applicable to research in order to systematize and analyze data that result in findings about reality.
- Respect the integrity, ideology, and identity the research participants.
- Use an accepted vocabulary by the immediate scientific community during the research processes.
- Write documents according to accepted academic standards in order to disseminate knowledge.

Key words: Scientific method. Applied-research projects.

Bibliography: * Valenzuela González, Jaime Ricardo., Fundamentos de investigación educativa [recurso electrónico]. Volumen I, Ciencia, investigación y educación / Jaime Ricardo Valenzuela González, Manuel Flores Fahara., Monterrey, México : Editorial Digital del Tecnológico de Monterrey, 2011., [9786075010717].

ED6000 Doctoral Defense

(0 - 0 - 1. Prerequisites: None. DEE10V)

Equivalence: None

This course is the final stage of the development of doctoral research. The student will present and defend his thesis orally before the panel of Synod.

General objective: The student will present and defend his doctoral research.

Key words: Doctoral dissertation. Research methods.

ED6033 Doctoral Research I

(3 - 0 - 12. Prerequisites: None. DEE10V)

Equivalence: None

The objective of this course is that the student continues collecting data to carry out the field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a learning result, the student is expected to complete the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED6034 Doctoral Research II

(3 - 0 - 12. Prerequisites: None. DEE10V)

Equivalence: None

The objective of this course is that the student continues collecting data to carry out the field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a learning result, the student is expected to complete the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED6035 Doctoral Research III (3 - 0 - 12. Prerequisites: None. DEE10V) Equivalence: None

The objective of this course is that the student completes collecting data to prepare for field study. The student is guided by a principal local advisor in developing the doctoral dissertation. The ongoing writing process is expected to include a methodology aligned to the statement of the problem and the theoretical framework established. As a learning result, the student is expected to have defined the methodology used to study the field of his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED6036 Doctoral Research IV (3 - 0 - 12. Prerequisites: None. DEE10V) Equivalence: None

This research course has the objective that the student begins the fieldwork and collects data that will serve to develop the doctoral dissertation. The student is guided by a local principal advisor in developing the doctoral dissertation. The course includes the concepts of sampling and methodological techniques for data collection. As a learning result, the student is expected to carry on the first data collection from the fieldwork that will serve him in his final dissertation document.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED6037 Doctoral Research V (3 - 0 - 12. Prerequisites: None. DEE10V) Equivalence: None

The objective of this research course is that the student continues his field study to develop the doctoral dissertation. The student is guided by a local principal advisor in developing the doctoral dissertation. The course includes the concepts of sampling and methodological techniques for data collection. As a learning result, the student is expected to continue gathering quantitative and qualitative data that will serve as the final research document. The documenting process requires writing skills of academic texts and methodological techniques for data collection.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Phelps, R, Fisher, K. y Ellis, A.H., Organizing and managing your research: A practical guide for postgraduates, SAGE.

ED6038 Doctoral Research VI (3 - 0 - 12. Prerequisites: None. DEE10V) Equivalence: None

It is an ongoing investigation with the intention that the student continues his field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concept of methodological techniques for fine data collection. As a result of learning, the student is expected to continue gathering data that will serve as the final document of presentation. Require writing skills of academic texts.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6039 Doctoral Research VII
(3 - 0 - 12. Prerequisites: None. DEE10V)
Equivalence: None

This research course has the objective that the student starts processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a local principal advisor in developing the doctoral dissertation. The course includes methodological techniques for data collection and use of specialized software for statistical analysis of data. As a learning result, the student is expected to refine and complete the data collection, and start the analysis of the data that will serve as the final dissertation document. Requires knowledge of specialized software used for data analysis.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6040 Doctoral Research VIII
(3 - 0 - 12. Prerequisites: None. DEE10V)
Equivalence: None

This research course has the objective that the student continues processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a local principal advisor in developing the doctoral dissertation. The course includes the use of software for statistical analysis of information. As a learning result, the student is expected to continue the analysis of the data that will serve as the final dissertation document. For this course, students require knowledge of specialized software used for statistical analysis.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6041 Doctoral Research IX
(3 - 0 - 12. Prerequisites: None. DEE10V)
Equivalence: None

This research course has the objective that the student continues writing the doctoral dissertation based on the results from the data analysis. The student is guided by a local principal advisor in developing the doctoral dissertation. This course includes data analysis strategies. As a learning result, the student is expected to prepare the chapter on analysis of results. For this course, students require knowledge of writing academic texts.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6042 Doctoral Research X
(3 - 0 - 12. Prerequisites: None. DEE10V)
Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6043 Doctoral Research XI (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem and theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6044 Doctoral Research XII (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6045 Doctoral Research XIII (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

ED6046 Doctoral Research XIV (3 - 0 - 12. Prerequisites: None. DEE10V) **Equivalence: None**

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

Key words: Doctoral dissertation. Research methods.

Bibliography: * Bloomberg, LED. y Volpe, M., Completing Your Qualitative Dissertation: A Roadmap From Beginning to End, SAGE.

EO Economics**EO4009 Open Macroeconomics**

(3 0 12. Prerequisites: [MA2002 , MA4016]. DCF11)

Equivalence: None

General objective: This course explores both recent theoretical and methodological advances and practical applications that have substantially reshaped the field of study of open macroeconomics. It brings together research methods pertinent to open economy macroeconomics and international trade policies to give students a basic understanding of how different aspects of contemporary debates are analyzed in practice. We also analyze the most recent research in endogenous growth theory, covering important issues such as R&D investment, market structure, private and public organization of R&D, education financing, human capital accumulation, inequality and growth, etc.

Bibliography: * Blanchard, O. J., Lectures in Macroeconomics, MIT Press, USA, 1989.

EO4011 Advanced Microeconomics

(3 0 12. Prerequisites: [MA2002 , MA4016].)

Equivalence: None

General objective: The course focuses on the study of the theory of microeconomic behavior. It covers topics such as the structure of markets, consumption, production, general equilibrium, game theory and incentive theory. It makes emphasis in the use of economic theory for solving theoretical and applied problems and the implications towards public policies.

Bibliography: * Varian, Hal R., Intermediate microeconomics: A modern approach, 3rd. Edition, New York: W.W. Norton, New York, 1993, eng, [0393963209],[0393963861].

F

Physics

F4002 Computer Simulations
 (3 - 0 - 12. Prerequisites: None. MSE09E)
 Equivalence: E4001

This basic course in mathematical and computational tools introduces the student to the use of computational techniques for engineering and scientific problems modeling. The student should have a command of at least one programming language and experience in writing programs. Learning outcome: the student will develop skills in the use of numerical analysis in the context of physical engineering problems.

General objective: After completing the course, the students will be able to: apply known algorithms in order to simulate physical processes which occur in engineering and science; reinforce the physical and

mathematical comprehension of the problem being studied in order to carry out successful simulations; reinforce the understanding of basic numerical methods as a foundation on which advanced numerical methods will be based; use statistical and sampling techniques, as well as confidence intervals and parameter estimation in order to solve engineering and science problems.

Key words: Differential equations. Fourier transform. Statistical methods. Numerical methods. Non-linear equations.

Bibliography: * William H. Press .. [et al.], Numerical recipes in C: The art of scientific computing, 2nd. Edition, Cambridge; New York: Cambridge University Press, 1992, [0521431085],[0521437202 (book in C)].

FZ**Finance****FZ4000 Introduction to Financial Information for Decision Making****(3.5 - 0 - 12. Prerequisites: None. MBA09, MBA09G, MGN10V, MMT09, MMT09V)****Equivalence: CF96211, GA00202, GA4010**

This is a basic course in the knowledge area of finance. This course requires previous knowledge of mathematics. As learning outcome, the student will be able to solve cases and exercises in which he understands, makes and analyses the financial statements and cost reports.

General objective: The student will be able to use financial information systems for enhancing decision makers' holistic views; to know and apply the main tools of financial accounting, cost accounting and managerial accounting useful for planning, control and decision making processes.

Key words: Financial information. Financial analysis. Cost accounting. Master budget.

Bibliography: * Reeve, James M., 1953-, Principles of financial and managerial accounting/James M. Reeve, Carl S. Warren, 9th. Edition, Mason, OH; México: Thomson/South-Western, c2008, Ohio, 2008, eng, [032464521x (international student ed.)], [9780324645217 (international student ed.)].

FZ4001 Corporate Finance**(3.5 - 0 - 12. Prerequisites: [AD4001 , AD4002 , FZ4000]. MBA09, MBA09G)****Equivalence: GA00231, GA5072**

This is a basic course in knowledge area of finance. This course requires previous knowledge of statistics, financial accounting and economics. As learning outcome the student will be able to develop a report where he analyzes the main financial decisions that a firm faces and how are they interconnected.

General objective: The student will be able to analyze and structure business-related problems and

makes decision on financial flows, risks and returns within the context of paradigm change facing organizations at the dawn of the century.

Key words: Financial management. Project evaluation. Value generation. Structure and capital cost. Financial statements analysis and forecasting.

Bibliography: * Ross, Stephen A., Corporate finance/ Stephen A. Ross, Randolph W. Westerfield, Jeffrey Jaffe, 8th. Edition, Boston: McGraw-Hill/Irwin, c2008, [0073105902 (papel alcalino)], [9780073105901 (papel alcalino)].

FZ4004 Financial Information Analysis**(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)****Equivalence: None**

This basic course in finance provides students with knowledge, skills and basic ethics related to financial information analysis and interpretation as the basis for decision-making at company level. Prior knowledge is needed of financial accounting. Learning outcome: the student will solve cases in which he analyzes and interprets the information shown in financial statements to make business decisions.

General objective: Students will be able to understand and analyze the basic Financial Statements of the Company Accounts, according to international standards. They will also be able to apply the concepts, ethical bases, techniques, and basic tools related to planning, registering, calculating, and analyzing the different entries that make up the financial information.

Key words: Comparative financial legislation. Generation of financial information. Financial analysis.

Bibliography: * Robinson, Munter y Grant, Financial Statement Analysis: A Global Approach, Prentice-Hall.

FZ4005 Financial Economics (3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V) Equivalence: None

This basic course in Finance provides the student with a basic knowledge of financial intermediation and of the selection mechanisms for an investment portfolio based on criteria for maximizing an objective function under diverse conditions. Prior knowledge is required of economics, mathematics and statistics. Learning outcome: the student will design portfolios as part of a team project, based on real stock and treasury bond data from a financial market.

General objective: Students will be able to select an investment portfolio based on objective function maximization, under a number of circumstances. They will carry out diverse measurements of the return and analyze the risk factors. They will be able to design portfolios that comply with a defined risk return profile.

Key words: Income level determination. Fiscal policy. Monetary policy. Financial intermediation.

Bibliography: * Copeland, T., Weston, J., Shastri, K., Financial theory and corporate policy, Fourth edition, Addison-Wesley.

FZ4006 Introduction to Corporate Finance (3.5 - 0 - 12. Prerequisites: [CD4001 , EC4008 , FZ4004 , MA4000],[AD4001 , AD4002 , FZ4000]. MAF09, MAF09V) Equivalence: None

This basic financial management course teaches the student about the relevance of working capital management in companies. Prerequisite: prior knowledge of economics, statistics and financial information. Learning outcome: the student will solve cases using the necessary tools to manage the company's financial resources in the short term.

General objective: Students will understand the importance of managing the working capital of com-

panies in order to administer the resources of the company in the short term. They will be able to ascertain the cost of various sources to provide finance to the companies in the short term and they will be able to evaluate the advantageousness of turning to each one. They will learn to be sensitive to the implications that internationalizing company operations may have and the impact of this on the working capital. They will be able to administer the risks that short-term decisions made by the company may bring, such as credit risk, financial and exchange risk.

Key words: Working capital management. Costs. Managerial accounting. Managerial decision making.

Bibliography: * Marshall, David H., Accounting: What the numbers mean/David H. Marshall, Wayne W. McManus, Daniel F. Viele, 7th. Edition, Boston: McGraw-Hill/Irwin, c2007, Massachusetts, 2007, eng, [0073011215].

FZ4007 Advanced Corporate Finance (3.5 - 0 - 12. Prerequisites: [FZ4006]. MAF09, MAF09V) Equivalence: None

This advanced course in finance provides financial tools for decision-making to maximize companies' value. Prerequisite: Prior knowledge of economics, mathematics and statistics. Learning outcome: Students will solve cases using the theory and concepts related to short-term and long-term decision-making, which will result in an increase in the company's value.

General objective: Students will be able to use quantitative methods and finance tools that enable them to maximize the value of companies and take long term decisions.

Key words: Valuation of real assets. Valuation of real options. Private equity. Venture capital. Financial distress.

Bibliography: * Hillier, Grinblatt y Titman, Financial Market and Corporate Strategy, 3rd. Edition, McGraw-Hill.

FZ4008 Investments
(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: None

This advanced course in finance provides investment instrument analysis and evaluation tools for the creation and optimization of portfolios. Prerequisite: prior knowledge of economics, mathematics and statistics. Learning outcome: the student will develop a portfolio in which he will analyze and assess fixed- and variable-income financial instruments.

General objective: Students will be able to explain the interaction of economic agents involved in the administration of investments in Mexico, especially so far as the capital market and money market are concerned. They will develop the optimum portfolio for a specific user profile, given the applicable parameters of the individual shares, their interactions, the relevant receipts of the user, and the transaction costs. They will be able to select and evaluate a portfolio or investment fund, given a reference parameter or benchmark.

Key words: Capital market. Money market. Investment portfolios.

Bibliography: * Chincarini, L.B. and D. Kim, Quantitative Equity Portfolio Management, McGraw-Hill.

FZ4009 Finance Management
(3.5 - 0 - 12. Prerequisites: [AD4001 , AD4002 , FZ4000]. MGN10V)
Equivalence: None

It is a basic course in the area of Finance. This course requires previous knowledge of statistics, financial accounting and economics. As learning outcome the student will be able to develop a report in which the main financial decisions that a firm has are presented; also, the report should include the interrelation of the financial decision and the tools that financial theory offers to support decision making.

General objective: The student will be able to: analyze and project financial statements; consider and measure risk and its relation with them; understand the valuation process for real and financial asset

value; comprehend the importance of capital cost estimation, cash flow and analyze capital structure decisions.

Key words: Financial management. Project evaluation. Value generation. Structure and capital cost. Analysis and forecast of financial statements.

Bibliography: * Ross, Stephen A., Corporate finance/ Stephen A. Ross, Randolph W. Westerfield, Jeffrey Jaffe, 8th. Edition, Boston; México: McGraw-Hill/Irwin, c2008, [0073257346],[0073105902 (papel alcalino)], [9780073105901 (papel alcalino)], [9780073337180].

FZ4012 Managerial Analysis for Financial Information
(1.5 0 6. Prerequisites: None. MAF15)
Equivalence: None

At the end of the course the student will be able to understand the financial reports generated by the companies, prepared under the International Financial Reporting Standards. The student may use different technological tools for comparative analysis of the financial information of companies and assess its conditions of financial health, liquidity, efficiency and profitability. The student will apply financial analytic methods that allows to evaluate the strategies followed by the companies and the quality of its profitability, which is fundamental for the making decision of investors.

Bibliography: *Robinson T. Henry E. and Pirie W., International Financial Statement Analysis (CFA Institute Investment Series), 3, Wiley, English, [9781118999479].

FZ4013 Statistical Foundations for Finance
(1.5 0 6. Prerequisites: None. MAF15)
Equivalence: None

At the end of the course the student will be capable to use tools and fundamental concepts of applied statistics for finance, data handling for a preliminar forecast of organization behavior.

Bibliography: * Lind, D.A., Marchal, W.G. & Wathen, S.A., Statistical Techniques in Business & Economics, 14, McGraw Hill/Irwin, English, [9780077309428]

FZ4014 Macroeconomics

(3.5 0 12. Prerequisites: [EC4018]. **MAF15)**

Equivalence: None

General objective: At the end of the course students will be capable of understand the close relationship between the sovereign decisions of economic management with the building expectations of decision makers in financial markets such as shares, bonds, foreign exchange, among others.

Bibliography: * Cecchetti, S. & Schoenholtz, K, Money, Banking and Financial Markets, 4, McGraw Hill, Ingles, [9780078021749].

FZ4015 International Financial Analysis

(3.5 0 12. Prerequisites: [FZ4012]. **MAF15)**

Equivalence: None

General objective: At the end of the course students will be able to understand the basis of recording, analysis and interpretation of organizations conducting operations in an international context, understand the national accounting standards as well as the comparison with international and american standards, will identify and contrast the differences between these normativities and its impact on financial analysis, will understand the derivatives transactions impact that organizations use like hedging instruments to manage risks.

Bibliography: * Douppnik, T., & Perera, H., International accounting, 4, McGraw Hill, [9780077862206].

FZ4016 Asset Valuation

(3.5 0 12. Prerequisites: [MA4018]. **MAF15)**

Equivalence: None

General objective: At the end of the course students will be capable of differentiate between value and price in uncertain markets where people participate,

apply the fundamentals of valuation in various kinds of actives including debt, equity, Exchange Traded Funds (ETFs) and derivative products in different markets, develop portfolios since its integration and performance, build valuation models based on cash flow, analyze different investors profiles, establish investment policies and determine a reference indicator

Bibliography: * Graham Benjamin, D. L. Dodd., Security Analysis, Principles and Technique, 6, McGraw Hill, [9780071623551].

FZ5000 International Financial Management

(3.5 - 0 - 12. Prerequisites: None. **MAF09, MAF09V)**

Equivalence: FZ5015

This advanced course in finance explains the importance of international finance in business administration. Prerequisite: prior knowledge of financial economics, corporate finance and investments. Learning outcome: the student will be able to solve cases in which he will identify and measure the exposure to foreign exchange risk and their proper management in relation to the company's international investments.

General objective: Students will be able to identify and measure exchange risk through reviewing the recent history of international financial markets and observing the main models that explain how exchange rates are determined.

Key words: International monetary system. Exchange rate determination: fundamental, technical, balance of payments, deterministic theories. Identification and measurement of foreign exchange risk exposure. Exchange risk exposure management. International capital cost. International investments: real assets and financial assets.

Bibliography: * Eun Resnkick, International Financial Management, 4th. edition, McGraw-Hill.

FZ5001 Markets and Financial Derivatives Valuation

(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: None

This advanced course in finance explains the use and application of derivative instruments. Prerequisite: prior knowledge of investments, corporate finance and financial economics. Learning outcome: the student will be able to solve cases in which he applies derivative instruments in real-life situations and completes the valuation and assessment of the operation and its results.

General objective: Students will be able to apply derivative instruments in real situations, value and evaluate the operation and the results of implementation. They will be able to determine the optimal coverage and design strategies to administer the risks across the businesses.

Key words: Options. Futures. Forwards. SWAPS.

Bibliography: * Hull, John C., Options, futures, and other derivatives, 7th. Edition, Prentice Hall.

FZ5002 Financial Information and Decision Making

(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

General objective: Decision making Theory. Decision making under uncertainty. Decision making and political processes. Decision making in turbulent environments. Decentralized decision. Negotiation processes. Financial information. Financial statements.

FZ5003 Capstone Seminar in Finance

(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: GA00913

In this advanced course in finance, the students will apply the knowledge they have acquired. Prerequisite: prior knowledge of econometrics, financial economics, financial management and financial theory. Learning outcome: the student will relate, through practical cases, the theory of finance and the models

previously studied.

General objective: Students will be able to analyze and interpret financial statements, financial plans, sustainable growth, investment projects, cost of capital, mergers and acquisitions, flotation, financial restructuring, and financial stress.

Key words: Financial economics. Corporate finance. Investments.

Bibliography: * Fruhan Kester, Case studies in Finance, 12th. edition, McGraw-Hill.

FZ5004 Finance Project

(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: None

In this advanced course, the student will apply her/his knowledge to undertake a finance project contributing to a financial area in Mexico. Prerequisite: prior knowledge of Finance, Financial Management, Economics, Statistics, Corporate Finance and Markets. Learning outcome: the student will create a research report, a study case or a financial consulting applicable in a real-world context. In all of these cases, results must be supported by financial theory and be useful for the development of Finance in Mexico.

General objective: Students will be able to contribute to the development of financial science or akin areas in Mexico, and to conduct research and financial consulting.

Key words: Research project. Scientific dissemination project (publishable). Instructor-led group (how to implement administration). Each professor's line of research. Based on a financial theory. Aligned with research projects.

Bibliography: * Hernández Sampieri, Roberto, Fernández Collado & Baptista, Metodología de la Investigación, 4ta. Edición, McGraw-Hill.

FZ5011 Economic Engineering (3.5 - 0 - 12. Prerequisites: None. EPY11) **Equivalence: None**

This advanced course in finance provides models and knowledge of the financial management of operations related to fixed-asset investment projects through the evaluation of the future quantifiable benefits translated into the organizations' capital budget. Prerequisites: Prior knowledge of economics, mathematics, statistics, corporate finance and bank management. Learning outcome: Students will complete a project in which they estimate cash flows, identify the different options existing in a capital investment and appraise companies.

General objective: Students will be able to determine the main criteria and methodologies that are used to analyze capital investments. They will learn the nature of the main sources of finance and how to ascertain the cost of each one, as well as learning how to design a finance structure that enables the profit generated by the project to be maximized. They will be able to identify risk factors when evaluating projects and they will understand how to incorporate these into the economic-financial analysis. Students will also be able to estimate cash flows generated by the project and to identify the different options available in a capital investment in order to evaluate them and identify the different models for valuing businesses.

Key words: Project evaluation tools. Economic and accounting considerations. Business valuation.

FZ5024 Investment Theory (3 - 0 - 12. Prerequisites: None. DCF11) **Equivalence: GF5008**

This is an intermediate-level course in the study of finance. The learning objective for this course is for the student to design portfolios according to a specific profile which will be based on government stocks and securities.

General objective: The aim of this course is for students to understand how to make up an optimal

portfolio and how to determine its return by means of the expected return function. Students will comprehend the way in which risk affects the expected return on an investment for the different financial agents; review the meaning of systemic risk factor for a share; analyze the efficient portfolio theory based on a portfolio with minimal diversification and the Markowitz analysis; and understand the bond valuation methods. As a result, students will be able to design portfolios that fulfill a specific profile, based on stocks and government securities.

Bibliography: * Copeland, Thomas E., 1946-, Student solutions manual for Financial theory and corporate policy third edition/Thomas E. Copeland, Fred J. Weston, Reading, Mass.: Addison-Wesley, 1988, eng, [0201106493].

FZ5026 Mathematics for Finance (3 - 0 - 12. Prerequisites: [MA4016]. DCF11) **Equivalence: GF5011**

This is an intermediate-level course in the study of finance. The learning objective for this course is for the student to propose and solve decision-based problems in economics and finance related to stochastic processes.

General objective: This course covers stochastic processes and develops some problem solution in economic and financial decision under stochastic environments. The student will apply tools, techniques and optimization models in continuous time such as stochastic optimum control, recursive equations, stochastic dynamic programming, Itô's lemma and Hamilton-Jacobi-Bellman's equation.

Bibliography: * Karatzas, Ioannis, Brownian motion and stochastic calculus/Ioannis Karatzas, Steven E. Shreve, 2nd. Edition, New York: Springer, 1996, [0387976558 (pbk. : New York: acid-free paper)],[3540976558 (pbk. : Berlin : acid-free paper)].

FZ5036 Energy Finance (3.5 0 12. Prerequisites: None. EAE15) **Equivalence: None**

General objective: The intention of this advanced

level course is to provide students with theoretical and practical knowledge about financial analysis and practice in emerging commodities markets (Mexico, Argentina, Brazil), as well as those which are more established (US, Canada, Europe), in the fields of carbon, allowances markets, bonuses, clean energy certificates and taxes. Along these lines, the course leads to knowledge for the practice of energy by product commerce and by products in the area of the environment and sustainability. Likewise, this class will explore evolving markets in the commerce of carbon; how they work; and the legal regulatory environment that surrounds them. The pre requisites for this course are as follows: Energy Administration, Energy Law and Regulations in the Energy Industry, and Risk Administration in the Energy Industry.

General objective: Upon completion of the course, the student will be able to: Recognize the varieties of funding instruments and energy agreements in all their sub markets. Apply models and calculate costs and benefits of financial instruments for energy projects, including permit markets and clean energy certificates.

Key words: Climate change. Delivery settlement. Cash settlement. Commodity commerce. Market Futures.

Bibliography: * Fischer, Katrina & Gerrard, Michael, *The Law of Adaptation to Climate Change: U.S. and International Aspects*, ABA.

FZ5037 Financial Modeling (3.5 0 12. Prerequisites: [EC4009]. MAF15) Equivalence: None

General objective: At the end of the course the student will be capable of handle with ease one or more suits of software most frequently used in modeling the finance industry, also will be able to understand, set up and apply the fundamental models used in finance, to assimilate and adapt the most modern techniques which are incorporated into the modeling practice in the type of problem that becomes more significant.

Bibliography: * Chatterjee, R., *Practical Methods of Financial Engineering and Risk Management: Tools*

for Modern Financial Professionals, 1, Springer/Apress, [9781430261339].

FZ5038 Modern Corporate Finance (3.5 0 12. Prerequisites: [FZ4015]. MAF15) Equivalence: None

General objective: At the end of the course the student will be capable of applying the finance theory to real problems in business management

Bibliography: * Brealey, Richard A., *Fundamentals of corporate finance* / Richard A. Brealey, Stewart C. Myers, Alan J. Marcus., 7th ed. International Edition., New York : McGraw Hill/Irwin, 2012., [9781259071898],[1259071898].

FZ5039 Investments (3.5 0 12. Prerequisites: [FZ4014]. MAF15) Equivalence: None

General objective: AAt the end of the course the student will be able to develop a portfolio that is optimal for a certain user profile, given the applicable parameters of individual assets, their interactions, the user conjunctural perceptions, as well as select and evaluate a portfolio or investment fund given a reference parameter or benchmark.

Bibliography: * Reilly, Frank K., *Investment analysis and portfolio management* / Frank K. Reilly, Keith C. Brown., 9th ed., Australia : South Western Cengage Learning, c2009., [9780324656121 (student ed. package)], [0324656122 (student ed. package)], [9780324656329 (student ed.)], [0324656327 (student ed.)], [9780324235968 (Thomson one business sch ed.)], [0324235968 (Thomson one business sch ed.)].

FZ5040 Financial Modeling (3.5 0 12. Prerequisites: [EC4009]. MAF15) Equivalence: None

General objective: At the end of the course the student will be able to know the process of Financial Risk Management. In particular, will identify, measure and evaluate the main risks that impact the operating and financial results of companies and financial

institutions; as well as design strategies to conduct an adequate risk management using financial derivatives mainly.

Bibliography: * Hull, John C., Options, Futures & Other Derivatives, 8, Prentice Hall, [9780132164948].

FZ96302 Case Problems in Financial Management

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: None

General objective: The justification of the firm's objectives, the interdependence between the firm and the financial markets, and the complexities arising from increased globalization create a framework for financial management decisions. Maximizing value, minimizing risk, and hedging are all part of the financial management of the firm.

FZ96303 Applications of Investment Theory

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: None

General objective: Financial markets and the financial services industry are examined in order to understand evaluation theories, fixed income analysis, equity analysis, derivatives, and risk management. Diversification and capital market integration among international capital markets are explored for investment management strategies.

GA Graduate Business Administration Programs

GA4025 Fundamental Administrative Environment

(2 - 0 - 8. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course combines basic knowledge in economics, accounting and statistics in order to offer the fundamental theoretical and practical skills in these disciplines. This course shall be offered by a group of professors in each occasion. The components are the following: Economics: This course offers the executive basic techniques in microeconomic and macroeconomic analysis in decision making. Therefore, the business language is introduced in the areas of economic theory and methodology. Fundamental topics in the corporate economics and their applications will be discussed, such as market structures and regulations. As fundamental topics of the companies and its applications, market equilibrium, elasticity, market structures and regulation, and operation of conceptual backgrounds are identified, as well as operation of markets in the study of international economics. Statistics Fundamental: Statistics provides the student with the necessary tools for the effective management of information and quantitative support for decision making with a global vision of business. This course seeks to develop abilities in statistic and technological issues as well and to work in collaborative and multidisciplinary teams. The use of statistical and computer resources is necessary in order to clarify the decision making process in a honest and responsible manner. Accounting: This course broadens the horizon of the holistic vision of decision makers, through financial information systems. During the course, the executives make use of the basic tools necessary for financial accounting, cost accounting and administrative accounting, all of them useful in the planning, control and decision making processes. Some of the topics covered during the course are: transactional analysis and its impact on the financial statements, analysis and interpretation of financial information, short term decisions and introduction to the accounting by areas of responsibility.

Bibliography: * Levin, Richard I., Estadística para administradores/Richard I. Levin, David S. Rubin, 6ta.

Edición, México: Prentice-Hall, c2000, México, 2000, español, [9688806757].

GA4026 Global Business Environment

(3 - 0 - 6. Prerequisites: None. MBE02)
Equivalence: None

General objective: Participants will meet for one week during this experiential learning module in an international center. Leading professors from the partner schools will teach participants materials that include: the evolution and structure of the global economy and approaches to nation building used by countries in different regions; the dominant forms of business organizations found in different regions of the world and their impact on managerial decision making processes and the conduct of business around the world; and the personal characteristics that differentiate successful from unsuccessful managers. During the week, cross-cultural teams will be formed for assignments which will highlight best practices around the world. The teams are required to produce post-experiential deliverables that would demonstrate participants' understanding and ability to apply business principles studied during the module.

GA4027 Analytical Tools for Decision Making and Macroeconomics for Managers

(3 - 0 - 11. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course includes two specific components in the areas of Analytic Tools for Decision Making and Macroeconomics for Managers. Both are the described: Analytic Tools for Decision Making, a course which provides the executive with the necessary methodological tools to analyze the area of decision making. The course works with access to methodological studies of the corporate phenomenon and the experience of investigation in a research replica; Macroeconomics Basic concepts of macroeconomics such as interest rates and exchange rates are studied. These concepts are applied

to analyze, interpret and discuss national and international events and government policies published in journals and specialized papers. This course develops the ability to analyze and evaluate the economic phenomenon and its direct impact in the organizational process to provide deep knowledge regarding the principal components of the aggregated supply and demand, the role of the government in economics, the money supply process and inflation, the stabilization policies and financial markets. The course develops abilities in order to integrate knowledge of macroeconomic phenomenon.

Bibliography: * Copeland, Thomas E., 1946-, Financial theory and corporate policy/Thomas E. Copeland, J. Fred Weston, Kuldeep Shastri, 4th. Edition, Boston, MA: Addison-Wesley, c2005, Massachusetts, 2005, eng, [0321127218 (papel alcalino)].

GA4028 Leadership, Organization and Change

(2 - 0 - 8. Prerequisites: None. MBE02)
Equivalence: None

General objective: Both managing and leadership are necessary to establish the organizational leadership, establish strategies and reach goals. The goal of this course is to improve the student's leadership and management skills, increasing his effectiveness in Today's dynamic and complex business environment. In this course, the student will become aware of his strengths as a leader and manager, and of areas in which he needs additional development. He will also create a personal development plan to improve his ability to manage and lead himself and others. This course incorporates a variety of learning methods, including case and small group discussions, self-diagnostic instruments, cases and experiential activities.

GA4029 Global Operations Management

(2 - 0 - 8. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course focuses on how operations can provide a competitive advantage for the firm, and how operations strategies connect with marketing and other functional strategies. The executives will be able to develop a foundation in the concepts of process analysis and improvement, as well as explore ways that outstanding quality can provide a strategic advantage and improved profitability. The fundamentals of project planning, capacity analysis and supply chain management are examined, along with information technology's impact on today's business operations. As a class project, the students will reengineer a process that cuts across functional areas of the companies, resulting in a significant improvement.

Bibliography: * Chase, Richard B., Production and operations management: Manufacturing and services/Richard B. Chase, Nicholas J. Aquilano, 8th. Edition, Chicago: Irwin, c1998, [0071152229].

GA4030 General Management and Strategy

(1 - 0 - 5. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course pulls together the functional knowledge, behavioral concepts and analytical tools that today's general manager needs to make sound business decisions in ambiguous situations. The executives will learn how competitive strategies are formulated and implemented within organizations, and practice their skills through case studies of companies like Wal-Mart, Netscape and Texas Instruments.

Bibliography: * Hatch, Mary Jo, Organization theory: Modern, symbolic, and postmodern perspectives/Mary Jo Hatch, Oxford; New York: Oxford University Press, 1997, England, 1997, eng, [0198774907 (pbk.)],[0198774915].

GA4031 Logistics and Sustainability**(3 - 0 - 6. Prerequisites: None. MBE02)****Equivalence: None**

General objective: During this one-week experiential learning module in Europe, participants will study issues related to logistics and sustainability through a combination of academic lectures and site visits of various industries and businesses. Both developed and emerging countries will be visited and studied, and prominent local political leaders and business executives will share their perspectives on best business practices in their own countries or regions. Participants will gain first-hand knowledge of how best practices are applied around the world, and how developed and developing economies work together. Working on a cross-cultural team with members from other continents, participants will prepare a post-experiential deliverable at the conclusion of the module.

GA4032 Financial & Managerial Accounting**(2 - 0 - 10. Prerequisites: None. MBE02)****Equivalence: None**

General objective: This course examines the role of accounting information in the creation of value, and applies a theoretical and analytical background in accounting and finance. Solid fundamentals are offered in the analysis of financial statement. Practice is acquired through the study of financial reports of different corporations, as well as the interpretation of the impact of financial transactions in the financial statements. During the course, the executive will learn basic concepts of the theory of value and efficient markets, specifically the different combinations of risk and expected growth created by managerial decisions. Even though basic knowledge in accounting techniques is required, the analysis and interpretation of financial statements, and both roles are studied. The manner in which the accountants prepare the information and how the executives participate in decision making, the evaluation, planning, and cost analysis, as well as strategic implications in all aspects, will be studied during the course.

Bibliography: * Hilton, Ronald W., Managerial accounting, 3rd. Edition, New York: McGraw-Hill, c1997, New York, 1997, eng, [0070290016 (acid-free paper)],[0071143130 (Int. ed.)].

GA4033 Corporate Finance**(3 - 0 - 12. Prerequisites: None. MBE02)****Equivalence: None**

General objective: This course has a focus on the International Exchange Markets and the different options in order to increment the value of the company recurring to capital markets, money markets and its implications in the capital cost and risk management. The manner in which connections between global macroeconomics and the financial crashes and the way that these affect the administration of a corporation will be studied as well. This course will provide the executive with analytical skills and models used in the decision making process by the Financial Management in a modern corporation. The concepts and theories that provide a solid background to Modern Corporate Finance will be reviewed in several topics, such as risk and revenue, capital cost and its structure, capital budgets, options, mergers and acquisitions and financial insolvency.

Bibliography: * Grinblatt, Mark, Financial markets and corporate strategy/Mark Grinblatt, Sheridan Titman, 2nd. Edition, Boston: McGraw-Hill Irwin, 2002, Massachusetts, 2002, eng, [0071123415 (ed. international)],[0072294337 (encuadernado)].

GA4034 Advanced Marketing Strategy**(2 - 0 - 10. Prerequisites: None. MBE02)****Equivalence: None**

General objective: This course explores how and why the businesses obtain benefits by being market-oriented and the manner in which these corporations can be built. During this course, the executive will develop a fundamental understanding of the way in which a successful business makes use of marketing concepts in order to give an aggregate value for its clients in a more efficient way than the rest of its competitors. Besides developing these analytical skills and creating marketing plans, the executive will learn strategic components related to the design of

the product, price, distribution and communication. Cases applied to several industries in different continents will be studied as well.

Bibliography: * McGuigan, James R., Managerial economics: Applications, strategy, and tactics/James R. McGuigan, R. Charles Moyer, Frederick H. de B. Harris, 8th. Edition, Cincinnati, Ohio: South-Western College, 1999, Iowa, 1999, eng, [0538881062].

GA4035 Micro and Strategic Economics

(2 - 0 - 9. Prerequisites: None. MBE02)
Equivalence: None

General objective: The manner in which microeconomics is applied in order to solve the company's problems, including the analysis of the market structure in the corporation, setting optimal prices and levels of production. Even though microeconomic theory is explored, the course emphasizes the development of skills to strategically apply the theory in the resolution of administrative problems in an international context. During the course, the following areas will be studied: strategic decisions when the success of these depends on the manner in which the rest of the participants in the industry will react (game theory applied); the importance of entry barriers to the market and dumping cases, as well as monopolistic practices.

Bibliography: * McGuigan, James R., Managerial economics: Applications, strategy, and tactics/James R. McGuigan, R. Charles Moyer, Frederick H. de B. Harris, 9th. Edition, Cincinnati, Ohio: South-Western College, c2002, Ohio, 2002, eng, [0324058810].

GA5025 Globalization of Finance and Cultural Marketing

(3 - 0 - 6. Prerequisites: None. MBE02)
Equivalence: None

General objective: During this one-week experiential learning module in Asia, participants will study issues related to globalization of finance and cultural marketing through a combination of academic lectures and site visits of various industries and busi-

nesses. Both developed and emerging countries will be visited and studied, and prominent local political leaders and business executives will share their perspectives on best business practices in their own countries or regions. Participants will gain first-hand knowledge of how best practices are applied around the world, and how developed and developing economies work together. Working on a cross-cultural team with members from other continents, participants will prepare a post-experiential deliverable at the conclusion of the module.

GA5026 Strategic Thinking and Change

(3 - 0 - 11. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course offers the executive a focus on strategic administration of international corporations, emphasizing the creation of competitive advantage in a global context. Three levels of analysis are presented: the competitive environment in which global organizations operate; the changing atmosphere in which they are organized and conduct international operations, and the changing roles in administration. During this course, a focus on strategic administration is maintained, from the perspective of CEO's. An emphasis on corporate control is presented. Theoretical and practical background is provided, as well as alternatives for monitoring the environment and incorporation of critical external factors in the planning process.

GA5027 Ethics and Business Environment

(3 - 0 - 13. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course brings together knowledge and skills in the areas of Negotiations, Mergers & Acquisitions and Ethics. Each component will be described as follows: Negotiations: During this course the executive will analyze negotiation styles and modifications, the managing of extreme emotions, understanding of "the other's" perspective, maximization of the negotiating power, the use of negotiation techniques, and selection of tactics and evaluation of negotiations. The development of technology, especially in communication, and the

growth of international commerce and social change that represent public liberties in several countries are factors that contribute to the rise of intercultural contacts. Today, knowledge of intercultural communication and negotiation in international contexts is necessary. In this course, two processes are emphasized: negotiation and intercultural communication. Besides, research on specific cases of negotiation among different groups or individuals on topics such as environment, labor, finance and commerce, among others, are studied in order to be analyzed through a critical perspective. Mergers and Acquisitions: this course explores the corporative acquisitions as a method that affects radical changes in the administration of large corporations. The impact of acquisitions is emphasized, and theoretical elements and administrative implications are examined. The growing interconnection between the economies and organizations in which they are located requires an understanding of the possibilities to complement efforts in order to increase the competitiveness of the firms. This course analyzes the conceptual background in which they should be constituted. Due to the fact that they represent a crucial aspect of strategic organization, the typology of alliances, the factors that must be evaluated to establish an alliance and concrete cases of success and failure in this matter, will be studied. This course offers an innovative focus that allows the identification of elements that contribute to the success of an alliance. Ethics: This course will expose the executive to ethical issues and dilemmas that arise in the business world. The focus of the course is on case discussions of real life ethical challenges faced by business managers. The students will be expected to write several case briefs that analyze business cases.

GA5028 International Finance and Strategic Technology

(2 - 0 - 9. Prerequisites: None. MBE02)
Equivalence: None

General objective: This course has two fundamental components: Strategic Technology and International Finance. Both components will be described. Strategic IT Information technology (IT) is increasingly recognized as a strategic asset by many of Today's businesses. The executive will explore technologies and management techniques currently used by busi-

nesses in furthering their strategic objectives. The student will gain a greater understanding of how to develop an IT based strategy by identifying opportunities, analyzing options for exploiting those opportunities, and developing practical plans for implementing the strategic vision. In International Finance, the executive will analyze international finance markets with an emphasis on concepts of time value of money, valuation, international portfolio theory, risk and return, financing alternatives, cost of capital, financial projections, and mergers and acquisitions. The executives will develop a "financial mindset" in their ability to analyze, plan and make real world financial decisions. The students will be expected to work individually and with teams to prepare for in class discussions of business cases.

GA5029 Adaptation to Dynamic Business Environments

(3 - 0 - 6. Prerequisites: None. MBE02)
Equivalence: None

General objective: During this one week experiential learning module in the Americas, participants will study issues related to risk and uncertainty, political and economic transformation, knowledge management and entrepreneurship through a combination of academic lectures and site visits of various industries and businesses. Both developed and emerging countries will be visited and studied, and prominent local political leaders and business executives will share their perspectives on the best business practices in their own countries or regions. Participants will gain firsthand knowledge of how the best practices are applied around the world, and how developed and developing economies work together. Working on a multicultural team with members from other continents, participants will prepare a post experiential delivery at the conclusion of the module.

GD

Graduate Administrative Science Programs

GD5002 Research Proposal I**(3 - 0 - 12. Prerequisites: None. DCA11)****Equivalence: None**

It is an ongoing investigation whose intention is that the student will develop the doctoral research project and present in public his or her progress in the context of group discussions. As a learning outcome, the student is expected to strengthen a critical stance on the approach and demonstrate his or her project through achievements in their presentations.

General objective: At graduation, student will be able to justify the relevance of his or her research topic, identifying the progress on the theme selected based on a literature review using various sources of information. To initiate the development of an applied research project or technological development with advice from a teacher researcher and submit periodic reports of progress. To define a work plan and budget for the project.

GD5003 Research Proposal II**(3 - 0 - 12. Prerequisites: None. DCA11)****Equivalence: None**

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: On completion of this course, students will further develop their research project with advice from a teacher researcher and submit periodic reports of progress.

GD5004 Research Proposal III**(3 - 0 - 12. Prerequisites: None. DCA11)****Equivalence: None**

This is a research course whose intention is that the student develops and presents before an audience, in a collective discussion environment, his doctoral research project. As a result, the student is expected to develop a critical position regarding his project approach and to demonstrate it through his achievements in the presentations.

General objective: At the end of the course, the student will justify the relevance of a research topic and will identify its evolution based on a comprehensive bibliographical revision, using varied sources of information. Start the development of an applied research or a technological development project, with the advice of a researcher academician, and presenting periodic reports. Define a working plan and a budget for the development of the project.

GD5005 Research Seminar I**(1 - 0 - 4. Prerequisites: None. DCA11)****Equivalence: None**

This is a course in research with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to acquire a critical stand point about the approach of his/her research project and demonstrate it through the accomplishments in his/her presentations.

General objective: The aim of this course is for students to make public presentations on the progress of his/her doctoral research.

GD5006 Research Seminar II
(1 - 0 - 4. Prerequisites: None. DCA11)
Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GD5007 Research Seminar III
(1 - 0 - 4. Prerequisites: None. DCA11)
Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GD5008 Assisted Research I
(3 - 0 - 12. Prerequisites: None. DCA11)
Equivalence: None

This is a course of research that is intended for the student, guided by the teacher, and includes the study of specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study that is conducted and implemented on a specific domain of interest and advised by a professor in that area.

GD5009 Assisted Research II
(3 - 0 - 12. Prerequisites: None. DCA11)
Equivalence: None

In this research-oriented course, the professor will guide the student towards the study of specific topics that will allow the student to develop his or her own research project. As a learning outcome, the student will produce a presentation that can be used as a guideline for his or her dissertation project.

General objective: Under the guidance of the professor, the student will select a research topic in his or her specific area of interest.

GD5010 Assisted Research III
(3 - 0 - 12. Prerequisites: None. DCA11)
Equivalence: None

This is a course of research that is intended for the student, guided by the teacher, and includes the study of specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study that is conducted and implemented on a specific domain of interest and advised by a professor in that area.

GD6000 Doctoral Defense
(0 - 0 - 1. Prerequisites: None. DCA11)
Equivalence: None

This course is the final stage of the development of doctoral research. The student will present and defend his thesis orally before the panel of Synod.

General objective: The student will present and defend his doctoral research.

Bibliography: * Artículos e investigaciones, Investigaciones doctorales.

GD6017 Doctoral Research I (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

Bibliography: * Material asignado, Disertaciones doctorales.

GD6018 Doctoral Research II (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GD6019 Doctoral Research III (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is a research course which intends to conclude the student data collection so as to prepare for field study. The student is guided by a leading local consultant in developing the doctoral dissertation. This also includes the definition of the methodology ac-

ording to the statement of the problem and the theoretical framework already established. As a result of learning, it is expected that the student has the methodology used to study the field of his doctoral dissertation.

General objective: Development of doctoral research.

Bibliography: * Materia asignado, Investigaciones sobre el tema.

GD6020 Doctoral Research IV (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student starts the field work and gathers the information on which to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concepts of sampling and methodological techniques for fine data collection. As a result of learning, the student is expected to assemble the first evidence from field work that will serve as the final dissertation document.

General objective: Development of doctoral research.

Bibliography: * Material asignado, Investigaciones.

GD6021 Doctoral Research V (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the students continue the field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concepts of sampling and methodological techniques for fine data collection. As a result of learning, the student is ex-

pected to continue to put together the quantitative and qualitative data that will serve as the final document of presentation. Requires writing skills of academic texts and methodological techniques for data collection.

General objective: Development of doctoral research.

Bibliography: * Material asignado, Investigaciones doctorales.

GD6022 Doctoral Research VI (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues the field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concept of methodological techniques for fine data collection. As a result of learning, the student is expected to continue gathering data that will serve as the final document of presentation. Requires writing skills of academic texts.

General objective: Development of doctoral research.

Bibliography: * Material asignado, Investigaciones.

GD6023 Doctoral Research VII (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student starts processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes the concept of methodological techniques for data collection and use of fine software for statistical analysis of information. As a result of learning, the student is expected to refine and complete the data collection and start the analysis of the data that will serve as the final dissertation document. Re-

quires knowledge of software used for analysis.

General objective: Development of doctoral research.

GD6024 Doctoral Research VIII (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the use of software for statistical analysis of information. As a result of learning, the student is expected to continue the analysis of the data that will serve as final dissertation document. For this course, the student requires knowledge of software used for statistical analysis.

General objective: Development of doctoral research.

GD6025 Doctoral Research IX (3 - 0 - 12. Prerequisites: None. DCA11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues writing the doctoral dissertation from the results of data analysis. The student is guided by a leading local consultant in developing the doctoral dissertation. This course covers data analysis strategies. As a result of learning, the student is expected to prepare the chapter on analysis of results. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GD6026 Doctoral Research X **(3 - 0 - 12. Prerequisites: None. DCA11)** **Equivalence: None**

It is an ongoing investigation for the student with the intention of writing the findings of his doctoral dissertation. The student is guided by a local consultant in developing the doctoral dissertation. Included are concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GD6027 Doctoral Research XI **(3 - 0 - 12. Prerequisites: None. DCA11)** **Equivalence: None**

It is an ongoing investigation for the student with the intention to write the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. This course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GD6028 Doctoral Research XII **(3 - 0 - 12. Prerequisites: None. DCA11)** **Equivalence: None**

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GF

Graduate Financial Science Programs

GF5019 Research Proposal I
(3 - 0 - 12. Prerequisites: None. DCF11)**Equivalence: None**

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: At graduation, students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information. Also, the student will initiate the development of an applied research project or technological development with advice from a teacher researcher and submit periodic reports of progress. Define a work plan and budget for the project.

GF5020 Research Proposal II
(3 - 0 - 12. Prerequisites: None. DCF11)**Equivalence: None**

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: On completion of this course, students will further develop their research projects with advice from a teacher researcher and submit periodic reports of progress.

GF5021 Research Proposal III
(3 - 0 - 12. Prerequisites: None. DCF11)**Equivalence: None**

It is an ongoing investigation whose intention is that the student will develop the doctoral research

project and present their progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate your project through achievements in their presentations.

General objective: Upon graduation, students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information. Initiate the development of an applied research project or technological development, with advice from a teacher researcher and submit periodic reports of progress. Define a work plan and budget for the project.

GF5022 Research Seminar I
(1 - 0 - 4. Prerequisites: None. DCF11)**Equivalence: None**

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GF5023 Research Seminar II
(1 - 0 - 4. Prerequisites: None. DCF11)**Equivalence: None**

The intention of this research course is that the student presents his\her research progress in the context of group discussions. As a result of the learning, the student is expected to strengthen a critical stance on his\her project approach and show in his\her presentation the achievements in his\her research project.

General objective: The objective of this course is that the students make public presentations on the progress of their doctoral research.

GF5024 Research Seminar III
(1 - 0 - 4. Prerequisites: None. DCF11)
Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GF5025 Assisted Research I
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

This is a course of research that is intended for the student who will study specific topics that will assist in the development of the research project with the teacher's guidance. As a result of learning, the student will be able to develop a paper that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest and advised by a professor in that area.

GF5026 Assisted Research II
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

This is a course of research that is intended for the student who will study specific topics that will assist in the development of the research project with the teacher's guidance. As a result of learning, student will be able to develop a paper that can be used to support the research project.

General objective: Choosing a topic of study that will be conducted and implemented on a specific domain of interest and advised by a professor in that area.

GF5027 Assisted Research III
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

This is a course of research that is intended for the student, guided by the teacher, and with specific topics to study that will assist in the development of the research project. As a result of learning, the student will be able to develop a paper that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

GF6000 Doctoral Defense
(0 - 0 - 1. Prerequisites: None. DCF11)
Equivalence: None

This course is the final stage of the development of doctoral research. The student will present and defend their thesis orally before the panel of Synod.

General objective: The student will present and defend his doctoral research.

GF6027 Doctoral Research I
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

This research course has as an intention that the student continues with data collection to carry out his/her field study. The student is guided by a leading local advisor in developing the doctoral dissertation. The concept of theoretical framework is part of the course. As a result of the learning, the student is expected to finish the conceptual framework for the doctoral dissertation. The course requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GF6028 Doctoral Research II
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

It is an ongoing investigation with the intention that the student continue data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GF6029 Doctoral Research III
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

It is a research course which intends to conclude the student data collection to prepare for field study. The student is guided by a leading local consultant in developing the doctoral dissertation. This also includes the definition of the methodology, according to the statement of the problem and the theoretical framework already established. As a result of learning, it is expected that the student has the methodology used to study the field of his doctoral dissertation.

General objective: Development of doctoral research.

GF6030 Doctoral Research IV
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

It is an ongoing investigation with the intention that the students start the field work and gather the information on which to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concepts of sampling and methodological techniques for fine data collection. As a result of learning, the student is expected to assemble the first evidence from field work that will serve as the final dissertation document.

General objective: Development of doctoral research.

GF6031 Doctoral Research V
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

It is an ongoing investigation with the intention that the student continues the field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concepts of sampling and methodological techniques for fine data collection. As a result of learning, the student is expected to continue to assemble the quantitative and qualitative data that will serve as the final document of presentation. Requires writing skills of academic texts and methodological techniques for data collection.

General objective: Development of doctoral research.

GF6032 Doctoral Research VI
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

It is an ongoing investigation with the intention that the student continues the field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concept of methodological techniques for fine data collection. As a result of learning, the student is expected to continue gathering data that will serve as the final document of presentation. Requires writing skills of academic texts.

General objective: Development of doctoral research.

GF6033 Doctoral Research VII
(3 - 0 - 12. Prerequisites: None. DCF11)
Equivalence: None

It is an ongoing investigation with the intention that the student starts processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of methodological techniques for data collection and use of fine software for statistical analysis of information. As a result

of learning, the student is expected to refine and complete the data collection, and start the analysis of the data that will serve as the final dissertation document. Requires knowledge of software used for analysis.

General objective: Development of doctoral research.

GF6034 Doctoral Research VIII

(3 - 0 - 12. Prerequisites: None. DCF11)

Equivalence: None

It is an ongoing investigation with the intention that the student continues processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the use of software for statistical analysis of information. As a result of learning, the student is expected to continue the analysis of the data that will serve as final dissertation document. For this course students require knowledge of software used for statistical analysis.

General objective: Development of doctoral research.

GF6035 Doctoral Research IX

(3 - 0 - 12. Prerequisites: None. DCF11)

Equivalence: None

It is an ongoing investigation with the intention that the student continues writing the doctoral dissertation from the results of data analysis. The student is guided by a leading local consultant in developing the doctoral dissertation. This course covers data analysis strategies. As a result of learning, the student is expected to prepare the chapter on analysis of results. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GF6036 Doctoral Research X

(3 - 0 - 12. Prerequisites: None. DCF11)

Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GF6037 Doctoral Research XI

(3 - 0 - 12. Prerequisites: None. DCF11)

Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GF6038 Doctoral Research XII

(3 - 0 - 12. Prerequisites: None. DCF11)

Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GI Graduate Engineering Programs

GI5000 Research and Innovation Methods

(1.5 - 0 - 6. Prerequisites: None. DBT11, DCI11, MBI09, MCP09, MIE09, MIR09, MMS09, MSA09, MSM09)

Equivalence: SC99489

Advanced course with the intention to provide the methods for developing a thesis project in applied research and/or technology development. The student will be able to justify and plan an applied research and/or technology development project.

General objective: Justify the relevance of the thesis topic for the development of the applied research and/or technology development project. Identify the advances in the selected thesis topic, based on literature review and utilizing various information sources. Define the hypothesis for the applied research and/or technology development project. Define specific and relevant research methods in the context of the selected thesis topic. Define a project plan and budget for the development of the thesis project.

Key words: Innovation. Applied research. Technological development.

GI5007 Thesis I

(3 - 0 - 12. Prerequisites: None. MBI09, MCP09, MIE09, MSA09, MSM09)

Equivalence: M 99491, SC99491

This is an advanced course with the intention to begin an applied research or technology development project. Previous knowledge of research and innovation methods is necessary. The student is capable of integrating and applying knowledge from the program of studies to complete the first stage in the development of an applied research project or technology development project.

General objective: Begin the development of an applied research project or technology development project, with supervision by a professor and delivering period progress reports.

Key words: Technological development. Thesis. Research.

GI5008 Thesis II

(3 - 0 - 12. Prerequisites: [GI5007]. MBI09, MCP09, MIE09, MSA09, MSM09)

Equivalence: M 99493, SC99493

This is an advanced course with the intention to complete an applied research or technology development project. The student is capable of integrating and applying knowledge from the program of studies to complete the second stage in the development of an applied research project or technology development project.

General objective: Complete the development of an applied research project or technology development project, with supervision by a professor and delivering period progress reports.

Key words: Technological development. Thesis. Research.

GI5010 Research and Innovation Methods

(3 - 0 - 12. Prerequisites: None. MER11V, MIP13, MIP13V)

Equivalence: None

Advanced course with the intention of providing the methods for developing a project for applied research and/or technology development. As a learning product, the student will be able to justify and plan an applied research and/or technology development project.

General objective: Justify the relevance of the topic for the development of the applied research and/or technology development project. Identify the most important references in the selected topic, based on literature review and utilizing several information sources. Define the hypothesis for the applied research and/or technology development project.

Define specific and relevant research methods in the context of the selected topic. Define a project plan and budget for the development of the project.

Key words: Innovation. Applied research. Technological development.

GI5011 Research Proposal I (3 - 0 - 12. Prerequisites: None. DBT11, DCI11) **Equivalence: None**

In this course, students will generate their doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: students will consolidate their project proposal.

General objective: Upon graduation, students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information. Initiate the development of an applied research project or technological development, with advice from a teacher researcher and submit periodic reports of progress. Define a work plan and budget for the project.

GI5012 Research Proposal II (3 - 0 - 12. Prerequisites: None. DBT11, DCI11) **Equivalence: None**

In this course, students will generate their doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: students will consolidate their project proposal.

General objective: Upon completion of this course, students will further develop their research project with advice from a teacher researcher and submit periodic reports of progress.

GI5013 Research Proposal III (3 - 0 - 12. Prerequisites: None. DBT11, DCI11) **Equivalence: None**

In this course, students will finish their doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: students will consolidate their project proposal and express it in a written document and an oral presentation before their thesis committee, in which the objectives, goals, deliverables and expected findings will be clearly defined.

General objective: Upon graduation, students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information. Initiate the development of an applied research project or technological development, with advice from a teacher researcher and submit periodic reports of progress. Define a work plan and budget for the project.

GI5014 Research Seminar I (1 - 0 - 4. Prerequisites: None. DBT11, DCI11) **Equivalence: None**

It is an ongoing investigation whose intent is for students to present their progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate your project through achievements in their presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GI5015 Research Seminar II
(1 - 0 - 4. Prerequisites: None. DBT11, DCI11)
Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievement in his presentation.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GI5016 Research Seminar III
(1 - 0 - 4. Prerequisites: None. DBT11, DCI11)
Equivalence: None

It is an ongoing investigation whose intent is for students presents their progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate your project through achievements in their presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GI5017 Assisted Research I
(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

This is a course of research that is intended for the students, guided by the teacher, study specific topics that will assist in the development of the research project. As a result of learning, students will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

GI5018 Assisted Research II
(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

This is a course of research that is intended for the students, guided by the teacher, study specific topics that will assist in the development of the research project. As a result of learning, students will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

GI5019 Assisted Research III
(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

This is a course of research that is intended for the students, guided by the teacher, study specific topics that will assist in the development of the research project. As a result of learning, students will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

GI5020 Professional Certification
(3.5 - 0 - 12. Prerequisites: None. EEN13, EIS11, ELS11, ENT11, EPY11)
Equivalence: None

This is an advanced level course intended to prepare the student to obtain a national or international professional certification. Learning outcome: the student is expected to integrate previously acquired knowledge in his specialty courses to the specific requirements of a professional certification relevant to his area of expertise.

General objective: After completing this course the student is expected to have the knowledge and skills necessary to obtain a national or international professional certification relevant to his area of specialty.

Key words: Professional certificate. Certificate.

GI6000 Doctoral Defense

(0 - 0 - 1. Prerequisites: None. DBT11, DCI11)

Equivalence: None

This course constitutes the final phase of the student's doctoral research. The student will present and defend his thesis orally before the members of the doctoral committee.

General objective: The student will present and defend his doctoral research.

GI6021 Doctoral Research I

(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)

Equivalence: None

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will finish writing the conceptual framework of his doctoral dissertation.

General objective: Development of doctoral research.

GI6022 Doctoral Research II

(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)

Equivalence: None

In this research course, the student will continue with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will finish writing the conceptual framework of his doctoral dissertation.

General objective: Development of doctoral research.

GI6023 Doctoral Research III

(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)

Equivalence: None

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. He will define the methodology, consistent with the topic proposal and the theoretical framework determined beforehand. Learning outcome: the student will have established the methodology to be used in the doctoral dissertation.

General objective: Development of doctoral research.

GI6024 Doctoral Research IV

(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)

Equivalence: None

In this research course, the student continues with his research work that will be used for his final dissertation document. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will have obtained the preliminary findings that will enable him to prove some of the hypotheses put forward during the initial phase of his research work.

General objective: Development of doctoral research.

GI6025 Doctoral Research V

(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)

Equivalence: None

In this course, the student will continue with his doctoral research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will continue to generate preliminary findings that can be used for his final dissertation document.

General objective: Development of doctoral research.

GI6026 Doctoral Research VI
 (3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students continue with their research. They are guided by a local principal advisor in writing their doctoral dissertation. Learning outcome: students will continue to generate preliminary findings that will help them to identify whether or not the hypotheses put forward at the beginning of their research work are correct.

General objective: Development of doctoral research.

GI6027 Doctoral Research VII
 (3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students continue with their research. They are guided by a local principal advisor in writing their doctoral dissertation. Learning outcome: students will validate the findings obtained and begin an analysis of these findings that can be used for their final dissertation document.

General objective: Development of doctoral research.

GI6028 Doctoral Research VIII
 (3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students continue with their research. They are guided by a local principal advisor in writing their doctoral dissertation. Learning outcome: students will validate the findings obtained and begin an analysis of these findings that can be used for their final dissertation document.

General objective: Development of doctoral research.

GI6029 Doctoral Research IX
 (3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students continue with their research. They are guided by a local principal advisor in writing their doctoral dissertation. Learning outcome: students will validate the findings obtained and begin an analysis of these findings that can be used for their final dissertation document.

General objective: Development of doctoral research.

GI6030 Doctoral Research X
 (3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will begin to write the conclusions to their doctoral dissertation.

General objective: Development of doctoral research.

GI6031 Doctoral Research XI
 (3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will begin to write the conclusions to their doctoral dissertation.

General objective: Development of doctoral research.

GI6032 Doctoral Research XII
(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will begin to write the conclusions to their doctoral dissertation.

General objective: Development of doctoral research.

GI6033 Doctoral Research XIII
(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will begin to write the conclusions to their doctoral dissertation.

General objective: Development of doctoral research.

GI6034 Doctoral Research XIV
(3 - 0 - 12. Prerequisites: None. DBT11, DCI11)
Equivalence: None

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will write the conclusions to their doctoral dissertation.

General objective: Development of doctoral research.

GI6041 Research Seminar I
(1 0 2. Prerequisites: None. DCC16, DNT16))
Equivalence: None

It is a research course intended to explore an area of research through reading scientific articles regardless of tools and technologies related to the area presenting research results and participating in the group of discussion. As a learning outcome, the student will present briefs of the reading material and the lectures given in class. The course does not require any previous course.

General objective: On completion of this course, the student will be able to present briefs of the reading material and lectures given in class.

Key words: Research seminar. Group Presentation. Research Discussion. Academic Reports. Expert Lectures.

Bibliography: * Tomasi, Wayne., Advanced electronic communications systems / Wayne Tomasi., 6th ed., Upper Saddle River, N.J. : Pearson/Prentice Hall, c2004., [0130453501].

GI6042 Research Seminar II
(1 0 2. Prerequisites: None. DCC16, DNT16)
Equivalence: None

It is a research course intended to explore an area of research through reading scientific articles regardless of tools and technologies related to the area listening research results of advanced students and experts of different areas. As a learning outcome, the student will present briefs of the reading material and the lectures given in class. The course does not require any previous course.

General objective: On completion of this course, the student will be able to participate in the discussion of the presentation, present briefs of the reading material and lectures given in class.

Key words: Research seminar. Group Presentation. Research Discussion. Academic Reports. Expert Lectures.

Bibliography: * Tomasi, Wayne., Advanced electronic communications systems / Wayne Tomasi., 6th ed., Upper Saddle River, N.J. : Pearson/Prentice Hall, c2004., [0130453501].

GI6043 Research Seminar III
(1 0 2. Prerequisites: None. DCC16, DNT16)
Equivalence: None

It is a research course intended to explore an area of research through socializing knowledge regardless of tools and technologies related to the area listening to students of the same or different programs, presenting to other students and listening to experts in the area. As a learning outcome, the student will present his research achievements, discuss other students achievements and actively participate in presentations by experts.

General objective: On completion of this course, the student will be able to present and discuss in seminars performed in class.

Key words: Research seminar. Group Presentation. Research Discussion. Expert Lectures. Academic Discussion.

Bibliography: * Northrop, Robert B., Introduction to instrumentation and measurements / Robert B. Northrop., 2nd ed., Boca Raton, Florida : Taylor & Francis, c2005., [0849337739 (papel alcalino)].

GI6044 Research Seminar IV
(1 0 2. Prerequisites: None. DCC16, DNT16)
Equivalence: None

It is a research course intended to explore an area of research through socializing knowledge regardless of tools and technologies related to the area listening to students of the same or different programs, presenting to other students and listening to specialized guests in different areas. As a learning outcome, the student will present his research achievements, discuss other students achievements and actively participate in presentations by experts.

General objective: On completion of this course,

the student will be able to present and discuss in seminars performed in class.

Key words: Research seminar. Group Presentation. Research Discussion. Expert Lectures. Academic Discussion.

Bibliography: * Bernard Sklar. , Digital Communications: Fundamentals and Applications, 2nd Edition, Prentice Hall. , Inglés.

GI6045 Research Seminar V
(1 0 2. Prerequisites: None. DCC16, DNT16)
Equivalence: None

It is a research course intended to explore an area of research through socializing knowledge regardless of tools and technologies related to the area listening to students of the same or different programs, presenting to other students, organizing the activities of the seminar and listening to specialized guests in different areas. As a learning outcome, the student will present his research achievements, discuss other students achievements and actively participate in presentations by experts.

General objective: On completion of this course, the student will be able to organize, present and be leader in the discussion in seminars performed in class.

Key words: Group Presentation. Research Discussion. Expert Lectures. Academic Discussion. Organization of Research Seminar.

Bibliography: * Proakis, John G., Digital communications / John G. Proakis, Masoud Salehi., 5th ed., international ed., Boston ; Mexico City : McGraw Hill, 2008., [0071263780],[9780071263788].

GI6046 Research Seminar VI
(1 0 2. Prerequisites: None. DCC16, DNT16)
Equivalence: None

It is a research course intended to explore an area of research through socializing knowledge regardless of tools and technologies related to the area listening to students of the same or different programs,

presenting to other students, organizing the activities of the seminar and listening to specialized guests in different areas. As a learning outcome, the student will present his research achievements, discuss other students achievements and actively participate in presentations by experts.

General objective: On completion of this course, the student will be able to organize, present and be leader in the discussion in seminars performed in class.

Key words: Group Presentation. Research Discussion. Expert Lectures. Academic Discussion. Organization of Research Seminar.

Bibliography: * Barry, John R., 1963 , Digital communication / John R. Barry, Edward A. Lee, David G. Messerschmitt., 3rd ed., Boston : Kluwer Academic Publishers, c2004., [0792375483 (alk. paper)].

GI6051 Research Workshop I

(1 0 4. Prerequisites: None. DCC16, DNT16)

Equivalence: None

It is a graduate course intended to allow the student to acquire skills, as a user or a developer, on complementary research tools such as information technology, entrepreneurship, innovation, advanced tools of specialization, among others, to help you better develop their research work. The approach to the problem to be solved and the selection of the best tool, suitable to facilitate their research or professional development is emphasized. As a result of learning, the student is expected to learn and efficiently use these tools.

General objective: On completion of this course, the student will be able to use the selected tools in your research or professional development.

Key words: Research Workshop. Research Tools. Use of Tools. Academic Training. Research Training.

Bibliography: * Davenport, Wilbur B., An introduction to the theory of random signals and noise / Wilbur B. Davenport, Jr., William L. Root., New York : IEEE Press, c1987., [0879422351].

GI6052 Research Workshop II

(1 0 4. Prerequisites: None. DCC16, DNT16)

Equivalence: None

It is a graduate course intended to allow the student to acquire skills, as a user or a developer, on complementary research tools such as information technology, entrepreneurship, innovation, advanced tools of specialization, among others, to help you better develop their research work. The approach to the problem to be solved and the selection of the best tool, suitable to facilitate their research or professional development is emphasized. As a result of learning, the student is expected to learn and efficiently use these tools.

General objective: On completion of this course, the student will be able to use the selected tools in your research or professional development.

Key words: Research Workshop. Research Tools. Use of Tools. Academic Training. Research Training.

Bibliography: *Burgelman, Robert A., Strategic management of technology and innovation / Robert A. Burgelman, Clayton M. Christensen, Steven C. Wheelwright., 5th ed., International ed., Boston ; México : McGraw Hill Irwin, 2009., [9780071263290 (ed. internacional)],[9780073381541 (papel alcalino)],[0073381543 (papel alcalino)]

GI6053 Research Workshop III

(1 0 4. Prerequisites: None. DCC16, DNT16)

Equivalence: None

It is a graduate course intended to allow the student to acquire skills, as a user or a developer, on complementary research tools such as information technology, entrepreneurship, innovation, advanced tools of specialization, among others, to help you better develop their research work. The approach to the problem to be solved and the selection of the best tool, suitable to facilitate their research or professional development is emphasized. As a result of learning, the student is expected to learn and efficiently use these tools.

General objective: On completion of this course, the student will be able to use the selected tools in

your research or professional development.

Key words: Research Workshop. Research Tools. Use of Tools. Academic Training. Research Training.

Bibliography: *Andre Vandierendonck, Walter Schroyens, and Gery d'Ydewalle, *The Mental Models Theory of Reasoning: Refinements and Extensions*, Psychology Press.

GI60454 Research Workshop IV

(1 0 4. Prerequisites: None. DCC16, DNT16)

Equivalence: None

It is a graduate course intended to allow the student to acquire skills, as a user or a developer, on complementary research tools such as information technology, entrepreneurship, innovation, advanced tools of specialization, among others, to help you better develop their research work. The approach to the problem to be solved and the selection of the best tool, suitable to facilitate their research or professional development is emphasized. As a result of learning, the student is expected to learn and efficiently use these tools.

General objective: On completion of this course, the student will be able to use the selected tools in your research or professional development.

Key words: Research Workshop. Research Tools. Use of Tools. Academic Training. Research Training.

Bibliography: * Bellamy, John, 1941 , *Digital telephony* / John C. Bellamy., 3rd ed., New York : Wiley, c2000., [0471345717 (papel no ácido)].

GI6055 Research Workshop V

(1 0 4. Prerequisites: None. DCC16, DNT16)

Equivalence: None

It is a graduate course intended to allow the student to acquire skills, as a user or a developer, on complementary research tools such as information technology, entrepreneurship, innovation, advanced tools of specialization, among others, to help you better develop their research work. The approach to the problem to be solved and the selection of the best tool,

suitable to facilitate their research or professional development is emphasized. As a result of learning, the student is expected to learn and efficiently use these tools.

General objective: On completion of this course, the student will be able to use the selected tools in your research or professional development.

Key words: Research Workshop. Research Tools. Use of Tools. Academic Training. Research Training.

Bibliography: * Akhter, Shameem., *Multi core programming : increasing performance through software multi threading* / Shameem Akhter, Jason Roberts., Hillsboro, OR : Intel Press, 2006., [0976483246 (rústica)], [9780976483243 (rústica)].

GI60456 Research Workshop VI

(1 0 4. Prerequisites: None. DCC16, DNT16)

Equivalence: None

It is a graduate course intended to allow the student to acquire skills, as a user or a developer, on complementary research tools such as information technology, entrepreneurship, innovation, advanced tools of specialization, among others, to help you better develop their research work. The approach to the problem to be solved and the selection of the best tool, suitable to facilitate their research or professional development is emphasized. As a result of learning, the student is expected to learn and efficiently use these tools.

General objective: On completion of this course, the student will be able to use the selected tools in your research or professional development.

Key words: Research Workshop. Research Tools. Use of Tools. Academic Training. Research Training.

Bibliography: * Kaiser, Kenneth L., *Transmission lines, matching, and crosstalk* / Kenneth L. Kaiser., Boca Raton : Taylor & Francis, c2006., [0849363624 (papel alcalino)].

GI6061 Scientific Product I (1.5 0 6. Prerequisites: None. DCC16, DNT16) Equivalence: None

It is a graduate research course intended for the student to obtain the first scientific research article from his doctoral research. As a learning outcome the student will send this first product of his research for publishing.

General objective: On completion of this course, the student will be able to present a finished scientific article to be sent for publication.

Key words: Scientific Research. Scientific Product. Publication. Article Preparation. Publishing Journals.

Bibliography: * Belcher, Wendy Laura., Writing your journal article in 12 weeks : a guide to academic publishing success / Wendy Laura Belcher., Thousand Oaks, Calif. : SAGE Publications, c2009., [141295701X (rústica)], [1412957559 (encuadernado)], [9781412957014 (rústica)], [9781412957557 (encuadernado)].

GI6062 Scientific Product II (1.5 0 6. Prerequisites: None. DCC16, DNT16) Equivalence: None

It is a graduate research course intended for the student to obtain the second scientific research article from his doctoral research. As a learning outcome the student will send this second product of his research for publishing.

General objective: On completion of this course, the student will be able to present a finished scientific article to be sent for publication..

Key words: Scientific Research. Scientific Product. Publication. Article Preparation. Publishing Journals

Bibliography: * Cargill, Margaret., Writing scientific research articles : strategy and steps / Margaret Cargill, BA, DipEd, MEd(TESOL), DEd, School of Agriculture Food and Wine, The University of Adelaide, Adelaide, South Australia 5005, Australia, Patrick O'Connor. BSc, PhD, School , Second edition., , [9781118570692 (cloth)], [1118570693(cloth)], [9781118570708 (pbk.)], [1118570707 (pbk.)].

GO Graduate Social Sciences

GO5000 Research Seminar I (1 - 0 - 4. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, the student will continue working on his doctoral research project and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through his accomplishment in the presentation.

General objective: Students will present in public progress reports on their doctoral research.

GO5001 Research Seminar II (1 - 0 - 4. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, the student will continue working on his doctoral research project and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through his accomplishment in the presentation.

General objective: Students will present in public progress reports on their doctoral research.

GO5002 Research Seminar III (1 - 0 - 4. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, the student will continue working on his doctoral research project and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding their project proposal and demonstrate it through his accomplishment in the presentation.

General objective: Students will present in public progress reports on their doctoral research.

GO5003 Assisted Research I (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students, under the guidance of their professor, will study specific topics that will help them to complete their research project. Learning outcome: students will be able to complete the work needed to support their research project.

General objective: Selection of a directed and applied research topic on a specific field of interest, under the guidance of a professor from this area.

GO5004 Assisted Research II (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, the student, under the guidance of his professor, will study specific topics that will help him complete his research project. Learning outcome: the student will be able to complete the work needed to support his research project.

General objective: Selection of a directed and applied research topic on a specific field of interest, under the guidance of a professor from this area.

GO5005 Assisted Research III (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students, under the guidance of their professor, will study specific topics that will help them to complete their research project. Learning outcome: students will be able to complete the work needed to support their research project.

General objective: Selection of a directed and applied research topic on a specific field of interest, under the guidance of a professor from this area.

GO6016 Doctoral Research I (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will continue collecting data to prepare their field study. The course covers the concept of theoretical frameworks. Learning outcome: students will finish writing the conceptual framework for the doctoral dissertation. The course requires prior knowledge of academic writing.

General objective: Students will conduct their doctoral research.

GO6017 Doctoral Research II (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will continue collecting data to prepare their field study. The course covers the concept of theoretical frameworks. Learning outcome: students will finish writing the conceptual framework for the doctoral dissertation. The course requires prior knowledge of academic writing.

General objective: Students will conduct their doctoral research.

GO6018 Doctoral Research III (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will finish collecting data to prepare their field study. They are guided by a local principal advisor in writing their doctoral dissertation. Students will define the methodology, consistent with the topic proposal and the theoretical framework determined beforehand. Learning outcome: students will have established the methodology to be used in the field study for their doctoral dissertation.

General objective: Students will conduct their doctoral research.

GO6019 Doctoral Research IV (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will begin the fieldwork and data collection for their doctoral dissertation. They are guided by a local principal advisor in writing their doctoral dissertation. The course includes the concepts of sampling and technical methodological concepts for precise data collection. Learning outcome: students will continue assemble the data obtained from their fieldwork to be used for their final dissertation document.

General objective: Students will conduct their doctoral research.

GO6020 Doctoral Research V (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will continue with the field study for their doctoral dissertation. They are guided by a local principal advisor in writing their doctoral dissertation. The course covers the concepts of sampling and methodological techniques for precise data collection. Learning outcome: students will continue to collect the quantitative and qualitative data required for their final dissertation document. The course requires prior knowledge of academic writing and methodological data collection techniques.

General objective: Students will conduct their doctoral research.

GO6021 Doctoral Research VI (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students continue with the fieldwork for their doctoral dissertation. They are guided by a local principal advisor in writing their doctoral dissertation. The course covers technical methodological concepts for precise data collection. Learning outcome: students will continue to collect the data they require for their final dissertation document. The course requires prior knowledge of academic writing.

General objective: Students will conduct their doctoral research.

GO6022 Doctoral Research VII (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will begin to process the data collected in the field study that will be used for their doctoral dissertation. They are guided by a local principal advisor in writing their doctoral dissertation. The course covers the concepts of methodological techniques for precise data collection and the use of statistical data analysis software. Learning outcome: students will refine and finish collecting data, and begin analyzing the data to be used for their doctoral dissertation. The course requires prior knowledge of the software they will use for their statistical analysis.

General objective: Students will conduct their doctoral research.

GO6023 Doctoral Research VIII (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will continue to process the data collected in the field study for their doctoral dissertation. They are guided by a local principal advisor in writing their doctoral dissertation. The course covers the use of statistical data analysis software. Learning outcome: students will continue to analyze the data to be used for the final document of their doctoral dissertation. The course requires prior knowledge of the software they will use for their statistical analysis.

General objective: Students will conduct their doctoral research.

GO6024 Doctoral Research IX (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will continue to write their doctoral dissertation based on the findings obtained in the data analysis. They are guided by a local principal advisor in writing their doctoral dissertation. The course covers data analysis strategies. Learning outcome: students will write the chapter

on the analysis of their findings. The course requires prior knowledge of academic writing.

General objective: Students will conduct their doctoral research.

GO6025 Doctoral Research X (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will write the conclusions to their doctoral dissertation.

General objective: Students will conduct their doctoral research.

GO6026 Doctoral Research XI (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will write the conclusions to their doctoral dissertation.

General objective: Students will conduct their doctoral research.

GO6027 Doctoral Research XII (3 - 0 - 12. Prerequisites: None. DCS11) **Equivalence: None**

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will write the conclusions to their doctoral dissertation.

General objective: Students will conduct their doctoral research.

GO6028 Doctoral Research XIII

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

In this research course, students will write the conclusions to their doctoral dissertation. They will be guided by a local principal advisor in writing their doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: students will write the conclusions to their doctoral dissertation.

General objective: Students will conduct their doctoral research.

GO6030 Doctoral Defense

(0 - 0 - 1. Prerequisites: None. DCS11)

Equivalence: None

This course constitutes the final phase of students' doctoral research. Students will present and defend their thesis orally before a jury.

General objective: Students will present and defend their doctoral research.

GO6031 Thesis Seminar I

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

The course will give the student the possibility to discuss the contents of his/her thesis with a group. The process will be done under the direction of professor/researcher who will guide the discussions.

General objective: At the end of the course the student will be able to discuss the contents of his/her thesis with a research group.

Key words: Thesis.

GO6032 Thesis Seminar II

(3 - 0 - 12. Prerequisites: No tiene. DCS11)

Equivalencias: No tiene

It is expected that the student will be able to argue the advances of his thesis around through transversal subjects.

General objective: At the end of the course the student will be able to discuss the contents of his/her thesis with a research group.

Key words: Thesis.

GO6033 Thesis Seminar III

(3 - 0 - 12. Prerequisites: No tiene. DCS11)

Equivalencias: No tiene

It is expected that the student will argue his research project with a work group using the analysis of academic papers. He/she is also expected to generate academic papers for publication in journals.

General objective: At the end of the course it is expected that the student will be able to publish texts related with his/her research project in academic journals. It is also expected that the student will be able to widely discuss texts related to his/her field of research.

Key words: Thesis.

GO6034 Thesis Seminar IV

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

It is expected that the student, through the guidance of a professor/researcher, can present advances of his research project in congresses from arbitrated expositions.

General objective: At the end of the course the student will have presented his advances from research project in different research forums or congresses through moderated expositions.

Key words: Thesis.

GP Graduate Politics Program

GP5000 Research Proposal I (3 - 0 - 12. Prerequisites: None. DPP11) Equivalence: None

It is an ongoing investigation with the intention that the student will develop the doctoral research project and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: At graduation, the student will be able to justify the relevance of a research topic, identifying the progress on the theme selected, based on literature review using various sources of information. He will initiate the development of an applied research project or technological development with advice from a researcher teacher and submit periodic reports of progress. Outcome: define a work plan and budget for the project.

GP5001 Research Proposal II (3 - 0 - 12. Prerequisites: None. DPP11) Equivalence: None

It is an ongoing investigation with the intention that the student develops the doctoral research project and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: On completion of this course, students will further develop their research projects with advice from a researcher teacher and submit periodic reports of progress.

GP5002 Research Proposal III (3 - 0 - 12. Prerequisites: None. DPP11) Equivalence: None

It is an ongoing investigation with the intention that the student develops the doctoral research project

and present in public his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: On completion of this course, students will be able to justify the relevance of a research topic, identifying the advancements made in the selected topic on the basis of a bibliographic review, using diverse sources of information; begin either an applied research or technological development project with the guidance of a research professor and present periodical progress reports; define a work plan and budget for the project.

GP5003 Research Seminar I (1 - 0 - 4. Prerequisites: None. DPP11) Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GP5004 Research Seminar II (1 - 0 - 4. Prerequisites: None. DPP11) Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GP5005 Research Seminar III (1 - 0 - 4. Prerequisites: None. DPP11) Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GP6000 Theory of Public Organizations and of Public Administration (3 - 0 - 12. Prerequisites: None. DPP11) Equivalence: None

This course poses a critical approach of Public Administration as a discipline that belongs in the Social Sciences. This approach tries to understand the role and functioning of Public Administration as an element of political power, analyzes the nature of public administration as part of that political power; analyzes the nature of public administration and its relationships with other political actors, on one side, and with the civil society on the other. It explores the processes of administrative reforms.

General objective: This course analyzes Public Administration in its organizational, social and political dimensions.

Key words: Scientific approach to public administration. Public administration and social sciences. Critical vision of administration science.

Bibliography: * Harmon, Michael M., Teoría de la organización para la administración pública/Michael M. Harmon y Richard T. Mayer; estudio introductorio de Jorge Tamayo Castroparedes; traducción de Pastor Jesús Covián y Mónica Utrilla, 1ra. Edición en español, México, D. F.: FCE: Colegio Nacional de Ciencias políticas y Administración Pública, 1999, México, 1999, español, [9681657500].

GP6001 Analytical Processes of Public Policy (3 - 0 - 12. Prerequisites: None. DPP11) Equivalence: None

This course presents a global revision of the role of public policy in modern societies. Its objective is for the student to fully understand the processes and factors that cause the formation of public policy in a balanced and sustainable economic context.

General objective: Analyze public policies in order to determine the factors that lead to social problems and, therefore, be able to provide the necessary solutions. Implement the Public Policy tools that will improve the level of governance and its impact on society. Generate broad knowledge in the student about the sources of economic growth within the context of macroeconomic balances, so they may be the starting point in elaborating public policies.

Key words: Political analysis. Analysis of the public politics issues. Tools of public politics aiming at government improvement.

Bibliography: * Cases in public policy-making/James E. Anderson, editor, 2nd. Edition, New York: Holt, Rinehart and Winston, 1982, New York, 1982, eng, [0030582083].

GP6003 Public Administration System of Competencies (3 - 0 - 12. Prerequisites: None. DPP11) Equivalence: None

To identify the scope and impact of government action, the approval of a general disposition or the implementation of any given public policy without weakening the competence system, established in the Constitution and Secondary Laws.

General objective: This course is designed for students to know the complex law system of competencies, that dictate the application of public policies in Mexico.

Key words: Competencies of the 3 government levels. State competencies system. Competencies system of municipalities.

Bibliography: * Montero Zendejas, Daniel, Derecho constitucional comparado/Daniel Montero Zendejas, México: Porrúa, 2006, México, 2006, español, [9700762335].

GP6021 Doctoral Research I
(3 - 0 - 12. Prerequisites: None. DPP11)
Equivalence: None

It is an ongoing investigation with the intention that the student continues data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GP6022 Doctoral Research II
(3 - 0 - 12. Prerequisites: None. DPP11)
Equivalence: None

It is an ongoing investigation with the intention that the student continues data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GP6023 Doctoral Research III
(3 - 0 - 12. Prerequisites: None. DPP11)
Equivalence: None

It is a research course which intends to conclude the student data collection to prepare for field study. The student is guided by a leading local consultant in developing the doctoral dissertation. This also includes

the definition of the methodology, according to the statement of the problem and the theoretical framework already established. As a result of learning, it is expected that the student has the methodology used to study the field of his doctoral dissertation.

General objective: Development of doctoral research.

GP6024 Doctoral Research IV
(3 - 0 - 12. Prerequisites: None. DPP11)
Equivalence: None

It is an ongoing investigation whose intent is for students to start the field work and gather the information upon which to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concepts of sampling and methodological techniques for data collection fine. As a result of learning, the student is expected to assemble the first evidence from field work that will serve as final dissertation document.

General objective: Development of doctoral research.

GP6025 Doctoral Research V
(3 - 0 - 12. Prerequisites: None. DPP11)
Equivalence: None

It is an ongoing investigation whose intent is for students to continue the field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concepts of sampling and methodological techniques for data collection fine. As a result of learning, the student is expected to continue to put together the quantitative and qualitative data that will serve as the final document of presentation. Require writing skills of academic texts and methodological techniques for data collection.

General objective: Development of doctoral research.

GP6026 Doctoral Research VI (3 - 0 - 12. Prerequisites: None. DPP11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues the field study to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the concept of methodological techniques for fine data collection. As a result of learning, the student is expected to continue gathering data that will serve as the final document of presentation. Requires writing skills of academic texts.

General objective: Development of doctoral research.

GP6027 Doctoral Research VII (3 - 0 - 12. Prerequisites: None. DPP11) **Equivalence: None**

It is an ongoing investigation whose intent is for students to start processing the data collected in the field study, which will serve to develop doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes the concept of methodological techniques for data collection and use of fine software for statistical analysis of information. As a result of learning, the student is expected to refine and complete the data collection, and start the analysis of the data that will serve as final dissertation document. Requires knowledge of software used for analysis.

General objective: Development of doctoral research.

GP6028 Doctoral Research VIII (3 - 0 - 12. Prerequisites: None. DPP11) **Equivalence: None**

It is an ongoing investigation with the intention that the student continues processing the data collected in the field study, which will serve to develop the doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course covers the use of software for

statistical analysis of information. As a result of learning, the student is expected to continue the analysis of the data that will serve as the final dissertation document. For this course, students require knowledge of software used for statistical analysis.

General objective: Development of doctoral research.

GP6029 Doctoral Research IX (3 - 0 - 12. Prerequisites: None. DPP11) **Equivalence: None**

It is an ongoing investigation whose intent is for students to continue writing the doctoral dissertation from the results of data analysis. The student is guided by a leading local consultant in developing the doctoral dissertation. This course covers data analysis strategies. As a result of learning, the student is expected to prepare the chapter on analysis of results. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GP6030 Doctoral Research X (3 - 0 - 12. Prerequisites: None. DPP11) **Equivalence: None**

It is an ongoing investigation for students whose intent is to write the findings of his doctoral dissertation. The student, the student is guided by a local consultant in Developing Leading the doctoral dissertation. Includes concepts Such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GP6031 Doctoral Research XI (3 - 0 - 12. Prerequisites: None. DPP11) **Equivalence: None**

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dis-

sertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GP6032 Doctoral Research XII

(3 - 0 - 12. Prerequisites: None. DPP11)

Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. Includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GP6033 Doctoral Research XIII

(3 - 0 - 12. Prerequisites: None. DPP11)

Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. It includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusions of the dissertation.

General objective: Development of doctoral research.

GP6034 Doctoral Defense

(0 - 0 - 1. Prerequisites: None. DPP11)

Equivalence: None

This course is the final stage of the development of doctoral research. The student will present and defend his thesis orally before the panel of Synod.

General objective: The student will present and defend his doctoral research.

GP6035 Research Methodology

(3 - 0 - 12. Prerequisites: None. DPP11)

Equivalence: None

The intention of this course is for the student to study and understand the basic research problems in the social sciences, carefully examining the epistemological, theoretical, technical, and analytical challenges involved at each step of the research process.

General objective: The objective of this course is that students become familiarized with basic social science research problems.

GT

Graduate Information Technology and Communications Programs

GT4000 Research and Innovation Methods**(1.5 - 0 - 6. Prerequisites: None. DTC11, MCC09, MIT12, MSE09E)****Equivalence: H4001, SC4001, SC99489**

This advanced course focuses on the methods for creating applied research and/or technological development projects. Learning outcome: Students will be able to justify and plan their project.

General objective: On completion of the course, students will be able to justify the importance of a subject of investigation, identify progress on the chosen topic based on a literature review and using various sources of information. Define the hypothesis on which the applied research project and/or technological development project is based. Define specific investigation methods, relevant to the scope of the chosen thesis subject. Define the budget and work plan for the project development.

Key words: Innovation. Research methodologies. Technological development.

Bibliography: * Hernández Sampieri, Roberto, Metodología de la investigación/Roberto Hernández Sampieri, Carlos Fernández Collado y Pilar Baptista Lucio, 2da. Edición, México: McGraw-Hill, c1998, México, 1998, español, [9701018990].

GT5000 Thesis I**(3 - 0 - 12. Prerequisites: None. MCC09, MIT12, MSE09E)****Equivalence: IA5019, SC5001, SC99491**

In this advanced course, the student will begin an applied research or technological development project. Prerequisite: Prior knowledge of research and innovation methodologies. Learning outcome: the student will be able to integrate the knowledge acquired from the curriculum to complete the first stage of an applied research or technological development project.

General objective: To start developing an applied research project or technological development project with the assistance of a research professor and submitting regular progress reports.

Key words: Thesis. Technological development. Research.

GT5001 Thesis II**(3 - 0 - 12. Prerequisites: [GT5000 , GT5000 Corequisite]. MCC09, MIT12, MSE09E)****Equivalence: IA5020, SC5002, SC99493**

In this advanced course, the student will begin an applied research or technological development project. Prerequisite: Prior knowledge of research and innovation methodologies. Learning outcome: The student will be able to integrate the knowledge acquired from the curriculum to complete the first stage of an applied research or technological development project.

General objective: To finish the development of an applied research project or technological development project with the assistance of a research professor and to present a final technical report that shows the contributions presented as a thesis.

Key words: Thesis. Technological development. Research.

GT5002 Research Proposal I**(3 - 0 - 12. Prerequisites: None. DTC11)****Equivalence: None**

In this research course, the student will define his doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate his project proposal and define the preliminary findings that demonstrate the proposal's viability.

General objective: On completion of this course, students will further develop their research project

with advice from a teacher researcher and submit periodic reports of progress.

GT5003 Research Proposal II
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will continue with the definition of his doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate his project proposal and seek to obtain preliminary findings as evidence of the proposal's viability.

General objective: On completion of this course, students will further develop their research project with advice from a teacher researcher and submit periodic reports of progress.

GT5004 Research Proposal III
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will continue with the definition of his doctoral research project proposal and presents a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate his project proposal and express it in a written document and an oral presentation before his thesis committee, in which the objectives, goals, deliverables and expected findings will be clearly defined. He will also present his preliminary findings as evidence of the proposal's viability.

General objective: On completion of this course, the student will be able to: justify the relevance of a research topic, identify the advancements made in the selected topic on the basis of a bibliographic review using diverse sources of information; begin either an applied research or technological development project with the guidance of a research professor; present periodical progress reports; Learning outcome: define a work plan and budget for the project; present the preliminary findings that validate their proposal.

GT5005 Research Seminar I
(1 - 0 - 4. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will publicly present a progress report of his work in the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through the achievements in his own presentations. The seminar offers a space for interaction and knowledge socialization between students and researchers.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GT5006 Research Seminar II
(1 - 0 - 4. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will publicly present a progress report of his work in the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through the achievements in his own presentations. The seminar offers a space for interaction and knowledge socialization between the student and other students and researchers.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GT5007 Research Seminar III
(1 - 0 - 4. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will publicly present a progress report of his work in the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through the achievements in his own presentations. The seminar offers a space for interaction and knowledge socialization between the student and other students and researchers.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

GT5008 Assisted Research I
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

This is a course of research that is intended for the student and guided by the teacher so as to study specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

GT5009 Assisted Research II
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

This is a course of research that is intended for the student and guided by the teacher so as to study specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest and advised by a professor in that area.

GT5010 Assisted Research III
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

This is a course of research that is intended for the student and guided by the teacher so as to study specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest and advised by a professor in that area.

GT6000 Doctoral Defense
(0 - 0 - 1. Prerequisites: None. DTC11)
Equivalence: None

This course is the final stage of the development of doctoral research. The student will present and defend their thesis orally before the panel of Synod.

General objective: The student will present and defend his doctoral research.

GT6028 Doctoral Research I
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation with the intention that the student will start data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GT6029 Doctoral Research II
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation with the intention that the student will continue data collection to carry out his field study. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes the concept of theoretical framework. As a result of learning, the student is expected to finalize the conceptual framework of the doctoral dissertation. Requires knowledge of writing academic texts.

General objective: Development of doctoral research.

GT6030 Doctoral Research III
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student continues with his research work. He is guided by his local principal advisor in writing his doctoral dissertation. He will define the methodology, consistent with the topic proposal and the theoretical framework determined beforehand. Learning outcome: the student will have established the methodology to be used in his doctoral dissertation.

General objective: Development of doctoral research.

GT6031 Doctoral Research IV
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will continue with his research work. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student is expected to obtain findings that will allow him to validate the objectives established in the initial phase of his research work.

General objective: Development of doctoral research.

GT6032 Doctoral Research V
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student continues with his research work. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will continue to generate findings that can be used for his final dissertation document.

General objective: Development of doctoral research.

GT6033 Doctoral Research VI
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will continue with his research work. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will continue to generate findings so that he can meet the objectives established in his research proposal.

General objective: Development of doctoral research.

GT6034 Doctoral Research VII
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student continues with his research work. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student is expected to validate the findings obtained and begin an analysis of these findings that can be used for his final dissertation document.

General objective: Development of doctoral research.

GT6035 Doctoral Research VIII
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, the student will continue with his research work. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student is expected to validate the findings obtained and begin an analysis of these findings so they can be used for his final dissertation document.

General objective: Development of doctoral research.

GT6036 Doctoral Research IX
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

In this research course, students continue with their research work. They are guided by a local principal advisor in writing their doctoral dissertation. Learning outcome: students are expected to validate the findings obtained and begin an analysis of these findings that can be used for their final dissertation document.

General objective: Development of doctoral research.

GT6037 Doctoral Research X
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation with the intention that the student writes the findings of his doctoral dissertation. The student is guided by a local leading consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusion of the dissertation.

General objective: Development of doctoral research.

GT6038 Doctoral Research XI
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation with the intention that the student will write the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusion of the dissertation.

General objective: Development of doctoral research.

GT6039 Doctoral Research XII
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation for the student whose intent is to write the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusion of the dissertation.

General objective: Development of doctoral research.

GT6040 Doctoral Research XIII
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation for the student with the intention to write the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusion of the dissertation.

General objective: Development of doctoral research.

GT6041 Doctoral Research XIV
(3 - 0 - 12. Prerequisites: None. DTC11)
Equivalence: None

It is an ongoing investigation for the student with the intention to write the findings of his doctoral dissertation. The student is guided by a leading local consultant in developing the doctoral dissertation. The course includes concepts such as: defining the problem, theoretical framework and methodology. As a result of learning, the student is expected to draw the conclusion of the dissertation.

General objective: Development of doctoral research.

H

Humanities

H4003 Theory of Knowledge**(3 - 0 - 12. Prerequisites: None. DCS11)****Equivalence: H 99200**

General objective: Provides a view of the development of knowledge through an extensive historical review of how knowledge has been produced from the beginning of time to today. Makes students aware of the implications of this development and its impact on society.

H4005 Discourse Analysis**(3 - 0 - 12. Prerequisites: None. DCS11)****Equivalence: H 99202**

General objective: A profound analysis of the different texts and contexts of a particular intellectual production or social phenomenon, to find the true criteria that support it. Also the ideologies that are behind it, the power relationship and their impact in the social development within a group.

Bibliography: * Foucault, Michel, *El orden del discurso*, Tusquets Editores, Barcelona, 1980.

H4012 Research Methods**(3 - 0 - 12. Prerequisites: None. DEH11, MEH09, MEH09V)****Equivalence: None**

General objective: This course examines research methods for the humanities and social sciences. In addition, said techniques are applied through the development of a research proposal.

H5014 Philosophy of Science**(3 - 0 - 12. Prerequisites: None. DCA11)****Equivalence: H 00215**

General objective: This course examines the main trends of the philosophy of science, since the 19th century philosophy to modern-day sociological and anthropological theories, which began with the work of Thomas Kuhn.

Bibliography: * Chalmers Alan F., *¿Qué es esa cosa llamada ciencia?*/Alan F. Chalmers, 3a ed. corr. y aum., Madrid: Siglo XXI, 2000, España, 2000, español, [8432304263].

H5022 Research Seminar**(3 - 0 - 12. Prerequisites: None. MEH09, MEH09V)****Equivalence: H 99213, H5001**

General objective: The purpose of this seminar is to guide the student in the various phases of a research assignment that is based on knowledge that he/she has acquired.

Bibliography: * Schmelkes, Corina, *Manual para la presentación de anteproyectos e informes de investigación: Tesis/Corina Schmelkes*, 2da. Edición, México, D.F.: Oxford University Press México, 1998, México, 1998, español, [9706133542].

H6012 Argumentation Theory**(3 - 0 - 12. Prerequisites: None. DEH11)****Equivalence: None**

This is an advanced graduate course that searches to give the student the Argumentation Theory analysis tools to enable him, at the end of the course, to apply them to any argumentative discourse in the Humanistic Studies Disciplines. Previous knowledge of Discourse Analysis Theories is highly recommended.

General objective: At the end of the course, the student should be able to apply the basic concepts and analysis tools of the different argumentative theories to this kind of discourses in his discipline of specialization.

Key words: Debate. Humanities. Argumentation. Discourse.

Bibliography: * UNAM (Año 2006), *Debate CEU-Rectoría. Torbellino pasional de los argumentos*, [Haidar, Julieta.].

Bibliografía: * UNAM (Año 2006), Debate CEU Rec-toría. Torbellino pasional de los argumentos, [Haidar, Julieta.].

H6013 Humanistic Debates (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

The primary purpose of this course is to promote knowledge development through reflective and critical analysis for those students interested in the principal debates generated during the past decades within the Social Sciences and Humanities. In addition to reinforcing previously acquired knowledge, this course is intended to provide an intellectual space for the review and critical interpretation of the above mentioned debates so as to evaluate their theoretical foundations and historical importance. The purpose of generating new perspectives regarding central themes in today's Social Sciences and Humanities is complemented by stimulating the need for detecting and solving theoretical problems with a focus on dialogical ethics as the basis for well thought out arguments.

General objective: By the end of the course students will be able to: identify the principal debates concerned with contemporary social thought; discern the theoretical bases involving various types of discourse; evaluate the theoretical reaches and limits of principal tendencies concerned with contemporary thought; and apply acquired knowledge to future academic scenarios.

Key words: Citizenship. Empire. New imperialism. Modernity. Multiculturalism and tolerance.

Bibliography: * Hardt, Michael, 1960-, Imperio/Michael Hardt, Antonio Negri, Buenos Aires: Editorial Paidós, 2002, [0674251210 :HRD].

H6014 Cultural Studies (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a course for the doctoral student in Cultural Studies providing him with the basic theoretical bases for this field. After taking the course, the student

will have the conceptual background for identifying the origins and main characteristics and trends of the cultural studies perspective related to humanistic studies.

General objective: The student will learn about the antecedents of the cultural studies approach related to humanistic studies and will explore and discuss recent trends. The student will also identify and evaluate methodological questions in cultural studies.

Key words: Cultural studies. Representations. Post-structuralism. Subjectivity and discourse.

Bibliography: * Barker, Chris, 1955-, Cultural studies: Theory and practice/Chris Barker; with a foreword by Paul Willis, 3rd. Edition, London; Thousand Oaks, Calif.: Sage, c2008, [9781412924153],[9781412924160].

H6015 Research Seminar I (1 - 0 - 4. Prerequisites: None. DEH11) **Equivalence: None**

In this research course, the student continues working on his doctoral research project and presents a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through his accomplishments in the presentations.

General objective: The objective of this course is to provide the student with a forum for dissemination and discussion of research topics of the program, promoting multidisciplinary interaction to enrich the research process.

Key words: Research course. Research development. Preview.

H6016 Research Seminar II (1 - 0 - 4. Prerequisites: None. DEH11) **Equivalence: None**

In this research course, the student continues working on his doctoral research project and presents a progress report publicly within the framework of collective discussions. Learning outcome: the student

will consolidate a critical position regarding his project proposal and demonstrate it through his accomplishments in the presentations.

General objective: The objective of this course is to provide to the student a forum for dissemination and discussion of research topics of the program, promoting multidisciplinary interaction to enrich the research process.

Key words: Research course. Doctoral thesis. Preview.

H6017 Research Seminar III (1 - 0 - 4. Prerequisites: None. DEH11) **Equivalence: None**

In this research course, the student continues working on his doctoral research project and presents a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through his accomplishments in the presentations.

General objective: The objective of this course is to provide to the student a forum for dissemination and discussion of research topics of the program, promoting multidisciplinary interaction to enrich the research process.

Key words: Research course. Doctoral thesis. Preview.

H6018 Research Project I (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his doctoral research projects and publicly presents his advance during group discussions. Each student is expected to select a research topic and the general methodological approaches to be applied apply.

General objective: On completing this course, the student will be able to present preliminary research that integrates the knowledge acquired.

Key words: Investigative work. Research course. Doctoral thesis. Investigative theme. Dissertation draft.

H6019 Research Project II (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which students develop their doctoral research projects and publically present their advances during group discussions. Each student is expected to develop the theoretical framework and specific objectives of his or her research, and to connect them with the proposed design of his or her study.

General objective: Upon completing this course, students will be able to present preliminary research that integrates the knowledge acquired.

Key words: Research course. Doctoral thesis. Investigative theme. Preliminary research report.

H6020 Research Project III (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which students develop their doctoral research projects and publically present their advances during group discussions. Each student is expected to develop a research proposal within the framework of the research project protocol governing the program. Each student's protocol must be approved by the academic committee of the student's concentration.

General objective: The goal of the seminar is for students to conclude their research protocols for their doctoral theses, and for their protocols to be approved by their concentration's academic committee.

Key words: Research course. Doctoral thesis. Investigative theme. Thesis project.

H6021 Thesis Seminar I (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This course is designed for discussion and supervision of the progress of doctoral research. The student presents his thesis progress to a group made up of students developing similar theses and led by a specialist in the research field, in order to receive recommendations and critical analysis of his work.

General objective: In the research seminars students will discuss ongoing research work on the syllabus and the progress of students' thesis.

Key words: Research course. Doctoral thesis. Preview.

H6022 Thesis Seminar II (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This course is designed for discussion and supervision of the progress of doctoral research. The student presents his thesis progress to a group made up of students developing similar theses and led by a specialist in the research field, in order to receive recommendations and critical analysis of his work.

General objective: In the research seminars students will discuss ongoing research work on the syllabus and the progress of students' thesis.

Key words: Research course. Doctoral thesis. Preview.

H6023 Thesis Seminar III (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This course is designed for discussion and supervision of the progress of doctoral research. The student presents his thesis progress to a group made up of students developing similar theses and led by a specialist in the research field, in order to receive recommendations and critical analysis of his work.

General objective: In the research seminars stu-

dents will discuss ongoing research work on the syllabus and the progress of students' thesis.

Key words: Research course. Doctoral thesis. Preview.

H6024 Doctoral Research I (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his research skills through the elaboration of his doctoral dissertation. In this stage, each student collects documents on his research topic and critically reviews most of the existing literature on the subject. The student is expected to be familiar with and have a critical understanding of the literature relevant to his dissertation.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Thesis direction. Research development.

H6025 Doctoral Research II (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his research skills through the elaboration of his doctoral dissertation. In this stage, each student collects documents on his research topic and critically reviews most of the existing literature on the subject. The student is expected to be familiar with and have a critical understanding of the literature relevant to his dissertation.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6026 Doctoral Research III (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his research skills through the elaboration of his doctoral dissertation. In this stage, each student collects documents on his research topic and critically reviews most of the existing literature on the subject. The student is expected to be familiar with and have a critical understanding of the literature relevant to his dissertation.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6027 Doctoral Research IV (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his research skills through the elaboration of his doctoral dissertation. Each student is guided by an advisor in the development of his doctoral dissertation. In this stage of the research, each student will give an organic form to the chosen subject using the documents and research already collected and analyzed, and will begin to develop his own ideas for the creation of knowledge in the chosen subject. The student is expected to be able to arrange the collected data, compare it with his own ideas, and write a first draft explaining his preliminary reflections.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6028 Doctoral Research V (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his research skills through the elaboration of his doctoral dissertation. Each student is guided by an advisor in the development of his doctoral disserta-

tion. In this stage of the research, each student will give an organic form to the chosen subject using the documents and research already collected and analyzed, and will begin to develop his own ideas for the creation of knowledge in the chosen subject. The student is expected to be able to arrange the collected data, compare it with his own ideas, and write a first draft explaining his preliminary reflections.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Research development.

H6029 Doctoral Research VI (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops his research skills through the elaboration of his doctoral dissertation. Each student is guided by an advisor in the development of his doctoral dissertation. In this stage of the research, each student will give an organic form to the chosen subject using the documents and research already collected and analyzed, and will begin to develop his own ideas for the creation of knowledge in the chosen subject. The student is expected to be able to arrange the collected data, compare it with his own ideas, and write a first draft explaining his preliminary reflections.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Research development.

H6030 Investigación doctoral VII (3 - 0 - 12. Prerequisites: None. DEH11) **Equivalence: None**

This is a research course in which the student develops the ability to do research at the level of specialized journals through the elaboration of his doctoral dissertation. Each student is guided by an advisor in the development of his doctoral dissertation. In this stage of the research, each student will determine the final layout of the thesis and realize a preliminary draft. The students is expected to draft a first ver-

sion of the thesis, in the format determined by the Doctoral Program and concentration (MLA or APA). The result should be a rigorous scientific work that is ready to be sent to readers or examiners.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6031 Investigación doctoral VIII

(3 - 0 - 12. Prerequisites: None. DEH11)

Equivalence: None

This is a research course in which the student develops the ability to do research at the level of specialized journals through the elaboration of his doctoral dissertation. Each student is guided by an advisor in the development of his doctoral dissertation. In this stage of the research, each student will determine the final layout of the thesis and realize a preliminary draft. The student is expected to draft a first version of the thesis in the format determined by the Doctoral Program and concentration (MLA or APA). The result should be a rigorous scientific work that is ready to be sent to readers or examiners.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6032 Investigación doctoral IX

(3 - 0 - 12. Prerequisites: None. DEH11)

Equivalence: None

This is a research course in which the student develops the ability to do research at the level of specialized journals through the elaboration of his doctoral dissertation. Each student is guided by an advisor in the development of his doctoral dissertation. In this stage of the research, each student will determine the final layout of the thesis and realize a preliminary draft. The student is expected to draft a first version of the thesis in the format determined by the Doctoral Program and concentration (MLA or APA). The result should be a rigorous scientific work that is ready to be sent to readers or examiners.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6033 Doctoral Research X

(3 - 0 - 12. Prerequisites: None. DEH11)

Equivalence: None

This is a research course in which the student develops the ability to properly complete a research project through his doctoral dissertation. Each student is guided by an advisor in the final stage of the doctoral dissertation. In this stage, each student should conclude the final draft of his thesis, which will be sent to readers or examiners in order to incorporate their suggestions and corrections.

General objective: Engage in doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

H6034 Doctoral Dissertation: Defense Research Seminar

(0 - 0 - 1. Prerequisites: None. DEH11)

Equivalence: None

This course constitutes the final phase of the development of doctoral research. Each student will orally present and defend his thesis before a panel of examiners.

General objective: The student will present and defend his doctoral research.

Key words: Research course. Doctoral thesis. Doctoral dissertation. Protocol development.

HI Languages

HI4000 English Prerequisite **(3 - 0 - 12. Prerequisites: None. MCP09)** **Equivalence: HI99141**

General objective: Listening comprehension and speaking skills at a high intermediate level. Exercises for listening comprehension of formal and informal conversation applying predicting strategies. Summary of what is heard. Identifying intonation. Identifying humor in discourse. Inferences. Generalizations. Identifying analogies. Chronological order of events. Exercises for speaking. Language skills for reading and writing on a high intermediate level: applying reading strategies, such as word definition according to context, identification of structural signs, inference of a text's content from its title, quick search, specific search, identification of meaning from context, elaboration of synthesis and summary. Developing vocabulary through academic strategies, such as analysis of main clauses. Consideration of one's personal position. in-depth discussion of a subject. Analysis of dictionary definitions. Differentiation between main and secondary ideas. Formulating the implicit main idea. Analysis and interpretation of proverbs. Comprehension of idioms. Written expression of more complex ideas than in lower-level courses. Identifying the purpose and intended audience of a text. Revising and editing, organization of sentences in a paragraph with main, secondary and supporting ideas. Creative writing, paragraphs with comparison and contrast, etc. Reviewing rhetoric styles, such as description of scientific topics, reports and articles, essays, formal and informal texts. Knowledge of English grammar at a high intermediate level: application and in-depth understanding of grammatical structures. Review of grammatical structures. Identifying parts of speech. Determining the syntactic order of speech. Analysis of verb tenses. Identification of auxiliary verbs. Use of tenses for present, past, and future times. Applying modal verb forms. Review of the passive voice. Using nouns and modifiers.

IA Artificial Intelligence

IA4000 Intelligent Systems (3 - 0 - 12. Prerequisites: None. MCC09, MIT12) Equivalence: CS5008, IA4001

This basic course provides students with the basic techniques and algorithms of artificial intelligence. Learning outcome: Students will be able to develop intelligent systems applied to games, constraint satisfaction and planning problems, among others.

General objective: On completion of the course, students will be able to understand basic Artificial Intelligence techniques, they will be familiar with the concepts of intelligent agents, their models and basic architecture, and they will understand different kinds of search, planning, and automated reasoning algorithms. In addition they will be able to develop intelligent systems using LISP and PROLOG programming languages.

Key words: Artificial intelligence. Intelligent agents. Search algorithms. Automatic reasoning. Intelligent systems.

Bibliography: * Russell, Stuart J. (Stuart Jonathan), Artificial intelligence: A modern approach/Stuart J. Russell and Peter Norvig; contributing writers, John F. Canny .. [et al.], 2nd. Edition, Englewood Cliffs, N. J.: Prentice Hall/Pearson Education, c2003, New Jersey, 2003, eng, [0137903952].

IA4002 Uncertainty Systems (3 - 0 - 12. Prerequisites: None. MIT12) Equivalence: IA4009

General objective: Introduction to uncertainty. Agents under Uncertainty. Uncertain and probabilistic Knowledge Representation. Simple decision Analysis. Decision Theory. Markov Decision Processes. Sequential decision problems. Reinforcement learning. Bayesian Modeling. Inference and learning in Bayesian networks. Theory of fuzzy systems: fuzzy sets and basic operations, fuzzy relations and extension principle. Linguistic variables and IF THEN rules. Fuzzy logic and approximate reasoning. Properties of fuzzy

systems: rule base and fuzzy inference. Fuzzifier and defuzzifiers. Fuzzy systems as nonlinear mapping.

Bibliography: * Russell, Stuart J. (Stuart Jonathan), Artificial intelligence : a modern approach / Stuart J. Russell and Peter Norvig ; contributing writers, John F. Canny .. [et al.], 2nd ed., Englewood Cliffs, N.J. : Prentice Hall/Pearson Education, c2003., [137903952].

IA4004 Agent-Based Systems (3 - 0 - 12. Prerequisites: None. MIT12) Equivalence: IA4011

General objective: Agent Architectures, Planning and Reasoning in Agents, Reactive Agents and behavior combination, Agent interactions, Agreements and negotiation, Agent communications, Cooperation protocols, Agent Design methodologies, Applications.

Bibliography: * Michael Wooldridge , An Introduction to Multiagent Systems, John Wiley and sons, 2001.

IA4005 Robotics (3 - 0 - 12. Prerequisites: None. MIT12) Equivalence: IA5021, IA99131

General objective: Introduction and terminology: robotic manipulators, mobile robots and softbots, mathematical foundations of Robotics: spatial reference systems, transformations and homogeneous matrices (rotation and translation), direct and inverse kinematic analysis, dynamic analysis and control, robot programming, basic sensors, introduction to automatic programming and path planning.

Bibliography: * Fu, K. S. (King Sun), 1930-, Robótica : control, detección, visión e inteligencia / K.S. Fu, R.C. Gonzalez, C.S.G. Lee, Madrid : McGraw-Hill, c1990, Spain, c1990, spa, [8476152140].

IA5005 Connectionist and Evolutionary Systems

(3 - 0 - 12. Prerequisites: None. MIT12)

Equivalence: IA4010, IA99120

General objective: This course covers connectionist systems: introduction, neural networks for pattern classification, auto-organized neural networks, fuzzy neural networks. Evolutionary systems: introduction, mathematical foundations of genetic algorithms, improvements to the simple genetic algorithm, other evolutionary methods, machine learning in evolutionary systems, applications to finance, manufacturing, and logistics.

Bibliography: * Freeman, James A., Neural networks: algorithms, applications, and programming techniques/James A. Freeman, David M. Skapura, Reading, Mass.: Addison-Wesley, c1991, [201513765].

IN Industrial Engineering

IN4015 Industrial Engineering Prerequisite

(3 - 0 - 12. Prerequisites: None. MCP09)
Equivalence: IS99266

This basic course provides the student with a basic knowledge of the field of industrial engineering. Learning outcome: the student will know and apply the main industrial and systems engineering tools.

General objective: On completion of the course, students will understand the basic concepts of an Industrial and Systems Engineering degree. They will be able to apply optimization tools for manufacturing and service processes as well as operations administration and quality control of processes.

Key words: Quality management. Industrial engineering.

Bibliography: * Hopp, Wallace J., Factory physics: Foundations of manufacturing management/Wallace J. Hopp, Mark L. Spearman, 3th. Edition, Boston: Irwin/McGraw-Hill, c2008, United States, 2008, eng, [9780071232463],[007123246x].

IN4016 Optimization Methods for Decision Making

(3 - 0 - 12. Prerequisites: None. MCP09)
Equivalence: IN99203

This basic course provides students with the optimization tools used to solve problems in the area of operational management, logistics and project management, among other applications. A basic knowledge of operational research is required. Learning outcome: Students will apply quantitative methods to decision-making related to organizational resources.

General objective: On completion of the course, students will understand optimization methods that are commonly used for decision making when tackling problems in operations administration, logistics, project administration, and other related areas, and

they will be able to apply optimization methods to the efficient use of company resources, whether manufacturing or service resources.

Key words: Optimization methods.

Bibliography: * Winston, Wayne L., Introduction to mathematical programming: Applications and algorithms/Wayne L. Winston, 2nd. Edition, Belmont California: Duxbury, c1995, Sin información, 1995, eng, [0534230466].

IN4017 Production Engineering

(3 - 0 - 12. Prerequisites: None. MCP09, MIP13, MIP13V)
Equivalence: IN99249

This basic course introduces students to the application of optimization techniques for designing and modeling manufacturing systems. A basic knowledge of operational research is required. Learning outcome: students will use analytical models to design manufacturing systems.

General objective: Upon completion of the course, students will be able to design and model manufacturing systems and use both deterministic and stochastic analytical models in the design of manufacturing systems.

Key words: Operations programming.

Bibliography: * Askin, Ronald G., Modeling and analysis of manufacturing systems/Ronald G. Askin, Charles R. Standridge, New York: Wiley, 1993, [0471514187 (tela : papel no ácido)].

IN4018 Supply Chain Management

(3 - 0 - 12. Prerequisites: None. MCP09, MIP13, MIP13V)
Equivalence: IN5014, IN5021, IN99247

This basic course introduces the student to the fundamentals of supply chain management. A ba-

sic knowledge of operational research is required. Learning outcome: the student will achieve a holistic understanding of the supply chain.

General objective: On completion of the course, students will be familiar with the basic concepts of supply chain administration and will be able to apply optimization tools to supply chain administration.

Key words: Supply chain.

Bibliography: * Ballou, Ronald H., 1937-, Business logistics management/Ronald H. Ballou, 3rd. Edition, Englewood Cliffs, N. J.: Prentice Hall, 1992, New Jersey, 1992, eng, [0131055453 (encuadernado)], [0130934100 (rústica)].

IN4019 Quality Management and Competitiveness

(3 - 0 - 12. Prerequisites: None. MCP09, MIP13, MIP13V)

Equivalence: IS99231

This basic course provides students with the leadership and administration model of an organization. Learning outcome: Students will put forward proposals to improve an organization's competitiveness and sustainability.

General objective: On completion of the course, students will be able to analyze and evaluate the management and administration model of an organization, understand strategic thinking and organizational skills, and know how to implement each value booster and put forward changes in an organization's management and administration, which will help to improve its competitiveness and sustainability.

Key words: Quality management. Organizational strategy.

Bibliography: * J James R. Evans & William M. Lindsay, Managing for Quality and Performance Excellence, South-Western College Publishing.

IN4020 Modeling Tools for Manufacturing

(3.5 - 0 - 12. Prerequisites: None. MDM09)

Equivalence: None

This basic course teaches the student how to model and optimize deterministic or stochastic elements of his organizations that make it possible to generate a better competitive position within the market in which he participates. Prerequisite: prior knowledge of operational management and linear programming. Learning outcome: the student will solve cases by modeling and optimizing elements that will improve processes or services in an organization.

General objective: Students will be able to create both deterministic and stochastic models that represent real manufacturing situations in order to experiment with the models and propose solutions to improve the competitiveness of the organization.

Key words: Linear programming. GAMS. C-PLEX. Simulation. ARENA.

Bibliography: * Kelton, Sadowski, Sturrock, Simulation with Arena, 3rd. Edition, McGraw-Hill.

IN4021 Quality Models

(3.5 - 0 - 12. Prerequisites: None. MDM09)

Equivalence: None

This basic industrial engineering course provides the student with the manufacturing methodologies and philosophies existing worldwide. No prior knowledge is needed. Learning outcome: the student will solve cases by selecting or integrating quality methodologies and philosophies existing worldwide according to his professional needs.

General objective: Students will be able to design and present quality models that are tailored made for specific manufacturing requirements.

Key words: Quality philosophies and models. Problem analysis and solution techniques. Basic tools. Quality costs. QC Story. 5'S. QS ISO Standard. 6 Sigma, Robustness. Innovation models.

Bibliography: * Sarv Singh Soin, Total Quality Essentials: Key Elements, Methodologies, and Managing for Success, McGraw Hill.

IN4022 Contemporary Manufactory Topics

(3.5 - 0 - 12. Prerequisites: None. MDM09)
Equivalence: None

This advanced industrial engineering course provides the student with the manufacturing methodologies and philosophies existing worldwide. Prior knowledge of manufacturing is needed. Learning outcome: the student will solve cases in which he makes decisions based on the analysis of diverse alternatives that he can use in his processes and select the most appropriate according to their requirements.

General objective: Students will be able to identify manufacturing strategies, their importance, and the way to monitor them in the field, as well as understand the different procedures that lead to a finished product, combined with their degree of sensitivity to decision making. Students will be able to analyze the interaction that exists between manufacturing systems and the way to achieve suitable planning of the functions that reconcile with the manufacturing objectives.

Key words: Lean manufacturing. Concurrent engineering. Production management. Competitive manufacturing. World class manufacturing. Flexible systems. Technological groups. Just in time. Restriction theory. Toyota production system and costing.

Bibliography: * Askin, Ronald G., Modeling and analysis of manufacturing systems/Ronald G. Askin, Charles R. Standridge, New York: Wiley, 1993, [0471514187 (tela : papel no ácido)].

IN4028 Statistical Methods and Visualization

(3.5 - 0 - 12. Prerequisites: None. MEM16)
Equivalence: None

It is a basic postgraduate course in the area of statistics, it intends that the student identify, select and cor-

rectly apply statistical tools. As a result of learning, the student will justify and defend the relevance of correctly applying appropriate statistical tool, according to the context of an engineering project.

General objective: After completing the course, the student will be able to:

- Hypothesize from a descriptive analysis of a data set.
- Apply the parametric and nonparametric, univariate and multivariate statistical tools useful to test the hypothesis.
- Enunciate statistics decisions in the context of the problem.

Key words: Visualization. Nonparametric techniques. Hypothesis testing. Pattern Recognition. Trust Intervals.

Bibliography: * Wackerly, Dennis D., 1945 , Mathematical statistics with applications / Dennis D. Wackerly, William Mendenhall III, Richard L. Scheaffer., 6th ed., Pacific Grove, Ca : Duxbury, c2002., [0534377416].

IN4029 Engineering Project Management

(3.5 - 0 - 12. Prerequisites: None. MEM16)
Equivalence: None

It is a basic postgraduate course in the area of project management intends that students get the tools necessary and essential for the management of a project from different perspectives and starting from the planning of activities, organization and control the necessary resources to project closure. The acquisition of skills and abilities in handling administrative techniques for project management is one of the requirements to cover with this course. As a result of learning, the student will analyze and apply the different methodologies of project management, engineering views from a holistic approach, be sensitized to the need for viable projects that support the economic development of a country, relying on arguments scientifically supported by appropriate methodologies for each situation.

General objective: AfAfter completing the course the student will be able to:

- Understand the concepts of planning and o

ganizing activities.

- Know how to integrate, manage and control resources in time and cost, applying the tools of gestation projects.

Key words: Project design. Project management. Critical Route. Project Phases. Network Activities Optimization.

Bibliography: *Angus, Robert B. (Robert Brownell), Planning, performing, and controlling projects : principles and applications / Robert B. Angus, Norman A. Gundersen, Thomas P. Cullinane., 2nd ed., Upper Saddle River, N.J. : Prentice Hall, 2000., [0130998788].

IN4030 Financial Analysis for Innovation and Technology Projects

(3.5 - 0 - 12. Prerequisites: None. MEM16)

Equivalence: None

It is a basic postgraduate course in the area of finance focused projects, which intends that students know the basics of accounting and financial statements, as well as financial analysis methods that allow students to evaluate the strategies followed by companies and high tech innovative projects; which it is essential for decision making investors. As a result of learning, the student will use efficiently apply the main tools and models from science of finance (cost of capital, CAPM, multifactor models, derivatives, etc.) to improve the effectiveness and efficiency of decisions investment with low reversibility and long term impacts for a more efficient and balanced financial management in the company.

General objective: After completing the course the student will be able to:

- Apply financial theory to real problems in managing companies.
- Describe the financial reports generated by the companies and interpret financial information of the company and the market through structural models.
- Explain how information influences strategic investment decisions and financing.
- Implement the models studied in the course, properly calibrate and interpret the results

thereof arising in the solution of specific situations related to their professional activity.

- Participate in decision making processes from the understanding of the relevant financial variables surrounding your organization.

Key words: Financial models. Financing and Financial Structure. Risk coverage. Evaluation of Projects/ Companies.

Bibliography: *Ross, Stephen A., Corporate finance / Stephen A. Ross, Randolph W. Westerfield, Jeffrey Jaffe., 10th ed., New York, NY : McGraw Hill/Irwin, 2013., [0078034779 (papel alcalino)], [9780078034770 (papel alcalino)].

IN4031 Economic Analysis for Business

(1.5 0 6. Prerequisites: None. MEM16

Equivalence: None

It is a basic postgraduate course in the area of economy that is intended that students know the fundamental issues of economics to engineering, notions of risk and decision making under risk and uncertainty, with an emphasis on understanding and application in the context of Mexican and global economy. Due to its characteristics is the basis for decision makers in the field of engineering projects under a conceptual base that defines the business and economic environment in which they operate.

The course will analyze what generates economic growth theory emphasizing accompanied by intuition illustrating with cases of countries and regions. Applications to identify the causes and consequences of the current global crisis work.

Comparative studies of different countries and lessons for the future will also be discussed. You will learn the techniques of micro and macroeconomic analysis. Thus, the fundamental issues of business economics and its applications to local and global markets touch, such as: market equilibrium, market structures and regulation; within the framework of market analysis in the study of the international economy.

As a result of learning, the student will know the micro and macroeconomic level around engineering projects. He/she will solve cases and make decisions of companies in these environments as well as solve

problems and real challenges related to daily action in an industry within economic future of the region and country.

General objective: After completing the course the student will be able to:

- Identify the macro and micro level around engineering projects.
- Resolving cases and decisions of companies in these environments.
- Write real problems and challenges related to the daily act in an industry within the economic future of the region and country.
- Analyze the behavior of markets and their shortcomings.
- Identify the main economic aggregates and their sources.
- Understand and analyze the impact of fiscal and monetary policy in an economic activity open to the world.

Key words: ecision making. Economic Decisions in Engineering Projects. Balance and Market Structures. Features of the International Economy. Notions of Risk.

Bibliography: * Taylor, John B., Principles of economics / John B. Taylor, Akila Weerapana., 7th ed., Australia ; Mason, OH : South Western Cengage Learning, c2012., [9780538453592],[0538453591].

IN4032 Risk Analysis Project Management

(1.5 0 6. Prerequisites: None. MEM16)

Equivalence: None

It is a basic postgraduate course in the area of project management intends that the student incorporate risk analysis to content previously presented in the course Financial Analysis for innovation and technology projects. Advanced content will be reviewed in the finance area, intending to provide models and statistical tools necessary for incorporating uncertainty in the process of valuation of companies and / or projects of innovation and technology. The principles of decision making are covered, as well as identification, risk analysis and application in the context of engineering management. As a result of learning, the student will have strategies to prevent, minimize,

monitor, controls the probability and / or impact of undesirable events and their consequences in the assessment, implementation and management of investment decisions of a company.

General objective: After completing the course the student will be able to:

- Identify the sources of risk to which a company is exposed and / or project innovation and technology.
- ntegrate the various risk factors in the economic and financial analysis used in evaluating companies and / or investment projects.
- Using statistical modeling and simulation tools within the context of financial valuation.
- Be prepared to conduct business in an environment characterized by uncertainty while be aware of the challenges and existing tools in the process of designing and implementing risk management strategies.

Key words: Risk analysis. Coverage. Uncertainty Modeling. Scenario Analysis. Tools for Decision Making.

Bibliography: * Chatterjee, R., Practical Methods of Financial Engineering and Risk Management: Tools for Modern Financial Professionals, Apress Springer, [1430261331].

ject of leadership in inventiveness, product innovation and problem solving derivatives thereof. As a result of learning, the student will lead, analyze, evaluate and implement original proposals of products and experiences, based on technologies, processes or differentiated services.

Likewise, the student will apply the tools and methods discussed in the course, a project implemented in the industry.

General objective: After completing the course, the student will be able to:

Identify opportunities, tools and methods to develop innovative projects. Develop innovative projects that lead to the design of new products or services to generate value in a specific environment.

Key words: Prototyping. Value generation. Design Thinking. Development Concept. Troubleshooting Theories of Empathy.

Bibliography: * Trott, Paul., Innovation management and new product development / Paul Trott., 4th ed., Harlow, England ; New York : Financial Times/Prentice Hall, 2008., [9780273713159 (papel alcalino)], [0273713159 (papel alcalino)].

IN4034 Legal Aspects in Managing Engineering

(1.5 0 6. Prerequisites: None. MEM16)
Equivalence: None

It is a basic level postgraduate course, in the area of project management intends that the student knows the legal aspects required as to the protection of intellectual property, to develop a research project or innovation. Also you will learn strategies for detecting business opportunities. As a result of learning, the student will apply, in the development of a new business unit within a company, the strategies required for the protection of intellectual property and detection of business opportunities. General objective: After completing the course the student will be able to:

- Identify legal elements to take into consideration in research and development projects within engineering.
- Identify legal elements to take into consideration in development of a new business unit in an established business.

Key words: Intellectual property. Intangible assets. Intellectual Property Strategies. Technology Portfolio.

Bibliography: * Parr, Russell L., Intellectual property : valuation, exploitation and infringement damages 2013 cumulative supplement / Russell L. Parr., 11th ed., Somerset, NJ : Wiley, c2013., [111836306X],[9781118363065].

IN5058 Design and Analysis of Experiments

(3 - 0 - 12. Prerequisites: [MA4009]. MBI09)
Equivalence: IN4006, IN99145

This advanced course offers principles and techniques to students who need to plan and conduct

experimental testing in a research project. A basic knowledge of statistics is required. Learning outcome: Students will develop the capacity to analyze and improve processes that affect the quality of services and products through strategies, analysis and statistical modeling of experiments, and develop the ability to define strategies for data collection and generation that will be useful for their research.

General objective: On completion of the course, students will be able to apply principles and statistical techniques in order to carry out experimental tests. They will be able to design how to obtain and gather the data that is most pertinent to the analysis they wish to carry out, analyze, and improve processes that affect the quality of products and services, and apply experimental strategies, analysis, and statistical modeling.

Key words: Design of experiments.

Bibliography: * Box, George E. P., Statistics for experimenters: Design, innovation, and discovery/George E.P. Box, J. Stuart Hunter, William G. Hunter, 2nd. Edition, Hoboken, N. J.: Wiley-Interscience, c2005, [0471718130 (papel no ácido)], [9780471718130 (papel no ácido)].

IN5077 Leaders for Manufacturing Project I

(3.5 - 0 - 12. Prerequisites: None. MDM09)
Equivalence: None

The aim of this advanced industrial engineering course is to provide students with project research and development skills in order to identify the topic of a leadership for manufacturing project, to find an advisor who will guide them and to propose their project committee. Prior knowledge of research methodology and manufacturing is required. Learning outcome: Students will write periodical progress reports on the experimental part of their work or fieldwork of their leadership for manufacturing project.

General objective: Students will be able to carry out the experimental part or the fieldwork for the approved research topic, as well as writing up progress reports for a group of advisors-professors and stu-

dents who share a common area of research.

Key words: Approval of project of leadership for manufacturing.

IN5078 Leaders for Manufacture Project II

(3.5 - 0 - 12. Prerequisites: [IN5077]. MDM09)

Equivalence: None

The aim of this advanced industrial engineering course is to provide students with the skills and knowledge that will allow them to conclude the experimental part or fieldwork of their project and to complete the documentation, presentation and defense of their leadership for manufacturing project before the corresponding committee. Prior knowledge of research methodology and of the areas of industrial engineering on which their project focuses is required. Learning outcome: Students will conclude their leadership for manufacturing project, which will be approved by the committee and will offer benefits for the organization in which it was conducted and for society in general.

General objective: Students will be able to complete, document, and successfully defend their manufacturing leadership project.

Key words: Professional exam. Project document.

IN5095 Production and Operations Management

(3.5 - 0 - 12. Prerequisites: None. MNL11V)

Equivalence: OR98289

Advanced course specialized in production and operations. Requires basic economics and strategy knowledge. As a learning result, the student will use the tools and techniques used by current operations managers, such as: forecasting and inventory models, quality control, action scheduling, and review of lead-time models, PERT, CPM and decision-making techniques. Learning will be evaluated by case study discussions, exams, and a group project.

General objective: At the end of this course, stu-

dents will know the basics of supply chain management and use tools for management optimization.

Key words: Logistics. Operations. Value chain. Production.

Bibliography: * Jacobs, F. Robert, Operations and supply chain management/F. Robert Jacobs, Richard B. Chase, Thirteenth ed., New York: McGraw-Hill Irwin, c2011, [0073525227 (papel alcalino)], [9780073525228 (papel alcalino)].

IN5096 Transportation and Third Party Logistics

(3.5 - 0 - 12. Prerequisites: None. ELS11)

Equivalence: None

This advanced course presents in depth the different systems and means of transport, together with the best way of planning routes and capacities, seeking to optimize times and costs. Learning outcome: the student will use tools to analyze and select the means of transport.

General objective: After completing the course the student will be able to use tools that allow to simulate models for purposes of analysis and selection of the mode or modes of transport, time and cost efficiencies, understanding the integration of assistive technology systems such as geographic information systems and identify strategies for making better decisions with the support of multi-criteria methods.

Key words: Multimodal systems. Routing systems. Decision making.

Bibliography: * Roy, Bernard, 1934-, Multicriteria methodology for decision aiding/Bernard Roy; translator, Mark R. McCord, Dordrecht, Netherlands; Boston, Mass.: Kluwer Academic Publishers, c1996, inglés, [079234166X].

IN5111 Project Design I

(1.5 0 6. Prerequisites: None. MEM16)

Equivalence: None

It is an advanced postgraduate course of project development which intends that students develop

skills for monitoring special projects in an enterprise combined with their normal responsibilities, the above is necessary because organizations are in a constant search for the quality assurance, timely delivery and reducing costs and when a project is too complex to be handled by one person, it is expected that the project manager to lead a team of collaborators to complete the task. This course will provide students with valuable experience and relevant tools to do this, including using Microsoft Project skills. As a result of learning, the student will break down a complex project into manageable segments and carry out a plan for a real project.

General objective: After completing the course the student will be able to:

- Implement the key steps involved in managing a project in its stages of evaluation, selection and planning.
- Organize the project into manageable components.
- Develop a comprehensive project plan is ready for implementation.
- Managing successfully a project team considering all interested parties as well as budget constraints and existing human resources.
- Develop budgets and project schedules.

Key words: Project management. Financial analysis. Strategy. Project Plan. Definition and Scope of a Project.

Bibliography: * A guide to the project management body of knowledge (PMBOK?? guide), 5th ed., Newtown Square, Penn. : Project Management Institute, Inc., 2013., [9781935589679 (rústica : papel alcalino)],[1935589679 (rústica : papel alcalino)].

IN5112 Project Design II (1.5 0 6. Prerequisites: None. MEM16) **Equivalence: None**

It is an advanced postgraduate course of project development which intends that students develop skills for monitoring special projects in an enterprise combined with their normal responsibilities, the above is necessary because organizations are in a constant search for the quality assurance, timely delivery and

reducing costs and when a project is too complex to be handled by one person, it is expected that the project manager to lead a team of collaborators to complete the task. This course will provide students with valuable experience and relevant tools to do this, including using Microsoft Project skills. As a result of learning, the student will break down a complex project into manageable segments and carry out a plan for a real project.

General objective: After completing the course, the student will be able to:

- Implement the key steps involved in managing a project in its early stages of implementation and monitoring.
- Use effective tools to monitor and control complex projects.
- Use Microsoft Project to create a project plan and monitor progress.
- Analyze and apply the lessons of other real projects.

Key words: Project management. Financial analysis. Strategy. Government Funds. Internal and External Communication in Project Management.

Bibliography: * Cleland, D & Ireland, L., Project Management: Strategic Design and Implementation, 5th. Edition, Mc.GrawHill, [9780071471602].

IN5121 Business Innovation Project I (1.5 0 6. Prerequisites: None. MEM16) **Equivalence: None**

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the first one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Initial situation of a problem.

Bibliography: * The Wiley guide to managing projects / [edited by] Peter W.G. Morris, Jeffrey K. Pinto., Hoboken, N.J. : John Wiley & Sons, 2004., [0471233021 (tela)], [9780471233022 (tela)].

IN5122 Business Innovation Project II (2 0 6. Prerequisites: None. MEM16)

Equivalence: None

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the second one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Implementation.

Bibliography: * Meredith, Jack R., Project management: a managerial approach / Jack R. Meredith, Samuel J. Mantel, Jr., 8th ed., Hoboken, NJ : Wiley, c2012., [9780470533024 (encuadernado)], [0470533021 (encuadernado)].

IN5123 Business Innovation Project III (2 0 6. Prerequisites: None. MEM16)

Equivalence: None

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the third one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Implementation.

Bibliography: * A. Shtub, Bard, J. F., and Globerson, S., Project Management: Engineering, Technology and Implementation, Prentice Hall.

IN5124 Business Innovation Project IV (2 0 6. Prerequisites: None. MEM16)

Equivalence: None

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the fourth one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Implementation.

Bibliography: * Schmidt, Terry., Strategic project management made simple [recurso electrónico] : practical tools for leaders and teams / Terry Schmidt., Hoboken, N.J. : John Wiley & Sons, c2009., [9780470442920 (electronic bk.)],[0470442921 (electronic bk.)],[9780470442937 (electronic bk. : Adobe Digital Editions)],[047044293X (electronic bk. : Adobe Digital Editions)],[9780470443194 (electronic bk. : Mobipocket Reader)],[0470443197 (electronic bk. : Mobipocket Reader)],[9780470411582 (cloth)].

IN5125 Business Innovation Project V (2 0 6. Prerequisites: None. MEM16)

Equivalence: None

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the fifth one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Implementation.

Bibliography: * Kerzner, Harold., Project management metrics, KPIs, and dashboards : a guide to measuring and monitoring project performance / Harold Kerzner, Ph.D., Sr. Executive Director for Project Management, The International Institute for Learning., Second Edition., , [9781118524664 (cloth)].

IN5126 Business Innovation Project VI (2 0 6. Prerequisites: None. MEM16)

Equivalence: None

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the sixth one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Implementation.

Bibliography: * Gido, Jack, 1945 autor., Successful project management / Jack Gido, James P. Clements., 6th Ed., , [9781285068374],[1285068378].

IN5127 Business Innovation Project VII

(2 0 6. Prerequisites: None. MEM16)

Equivalence: None

Advanced graduate level course in the area of development and project management that intends the student to integrate the knowledge acquired during the master by performing a real project in a company. It requires prior knowledge of problem solving methodologies, project feasibility, evaluation and project management. As a result of learning the student will use the skills of systemic thinking, analysis, synthesis and communication acquired in graduate school at an organizational problem by developing an application project. The project to be developed will be conducted with seven courses, this being the last one.

General objective: Upon completion of this course the students will be able to demonstrate their ability to identify and solve problems; analysis, synthesis and evaluation; teamwork; high working capacity; honesty and responsibility in the development of the business innovation project.

Key words: Engineering projects. Diagnostic process. Integration. Implementation.

Bibliography: * Grady, Robert B., 1943 , Practical software metrics for project management and process improvement / Robert B. Grady., Englewood Cliffs, NJ : Prentice Hall, c1992., [0137203845].

IQ Chemical Engineering**IQ4002 Fundamentals for Energy Analysis****(3 - 0 - 12. Prerequisites: None. MER11V)****Equivalence: None**

This is a basic level course in the discipline of chemical engineering with the intention that the student knows and identifies weaknesses in systems to promote energy savings. No basic knowledge in the area of energy analysis is required. As learning result, the student will be able to develop abilities of analysis, synthesis, and critical thinking to reduce the energy consumption of a process in study in order to promote optimization and respect for natural energy resources.

General objective: The student will be able to understand the basic concepts of the conservation of energy to analyze thermal process and electric systems, besides the student can evaluate the energy consume of a process and identify opportunity areas for energy savings.

Key words: Energy analysis. Energy savings. Energy conservation. Energy expenditure of a process.

Bibliography: * Felder. Richard M., 1939-, Principios elementales de los procesos químicos/Richard M. Felder, Ronald W. Rousseau; versión en español de María Eugenia Costas Basín; con la colaboración de José Manuel Méndez Stivalet, 2da. Edición, México, D. F.: Pearson Education: Addison Wesley Longman de México, 1999, español, [968444379X].

M Mechanical Engineering

M1002 Computer Drawing
 (2 - 2 - 8. Prerequisites: [M1003 Corequisite , M1003]. MIR09, MMS09, MSM09)
Equivalence: M 00831, M1006, PV1017

Competencies: Utilize fundamental concepts of technical drawing to interpret and read industrial drawings and prints for parts and assemblies in the design of mechanical products. Utilize hand sketching and drawing techniques to create plans. The course is carried out in the project oriented learning (POL) approach to model, assemble and create plans for mechanical products via a CAD software. The course should be taken in parallel with the a laboratory to understand the fundamentals and commands for creating solids, assemblies, and drawings of a commercial design software. The course intent in the overall program: This is a basic level course to learn the fundamentals of technical drawing and utilizes a CAD software tool in order to model three dimensional (3D) geometries, assemblies and fabrication drawings considering all applicable industry standards. Expected learning outcome: Be capable of representing parts and assemblies in 3D in a mechanical system via a CAD software in addition to documenting the design in 2D fabrication drawings including orthographic view projection, dimensioning, form and position tolerance, standards application, and symbol use. Learning Objective: Develop in the student the abilities required to graphically represent components and assemblies in a mechanical system generating the necessary documentation for fabrication and taking into account the three dimensions of sustainable development.

General objective: Develop in students the skills required to graphically represent in 3D the components and assemblies of a mechanical system, generating the documentation needed for its manufacture and taking into account the three dimensions of sustainable development.

Key words: Engineering drawing. Drawing standards. Computer-aided design software (CAD). Multiple, auxiliary and section views. Assembly process animation. Geometric 3D modeling. Geometric 3D modeling. Geometric 3D modeling. Assembly process simulation.

Bibliography: * French, Thomas Ewing, 1871-1944, Engineering drawing and graphic technology/Thomas E. French, Charles J. Vierck, Robert J. Foster, 14th ed., New York: McGraw-Hill, c1993, New York, 1993, eng, [0070223475].

M2006 Mechanics of Materials I
 (3 - 1 - 8. Prerequisites: [M1003]. MMS09)
Equivalence: M 00841, M2023

This is an intermediate level course in which mathematical thinking and analysis is used to study plane stresses and strains generated by different types of loading of mechanical components and/or systems. The student will compute different types of plane stresses and strains and conduct strength design of simple mechanical systems. Prerequisites: rigid body equilibrium, vectors, distributed forces. As an outcome of the course, the student will be able to: solve mechanical engineering problems by applying basic science and strength of materials; conduct experiments to measure strains and confirm theoretical values of stresses in mechanical components and/or systems.

General objective: Upon completion of this course, the student will be able to: 1. Recognize state of stress and strain of mechanical components and/or systems, subjected to different types of loading. 2. Solve engineering problems using the basic concepts of mechanics of materials. 3. Analyze combined force states of simple mechanical elements under the interaction of diverse types of loading. 4. Identify the maximum critical load conditions for different types of materials (fragile and ductile).

Key words: Analysis of statically indeterminate systems. Force moments and torque. Force moments and torque. Force moments and torque. Force moments and torque. Momentum and torque. Momentum and torque. Momentum and torque. Combined loads strengths. Shear strength and compressive strength. Torsion strength. Transversal loads strengths in beams.

Bibliography: * Hibbeler, R. C., Mechanics of materials/R.C. Hibbeler, 6th. Edition, Upper Saddle River, N. J.: Pearson/Prentice Hall, 2005, [013191345X].

M2010 Materials Behavior
(3 - 1 - 8. Prerequisites: [Q1001 , IQ2001 Corequisite],[Q1001 , IQ2001]. MMS09, MSM09)
Equivalence: M 00861

Intermediate mechanical engineering course that provides the bases for understanding the structure-behavior relationship of materials, as well as the evaluation methods for mechanical properties and their relationship to mechanical design. This course requires prior knowledge of chemistry, material resistance, and mathematics. The learning outcome of the course is for students to apply their basic knowledge of material science to the design of mechanical components.

General objective: On completing the course the student will be able to find and evaluate mechanical properties relevant to mechanical design and interpret and use them in an informed way.

Key words: Structure-properties of materials relationship. Evaluation of mechanical properties.

Bibliography: * William D. Callister Jr., Materials science and engineering, 3era. Edición, John Wiley & Sons, inglés.

M4000 Analysis and Synthesis of Mechanical Systems
(3 - 0 - 12. Prerequisites: None. MSM09)
Equivalence: M 99239

The intention of this basic course is to provide the fundamentals of mechanisms in mechanical engineering. The student develops the skills to apply the principles and methods of mechanical system analysis and synthesis.

General objective: Understand and apply fundamental mechanics concepts of statics, kinematics and kinetics of rigid bodies. Understand and apply planar mechanism design methods, including interpretation of their vibrations response.

Key words: Planar mechanisms. Statics. Kinematics and kinetics of rigid bodies. Mechanical vibrations.

M4008 Product Design
(3 - 0 - 12. Prerequisites: [M1002]. MIR09, MMS09, MSM09)
Equivalence: None

The intention of this basic course is to provide fundamentals and methods for the engineering design of mechanical and mechatronic products. Basic knowledge of computer aided design is required. At the completion of this course, the student will be able to identify customer needs and design innovative and competitive products.

General objective: Identify customer needs in specific markets. Develop skills for competitive and innovative product design through engineering techniques and methodological tools. Analyze, synthesize and evaluate mechanical and mechatronic design variants in the context of current industrial projects. Develop a design project based on a real product.

Key words: Engineering design. Mechanical products. Mechatronic products. Patent analysis. Design for manufacturing and assembly.

M4009 Advanced Materials in Manufacturing
(3 - 1 - 12. Prerequisites: [M2010]. MMS09, MSM09)
Equivalence: M 99234

The intention of this basic course is to provide the fundamentals of materials behavior. Basic knowledge of materials engineering is required. The student should analyze the behavior advanced materials and select them, based on compatibility with product design and manufacturing processes for the families in metals, polymers, ceramics and composites.

General objective: Understand the mechanical behavior of advanced materials, considering families in metals, polymers, ceramics and composites. Understand methods and standards for characterization (destructive and non-destructive) in advanced materials. Analyze failure mechanisms and criteria

in advanced materials. Establish compatibility between materials and advanced manufacturing process, utilizing materials selection methodologies that integrate technological, economic and environment issues.

Key words: Materials selection. Mechanical behavior. Properties and characterization. Failure analysis.

M4010 Automation in Manufacturing Systems

(3 - 1 - 12. Prerequisites: None. MMS09, MSM09)
Equivalence: IN99245, MR5015, TF99245

The intention of this basic course is provide the fundamentals and technology know-how associated with software and equipment for manufacturing automation. The student is able to select software and automated equipment for manufacturing, considering the manufacturing processes and basic production indicators, such as productivity, flexibility, cost and quality.

General objective: Understand current technologies for manufacturing automation, such as CAD / CAE / CAM systems, product life-cycle management (PLM), numerically controlled machine tools (CNC), production machinery, robots, systems for materials storage and transportation, sensors, actuators, programmable logic controllers (PLC) and industrial networks. Configure manufacturing systems considering appropriate technologies, based on utilized manufacturing processes, as well as productivity, flexibility, cost and quality requirements.

Key words: CAD/CAE/CAM systems. Numerical control machines. Industrial robots. Manufacturing system configuration.

Bibliography: * Groover, Mikell P., 1939-, Automation, production systems, and computer-integrated manufacturing/Mikell P. Groover, 3rd. Edition, Upper Saddle River, N. J.: Prentice Hall, 2008, [0132393212 (encuadrado)],[9780132393218 (encuadrado)].

M4011 Internal Combustion Engines **(3 - 1 - 12. Prerequisites: None. MIR09)** **Equivalence: M5010**

This basic course provides the concepts and tools necessary to understand the operation of internal combustion engines, as well as the different technologies employed to prevent and control pollution emissions. In addition, the new energy sources for automotive vehicles are described. Learning outcome: the student will be able to evaluate thoroughly the operation of the different combustion engines currently available in the market.

General objective: At the end of the course, the students will be able to describe how different power sources for automotive vehicles work from an analytical and experimental point of view, in particular on the internal combustion engines. They will also be able to apply the basic concepts of internal combustion engines to their design and analysis.

Key words: Internal combustion engine operation. Internal combustion engine evaluation. Principles of combustion and air mixture.

M5047 Integration Project I **(3 - 0 - 12. Prerequisites: None. MIR09, MMS09)** **Equivalence: None**

This is an advanced course with the intention of providing methods for the development of an integration project. At the end of the course the student demonstrates the integration and application of knowledge in an integration project associated to the graduate program.

General objective: Develop an integrated project in which students apply all the knowledge acquired during the course. Students will be able to define a project proposal and develop it. They will also be able to write technical reports summarizing their progress.

Key words: Capstone project.

M5048 Integration Project II
(3 - 0 - 12. Prerequisites: [M5047]. MIR09, MMS09)
Equivalence: None

This advanced course provides the methodologies for developing a capstone project. Learning outcome: the student will be able to demonstrate his ability to integrate multidisciplinary knowledge and skills to solve key problems in an integral project.

General objective: Develop an integrated project based on a well-founded proposal. They will also be able to write technical reports explaining the final results of the project and defend these results in formal oral presentation.

Key words: Capstone project.

MA Mathematics

MA4000 Introduction to Mathematics for Finance

(3.5 - 0 - 12. Prerequisites: None. MAF09, MAF09V)
Equivalence: MA1002

The aim of this basic mathematics course is to provide the student with the mathematical fundamentals for solving economic and business problems. Prior knowledge of mathematics is required. Learning outcome: the student will be able to solve problems using his/her analytical skills and computer tools.

General objective: Students will be able to use mathematical concepts to solve problems from diverse business disciplines and will also be able to use computational tools efficiently in order to help develop their analytical skills.

Key words: Linear programming. Differential and integral calculus. Differential equations. Stochastic calculus.

Bibliography: * Chiang, Alpha C., 1927-, Fundamental methods of mathematical economics/Alpha C. Chiang, Kevin Wainwright, 4th. Edition, Boston, Mass.; México: McGraw-Hill/Irwin, c2005, Massachusetts, 2005,eng,[0070109109(papelalcalino)],[0071238239 (ed. internacional)],[9780071238236 (ed. internacional)].

MA4007 Partial Differential Equations

(3 0 12. Prerequisites: None. MNT16)
Equivalence: MA99118

This is a graduate basic course in the area of applied mathematics that requires analyses and strong mathematical background to model and to find the solutions of problems that arise in physics and engineering. As learning outcome the student will use the mathematical tools in modelling and solution of physics and engineering problems.

General objective: After completing the course, students will be able to quickly develop a basic competence in each of many areas of mathematics, such as

Complex Variables, Fourier Analysis, Partial Differential Equations, Calculus of Variations and Tensor Analysis, needed in the graduate courses in engineering. This is a course of proper training in mathematical modeling of phenomena that appear in engineering applications, utilizing Maple, Matlab and Mathematica as computer software.

Key words: Complex variable. Partial differential equations. Fourier Series. Variational Calculus. Tensor Analysis.

Bibliography: * García Lumbreras S., Matemáticas Avanzadas para Ingeniería, CECSA, 1998

MA4009 Statistical Methods

(3 - 0 - 12. Prerequisites: None. DCA11, MCP09)
Equivalence: MA00128, MA99128

This introductory course analyzes the most common statistical techniques that include descriptive tools and uses them to carry out inferences on parameters of one or more populations. Learning outcome: the student will be able to use parametric and non-parametric models for one or more populations.

General objective: On completion of the course, students will be able to use graphical tools and descriptive statistics to organize information according to its characteristics. They will also be able to present statistical hypotheses that correspond to actual practical problems and use statistics that suit the problems in order to support (or not) the hypothesis under investigation and, therefore, state the statistical decisions in the context of the problem.

Key words: Confidence interval. Statistical hypothesis testing. Nonparametric techniques. Exploratory analysis.

Bibliography: * Devore, Jay L., Probability and statistics for engineering and the sciences/Jay L. Devore, 7th. Edition, Belmont, Calif.; México: Brooks/Cole/Cengage Learning, c2009, California, 2009, eng, [0495557455],[9780495557456].

MA4011 Matrix Algebra and Optimization

(3 - 0 - 12. Prerequisites: None. DCA11)
 Equivalence: MA00130, MA95130

This introductory course where basic matrix properties are applied as well as generalized inverses and other properties for the expression and solution of linear statistical models and the optimization of functions. Learning outcome: the student will be able to efficiently use matrix algebra and theories related to spectral decomposition in linear statistical models.

General objective: On completion of the course, students will be able to carry out computations and operations in matrix form and use matrix algebra to obtain solutions for systems of equations that can be found in statistical problems in the form of linear models.

Key words: Linear algebra. Matrix operations and properties. Function optimization with different types of restrictions.

Bibliography: * Stewart, C.W., Introduction to Matrix Computations, Academic Press.

MA4016 Calculus and Linear Algebra

(3 - 0 - 12. Prerequisites: None. DCF11)
 Equivalence: GF5001

This is a basic course in mathematics. The learning objective for this course is that students propose single- or multi-variable economic and financial models with restrictions.

General objective: This course familiarizes students with basic concepts of limits, differentials, and integrals applied to elaborating decision making problems of different agents participating in economy. Students will use vectors and matrices and their basic operations in modeling financial and economy models. Also student will be able to construct financial and economics models in one or many variables.

Bibliography: * Swokowski, Earl William, 1926-, Calculus of a single variable/Earl W. Swokowski, Michael Olinick, Dennis Pence; with the assistance of Jeffery A. Cole, 2nd. Edition, Boston: PWS Pub. Co., c1994, [0534939244 :],[\$46.00].

MA4017 Probability and Statistics

(3 - 0 - 12. Prerequisites: None. DCF11)
 Equivalence: GF5002

This is a basic course in mathematics. The learning objective for this course is that the student understands fundamental knowledge and concepts of probability with emphasis on measure theory, and that he applies this knowledge to statistical inference problems: parametric and non-parametric estimation.

General objective: After this course the student will handle basic fundamentals and concepts of probability applied in statistic inference problems: parametric and nonparametric estimation. Moreover, the student must develop the ability to verify statistical hypothesis. Finally, the student must handle concepts of stochastic limits and convergence.

Bibliography: * Hogg, Robert V., Introduction to mathematical statistics/Robert V. Hogg and Allen T. Craig, 5th. Edition, Englewood Cliffs, N. J.: Prentice Hall, 1995, [0023557222].

MA4018 Mathematical Foundations for Finance

(1.5 0 6. Prerequisites: None. MAF15)
 Equivalence: MA4000

General objective: At the end of the course the student will be able to use tools and fundamental concepts of mathematics for economy and finance in the approach and solution of basic problems of optimization, because these are the basis of systematic financial decisions

Bibliography: * Capinski, M. & Zastawniak, T., Mathematics for Finance: an introduction to financial engineering, 2, Springer Verlag London Ltd., English, [9780857290816].

ME

Graduate Medicine and Health Sciences

ME4140 Clinical Ethics

(1.5 - 0 - 6. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

This basic course intends the physician in postgraduate training to integrate elements in order to develop the competencies of ethics and professionalism. It includes the development of concepts related to Health Sciences and their relation with Humanities and Bioethics, of moral judgment, professional ethics, and applied ethics in a clinical setting. It favors the improvement of communication and interpersonal abilities related with professionalism and quality in medical attention, as well as skills related with wellness and self-care. It promotes the development of ethical reasoning, self-reflection and self-consciousness as axis in the analysis and ethical decision-making processes through the analysis of the ethical aspects of clinical practice and of the daily ethical dilemmas proper of these areas. It requires basic knowledge of moral philosophy, bioethics, professional ethics, medical ethics, and applied ethics. As a learning outcome, the student is expected to integrate knowledge, skills, attitudes, principles, and ethical values in his real-clinical-setting case analysis and decision-making processes with professional responsibility, attempting social wellness.

General objective: At the end of the course, the resident will be able to: - Build the theoretical basis and the ethical reasoning and reflection skills that contribute to formulate practical solutions to the ethical dilemmas that he will face in each of his professional career stages.- Develop the necessary skills and instruments to face the challenges that changing means of health care give.- Develop the competencies of ethics and professionalism for health sciences through active and opportune participation in the analysis of ethical aspects of daily clinical practice and of the solution of ethical dilemmas under a methodology that allows him:

a. Learn through lecture, discussion, deliberation, and writing, articulate and organize ethical arguments through a philosophical perspective.

- b. Learn to analyze the relation between philosophical concepts, ethical questioning, ethical deliberation processes, and decision making.
- c. Learn and practice the ability of evaluating fortresses and weaknesses of their own moral judgments through reasoned evidences (based in rights, consequences, virtues, and other theoretical concepts).
- d. Use reason and dialog with other persons to solve conflicts.
- e. Reflect about the responsibility he has as a health professional and the compromise to seek a just society.
- f. Explain and evaluate the distributive justice and basic rights concepts applied to health resources, especially in shortage circumstances; and the care management in health resources.
- g. Use ethical theories and other conceptual instruments to identify the ethical problematic in the specific case of health professionals and formulate a reasoned judge.
- h. Articulate alternative points of view about how to proceed in these cases and examine and evaluate the reasons for and against these points of view.
- i. Recognize and apply the legal fundamentals in the reflection of ethical dilemmas.
- j. Recognize and apply the regimentation of the regulation agencies (FDA, COFEPRIS, MEDICAL ASSOCIATIONS, ETC.) in the solution of ethical dilemmas.
- k. Establish a multidisciplinary work methodology for the solution of ethical dilemmas in the respective committees.

Key words: Bioethics. Professional ethics. Applied ethics. Health and humanitarian sciences. Moral philosophy.

Bibliography: * Jonsen, Albert R., Clinical ethics : a practical approach to ethical decisions in clinical medicine / Albert R. Jonsen, Mark Siegler, William J. Winslade., 5th ed., New York : McGraw-Hill, Health Professions Division, c2002., [0070331200].

ME4141 Health Sciences Education

(1.5 - 0 - 6. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

This graduate course seeks to develop teaching skills. Different education techniques will be used and they should know when to apply them. Learning outcomes: providing information, planning educational actions, creating educational resources, facilitating and tutoring the learning process, offering counsel and feedback, evaluating learning and acting as a role model of the medical environment.

General objective: Students will be able to:

- Understand the concepts and theoretical principles that are the bases of the development and improvement of the skills required of residents in the clinical context, both in the private and public sectors.
- Identify the responsibilities, resources, limitations and others aspects involved in the resident's role as professor to medical students and other residents.
- Apply the skills acquired in their clinical practice, as well as acquire greater confidence in their learning abilities.
- Improve their practice through reflection, self-evaluation, peer-evaluations, and professor evaluations.
- Value clinical practice as a continuous source of knowledge for both students and professor, as well as to determine the type of student they are and want to be.
- Know the tools available in e-learning and develop teaching processes that benefit students, colleagues, patients and the community.

Key words: Learning. Teaching. Clinical teaching.

Bibliography: * Stephen M. Stahl, Richard L. Davis, Best Practices in Medical Teaching, 1 edition , Cambridge University Press.

ME4142 Quality Health Care

(1.5 - 0 - 6. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

It is a basic course oriented to study the concept of quality of care of patients and their families, in each of its six dimensions. As a learning outcome, resident must implement and report actions to improve quality and patient safety, using evidence-based medicine, the best security strategies and / or rational use of available resources in a specific project.

General objective: Student will be able to:

- Understand the concept of quality and safety of care and its importance to the patient and family.
- Assess strategies, systems, processes and / or indicators that are used in clinical contexts.
- Design proposals for improving patient care and their families.

Key words: Leadership. Patient safety. Quality. continuous improvement.

Bibliography: * Robert M. Watcher, - Understanding Patient Safety (LANGE Clinical Medicine), McGraw Hill Medical .

ME4143 Research and Innovation Methods

(1.5 - 0 - 6. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

It is a basic research course that aims for residents to develop basic knowledge of Evidence-based Medicine, proper clinical practices and biomedicine. It does not require previous knowledge. As a learning outcome, residents must present reports on different essay styles and systemic reviews in which they apply their new knowledge, with emphasis in Evidence-based Medicine and biostatistics.

General objective: At the end of the course, the resident will be able to:

- Understand theoretical foundations related to Evidence
- Based Medicine, Good Clinical Practices, and Biostatistics.
- Develop the necessary skills to generate new knowledge and share it with the society through scientific publications, conferences, posters, or books as complement, in addition to the primary objective of the general problem: their clinical training.
- Apply principles and guidelines for the acquisition of new knowledge and long-life learning, a must be for new specialists.
- Clearly establish a problem approach in a context approved by his thesis director, with a clear definition, hypothesis, and justification that allow establishing the necessary conditions to begin a formal investigation in one of the research groups of his specialty.
- Develop the literature review of the research based in the variables included in the research question from its basic conceptualization to its deepening with multiple formal previous studies that allow the researches to select the research method, as well as the possible interpretations or analysis derived from them.
- Select the research method and their measurement instruments that allow answering the research question. This method must clearly include the population or sample being considered, the time period and the inclusion and exclusion conditions for the study. Likewise, this process must include the selection of qualitative or quantitative methods and their instruments.

Key words: Clinical research. Biostatistics. Good clinical practice. Evidence-based medicine.

Bibliography: * Guyatt G, Rennie D., Users Guide to the Medical Literature, American Medical Association.

ME4144 Thesis Project I

(3 - 0 - 12. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

This research course aims to develop the clinical research competencies in the specialty program of the student. It is intended that the student makes a progress in his thesis following one of the research groups of the Faculty Board of his program, developing his capacity of looking for bibliographic resources, approaching to a research problem, and documenting scientific evidence following style lineaments such as the established by the American Psychological Association (APA). Previous knowledge about research methodology is required. As a learning outcome, the resident will present a progress report of his thesis, including the research problem approach, literature review, research method design, and evaluation instruments that fulfill the theoretical and practical argumentation according to the requirements of the established approach.

General objective: At the end of the course, the student will be able to:

Key words: Clinical research. Thesis. Research methods.

Bibliography: * Houser, Janet, 1954-, Clinical research in practice : a guide for the bedside scientist / Janet Houser, Joanna Bokovoy., Sudbury, Mass. : Jones and Bartlett, c2006., [0763738751 (rústica: papel alcalino)],[9780763738754].

ME4145 Medical Care in Psychiatry I

(0 - 60 - 12. Prerequisites: None. RPS13)

Equivalence: None

It is a clinical course that aims to provide residents with the principles of internal medicine and neurology, as well as provide an introduction to the practice of psychiatry, giving residents a supervised responsibility of evaluating and managing psychiatric patients in hospitalized and ambulatory settings. As a learning outcome, residents must develop a portfolio of the clinical cases they have encountered in emergencies, intensive care, ward and when on-call.

General objective: Residents will be able to:

1. Practice diagnosis and treatment of the most common disorders in internal medicine.

2. Practice diagnosis and treatment of the most common disorders of General Medical Emergencies.
3. Elaborate a general medicine History and Physical, including psychopathology examination, identifying the principle psychiatric syndromes.
4. Apply teaching strategies and didactic techniques needed to help in the education of residents and students.

Key words: Medical History of the psychiatric patient. Treatment. Diagnosis.

Bibliography: * , Diagnostic and statistical manual of mental disorders : DSM-IV-TR., 4th ed., text revision., Washington, DC : American Psychiatric Association, c2000., [0890420246 (casebound : alk. paper)],[0890420254 (pbk. : alk. paper)].

ME4146 Psychiatry I (3 - 0 - 12. Prerequisites: None. RPS13) **Equivalence: None**

It is a theoretical course that aims for students to acquire basic knowledge on the physiology of the central nervous system; the general aspects of psychopathology; the main neurological syndromes; psychiatric emergencies and the technology and instruments applied in electroencephalography. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective: Resident will be able to:

1. Understand the development, structure, functions and the relationship between the different areas of the central and peripheral nervous system.
2. Identify the symptoms and signs of the psychopathology of the different mental diseases and human behavior, as well as the psycho-endocrinological, immunological and genetic aspects.
3. Identify and interpret the clinical manifestations of the dysfunction of the central and peripheral nervous system in the different stages of development.
4. Analyze the natural evolution, prevention, diagnosis, treatment and rehabilitation of the most common disorders of the central and peripheral nervous system in adults, teenagers and children.

5. Identify and interpret the main syndromes in psychiatric emergencies.

Key words: Psychopathology. Neurological syndromes. Psychiatric urgencies.

Bibliography: * , Diagnostic and statistical manual of mental disorders : DSM-IV-TR., 4th ed., text revision., Washington, DC : American Psychiatric Association, c2000., [0890420246 (casebound : alk. paper)],[0890420254 (pbk. : alk. paper)].

ME4147 Medical Care in Psychiatry II (0 - 60 - 12. Prerequisites: None. RPS13) **Equivalence: None**

It is a clinical course that aims to provide residents with the principles of neurology, as well as provide an introduction to the practice of psychiatry, giving residents a supervised responsibility of evaluating and managing psychiatric patients in hospitalized and ambulatory settings. As a learning outcome, residents most develop a portfolio of the clinical cases they have encountered in ambulatory psychiatry, wards, emergency departments, intensive care, and when on-call in hospitalized patients.

General objective: Residents will be able to:

1. Practice diagnosis and treatment of the most common disorders in internal medicine.
2. Practice diagnosis and treatment of the most common disorders of General Medical Emergencies.
3. Elaborate a general medicine History and Physical with emphasis on neurology, including psychopathology examination, identifying the principle psychiatric syndromes.
4. Apply teaching strategies and didactic techniques needed to help in the education of residents and students.

Key words: Psychopathology. Neurological syndromes. Psychiatric emergencies.

Bibliography: * , Diagnostic and statistical manual of mental disorders : DSM-IV-TR., 4th ed., text revision., Washington, DC : American Psychiatric Association, c2000., [0890420246 (casebound : alk. paper)],[0890420254 (pbk. : alk. paper)].

ME4148 Psychiatry II (3 - 0 - 12. Prerequisites: None. RPS13) Equivalence: None

It is a theoretical course that aims for students to acquire deeper knowledge on the psychopathology of different mental disorders; the endocrinological, immunological and genetic aspects of these disorders; the historical precedents of psychiatry and the psychopharmacology of psychiatric treatments. It requires basic knowledge of central nervous system anatomy and physiology. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective: Resident will be able to:

1. Identify the symptoms and signs of the psychopathology of the different mental diseases and human behavior, as well as the psycho-endocrinological, immunological and genetic aspects.
2. Describe the historical evolution of current knowledge on psychiatry.
3. Understand the basics and applications of psychopharmacology, and provide pharmacological schemes for the treatment of mental and behavior disorders.

Key words: Psychiatric diseases. Psychopharmacology. Psychoendocrinology.

Bibliography: * , Nueva historia de la psiquiatría / Jaques Postel y Claude Quétel (coordinadores), 2a ed., México : Fondo de Cultura Económica, 2000., [9681657454].

ME4149 Medical Care in Psychiatry III (0 - 60 - 12. Prerequisites: None. RPS13) Equivalence: None

It is a clinical course that aims to broaden the residents' experiences of the first year, while introducing them to the process of patient care, through a specifically designed program of supervised day hospital care and ambulatory care. As a learning outcome, residents must develop a portfolio of the clinical cases they have encountered in ambulatory settings, wards, emergency departments, and when on-call in hospitals.

General objective: Residents will be able to:

1. Perform evaluations of psychiatric disorders while showing a clear appreciation of the useful diagnostic methods related to psychological tests and laboratory exams.
2. Evaluate treatment plans for most severely ill mental patients, their most common medical and surgical problems, and the forensic aspect that may influence the treatment.
3. Collaborate in the psychological, pharmacological and physical treatments of severely ill mental patients.
4. Participate in the medical team of intrahospital settings, while showing leadership skills.
5. Develop and follow-up on the treatment plans for eating and addiction disorders.
6. Obtain experience on psychiatric subspecialties by rotating in different psychiatric services, like psychiatry for affective disorders (adults and adolescents) and eating disorders.
7. Prescribe psychological treatments based on symptoms and time limited, and long term treatments focused on insight, by participating in supervised psychotherapy for specific ambulatory patient.
8. Obtain experience of vertical integration of the medical practice by incorporating daily programs and services and outpatient care.
9. Develop awareness of the ethical aspects of medical practice at a postgraduate clinical level.

Key words: Eating disorders. Mood disorders.

Bibliography: * , Psiquiatría general / [edited by] Howard H. Goldman ; traducción por Gloria Padilla Sierra ; editor responsable Iliana T. Rojas Rubio., 5a ed., México : Manual Moderno, 2001 2008., spaeng, [9684269390].

ME4150 Psychiatry III (3 - 0 - 12. Prerequisites: None. RPS13) Equivalence: None

It is a theoretical course that aims for students to acquire knowledge on the basic principles of child and adolescent psychiatry, liaison psychiatry and social psychiatry; the basics of imagenology used in psychiatry, the principles and applications of electroencephalography, as well as the principles of

psychotherapy. It requires basic knowledge of psychopathology. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective:

1. Understand the basic principles of child and adolescent psychiatry, including the most common disorders and their biological, psychotherapeutic and social treatments.
2. Understand the basic principles of liaison psychiatry, the most common disorders and their treatments.
3. Analyze the basic principles of imaging related to the most common psychiatric disorders.
4. Analyze the basic principles, applications and interpretation of a normal encephalography and the most common findings related to mental and behavior disorders.
5. Know the basic principles of psychotherapy, the different techniques and application to different psychiatric disorders.
6. Know the principles and application of psychiatry to social psychiatry,

Key words: Child and adolescent psychiatry. Social psychiatry. Liaison psychiatry.

Bibliography: * , Tratado de psiquiatría del niño y del adolescente / [editado por] Serge Lebovici, René Diatkine, Michel Soulé ; prólogo y traducción, Ignacio Avellanosa, tr. Alberto Lasa.. [et al.], Madrid : Biblioteca Nueva, D.L. [1988-1993], spafre, [8470303155 (set)].

ME4151 Medical Care in Psychiatry IV (0 - 60 - 12. Prerequisites: None. RPS13)
Equivalence: None

It is a clinical course that aims to introduce concepts and methods of advanced patient care in different hospital sectors, with supervision, and also introduce the process of patient care, while vertically integrating a specially designed program of supervised day hospital and outpatient experiences. As a learning outcome, residents most develop a portfolio of the clinical cases they have encountered in outpatient,

emergency department, intensive care, ward and when on-call.

General objective: Residents will be able to:

1. Perform evaluations of psychiatric disorders while showing a clear appreciation of the useful diagnostic methods related to psychological tests and laboratory exams.
2. Evaluate treatment plans for most severely ill mental patients, their most common medical and surgical problems, and the forensic aspect that may influence the treatment.
3. Collaborate in the psychological, pharmacological and physical treatments of severely ill mental patients.
4. Participate in the medical team of intrahospital settings, while showing leadership skills.
5. Develop and follow-up on the treatment plans for eating and addiction disorders.
6. Obtain experience on psychiatric subspecialties by rotating in different psychiatric services, like psychiatry for affective disorders (adults and adolescents) and eating disorders.
7. Obtain experience on psychiatric subspecialties by rotating in different psychiatric services, like geriatric psychiatry, neuropsychiatry, schizophrenia, chronic pain and behavior disorders (including drug abuse).
8. Know psychological treatments based on symptoms and time limited, and long term treatments focused on ?insight?, by participating in supervised psychotherapy for specific outpatients.
9. Obtain experience of vertical integration of the medical practice by incorporating daily programs and services and outpatient care.

Key words: Neuropsychiatric disorders. Chronic pain. Psychogeriatric disorders. Substance abuse disorders. Schizophrenia.

Bibliography: * Krassoievitch, Miguel., Psicoterapia Geriátrica/ Miguel Krassoievitch., México: Fondo de Cultura Económica, 1998., spa, [9681638832].

ME4152 Psychiatry IV
(3 - 0 - 12. Prerequisites: None. RPS13)
Equivalence: None

It is a theoretical course that aims for students to acquire knowledge the main disorders of child and adolescent psychiatry; alcoholism; forensic psychiatry and criminology; the principles behind psychological and neuropsychological tests used in psychiatry; and psychotherapy. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective: Resident will be able to:

1. Understand the basic principles of child and adolescent psychiatry, including the most common disorders and their biological, psychotherapeutic and social treatments.
2. Analyze the basic principles of psychotherapy, the different techniques and application to different psychiatric disorders, especially the psychotherapeutic methods emphasized on symptoms and time limited, and the orientated on long term insight.
3. Know the diagnostic and treatment principles of drug addictions (especially alcohol).
4. Know the basic principles of forensic psychiatry and criminology, applying this knowledge to the evaluation and management of patients and their circumstances.
5. Integrate the basic principles of the application and interpretation of different psychological and neuropsychological tests, in the diagnostic and therapeutic evaluations of patients.

Key words: Child and adolescent psychiatry. Forensic psychiatry. Psychotherapy.

Bibliography: * Kaplan, Harold I., 1927-, Sinopsis de psiquiatría : ciencias de la conducta, psiquiatría clínica / Harold I. Kaplan, Benjamin J. Sadock., 10a ed., Madrid : Wolters Kluwer-Lippincott Williams & Wilkins, 2008., spaeng, [9788496921184].

ME4161 Medical Care in Urology I
(0 - 60 - 12. Prerequisites: None. RUR13)
Equivalence: None

This is a clinical care course that aims the student to approach to his formation as a health professional and to the beginning of the development of his competencies of clinical judgment and decision-making under continuous surveillance. He will develop interpersonal and effective communication abilities, learn based on daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of problem identification and integration of syndromes under the surveillance and evaluation of the Faculty Board. As a result of learning, the student will know the natural evolution of the urological disorder and the effect of the therapeutic maneuvers on them, observe diagnostic, basic, and complex therapeutic maneuvers, and take part in the decision-making on therapies. The student will develop skills of effective communication and professionalism with the medical morning report.

General objective: The resident will be able to identify and help solve common and frequent urologic problems in medical care of patients during medical visits, in preoperative areas, and in medical resident work hours.

Key words: Outpatient visit. Intensive care medicine. Medical morning report. Scheduled ambulatory surgery.

Bibliography: * , Health services research [electronic resource] : work force and educational issues / Committee on Health Services Research: Training and Work Force Issues, Division of Health Care Services, Institute of Medicine ; Marilyn J. Field, Robert E. Tranquad, Washington, D.C. : National Academy Press, 1995., [0585030235 (electronic bk.)].

ME4162 General Urology I
(3 - 0 - 12. Prerequisites: None. RUR13)
Equivalence: None

This is a theoretical course that aims the student to know the evolution that Urology has had since its beginnings, the application of molecular biology

in physiological, pathological, and recovering processes, also to promote an approach of the student to open surgical processes and laparoscopic surgery. There will be included concepts of anatomy, physiology, and urologic pathology. There will be revised the perioperative management of resource optimization, maintenance of liquid and electrolyte balance, peri- and postoperative states, and the recognition and management of complications. There are described concepts of basic urologic emergencies which include acute scrotum and urologic trauma. As a learning outcome, the student is expected to elaborate plans for the management of the perioperative state of the hospitalized patients, under supervision and strict adherence of resource optimization and correct clinical choices.

General objective: The student will be able to identify and describe the physiological response and the biologic behavior of the urologic diseases; to analyze the signs, symptoms, laboratory and cabinet results, and to select the priority models of treatment for an optimal resolution of the urologic problems.

Key words: History of Urology. Urological emergencies. Perioperative management. Fluids and Electrolytes.

Bibliography: * , Campbell-Walsh urología / Alan Wein.. [et al.], 9a ed., Buenos Aires : Médica Panamericana, 2008., [9789500682671].

ME4163 Medical Care in Urology II

(0 - 60 - 12. Prerequisites: None. RUR13)

Equivalence: None

This clinical care course aims the student to approach his formation as a health professional and to the beginning of the development of his competencies of clinical judgment and decision-making under continuous surveillance. He will continue to develop interpersonal and effective communication abilities, learn based on daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of identification of clinical syndromes and urologic pathologies under the surveillance and evaluation of the Faculty Board. As a result of learning, the student is expected to know the natural evolution of urologic ailments and

the effect that therapeutic maneuvers have on them, observe basic and complex diagnostic and therapeutic maneuvers, and participate in the therapeutic decision-making. The student will develop skills of effective communication and professionalism with the medical morning report.

General objective: The student will be able to observe, identify, and help solve common and frequent urologic problems of patients during medical visits, in perioperative areas, and in medical resident work hours.

Key words: Outpatient visit. Medical morning report. Scheduled ambulatory surgery. Urgent surgery. Intensive care.

Bibliography: * Boutilier, Marie , Structured risks for impairment: Postgraduate medical training in Ontario.

ME4164 General Urology II

(3 - 0 - 12. Prerequisites: None. RUR13)

Equivalence: None

This is a theoretical course intends the student to achieve an exhaustive comprehension of the semiology of pain; learn about the evaluation of the urologic patient; use the concepts of surgical anatomy of the peritoneum, and know the basis and fundamental principles for indicating surgical treatment in urology. There would be included concepts like retroperitoneum anatomy, embryology, physiology, and pathology of the retroperineum and urinary system. As a result of the learning experience, the student will be capable of developing plans for surgical management of health problems of the retroperineum, under supervision and strict adherence to Mexican, American, and European surgical guidelines.

General objective: The student will be able to identify anatomic relationships and their application in the surgical field; to analyze the present renal function of the patient at the moment of the diagnosis, and to select the priority treatment methods for the optimal resolution of urological problems in patients with normal or abnormal renal function.

Key words: Renal physiology. Pain semiology. Basic Instrumentation. Surgical anatomy of the peritoneum. Evaluation of the Urologic Patient.

Bibliography: * , Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME4165 Medical Care in Urology III

(0 - 60 - 12. Prerequisites: None. RUR13)

Equivalence: None

This is a clinical care course that aims the student to develop the competencies of clinical judgment and decision-making under continuous surveillance, and analyze laboratory and desk studies to support the diagnosis. He will continue to develop interpersonal and effective communication abilities, learn based on daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of essential paraclinical studies. He will do daily visits to the hospital, outpatient visits, medical resident work hours, and urologic emergencies service under the surveillance of senior residents and of the Faculty Board. As a result of learning, the student is expected to know the natural evolution of urologic ailments and the effect that therapeutic maneuvers have on them, dictate diagnostic and therapeutic maneuvers, both basic and complex, and participates in the therapy decision-making. The student will develop skills of effective communication and professionalism with the medical morning report.

General objective: The resident will be able to identify and solve, under surveillance, frequent and complex urologic problems in medical care of patients during medical visits, in preoperative areas, and during medical resident work hours.

Key words: Intensive care medicine. Medical morning report. Scheduled ambulatory surgery. Urgent surgery. Medical Resident Work Hours.

Bibliography: * Boutilier, Marie , Structured risks for impairment: Postgraduate medical training in Ontario.

ME4166 General Urology III

(3 - 0 - 12. Prerequisites: None. RUR13)

Equivalence: None

This theoretical course intends the student to classify with precision both complicated and uncomplicated infections; to know the different accesses the pathogens that provoke urinary infections have, their forms of transmission and biological cycles, and the immediate response of the urinary system before infections; to deepen knowledge about urinary and renal tuberculosis; to distinguish the treatment methods, and to accomplish a clinical judgment for the optimal selection. Also, to know the obstructive uropathies and the pathologies that damage male reproduction. There will be included concepts of simple and complex urinary infections, urinary tuberculosis, obstructive uropathy, and male infertility. The student will be able to diagnose and manage urinary tract infections, recognize male infertility, describe diagnosis methods, and elaborate, under supervision, the initial management of surgery that involves the scrotum and its structures under strict adherence to the current surgical techniques.

General objective: The student will be able to identify and propose a flux diagram of the natural history of the urinary tract infections; to analyze the signs, symptoms, laboratory and cabinet results, and to select the priority models of treatment for the optimal resolution of infection problems.

Key words: Urinary tract infection. Prostatitis. Urinary tract tuberculosis. Sexually transmitted diseases. Obstructive uropathy.

Bibliography: * , Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME4167 Medical Care in Urology IV

(0 - 60 - 12. Prerequisites: None. RUR13)

Equivalence: None

This is a clinical care course that aims the student to develop the competencies of clinical judgment and decision-making under continuous surveillance, and

analyze laboratory and desk studies to support the diagnosis, carry out differential diagnosis, clearly explain the pathology and sustain the possible treatment suggestions. He will continue to develop interpersonal and effective communication abilities, learn based on a daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of essential paraclinical studies, tumor markers, extension studies, bone and renal gammagraphy, computed axial tomography, and nuclear magnetic resonance. He will do daily visits to the hospital, outpatient visits, medical resident work hours, and urologic emergencies service under the surveillance of senior residents and of the Faculty Board. As a result of learning, the student is expected to be accurate in diagnosis decisions, know the normal laboratory levels, and interpret the results of these studies related with the patient's clinical history. The student will develop skills of effective communication and professionalism with the medical morning report.

General objective: The resident will be able of identifying and solve, under surveillance, the frequent and complex urologic problems in medical care of patients during medical consultations, medical visits, in perioperative areas, and in the resident work hours.

Key words: Outpatient visit. Medical morning report. Intensive care. Medical Resident Work Hours. Emergency room.

Bibliography: * , Health services research [electronic resource] : work force and educational issues / Committee on Health Services Research: Training and Work Force Issues, Division of Health Care Services, Institute of Medicine ; Marilyn J. Field, Robert E. Tranquid, Washington, D.C. : National Academy Press, 1995., [0585030235 (electronic bk.)].

ME4168 General Urology IV (3 - 0 - 12. Prerequisites: None. RUR13) **Equivalence: None**

This theoretical course intends the student to distinguish the urinary incontinence modalities, identify the clinical presentations, confront decisions to make a diagnosis, and choose the proper management.

Also, boost the interest for the discovery of controversial pathologies like interstitial cystitis, including current diagnosis methods and treatments. There will be included the concepts of urinary incontinence, female pelvic instability, interstitial cystitis, detrusor dyssynergia. As a result of learning, the student will carry out, under supervision, surgical treatment plans for urinal incontinency, bladder distention under anesthesia, and describe the urodynamics.

General objective: The student will be able to describe through a flux diagram the physiological response of the bladder before diseases that alter it; analyze the signs, symptoms, laboratory and cabinet results, and select the priority models of treatment for the optimal resolution of bladder instability problems.

Key words: Urinary incontinence. Interstitial cystitis. Painful pelvic syndrome. Detrusor Dyssynergia.

Bibliography: * , Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME4169 AClinical Practice in Internal Medicine I

(0 - 60 - 12. Prerequisites: None. REM13)

Equivalence: None

This is a in service clinical training that intends the student to develop basic clinical competencies to give medical services to in-hospital patients, mainly in the areas of Emergency Medicine, Cardiology and Endocrinology. It requires previous medical knowledge. Learning outcome: the resident is expected to have a portfolio showing he covers the minimal requirements of the course, and of his accomplishment in the assigned clinical rotations.

General objective: Resident will be able to:

- To develop capabilities in the clinical interview and physical examination through the supervised practice.
- Develop the ability to identify clinical problems during supervised clinical practice.

- To get familiar with the use of the clinical record, its components, as well as the Mexican Official Norm (NOM) of the clinical record
- Interpret laboratory and radiologic results.
- Know the natural history of diseases y the results of therapy.
- Establishing a good communication, effective and responsible, with the patient, family, attending physician, and the rest of the health care personnel.

Key words: Internal medicine. Clinical record documentation. Hospital rounds. Mexican official rule of the clinical record. Clinical record.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)],[9780071632447 (v.1 : print)],[9780071748872 (v.2 : print)].

ME4170 Internal Medicine I (3 - 0 - 12. Prerequisites: None. REM13, RGE13) **Equivalence: None**

This a course on the theoretical foundations of Internal Medicine in which the student acquires the bases of Internal Medicine in order to take care of patients in areas of Emergency Medicine, Cardiology and Endocrinology. As a learning outcome it is expected that the student proves his knowledge through the discussion and analysis of clinical cases of adult patients in the aforementioned areas.

General objective: Resident will be able to:

- Understand the basic knowledge in Internal Medicine related to diseases in the areas of Emergency Medicine, Cardiology and Endocrinology, with emphasis in the fundamentals of diagnostics and therapeutics of the adults.
- Analyze the risk factors for acquired heart disease, particularly coronary artery disease.
- Understand impact of Diabetes and other endocrine diseases in the general health of the adult population.

Key words: Cardiology. Endocrinology. Diabetes. Emergency medicine. Coronary artery disease.

Bibliography: * , Harrison's principles of internal medicine Dennis L. Kasper .. [et al.], 16th ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071391401 (juego)], [0071402357 (combo)], [9780071391405], [9780071391412], [9780071391429].

ME4171 Clinical Practice in Internal Medicine II

(0 - 60 - 12. Prerequisites: None. REM13)
Equivalence: None

This is a in-service clinical training that intends to develop in the student the basic competencies for the clinical care of the adult patient. It requires previous medical knowledge. Learning outcome: The student is expected to keep a portfolio of the minimal requirements of the assigned rotations.

General objective:

- To develop skills in clinical interview and physical examination through the supervised practice.
- To use and keep developing the ability to identify clinical problems during supervised clinical practice, integrating syndromes under supervision.
- Continue to develop the skills for the interpretation of laboratory and radiologic exams and to perform diagnostic and therapeutic maneuvers.
- Know the natural history of diseases y the results of therapy, as well as establishing a good communication, effective and responsible, with the patient, family, attending physician, and the rest of the health care personnel.

Key words: Internal medicine. Bibliographic searches. Clinical skills.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)],[9780071632447 (v.1 : print)],[9780071748872 (v.2 : print)].

ME4172 Internal Medicine II

(3 - 0 - 12. Prerequisites: None. REM13, RGE13)
Equivalence: None

This a course on the theoretical foundations of Internal Medicine in which the student acquires the bases of Internal Medicine in order to take care of patients in areas of Pulmonary Medicine, Kidney Diseases and Rheumatology. As a learning outcome it is expected that the student proves his knowledge through the discussion and analysis of clinical cases of adult patients in the aforementioned areas.

General objective: Resident will be able to:

- Understand the basic knowledge in Internal Medicine related to diseases in the areas of Pulmonary Medicine, Kidney Diseases and Rheumatology, with emphasis in the fundamentals of diagnostics and therapeutics of the adults.
- Analyze the risk factors for acquired lung diseases, particularly chronic obstructive pulmonary disease and acute lung diseases.
- Understand the impact of arthritis and other rheumatic diseases in the general health of the adult population.

Key words: Pulmonary medicine. Nephrology. Obstructive pulmonary disease. Arthritis. Rheumatology.

Bibliography: * , Harrison's principles of internal medicine Dennis L. Kasper ..[et al.], 16th ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071391401 (juego)], [0071402357 (combo)], [9780071391405], [9780071391412], [9780071391429].

ME4173 Clinical Practice in Internal Medicine III

(0 - 60 - 12. Prerequisites: None. REM13)
Equivalence: None

This is an in-service clinical course that intends that the student continues developing his clinical skills and decision making capabilities in patients in different areas of Internal Medicine, both in hospital and ambulatory settings. Requires basic knowledge on Emergency Medicine, Cardiology, and Endocrinology. As a learning outcome, it is expected that the

student participates in the ambulatory and in-hospital care of patients with Endocrine, Hematologic and Digestive Diseases, with written documentation of the grading of his clinical activities by their tutors.

General objective: Resident will be able to:

- Acquire the capacities on clinical interview and physical examination in order to write admit notes that reflect his knowledge and understanding of the patient's disease process.
- Identify acute disease problems that put into risk the patient's integrity, and that therefore, need emergency therapy or subspecialist consultation.
- Perform bibliographic searches to learn more of the patients disease process.
- Provide patient care for ambulatory patients with acute or chronic illness.
- Request judiciously laboratory and other test needed for the patients treatment, as well as to perform diagnostic and therapeutic procedures of a mid-level of complexity.
- Supervise lower level residents, as well as medical students and nursing personnel.

Key words: Gastroenterology. Hematology. Internal medicine. Endocrinology. Ambulatory consultation.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)], [9780071632447 (v.1 : print)], [9780071748872 (v.2 : print)].

ME4174 Internal Medicine III

(3 - 0 - 12. Prerequisites: None. REM13, RGE13)
Equivalence: None

This is a course on fundamental theoretical knowledge on Gastroenterology, Infectology and Neurology, about diagnostics, therapy and differential diagnosis in the aforementioned areas. It requires previous knowledge on Cardiology and Emergency Medicine. As a learning outcome it is expected that the student can establish an analysis and discuss on the differential diagnosis and therapeutics strategies in the mentioned areas.

General objective: Resident will be able to:

- Acquire the theoretical basic knowledge of Internal Medicine in the areas of Gastroenterology, Neurology and Infectology, building on and integrating previous knowledge, with emphasis in diagnosis and therapy of the adult population.
- Identify the most frequent diseases of the aforementioned areas, and their differential diagnosis.

Key words: Neurology. Infectology. Gastroenterology.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadrado: papel alcalino)],[007149992X (encuadrado: papel alcalino)].

ME4175 Clinical Practice in Internal Medicine IV

(0 - 60 - 12. Prerequisites: None. REM13)

Equivalence: None

This is an in-service clinical course that intends the student to continue developing his clinical skills and decision making capabilities in patients with diseases of different areas of Internal Medicine, both in hospital and ambulatory settings. Requires basic knowledge on Emergency Medicine, Cardiology, Gastroenterology, and Endocrinology. As a learning outcome, it is expected that the student participates in the ambulatory and in-hospital care of patients with Cardiac, malignant, and critical diseases, making written documentation of his tutors evaluations.

General objective: Resident will be able to:

- Acquire the capacities on clinical interview and physical examination in order to write admit notes that reflect his knowledge and understanding of the patient's disease process.
- Identify acute disease problems that put into risk the patient's integrity, and that therefore, need emergency therapy or subspecialist consultation.
- Develop the capacity to perform bibliographic searches to learn more of the patients disease process.
- Develop the skills and abilities for the treatment of ambulatory patients with acute or chronic illness.

- Develop the ability to request judiciously laboratory and other test needed for the patients treatment, as well as to perform diagnostic and therapeutic procedures of a mid-level of complexity.
- Develop teaching abilities to supervise lower level residents, as well as medical students and nursing personnel.

Key words: Cardiology. Endocrinology. Internal medicine. Critical Care Medicine.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)],[9780071632447 (v.1 : print)], [9780071748872 (v.2 : print)].

ME4176 Internal Medicine IV

(3 - 0 - 12. Prerequisites: None. REM13, RGE13)

Equivalence: None

This is a course on theory fundamentals that pretends the student to acquire basic knowledge in the areas of Hematology, Dermatology, Geriatrics and Psychiatry. It requires basic knowledge of Cardiology, Pulmonary Medicine and Neurology. As a learning outcome, the student is expected to discuss and analyze patients in the aforementioned areas, with the view of internal Medicine, leaving digital copies of his case presentations.

General objective: Resident will be able to:

- Acquire basic theoretical knowledge of Internal Medicine in the areas of Hematology, Dermatology, Geriatrics and Psychiatry, building on and integrating previous knowledge, with emphasis on diagnosis and therapy of the adult patient.
- Establish differential diagnosis, and discuss the therapy of diseases of the aforementioned areas.
- Identify and establish diagnostic and therapeutic plans for patients with diseases of the discussed areas.

Key words: Hematology. Geriatrics. Dermatology. Psychiatry.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J.

Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)],[9780071632447 (v.1 : print)],[9780071748872 (v.2 : print)].

ME4177 Management in Clinical Care I (3 - 0 - 12. Prerequisites: None. RCA13) **Equivalence: None**

It is a course of theoretical concepts which intends that the student knows the basic fundamentals that involve the quality of clinical care defined in three moments of learning: contextualization of the quality, measurement and evaluation and intervention. Led in three areas of the field of application of knowledge such as: patient safety, evaluation and improvement of the quality and management. It requires basic knowledge of clinical inpatient and outpatient patient care processes. As a learning outcome is expected that the student perform projects specific integrators of the content of this field-aligned to hospital practice.

General objective: Student will be able to:

- Understand basic and general aspects related to the contextualization, measurement and evaluation and intervention of the in general health services, hospital processes, outpatient units as well as the foundations of quality, safety and management.
- Understand the environment of health services, understand the complexity of organizations of attention to the health and the patient-centered approach.
- Acquire the knowledge essential for evidence-based medicine.

Key words: Quality management in health services. Patient safety. Adverse event.

Bibliography: * , Quality by design : a clinical microsystems approach / Eugene C. Nelson, Paul B. Batalden, Marjorie M. Godfrey, editors ; foreword by Donald M. Berwick., 1st ed., [Lebanon, NH] : Center for the Evaluative Clinical Sciences at Dartmouth ; San Francisco : Jossey-Ba, [9780787978983 (rústica)],[0787978981 (rústica)].

ME4178 Hospital Practice I (0 - 60 - 12. Prerequisites: None. RCA13) **Equivalence: None**

It is a clinical course intended for students to develop skills and competencies aligned to the academic program of the specialty. It requires basic knowledge of clinical assistance in the core clinical specialties centered in the patient care environment, leadership, communication and team working skills. As a learning outcome is expected that the student will be able to develop and implement a project; through a clinical service with collaborative learning, problem based and oriented quality of care projects.

General objective: Resident will be able to:

- Acquire the skills of study and documentation in the areas of main clinical processes oriented in Microsystems management throughout the supervised preparation of flow charts and mapping processes that reflect their knowledge and understanding of the hospital environment an the complexity of this type of organization.
- Learn how care is given through the processes of care with the patients and their family during the acute or chronic diseases that require the intervention of hospital services in the areas of internal medicine, gynecology and obstetrics, pediatrics or general surgery
- During the first semester the resident is an active part in the identification and knowledge of the organizational structure, relating to the provision of medical care services and the hospital processes. During their clinical activities, the resident will focuses as a collaborator in the documentation on mapping, analyzing clinical processes of care under the supervision of a tutor. The resident will learn to identify areas for improvement and develop some proposals for develop skills, attitudes and values in relation to health professionals and staff involved.
- Develop skills, attitudes and values in relation to health professionals and staff. Develop abilities and skills focusing on the collaboration of health care trying to resolve the health problems identified.
- Learn how to use electronic information and updated publications tools to apply to the improvement of the processes.

- Establish according to his tutor his/her line of research.

Key words: Patient safety. Clinical microsystems. Clinical care processes.

Bibliography: * , Value by design : developing clinical microsystems to achieve organizational excellence / Eugene C. Nelson .. [et al.], 1st ed., San Francisco : Jossey-Bass, c2011., [9780470385340 (pbk.)],[0470385340 (pbk.)].

ME4179 Management in Clinical Care II (3 - 0 - 12. Prerequisites: None. RCA13) **Equivalence: None**

This is a course of theoretical concepts which intends that the student meet the applied concepts that involve the quality of clinical care defined in three moments of learning: contextualization of the quality, measurement and evaluation and intervention. Led in three areas of the field of application of knowledge such as: patient safety, evaluation and improvement of the quality and management. It requires knowledge of clinical processes and management of inpatient and ambulatory patients. As a learning outcome is expected that the student perform projects specific integrators of the content of this field-aligned to hospital practice.

General objective: Student will be able to:

- Learn about specific aspects related to the contextualization, measurement and intervention of the in general health services, hospital processes, outpatient units as well as the basis of quality, safety and management.
- Understand the environment of health services, understanding the complexity of organizations of attention to the health and the patient-centered approach.
- Acquire the knowledge essential for evidence-based medicine.

Key words: Quality management in health services. Patient safety. Adverse event.

Bibliography: * , Quality by design : a clinical microsystems approach / Eugene C. Nelson, Paul B. Batalden, Marjorie M. Godfrey, editors ; foreword by

Donald M. Berwick., 1st ed., [Lebanon, NH] : Center for the Evaluative Clinical Sciences at Dartmouth ; San Francisco : Jossey-Ba, [9780787978983 (rústica)], [0787978981 (rústica)].

ME4180 Hospital Practice II (0 - 60 - 12. Prerequisites: None. RCA13) **Equivalence: None**

It is a clinical course intended for students to develop skills and competencies aligned to the academic program of the specialty. It requires basic knowledge of clinical assistance in the core clinical specialties; strengthen the medical knowledge and working with colleagues, developing leadership, communication and team working skills. As a learning outcome, is expected that the student will be able to involve in technical committees, follow up and implement a quality and patient safety improvement project; through a clinical service with collaborative learning. He will identify and follow up clinical guidelines and identify care deviations.

General objective: Resident will be able to:

- Develop skills to analyze hospital processes of specialties in critical services such as emergency or intensive care units, as well as organizational change management in the areas of clinical operation and safety of the patient, reflecting their knowledge and understanding of such services.
- Be an active part in the identification and knowledge of the main causes of morbidity mortality of the core specialties. He will collaborates in the resolution of health problems of patients associated with different causes of morbidity and mortality.
- Participate in the construction and correct order of the clinical profile. In addition to develop skills, attitudes and values in relation to patients and families during this phase, he will develop abilities and skills focusing on the collaboration of health care.
- Collaborate with health professionals in improving processes clinical of direct patient care, strengthening the culture of patient safety, identifying risks during care and failure of processes.
- Establish a methodology of implementation according to selected research project according to his/her tutor.

Key words: Patient safety. Clinical microsystems. Clinical care processes.

Bibliography: * , Value by design : developing clinical microsystems to achieve organizational excellence / Eugene C. Nelson .. [et al.], 1st ed., San Francisco : Jossey-Bass, c2011., [9780470385340 (pbk.)], [0470385340 (pbk.)].

ME4181 Management in Clinical Care III

(3 - 0 - 12. Prerequisites: None. RCA13)

Equivalence: None

It is a course of theoretical concepts and foundations to develop skills that students learn and implement applied concepts that involve the quality of clinical care which intends defined in three moments of quality: contextualization of the quality, measurement and evaluation and intervention. Led in three areas of the field of application of knowledge such as: patient safety, evaluation and improvement of the quality and management. It requires knowledge of clinical processes and management, Fundamentals of research methodology, as well as understanding of health organizations for the identification and evaluation of processes and structure of care. As a learning outcome is expected that the student perform projects specific integrators of the content of this field-aligned to hospital practice.

General objective: Residents will be able to:

- Identify the specific aspects related to the contextualization, measurement and evaluation and intervention of the in general health services, hospital processes, outpatient units as well as the foundations of quality, safety and management.
- Get involved in the health care environment, understanding the complexity of organizations of attention to the health and the patient-centered approach.
- Apply the knowledge essential for evidence-based medicine. Apply concepts theorists/academics in clinical practice.

Key words: Quality management in health services. Patient safety. Adverse event.

Bibliography: * , Quality by design : a clinical microsystems approach / Eugene C. Nelson, Paul B. Batalden, Marjorie M. Godfrey, editors ; foreword by Donald M. Berwick., 1st ed., [Lebanon, NH] : Center for the Evaluative Clinical Sciences at Dartmouth ; San Francisco : Jossey-Ba, [9780787978983 (rústica)], [0787978981 (rústica)].

ME4182 Hospital Practice III

(0 - 60 - 12. Prerequisites: None. RCA13)

Equivalence: None

It is a clinical course intended for students to develop and enforce skills and competencies aligned to the academic program of the specialty. It requires basic knowledge of clinical assistance in the core clinical specialties and in support clinical services; and leadership, communication and team working skills. As a learning outcome is expected that the student will be able to leader and get involved in multidisciplinary groups, implementing systems of quality and patient safety improvement at the front line services, follow up and implement a quality and patient safety improvement project; with collaborative learning. He/she will identify and follow up clinical guidelines and identify care deviations.

General objective: Resident will be able to:

- Develop skills to analyze hospital processes of specialties in services of Anesthesiology, laboratory, radiology, transplantation, pharmacy, quality, reflecting their knowledge and understanding of such services in the areas of clinical operation.
- Develop teaching skills for the supervision of residents of minor hierarchy, as well as medical students and nurses. Develop abilities and skills focusing on collaboration and execution with supervision. In addition to develop skills, attitudes and values in the care and safety for patients, their academic objectives focus on the initial phase of the second level of breadth and depth in the analysis and identification of areas of opportunity to improve the quality of health services.
- Use electronic information search tools to apply to the improvement of the processes and learn to use the basic tools of the quality spend solving problems.
- Implementation of projects that promote the safety of patients. Development and follow-up to the

clinical Microsystem through the design of methodologies of control and monitoring of the performance of the system.

- Follow-up on its protocol of research according to the methodology of the tutor.

Key words: Continuous improvement. Patient safety. Clinical microsystems. Clinical care processes. Adverse event.

Bibliography: *, Value by design : developing clinical microsystems to achieve organizational excellence / Eugene C. Nelson .. [et al.], 1st ed., San Francisco : Jossey-Bass, c2011., [9780470385340 (pbk.)], [0470385340 (pbk.)].

ME4183 Ambulatory and Hospitalized Care in Pediatrics I

(0 - 60 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to learn the concept of patient care, especially how to observe and collaborate under supervision in the care of the most common diseases of general pediatrics. It requires theoretical knowledge of the basics of pediatrics. As a learning outcome, students must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this Ambulatory and Hospitalized Care in Pediatrics I course, residents will be able to:

- Solve basic problems of pediatric consultations in ambulatory and hospitalized settings, through the application on acquired theoretical knowledge.
- Do a complete and perfect pediatric physical exam.
- Interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Properly apply programs for Well Kid care, disease and accident prevention.
- Communicate with patients and with different members of the Health Care system, in an objective, warm and humane manner.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: *, The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME4184 Pediatrics I

(3 - 0 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a theoretical course that aims for residents to develop knowledge on the pathologies present in hospitalized and ambulatory settings, normal growth and development, disease prevention and accident prevention in pediatrics. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatric I course, students will be able to:

- Understand pediatric pathologies in hospitalized and ambulatory settings.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Ambulatory pediatrics. Growth and normal development. Pediatric hospital.

Bibliography: *, The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME4185 Ambulatory and Hospitalized Care in Pediatrics II

(0 - 60 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to learn the concept of patient care, especially how to observe and collaborate under supervision during the care of the most common diseases of general pediatrics. He will develop a complete and perfect History and Physical and patient notes of the most common diseases of general pediatrics in non-complicated hospitalized settings and ambulatory settings. He will obtain the knowledge needed to manage the 20 most common pathologies in Pediatrics. It requires theoretical knowledge of the basics of pediatrics. As a learning outcome, residents must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this Ambulatory and Hospitalized Care in Pediatrics II course, residents will be able to:

- Solve basic problems of pediatric consultations in ambulatory and hospitalized settings, through the application on acquired theoretical knowledge.
- Do a complete and perfect pediatric physical exam.
- Interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Properly apply programs for Well Kid care, disease and accident prevention.
- Communicate with patients and with different members of the Health Care system, in an objective, warm and humane manner.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care. Pediatric pathology.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037], [0323053033].

ME4186 Pediatrics II

(3 - 0 - 12. Prerequisites: [ME4184]. REN13)

Equivalence: None

It is a theoretical course that aims for residents to develop knowledge on the correct clinical management, diagnosis and treatment of the main pathologies in pediatrics. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatric II course, students will be able to:

- Understand pediatric pathologies in hospitalized and ambulatory settings.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Ambulatory pediatrics. Pediatric hospital. Pediatric pathologies.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME4187 Ambulatory and Hospitalized Care in Pediatrics III

(0 - 60 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to learn the concept of patient care, especially how to observe and collaborate under supervision during the care of the most common diseases of general pediatrics. He will develop a complete and perfect History and Physical and patient notes of the most common

diseases of general pediatrics in non-complicated hospitalized settings and ambulatory settings. He will obtain the knowledge needed to manage the 20 most common pathologies in Pediatrics. He will also perform basic procedures of Pediatrics. It requires theoretical knowledge of the basics of pediatrics. As a learning outcome, residents must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this Ambulatory and Hospitalized Care in Pediatrics III course, residents will be able to:

- Solve clinical problems of pediatric consultations in ambulatory and hospitalized settings, through the application on acquired theoretical knowledge.
- Do a complete and perfect pediatric physical exam.
- Perfectly interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Apply with greater accuracy programs for Well Kid care, disease and accident prevention.
- Communicate with patients and with different members of the Health Care system, in an objective, warm and humane manner.
- Teach younger residents and students, and share the knowledge and experience they've acquired.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME4188 Pediatrics III

(3 - 0 - 12. Prerequisites: [ME4186]. REN13)

Equivalence: None

It is a theoretical course that aims to complete previous knowledge of the pathologies found in hospitalized and ambulatory settings, of normal growth and development evaluation, and prevention of diseases and accidents in pediatrics. It requires pre-

vious knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatric III course, students will be able to:

- Perfectly understand pediatric pathologies in hospitalized and ambulatory settings.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Ambulatory pediatrics. Disease prevention. Pediatric hospital.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME4189 Ambulatory and Hospitalized Care in Pediatrics IV

(0 - 60 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to perfect the skills needed to develop a complete and ideal physical exam on a pediatric patient, as well as the skills to analyze and integrate information from paraclinical studies to physical exam to obtain a correct and integral diagnosis with actualized therapeutic plans. It requires theoretical knowledge of the basics of pediatrics. As a learning outcome, students must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this course, residents will be able to:

- Solve clinical problems of pediatric consultations in ambulatory and hospitalized settings, through the application on acquired theoretical knowledge.
- Do a complete and perfect pediatric physical exam.
- Perfectly interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Apply with greater accuracy programs for Well Kid care, disease and accident prevention.
- Communicate with patients and with different members of the Health Care system, in an objective, warm and humane manner.
- Teach younger residents and students, and share the knowledge and experience they've acquired.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037], [0323053033].

ME4190 Pediatrics IV (3 - 0 - 12. Prerequisites: [ME4188]. REN13) **Equivalence: None**

It is a theoretical course that aims for residents to develop deeper knowledge on the pathologies present in hospitalized and ambulatory settings, normal growth and development, disease prevention and accident prevention in pediatrics. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatric IV course, students will be able to:

- Perfectly understand pediatric pathologies in hospitalized and ambulatory settings.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.

- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Ambulatory pediatrics. Pediatric hospital.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME4191 Medical Care in Neonatology I (0 - 60 - 12. Prerequisites: None. RNE13) **Equivalence: None**

This clinical course aims for the student to review the characteristics of neonatal medical history, and the initial approach to study the neonatal patient. Requires basic Propaedeutic in Pediatrics. As a result of learning activities, the student is expected to recognize the healthy newborn, and become proficient in neonatal resuscitation, to learn the initial approach to the sick term and preterm neonate, in the areas of respiratory, metabolic and hematologic diseases.

General objective: Know and use the NOM's (Norma Oficial Mexicana) on clinical record, learn and use skills and professional ethics in the neonatal patient care, neonatal clinical history, masters the knowledge inherent in pregnancy and childbirth, diagnosis and management of fetal status, birth, resuscitation and perinatal asphyxia, identify and treat newborn of normal or low risk, as well as becoming capable of identifying respiratory, metabolic and hematological problems. It should also be able to develop expert skills in the specialty and analytics related to the above premises.

Key words: Pregnancy. Birth. Respiratory, hematological and metabolic abnormalities.

Bibliography: * Young, Thomas E., Neofax / Thomas E. Young y Barry Mangum., 18a ed., Buenos Aires

; Madrid : Medica Panamericana, c2006., spaeng, [9500615827],[8479036257].

ME4192 Neonatology I

(3 0 12. Requisitos: No tiene. RNE13)

Equivalencias: No tiene

A theoretical foundations course, it is intended that students learn the factors of pregnancy and childbirth, respiratory, metabolic and hematological conditions and their influence on the evolution of the normal newborn and low risk neonate. Apply clinical reasoning, using critical thinking and apply evidence-based medicine during classes or seminars on the subject. Requires basic knowledge of anatomy, physiology, embryology and biochemistry. As learning outcome is expected that students be able to analyze clinical cases, appraise scientific literature and solve written examinations.

General objective: After completing these course theoretical activities, it is expected that students master the knowledge inherent in the following general topics: Pregnancy and Childbirth; Diagnosis and management of fetal status, birth, resuscitation and perinatal asphyxia, normal or low risk newborn, breathing, metabolic and hematological problems. It should also be able to develop expert skills in their specialty and analytics related to the above premises.

Key words: Respiratory diseases. Pregnancy. Hermatologic diseases. Metabolic diseases. Birth.

Bibliography: * , Fetal and neonatal physiology / [edited by] Richard A. Polin, William W. Fox, Steven H. Abman., 3rd ed., Philadelphia, Pa. : Saunders, 2004., [0721696546 (juego)], [9780721696546 (juego)], [9997628268 (v. 1)], [9997628314 (v. 2)].

ME4193 Medical Care in Neonatology II

(0 - 60 - 12. Prerequisites: None. RNE13)

Equivalence: None

It is a clinical course that is intended to introduce students to the neonatal dental problems, as well as to Neonatal and Fetal Nutrition and Neonatal Infectious Diseases, Neonatal Neurology, Cellular and Molecular Pharmacology and Neonatal Ophthalmology. It is

expected to develop a logical system of monitoring of a hospitalized neonate, with emphasis on the process of study, analysis and recording of information. Requires basic computer skills, propedeutics, ethics and professionalism. As main learning outcome it is expected that students can diagnose and treat simple neonatal disease holistically.

General objective: Be able to diagnose and treat simple neonatal disease related to: Dental development, Neonatal Fetal Nutrition and Neonatal Infectious Diseases, Neonatal Neurology, Cellular and Molecular Pharmacology and Neonatal Ophthalmology.

Key words: Neonatal diseases. Neonatal pharmacology. Neonatal nutrition. Neonatal ophthalmology. Neonatal neurology.

Bibliography: * Young, Thomas E., Neofax / Thomas E. Young y Barry Mangum., 18a ed., Buenos Aires ; Madrid : Medica Panamericana, c2006., spaeng, [9500615827],[8479036257].

ME4194 Neonatology II

(3 - 0 - 12. Prerequisites: None. RNE13)

Equivalence: None

A theoretical foundations course in which it is intended that students learn the nutritional, pharmacological, digestive, neurological and ophthalmic conditions and their influence on the evolution of newborn of normal and high risk. Apply clinical reasoning, using critical thinking and apply evidence-based medicine during classes or seminars on the subject. Requires basic knowledge of anatomy, physiology, embryology and biochemistry. As learning outcome is expected that students be able to analyze clinical cases, appraise scientific literature and solve written examinations.

General objective: Master the skills inherent in the following general topics: dental, Fetal and neonatal Nutrition and Neonatal Infectious Diseases, Neonatal Neurology, Cellular and Molecular Pharmacology and Neonatal Ophthalmology. It should also be able to develop expert skills in their specialty and analytics related to the above premises.

Key words: Neonatal diseases. Neonatal neurology. Neonatal ophthalmology. Neonatal pharmacology. Neonatal nutrition.

Bibliography: * , Avery's neonatology : pathophysiology & management of the newborn / edited by Mhairi G. MacDonald, Mary M.K. Seshia, Martha D. Mullett., 6th ed., Philadelphia : Lippincott Williams & Wilkins, c2005., [0781746434].

ME4195 Medical Care in Neonatology III

(0 - 60 - 12. Prerequisites: None. RNE13)
Equivalence: None

It is a course that is intended for the student to go deeper into the evaluation and management of patients with cardiac diseases, nephro-urology disorders, endocrinology and gastroenterology progressively more severe. Requires basic propaedeutic and ethics skills, and an attitude of professionalism. As a main learning outcome it is expected that students can collaborate and perform, under supervision, the proper health care processes for simple, complex, frequent and infrequent neonatal problems. The student participates in diagnostic and treatment decision-making of different patients in their service. Also, acts as advisor for undergraduate students at the start of their clinical care activities.

General objective: During the third semester, the resident is an active part in the comprehensive care of patients with simple, complex, frequent and infrequent neonatal pathology. Develops abilities and skills focused on collaboration and execution monitoring. In addition to developing skills and attitudes and values in relation to patients, their academic goals focus on the initial phase of the second level of breadth and depth in the care of neonatal health problems related to: Embryology, Genetics of Development Neonatal Cardiology, Neonatal Nephrology and Urology, Gastroenterology, Neonatal Follow-Up and Neurodevelopment and Neonatal Endocrinology. Reinforces the habits of availability to provide assistance and ongoing medical care and for educating the patient and family in health habits, promote activities of early detection of diseases and establish treatment guidelines Establishes in accordance with its research tutor a thesis proposal. Continues to use

electronic search tools to apply information to solving clinical problems and learn the basic tools for managing clinical databases.

Key words: Embryonic development, fetal and newborn. Neonatal cardiology. Developmental genetics. Neonatal gastroenterology. Neonatal endocrinology.

Bibliography: * Young, Thomas E., Neofax / Thomas E. Young y Barry Mangum., 18a ed., Buenos Aires ; Madrid : Medica Panamericana, c2006., spaeng, [9500615827],[8479036257].

ME4196 Neonatology III

(3 - 0 - 12. Prerequisites: None. RNE13)
Equivalence: None

A theoretical foundations course in which it is intended that students learn the genetic and embryologic foundations of normal and abnormal development of the baby, understand the normal and pathological development of the cardiovascular, digestive, endocrine, nephrourological system, and monitoring neonatal neurodevelopment. Apply clinical reasoning, using critical thinking and apply evidence-based medicine during classes or seminars on the subject. Requires basic knowledge of Anatomy, Histology, Embryology, Genetics, Biochemistry, Pathology and Cell Biology. As learning outcome is expected that students be able to analyze clinical cases, appraise scientific literature and solve written examinations.

General objective: Master the skills inherent in the following general topics: Embryology, Genetics of Development, Neonatal Cardiology, Nephrology and Urology Neonatal Neonatal Gastroenterology, Monitoring and Neurodevelopment, and Neonatal Endocrinology. It should also be able to develop expert skills in their specialty and analytics related to the above premises.

Key words: Neonatal cardiology. Neonatal gastroenterology. Neonatal endocrinology. Neonatal development. Neonatal nephrourology.

Bibliography: * Michael Artman, Lynn Mahoney, David F Teitel, Neonatal Cardiology , 1 edition , McGraw-Hill Professional;, English, [0070070989].

ME4197 Critical Care Medicine I (3 - 0 - 12. Prerequisites: None. REE13) Equivalence: None

It's a course based on theoretical concepts intended for the students to be formed as experts in the management of cardiovascular and respiratory diseases in the intensive care unit (ICU) as well as in the use of mechanical ventilation. It requires basic knowledge of the cardiovascular and respiratory pathophysiology as well as of the major syndromes associated with these systems. As a result, it is expected that the student will be capable of answering multiple-choice tests, exposing clinical cases and bibliographic reviews and making self-criticism of the knowledge acquired in cardiovascular and respiratory areas.

General objective: Student will be able to:

- 1) Understand the basics of physiology, pathophysiology, clinical scales and general monitoring of the critically ill patients.
- 2) Understand the clinical features, pathophysiology, therapeutic principles, and interpretation of data from invasive and non-invasive monitoring devices (floatation catheter and monitoring of cardiac output by other techniques) as well as interpretation of diagnostic tools for the main cardiovascular pathologies.
- 3) Understand the clinical features, pathophysiology, ventilatory, as well as the interpretation and therapeutic principles of the ventilator monitoring and gasometric and diagnostic in critically ill patients for the major respiratory diseases.

Key words: Systemic inflammatory response syndrome. Respiratory failure. Mechanical ventilation. Shock. Hemodynamic monitoring.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME4198 Medical Care in Critical Medicine I (0 - 60 - 12. Prerequisites: None. REE13) Equivalence: None

It's a course based on clinical activities intended for the students to acquire clinical skills expertise in the management of cardiovascular, respiratory, renal and metabolic diseases through the practice of physical examination and monitoring of the patients from the ICU. It requires basic knowledge in Critical Care Medicine. As a result it is expected that the student will be capable of performing procedures related to the area of interest, exposing clinical cases and clinical reviews from the literature and making self-criticism of the knowledge acquired in these areas.

General objective:

- 1) To practice the daily use and interpretation of severity and prognostic scales of injury, as well as learning the universal criteria of admission and discharge of the ICU, while acquiring the knowledge, skills and values described in the ethics and professionalism competition.
- 2) To observe and learn the methods for carrying out the installation of all available methods of cardiovascular monitoring, as well as all available types of multilumen catheters installed in a central vein either for monitoring or therapeutic purposes through all the available paths, such as jugular, subclavian or femoral approaches, including long catheter insertion in a central vein from a peripheral approach. The installation of the catheters should always be carried out with the supervision of a senior resident or professor.
- 3) To learn the basic principles of use of the available mechanical ventilators and their equipment, including the programming modes for different pathologies and the use of the diverse modalities of ventilatory monitoring.

Key words: Severity scales. Ventilatory assistance. Vascular access. Clinical files. Admission criteria.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME4199 Critical Care Medicine II
(3 - 0 - 12. Prerequisites: None. REE13)
Equivalence: None

It's a course based on theoretical concepts intended for the students to be formed as experts in the management of neurologic, metabolic, renal, hematologic, infectious and endocrine diseases in the intensive care unit (ICU). It requires basic knowledge of the pathophysiology as well as of the major syndromes associated with these systems. As a result it is expected that the student will be capable of answering multiple-choice tests, exposing clinical cases and bibliographic reviews and making self-criticism of the knowledge acquired in these areas.

General objective: Students will be able to:

- 1) Understand the basics of physiology, pathophysiology, therapeutical principles and interpretation of laboratory tests that evaluate the renal, endocrine and metabolic function of the critically ill patients.
- 2) Describe the clinical features, pathophysiology, therapeutic principles, and interpretation of data from invasive and non-invasive monitoring devices (clinical evaluation scales, intracranial pressure monitoring) as well as interpretation of diagnostic tools for the main neurologic pathologies.
- 3) Understand the clinical features, pathophysiology, therapeutical principles, diagnostic and laboratory tests that evaluate the hematologic pathologies in the ICU patients
- 4) Understand the clinical features, pathophysiology, therapeutical principles, diagnostic and laboratory tests that evaluate the infectious pathologies in the ICU patients

Key words: Renal failure. Nosocomial infection. Neuro-monitoring. Coma State. Metabolic acidosis.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME4200 Medical Care in Critical Medicine II
(0 - 60 - 12. Prerequisites: None. REE13)
Equivalence: None

It's a course based on clinical activities intended for the students to acquire high degree medical skills in the management of neurologic, hematologic, infectious and traumatic diseases through the practice of physical examination and monitoring of the patients from the ICU. It requires basic knowledge from the Critical Care Medicine II course. As a result it is expected that the student will be capable of performing procedures related to the area of interest, exposing clinical cases and clinical reviews from the literature and making self-criticism of the knowledge acquired in these areas.

General objective:

- 1) To learn the different dialysis techniques for supporting the patient with renal failure and to select the laboratory tests that evaluate the endocrine and metabolic function according to the critically ill patient requirements under the supervision and monitoring of a senior resident or professor
- 2) To learn the interpretation of invasive and non-invasive monitoring devices (clinical evaluation scales, intracranial pressure monitoring) as well as interpretation of diagnostic tools for the main neurologic pathologies, under the supervision and monitoring of senior resident or professor.
- 3) To learn about the diagnostic tools (bone marrow puncture) and laboratory tests that are useful in critically ill patient with hematologic diseases, under the supervision of a senior resident or professor
- 4) To learn about the diagnostic tools and laboratory tests that are useful in critically ill patient with infectious diseases, under the supervision of a senior resident or professor

Key words: Dialysis. Antibio-gram. Sepsis scales. Neurologic evaluation. Metabolic derangements.

ME4201 Medical Care in Geriatrics and Gerontology I

(0 - 60 - 12. Prerequisites: None. RGE13)

Equivalence: None

It is a clinical course aimed to obtain a full medical history, provide supervised medical care to hospitalized geriatric patients, while working with an interdisciplinary team of specialized physicians and other health care professionals. Residents will also have indicated and done basic therapeutic procedures for the care of the older patient. It requires basis knowledge of Internal Medicine and Geriatrics. Learning outcome: residents are expected to elaborate full medical histories, according the official national norms and international standards.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence.
- Identify the responsibilities of every member of the interdisciplinary medical team.
- Elaborate a diagnosis and diagnostic, therapeutic and preventive plan for the geriatric patient.
- Be able to indicate and do the following procedures: urinary catheterization, nasogastric catheterization, orotracheal intubation, basic and advanced CPR, obtaining blood samples for blood cultures and obtaining arterial blood samples.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.-Show respect to every patient and their autonomy.
- Take into considerations the patient's, physician's and families religious and moral beliefs into the health care management plans.
- Include the family and care-giver of the patient into the interdisciplinary team.

Key words: Old Age Hospitalization. Basic procedures. Complete Clinical History. Acute Care.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME4202 Medical Care in Geriatrics and Gerontology II

(0 - 60 - 12. Prerequisites: None. RGE13)

Equivalence: None

This is a clinical course aimed to provide supervised medical care to hospitalized geriatric patients, while working with an interdisciplinary team of specialized physicians and other health care professionals. At the same time, residents will also provide supervised care of patients with dermatological and rheumatological problems, as well as have indicated and properly done a vascular access in an elder patient. It requires basis knowledge of Internal Medicine and Geriatrics. Learning outcome: residents are expected to develop a portfolio of clinical cases and procedures elaborated during their rotations.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence, with emphasis on dermatological and rheumatological diseases.
- Explain the responsibilities of every member of the interdisciplinary medical team.
- Elaborate a diagnosis of patients, with emphasis on dermatological and rheumatological diseases.
- Generate a diagnostic, therapeutic and preventive plan for the geriatric patient, with emphasis on dermatological and rheumatological diseases.
- Be able to indicate and do the following procedures: insertion of a PICC, subclavian insertion of a central catheter, and jugular insertion of a central catheter.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Show respect to every patient and their autonomy.
- Take into considerations the patient's, physician's and families' religious and moral beliefs into the health care management plans.
- Include the family and care-giver of the patient into the interdisciplinary team.

Key words: Old age hospitalization. Reumatology. Dermatology. Central vascular access. Acute care in the elder patient.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair,

John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME4203 Medical Care in Geriatrics and Gerontology III

(0 - 60 - 12. Prerequisites: None. RGE13)

Equivalence: None

This is a clinical course aimed to provide supervised medical care to hospitalized geriatric patients with cardiac, gastroenterology, pneumology, endocrinology and emergency diseases, while supervising first year residents. It requires basis knowledge of Geriatrics and Gerontology. Learning outcome: residents are expected to elaborate a portfolio of clinical cases and medical procedures.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence, with emphasis on cardiology, gastroenterology, pneumology, endocrinology and emergencies.
- Identify the responsibilities of every member of the interdisciplinary medical team.
- Elaborate a diagnosis of patients, with emphasis on cardiology, gastroenterology, pneumology, endocrinology and emergencies.
- Elaborate a diagnostic, therapeutic and preventive plan for the geriatric patient, with emphasis on cardiology, gastroenterology, pneumology, endocrinology and emergencies.
- Be able to indicate and do the following procedures: therapeutic and diagnostic thoracocentesis, percutaneous pleural biopsy, therapeutic and diagnostic paracentesis, insertion of temporal pacemaker and a balloon catheter insertion.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Show respect to every patient and their autonomy.
- Take into considerations the patient's, physician's and families' religious and moral beliefs into the health care management plans.
- Include the family and care-giver of the patient into the interdisciplinary team.

Key words: Cardiology. Acute care unit for the old age. Hospital On-Call. Urgencies. Endocrinology.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME4204 Medical Care in Geriatrics and Gerontology IV

(0 - 60 - 12. Prerequisites: None. RGE13)

Equivalence: None

This is a clinical course aimed to provide supervised medical care to hospitalized geriatric patients with psychiatric, neurological, oncological, hematological and nephrological diseases, while supervising first year residents. It requires basis knowledge of Geriatrics and Gerontology. Learning outcome: residents are expected to elaborate a portfolio of clinical cases and medical procedures.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence, with emphasis on psychiatric, neurological, oncological, hematological and nephrological diseases.
- Explain the responsibilities of every member of the interdisciplinary medical team.
- Elaborate a diagnosis, with emphasis on psychiatric, neurological, oncological, hematological and nephrological diseases.
- Elaborate diagnostic, therapeutic and preventive plan for the geriatric patient, with emphasis on psychiatric, neurological, oncological, hematological and nephrological diseases.
- Be able to indicate and do the following procedures: lumbar puncture, bone and bone marrow biopsy, bone marrow puncture, Mahurkar catheter insertion, peritoneal dialysis.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Show respect to every patient and their autonomy.
- Take into considerations the patient's, physician's and families' religious and moral beliefs into the health care management plans.
- Include the family and care-giver of the patient into the interdisciplinary team.

Key words: Psychiatry. Nephrology. Hematology. Oncology. Neurology.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553], [9780470090558].

ME4205 Radiology and Image I

(3 - 0 - 12. Prerequisites: None. RER13)

Equivalence: None

This is a theoretical course that aims for the study of physics in radiology. It does not require prior knowledge of physics. As a learning outcome, residents are expected to present reports, classes and pass a final exam.

General objective: In this course the student will understand the physical principles of electromagnetic radiation and other energy forms as applied to the main imaging modalities: radiography, fluoroscopy, computed tomography, nuclear medicine imaging, single photon emission tomography, positron emission tomography, sonography, and magnetic resonance imaging. Nuclear physics, radiation biology, radiation safety and quality assurance principles associated to these imaging modalities are also introduced.

Key words: Electromagnetic radiation. Radiation biology. Nuclear physics. Computed tomography.

Bibliography: * Bushberg, The Essential Physics of Diagnostic Imaging, Williams & Wilkins.

ME4206 Medical Care in Radiology and Image I

(0 - 60 - 12. Prerequisites: None. RER13)

Equivalence: None

It is a theoretical course that aims for residents to study normal and abnormal radiographic anatomy seen in plain x rays, fluoroscopy and contrast studies. It does not require prior knowledge. As a learning outcome, residents are expected to present cases and images.

General objective: Student will be able to develop the necessary skills to help in the execution of the studies. Emphasis will be made in the identification of the normal and abnormal anatomy in conventional X rays studies, fluoroscopy and studies with contrast media.

Key words: X rays. Fluoroscopy and studies with contrast media.

Bibliography: * Wicke, Lothar., Atlas of radiologic anatomy / Lothar Wicke, with the collaboration of Wilhelm Firbas and Roland Schmiedl ; translated and edited by Anna N. Taylor, with the collaboration of Kenneth C. Taylor ; radiographic images by Andreas Braunsteiner .. [et al.], 6th English ed., Baltimore : Williams & Wilkins, c1998., engger, [0683301276].

ME4207 Radiology and Image II

(1.5 - 0 - 6. Prerequisites: None. RER13)

Equivalence: None

This is a theoretical course that aims for residents to study chest radiology. As a learning outcome, residents are expected to present classes, reports, and pass a final exam.

General objective: In this course the student will be able to understand the embryology, histology and the anatomy of the thorax and the respiratory system and will be able to apply, describe and read all the diagnostic and therapeutic studies of this area.

Key words: Diagnostic Studies of the Respiratory System. Therapeutic Studies of the respiratory system.

Bibliography: * Felson, Benjamin., Chest roentgenology / Benjamin Felson., Philadelphia : W. B. Saunders Co., 1973., [0721635911].

ME4208 Medical Care in Radiology and Image II

(0 - 60 - 12. Prerequisites: None. RER13)

Equivalence: None

It is a clinical course that aims to provide students with the knowledge and practice of different studies

and procedures available in their area of study, emphasizing plain x rays, fluoroscopy and contrast studies. As a learning outcome, residents are expected to develop a portfolio of diagnostics studies and procedures developed during their rotation.

General objective: Student will be able to develop the necessary skills to participate in the execution of those studies. There will be emphasis in the identification and solution of problems in the areas of plain X rays studies, fluoroscopy and studies with contrast media. **Key words:** X rays. Fluoroscopy and studies with contrast media.

Bibliography: * Meyers, Morton A., Dynamic radiology of the abdomen : normal and pathologic anatomy / Morton A. Meyers ; with contributions by Stephen R. Baker .. [et al.], 5th ed., New York : Springer, 2000., [0387988459 (encuadernado: papel alcalino)].

ME4209 Advanced Physics (1.5 - 0 - 6. Prerequisites: None. RER13) **Equivalence: None**

This is a theoretical course that provides the scientific and technological basis of the design and use of advanced imaging systems and the risks associated to ionizing radiations. The course contributes to develop the ethical-professional responsibility of Radiologists in their professional practice applying and promoting the universal principles of radiation safety. The course requires previous knowledge on Radiology Physics from Radiology and Image 1. As a learning outcome, residents are expected to present reports, classes and pass a final exam.

General objective: In this course students learn the physical principles of the design, use, and optimization of dose and image quality in modern computed tomography and magnetic resonance imaging. The course includes the study of the interactions of radiation with matter in the biological perspective, the biological effects of radiation in Diagnostic Radiology, and the universal principles of radiation safety.

Key words: Computed tomography. Magnetic resonance imaging. Radiology physics. Radiation protection. Biological Effects of Radiation.

Bibliography: * Hall, Eric J., Radiobiology for the radiologist / Eric J. Hall and Amato J. Giaccia., 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781741513 (papel alcalino)].

ME4210 Radiology and Image III (3 - 0 - 12. Prerequisites: None. RER13) **Equivalence: None**

It is a theoretical course that aims for residents to study the radiology of the musculoskeletal system. As a learning outcome, residents are expected to present classes, reports and approve a final exam.

General objective: In this course the student will be able to understand the embryology, histology and the anatomy of the musculoskeletal system and will able to apply and describe all the diagnostic and therapeutic studies of this area.

Key words: Diagnostic Studies of the Musculoskeletal System. Therapeutic Studies of the musculoskeletal system.

Bibliography: * , Diagnóstico por imagen : tratado de radiología clínica / edición dirigida por Cesar S. Pedrosa y Rafael Casanova Gomez., 2a ed., Madrid : McGraw-Hill, c2004., [8448602978 (Obra completa)], [8448602994 (v. 1)], [8448603052 (v. 2)].

ME4211 Medical Care in Radiology and Image III (0 - 60 - 12. Prerequisites: None. RER13) **Equivalence: None**

It is a clinical course that aims to provide students with the knowledge and practice of different studies and procedures available in their area of study, emphasizing Ultrasound and computed tomography. As a learning outcome, residents are expected to develop a portfolio of diagnostics studies and procedures developed during their rotation.

General objective: In this course the student will be able to develop the necessary skills to help in the execution of the studies and procedures done in Radiology. The Student will be involved more specifically in the identification of the normal and abnormal

anatomy in studies of Ultrasound and Computerized Axial Tomography.

Key words: Ultrasound. Computerized axial tomography.

Bibliography: * , Computed tomography of the human body : an atlas of normal anatomy / Ralph J. Alfidi .. [et al.], Saint Louis : Mosby, 1977., [0801601169].

ME4212 Radiology and Image IV (3 - 0 - 12. Prerequisites: None. RER13) **Equivalence: None**

It is a theoretical course that aims for residents to study the radiology of the digestive system. It does not require prior knowledge. As a learning outcome, residents are expected to present classes, reports and approve a final exam.

General objective: In this course the student will review the embryology, histology and the anatomy of the alimentary tract and will learn to perform, describe and read all the diagnostic and therapeutic studies of this area.

Key words: Diagnostic Studies of the Abdomen. Therapeutic Studies of the Abdomen.

Bibliography: * Meyers, Morton A., Dynamic radiology of the abdomen: normal and pathologic anatomy / Morton A. Meyers ; with contributions by Stephen R. Baker .. [et al.], 5th ed., New York : Springer, 2000., [0387988459 (encuadernado: papel alcalino)].

ME4213 Medical Care in Radiology and Image IV (0 - 60 - 12. Prerequisites: None. RER13) **Equivalence: None**

It is a clinical course that aims to provide students with the knowledge and practice of different studies and procedures available in their area of study, emphasizing ultrasound and computerized tomography. As a learning outcome, residents are expected to develop a portfolio of diagnostic studies and procedures developed during their rotation.

General objective: In this course the student will be able to develop the necessary skills to help in the execution of the studies and procedures done in Radiology. The Student will be involved more specifically in the identification of the normal and abnormal anatomy in studies of Ultrasound and Computerized Axial Tomography.

Key words: Ultrasound. Computerized axial tomography.

Bibliography: * Hagen-Ansert, Sandra L., Textbook of diagnostic ultrasonography / Sandra L. Hagen-Ansert., 6th ed., St. Louis, Mo. : Mosby Elsevier, c2006., [0323028039], [9780323028035].

ME4214 Neurology I (3 - 0 - 12. Prerequisites: None. REU13) **Equivalence: None**

In this theoretical course, the student will acquire a profound knowledge of: embryogenesis of the central and peripheral nervous system, neurophysiology, anatomy of neurologic systems, functional anatomy, neuronal plasticity, and aging. It requires basic knowledge in anatomy, physiology, neurophysiology, and embryology. As a learning outcome, the student is expected to do detailed and thorough presentations of the central and peripheral nervous systems anatomy, of neurophysiology, and of research on basic neuroscience.

General objective: At the end of the course, the resident will be able to:

- Understand the foundations of basic and clinical sciences related with the neurophysiology of the nervous system.
- Know the basis embryogenesis of the central and peripheral nervous system, neurophysiology, anatomy of neurologic systems, functional anatomy, neuronal plasticity, and aging; and the anatomical-clinical correlation method and its implication in the study of syndromic diagnosis.

Key words: Neuroanatomy. Neurophysiology.

Bibliography: * , Merritt's neurology / edited by Lewis P. Rowland., 10th ed., Philadelphia, PA : Lippincott Williams & Wilkins, c2000., [0683304747 (cloth)].

ME4215 Medical Care in Neurology I (0 - 60 - 12. Prerequisites: None. REU13) Equivalence: None

In this clinical course, the student will obtain truthful and timely information from a neurological pathology with the different techniques of physical examination. It requires basic knowledge of medical clinic, doctor-patient relationship, and systemic physical examination. As a learning outcome, the student will describe a neurologic medical history and establish the different pathological findings of the nervous system, as well as, the normality in a patient with neurological disturbance.

General objective: At the end of the course, the resident will have developed attitudes, skills, and professional abilities of a neurologist towards his patients, his family, and other health professionals, emphasizing his capacity for:

- Taking the medical history.
- Proposing diagnostic hypotheses.
- Formulating indications.
- Reviewing and interpreting paraclinical studies.
- Doing procedures, final diagnosis, and therapeutic, preventive, and rehabilitation plans, and communicating this information effectively.

Key words: Physical examination. Medical history.

Bibliography: * , Merritt's neurology / edited by Lewis P. Rowland., 10th ed., Philadelphia, PA : Lippincott Williams & Wilkins, c2000., [0683304747 (cloth)].

ME4216 Neurology II (3 - 0 - 12. Prerequisites: None. REU13) Equivalence: None

In this theoretical course, the student will obtain the necessary knowledge in order to diagnose, classify, and give medical and non-medical treatment in the different cephalalgia diagnosis, besides giving a differential diagnosis of convulsive crisis and abnormal non-convulsive movements; also, he will be able to classify convulsive crisis in epileptics and non-epileptics. The course requires basic knowledge in neurological exploration and localization. The student will begin to carry out the systematic method for neurological diagnostic. As a learning outcome, the

student is expected to analyze and present orally the neurological diagnosis method of a clinical case; to recognize and do the differential diagnosis of the different types of cephalalgia, as well as the clinical diagnosis, classification, and medical management of convulsive epileptic and non-epileptic movements.

General objective: At the end of the course, the resident will be able to:

- Know the bases and the method to make the medical history, the neurologic exploration, the anatomo-clinical correlation, the problem approach, the syndromic, topographic, and etiological diagnosis and its possible complications, and the differential diagnosis.
- Understand the foundations of basic and clinical sciences related with the neuroanatomy and neurophysiology of the cephalalgias.
- Do a methodic analysis of the different abnormal convulsive and pseudo convulsive movements he would be dealing with in medical practice.
- Know the different paraclinical support studies in epilepsy diagnosis.
- Develop critical knowledge in the medical management of the principal convulsive movement diagnosis, as well as the possible surgical management of epilepsy.

Key words: Headache. Epilepsy.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadernado: papel alcalino)], [007149992X (encuadernado: papel alcalino)].

ME4217 Medical Care in Neurology II (0 - 60 - 12. Prerequisites: None. REU13) Equivalence: None

In this clinical course, the student will establish competences for the correct diagnosis of the different neurologic entities, as well as the support in paraclinical studies for the corroboration of the previous diagnosis presumption. It requires basic knowledge of physical examination, neuroepidemiology, and neuropharmacology. As a learning outcome, the student will present the cases of his daily clinical care in

the different hospitals in which clinical and care rotations are made.

General objective: At the end of the course, the resident will have developed attitudes, skills, and professional abilities of a neurologist towards his patients, his family, and other health professionals, emphasizing his capacity for:

- Taking the medical history.
- Proposing diagnostic hypotheses.
- Formulating indications.
- Reviewing and interpreting paraclinical studies.
- Doing procedures, final diagnosis, and therapeutic, preventive, and rehabilitation plans, and communicating this information effectively regarding the following neurologic diseases: infectious and parasitic, cephalalgia, epilepsy, and ischemic and hemorrhagic cerebrovascular diseases.

Key words: Medical history. Headache. Paraclinical exams.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadrado: papel alcalino)], [007149992X (encuadrado: papel alcalino)].

ME4218 Neurology III

(3 - 0 - 12. Prerequisites: None. REU13)

Equivalence: None

In this theoretical course, the student will recognize diverse vascular pathologies and their etiology in order to achieve an optimal medical management in these patients; besides, he will define the normal cognitive status and establish the abnormality in the mental state, as well as its etiologic study. There is required basic knowledge in neuroanatomy, neurophysiology, and neurologic localization. As a learning outcome, the student will recognize an acute ischemic event and the proper management of the medical emergency in the cerebrovascular disease; do a scrutiny to the patients with cognitive deterioration, and discern between a reversible cognitive alteration and a non-reversible one, its differential diagnosis, and its pharmacologic and paramedic management.

General objective: At the end of the course, the resident will be able to:

- Use the different clinical scales for initial assessment and establishment of the appropriate medical management in a cerebrovascular event, as well as for the short and long-term complications.
- Establish the underlying etiology to the cerebral ischemic event.
- Evaluate the patient with cognitive deterioration and establish, using clinical guidelines and scrutiny scales, the clinical diagnosis of dementia, as well as its severity.

Key words: Cerebrovascular disease. Dementia.

Bibliography: * , Neurología clínica / Walter G. Bradley .. [et al.], España : Elsevier, 2010., [9788480864893 (Obra completa)], [9788480864855 (v.1)], [9788480864862 (v.2)].

ME4219 Medical Care in Neurology III

(0 - 60 - 12. Prerequisites: None. REU13)

Equivalence: None

In this clinical course, the student will establish the practical basis to manage patients in the emergency room of a second and third-level hospital. It requires basic knowledge of neuropharmacology, neuro-radiology, and neuroepidemiology. As a learning outcome, the student will present clinical cases of patients with emergency medical conditions in neurology.

General objective: At the end of the course, the resident will have developed attitudes, skills, and professional abilities of a neurologist towards his patients, his family, and other health professionals, emphasizing his capacity for:

- Taking the medical history.
- Proposing diagnostic hypotheses.
- Formulating indications.
- Reviewing and interpreting paraclinical studies.
- Doing procedures, final diagnosis, and therapeutic, preventive, and rehabilitation plans, and communicating this information effectively regarding the following diseases: neuropediatrics, neuroradiology, and neuropathology.

Key words: Medical history. Paraclinical exams. Neuropediatrics.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadrado: papel alcalino)], [007149992X (encuadrado: papel alcalino)].

ME4220 Fundamentals in Ophthalmology I

(3 - 0 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a theoretical course intended for the student to initiate the study of ocular anatomy and physiology related to the ocular structure and function on four initial aspects. Requires basic knowledge of general medicine, anatomy and physiology. Learning outcome is expected by the student through a portfolio of exercises suggested by Professor within platform interaction.

General objective: Residents will be able to:

- Understand the anatomy and physiology of the ocular structures, the orbit and its annexes, and importance in the physiology of the eye and the relationship with the vision
- Understand the principles of pharmacology, microbiology, toxicology, and its interaction with the eye and vision
- Understand the embryology eye orbit and the annexes and the relationship with problems of development of these structures.
- Understand of neuroanatomy applied to ophthalmology
- Understand of age related changes and its function of the structures of the eye.

Key words: Physiology of the eye. Ocular microbiology and immunology. Ocular pharmacology and toxicology. Age changes in vision and eye structures. Embryology of the eye.

Bibliography: * , Adler's physiology of the eye : clinical application / edited by Paul L. Kaufman, Albert Alm., 10th ed., St. Louis : Mosby, c2003., [0323011365].

ME4221 Medical Care and Surgery in Ophthalmology I

(0 - 60 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a clinical and surgical course intended for the initial practice for the student. Requires basic knowledge in general medicine. Learning outcome is expected that students develop a portfolio that contains evidence of the activities which he appeared.

General objective: Residents will be able to:-Identify the general principles of clinical and surgical practice in Ophthalmology.

- Know the basics of an ocular exam, the instruments required, as well as paraclinical studies and surgical methods for ophthalmological diseases.
- Know the indications, contraindications and possible complications of the diagnostic ocular exam.
- Observe and assist in diagnostic and therapeutic procedures.

Key words: Clinical ophthalmology. Clinical assessment. Surgical skills.

Bibliography: * , Principles and practice of ophthalmology / [edited by] Daniel M. Albert, Frederick A. Jakobiec ; associate editors to Dr. Jakobiec, Dimitri T. Azar, Evangelos S. Gragoudas., 2nd ed., Philadelphia : W. B. Saunders Co., c2000., [072167500X (obra completa)], [0721675018 (v. 1)], [0721675026 (v. 2)], [0721675034 (v. 3)], [0721675042 (v. 4)], [0721675050 (v. 5)], [0721675069 (v. 6)].

ME4222 Fundamentals in Ophthalmology II

(3 - 0 - 12. Prerequisites: None. REO13)

Equivalence: None

The resident will study the physiology of the eye in advanced aspects that will help to understand properly the functioning eye and vision, for learning the different subspecialties. The resident will learn basic principles of optics and refraction, and the adaptation of common visual aid devices. Learning outcome: residents are expected to show their knowledge and skills through written examinations, reports and/or clinical case studies.

General objective: Residents will be able to:

- Understand the advanced aspects of Ocular Physiology, that will help you to understand properly the functioning eye and vision, preparing the student for learning the different subspecialties.
- Identify the eye as optical instrument and analyze its optical components.
- Understand the basic principles of optics and refraction, and the adaptation of common visual aid devices.

Key words: Physiology of the eye. Ocular physiology. Optometry. Optics and refraction.

Bibliography: * , Adler's physiology of the eye : clinical application / edited by Paul L. Kaufman, Albert Alm., 10th ed., St. Louis : Mosby, c2003., [0323011365].

ME4223 Medical Care and Surgery in Ophthalmology II

(0 - 60 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a clinical course intended for the initial practice for the student in diagnostic eye examination and required equipment, paraclinical studies and surgical methods and materials to learn refraction and contact lens. Requires basic knowledge of ophthalmology and knowledge in general medicine. Learning outcome is expected that students develop a portfolio of clinical practice.

General objective: Residents will be able to:

- Identify the debts of the principles of clinical and surgical practice in Ophthalmology.
- Know the basics of a diagnostic ocular exam and refractions.
- Know the different therapeutic options for refractive errors, their indications, contraindications and possible complications.
- Observe and assist in diagnostic and therapeutic procedures.

Key words: Clinical and surgical ophthalmology. Refraction.

Bibliography: Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976.

ME4224 Oculoplastic, Pediatric Ophthalmology and Strabismus

(3 - 0 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a theoretical course intended for the student to understand Oculoplastics, Pediatric Ophthalmology and Strabismus, student should be able to identify, understand and apply their knowledge in the clinical field. Requires basic fundamentals in ophthalmology. As a learning outcome, residents are expected to show their knowledge and skills through written examinations, reports and/or clinical case studies.

General objective: Residents will be able to:

- Understand and apply their knowledge in the clinical field of Pediatric Ophthalmology .
- Understand and apply this knowledge in the clinical field of Strabismus.
- Understand the diagnosis and treatment of diseases of the tear ducts.
- Identify, understand and apply this knowledge in the clinical field of Oculoplastics and Orbit Surgery.

Key words: Pediatric ophthalmology. Strabismus. Oculoplastics. Orbit. Lacrimal system.

Bibliography: Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976.

ME4225 Medical Care and Surgery in Ophthalmology III

(0 - 60 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a clinical and surgical course intended for the practice of students in the diagnosis and management of Strabismus and Oculoplasty (eyelids, orbit and lachrymal system), as well as to acquire knowledge of the equipment, paraclinical work-up and surgical methods needed for the treatment of this diseases. It requires knowledge of the bases of ophthalmology. Learning outcome: students are expected to provide a portfolio with evidences of their practice.

General objective: Residents will

- Know the basics of an ocular exam in Pediatric Ophthalmology, Strabismus, and Oculoplastic surgery (eyelids, orbit and lachrymal system).
- Know the instruments needed, as well as paraclinical studies and surgical methods, for the resolution of diseases from these subspecialties.
- Know the indications, contraindications and possible complications.-Observe and assist in diagnostic and therapeutic procedures.
- Begin direct contact under supervision.

Key words: Strabismus. Clinical ophthalmology. Oculoplasty.

Bibliography: Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976.

ME4226 Glaucoma, Anterior Segment and Neurophthalmology

(3 - 0 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a theoretical course intended for the student to understand Glaucoma, anterior segment and neuro-ophthalmology, student should be able to identify, understand and apply their knowledge in the clinical field. Requires basic fundamentals in ophthalmology. As a learning outcome, residents are expected to show their knowledge and skills through written examinations, reports and/or clinical case studies.

General objective: Residents will be able to:- Understand and apply their knowledge in the clinical and surgical field of Glaucoma, in order to prevent blindness.

- Understand and apply this knowledge in the clinical and surgical field of Anterior segment.
- Understand the diagnosis and treatment of diseases of the visual tract, student should be able to identify, understand and apply this knowledge in the clinical field of Neuro-ophthalmology and its interaction with other subspecialties.

Key words: Glaucoma. Prevention and screening. Cataract. Neuro-ophthalmology. Anterior segment.

Bibliography: Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976.

ME4227 Medical Care and Surgery in Ophthalmology IV

(0 - 60 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a clinical and surgical course intended for the initial practice for the student in. Diagnostic eye examination and required equipment, paraclinical studies and surgical methods and materials in neuro-ophthalmology, Glaucoma and Cataract. Requires basic knowledge of ophthalmology and knowledge in general medicine. Learning outcome is expected that students develop a portfolio that contains evidence of the activities which he appeared.

General objective: At the end of the course, residents will:

- Know the basics of a diagnostic ocular exam for Neuro-Ophthalmology and Glaucoma.
- Know the instruments, paraclinical studies and surgical methods needed for the resolution of diseases from these subspecialties.
- Know the indications, contraindications and possible complications.
- Observe and/or assist in diagnostic and/or therapeutic procedures.
- Have direct participation under supervision.

Key words: Clinical neuro-ophthalmology. Surgical and clinical cataract. Clinical and surgical Glaucoma.

Bibliography: * , Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976.

ME4228 Cardiology I

3 - 0 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is a basic level course with the intention that students learn in depth the basic sciences used by cardiology. It will include basic concepts of embryology and anatomy, physiology, physiopathology,

electrocardiography, pharmacology, molecular biology, genetics, bioethics and medical cardiovascular propaedeutic. As a learning outcome, it is expected that the students will be able to demonstrate their knowledge in the fundamentals of cardiology, as well as using such knowledge in the explanation of any cardiovascular problem.

General objective: The students will be able to explain, with a clinical orientation, the anatomy, physiology, physiopathology and the embryology of the heart; understand the basic principles of the cardiovascular diagnostic methodology, the normal and abnormal electrocardiogram; identify the actions of the main cardiovascular medications; recognize the relevance of biochemistry, molecular biology, genetics and immunology; as well as to know the steps of medical propaedeutic, basic computing sciences, biostatistics; while valuing the importance of ethics in cardiovascular and general medicine.

Key words: Basic cardiology. Physiology and cardiovascular physiopathology. Molecular biology and genetics. Bioethics and medical propedeutics. Cardiovascular embryology.

ME4229 Medical Care in Cardiology I

(0 - 60 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is a basic level course with the intention that students begin to develop basic abilities and attitudes of medical care in patients with cardiovascular diseases, applying the knowledge of the different matters and subjects of general cardiology, which will be studied in a parallel theoretical course. It will focus in basic clinical propaedeutical cardiology, clinical care of patients with cardiovascular diseases, with a comprehensive overview and exposure to urgent cardiovascular problems, cardiovascular emergencies, and the most common cardiovascular diseases seen in a general cardiology practice. As a learning outcome, the students will be able to learn and build clinical histories; develop their personal and clinical relationship with cardiovascular patients and become acting part of the medical team caring for the cardiovascular patients; such team will be led by a primary physician who will also become the professor in charge of the students tutoring.

General objective: The students will be able to build clinical histories at a level of excellence, as well as collaborate and work in a medical cardiovascular team, where they will help to establish clinical diagnosis, treatment, rehabilitation and follow up of patients with the cardiac and vascular diseases most commonly seen in a general cardiology practice. The students will also develop clinical and electrocardiographic competences, and will learn to interact and communicate diligently with their peers, acting with great responsibility at the emergency room, outpatient clinic and hospital wards.

Key words: Collaboration with the health team. Identification of cardiac problems. Work up and diagnosis of urgent and common cardiovascular problems. Responsibility patient care.

Bibliography: * , Heart disease : a textbook of cardiovascular medicine / editado por Eugene Braunwald, Douglas P. Zipes, Peter Libby., 6th ed., Philadelphia : Saunders, c2001., [0721685617 (obra completa)], [0721685625 (v.1)], [0721685633 (v.2)].

ME4230 Cardiology II

(3 - 0 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is a basic level course with the intention that students learn in depth the different cardiovascular diseases which will conform their basic knowledge of the specialty practice. Basic concepts of the main cardiovascular diseases will be included. As a learning outcome, it is expected that the students will be able to learn, know, diagnose and identify the essentials of therapy of such diseases.

General objective: The students will be able to understand and acquire the basic knowledge for the diagnosis, prevention and therapeutics of the critical, urgent cardiovascular diseases, acute heart failure, hypertension and the abnormalities during pregnancy and aging.

Key words: Critical pathology and emergency medicine. Heart failure. Arterial hypertension. Pregnancy. Aging.

Bibliography: * The Heart, Willis Hurst, J., 12va, Mc Graw Hill.

ME4231 Medical Care in Cardiology II

(0 - 60 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is a basic level course with the intention that students continue the development of basic abilities and clinical skills of medical care in patients with cardiovascular diseases, applying the knowledge of the theoretical cardiology course which will be developed simultaneously. The course will focus on clinical care of patients with cardiovascular diseases, particularly those which are urgent and critical, as well as the most commonly encountered cardiovascular problems in a general cardiology practice. As a learning outcome, the students will become part of a medical team responsible of the diagnosis, treatment and monitoring of the clinical cases under the supervision of a responsible professor and attending physician.

General objective: The students will be able to work in a clinical cardiology team, where they help to diagnose, treat, and follow up on medical clinical cases for patients with general cardiology problems, focusing in coronary artery disease, heart failure and hypertension. The students will learn personal and professional skills which will allow them to perform in the clinical areas of the emergency room, intensive care, hospital wards and outpatient clinic with excellent attitude, diligence and responsibility.

Key words: Medical care in cardiac patients. Hospital visit. Medical examination in critical care. Outpatient clinic.

Bibliography: * Willis Hurst, J., The Heart, 12va, Mc Graw Hill.

ME4232 Cardiology III

(3 - 0 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is a basic level course with the intention that students learn in depth the different cardiovascular diseases that will become the basis of their general

cardiology clinical practice. It will include concepts of the main cardiovascular diseases. As a learning outcome, it is expected that the students be able to learn, know, diagnose, and identify the basic principles of therapy of such diseases.

General objective: The students will be able to understand the basis of the diagnosis, prevention and therapy of the different cardiovascular diseases, such as ischemic heart disease, cardiomyopathies, peripheral vascular diseases, myocarditis, pericarditis and cardiac masses

Key words: Ischemic heart disease. Inflammatory diseases. Tumors and cardiac masses. Vascular diseases. Cardiomyopathies.

Bibliography: * Willis Hurst, J., The Heart, 12va, Mc Graw Hill.

ME4233 Medical Care in Cardiology III

(0 - 60 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is a basic level course with the intention to allow the students to increase their clinical and personal skills and attitudes of medical care in patients with cardiovascular diseases; applying the knowledge acquired on the theoretical cardiology course which will be developed simultaneously. The course will focus on medical care of patients with common, urgent and critical cardiovascular diseases. As a learning outcome, it is expected that the students, collaborate and execute duties for the caring of the patient under the supervision of a responsible professor and attending physician.

General objective: The students will be able to care for cardiovascular patients under the guidance of an attending physician and responsible course professor, developing skills to work as part of a medical team where they will help on the diagnosis making process as well as the implementation of medical therapy and the follow up of patients with diseases seen in a general cardiology practice; focusing at ischemic heart disease, cardiomyopathies, peripheral vascular diseases, myocarditis, pericarditis and patients with cardiac masses and cardiovascular tumors. The students will continue learning and de-

veloping personal and professional skills which will allow them to perform in the clinical areas of the emergency room, intensive care, hospital wards and outpatient clinic, with excellent attitude, diligence and responsibility.

Key words: Work and collaboration with the health team. Medical rounds. Clinical research. Outpatient clinic.

Bibliography: * Willis Hurst, J., The Heart, 12va, Mc Graw Hill.

ME4234 Anesthesiology I

(3 - 0 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a theoretical course that aims for first year residents to experience their first encounter with the Anesthesiology Department: inside the O.R., acquiring knowledge of the work area, professors, personnel, different routines, working hours, on-call schedules, as well as other aspects. They will develop team work skills, preoperative diagnostic techniques and some general anesthesiology. Learning outcome: resident present clinical cases and written examinations related to airway management and regional anesthesia (epidural and subarachnoid) in adult patients.

General objective: Residents will be able to:

- Know some anesthesiology techniques in adult patients, for example airway management, epidural anesthesia and subarachnoid anesthesia.
- Identify electromedical equipment, the anesthesiology machine and different anesthesiology circuits.
- Assume ethical and moral values that permit an appropriate relationship with patients, professors and paramedical personnel.

Key words: Principles of anesthesiology. Preoperative anesthetic plan. Anesthetic techniques.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4235 Medical Care in Anesthesiology I

(0 - 60 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a clinical course that aims for residents to develop problem solving skills for surgical patients with common, simple and non-complex diseases, which require anesthesiology, sedation or monitoring. Its activities are centered in observation and collaboration under supervision of a tutor. It does not require previous knowledge. As a learning outcome, resident must create a portfolio of evidences that show their knowledge of the basic management in the OR, anesthesiology instruments, and the physiological and pharmacological bases of anesthesiology.

General objective: Residents will be able to:

- Collaborate in the perioperative management of patients with simple and common problems, under supervision.
- Practice the preoperative assessment of patients, and register it correctly in the patients' file.
- Prepare the anesthetic equipment, medications and materials used in a procedure.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control.
- Register the anesthetic control.
- Participate in the transportation of a patient to recovery.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.
- Demonstrate analytical skills while discussing clinical cases with professors.
- Pass the basic ACLS training.

Key words: Armamentarium of the anesthesiologist. Physiological and pharmacological basis of anesthesiology.

Bibliography: * , Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4236 Anesthesiology II (3 - 0 - 12. Prerequisites: None. REA13) **Equivalence: None**

It is a theoretical course that aims to provide students with basic and specialized knowledge of anesthesiology in Obstetrics and Pediatrics. They will study the anatomic and physiological elements involved in the care of pregnant women and children, the regional anesthesiology used in this patients, the effects of the anesthesia and the treatment of possible complications. It requires previous knowledge of the basic theory and technique of anesthesia. As a learning outcome, resident must participate in clinical case discussion, demonstrate their knowledge of the anatomical and physiological aspects of care in obstetrics/pediatric patients, the effects of anesthesia and treatment of possible complications.

General objective: Residents will be able to:

- Understand the physiological and pharmacological bases relates to obstetric and pediatric patients, with emphasis on the most common pathologies that require anesthesiology intervention.
- Acquire knowledge on the most common perioperative events in obstetric and pediatric anesthesiology, their prevention and treatment.
- Apply regional and general anesthesiology techniques in real patients.
- Perform with a high level of professionalism, both in the process of learning and in applying their knowledge.
- Demonstrate improvement in their analytic skills, effective communication skills, in the management of information, in their self-study capacities and in research.

Key words: Anesthetic techniques. Obstetric anesthesia. Pediatric anesthesia.

Bibliography: Anesthesia / Ronald D. Miller, 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4237 Medical Care in Anesthesiology II (0 - 60 - 12. Prerequisites: None. REA13) **Equivalence: None**

It is a clinical course that aims for residents to continue participating in the problem solving for surgical patients as well as pediatric patients and pregnant women which require anesthetic management. Its main academic objectives are to learn the anatomy and physiology of children and the physiological changes of pregnant women. As a learning outcome, resident must create a portfolio of evidences that show their participation in preoperative assessment visits, postoperative recovery, hospitalization, general OR and obstetric OR.

General objective: Residents will be able to:

- Collaborate in the perioperative management of pediatric and obstetric patients with simple and common problems, under supervision.
- Practice the preoperative assessment of pediatric and obstetric patients, and register it correctly in the patients' file.
- Prepare the anesthetic equipment, medications and materials used in pediatric and obstetric procedures.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control in pediatric and obstetric patients.
- Register the anesthetic control, while taking in consideration de different parameters for pediatric patients.
- Participate in the transportation of a patient to recovery until he is properly placed in the care of the recovery team.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.
- Demonstrate analytical skills while discussing clinical cases with professors.

Key words: Armamentarium of the anesthesiologist. Physiological and pharmacological basis of anesthesiology.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4238 Anesthesiology III (3 - 0 - 12. Prerequisites: None. REA13) **Equivalence: None**

It is a theoretical course that aims to provide residents with basic and specialized knowledge of anesthesiology in General Surgery and Geriatrics, in Respiratory Therapy, management of Critical Ill Patients and anesthesiology in Ambulatory Surgery. It requires previous knowledge of the basic theory and technique of anesthesia. As a learning outcome, resident must participate in clinical case discussion; demonstrate their knowledge of the principles and techniques of anesthesiology used in the management of patients in General Surgery and Geriatrics, the effects of anesthesia and treatment of possible complications.

General objective: Residents will be able to:

- Know the anesthesiology management of general surgery patients.
- Understand the physiological changes in older patients and the anesthetic implications it may have.
- Understand the respiratory physiological and the different techniques available to treat specific problems in this area.
- Acquire knowledge on the critically ill patient, their initial management as well as the management of the principle syndromes and crisis that may present in such patients.
- Demonstrate their analytic skills, effective communication skills, and an adequate management of information, self-study capacities and research skills.
- Perform with a high level of professionalism, both in the process of learning and in applying their knowledge.

Key words: Anesthetic techniques. Principles of anesthesiology.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4239 Medical Care in Anesthesiology III (0 - 60 - 12. Prerequisites: None. REA13) **Equivalence: None**

It is a clinical course that aims for residents to increase their participation in the problem solving for patients with moderate surgical risk, like the general surgery patient, geriatric patient, patients with head and neck pathologies, and the obstetric patient which require anesthetic management. Its main academic objectives are: to identify and treat problems in abdominal and head/neck surgical patients, from an anesthesiology stand point; basic knowledge of the physiopathology of geriatric patients undergoing anesthesia. This phase includes an obstetrics rotation in a governmental hospital. As a learning outcome, resident must create a portfolio of evidences that show their participation in a general and obstetric OR.

General objective: Residents will be able to:

- Collaborate in the perioperative management of general surgery, head/neck surgery, and geriatric surgery patients with simple, complex, common and rare problems, under supervision.
- Practice the preoperative assessment of a patient, and register it correctly in the patient's file.
- Prepare the anesthetic equipment, medications and materials used in anesthetic procedures.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control.
- Register the anesthetic control.
- Participate in the transportation of a patient to recovery.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.
- Demonstrate analytical skills while discussing clinical cases with professors.

Key words: Preoperative assessment. Anesthetic register. Anesthetic equipment.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid: Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4240 Anesthesiology IV

(3 - 0 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a theoretical course that aims to provide residents with basic and specialized knowledge of anesthesiology in Ophthalmology, Otorhinolaryngology, Bucodentomaxilar Surgery and Neurosurgery. It requires previous knowledge of the basic theory and technique of anesthesia. As a learning outcome, resident must participate in clinical case discussion; demonstrate their knowledge of the principles and techniques of anesthesiology used in the management of patients in Ophthalmology, Otorhinolaryngology, Bucodentomaxilar Surgery and Neurosurgery, the effects of anesthesia and treatment of possible complications.

General objective: Residents will be able to:

- Obtain knowledge on the anesthesiology management of patients from Ophthalmology, Otorhinolaryngology, Bucodentomaxilar Surgery and Neurosurgery, that will undergo a surgical procedure.
- Acquire knowledge of the anesthetic techniques used in the management of these patients, its effects and treatment of its complications.
- Demonstrate their analytic skills, effective communication skills, and an adequate management of information, self-study capacities and research skills.
- Perform with a high level of professionalism, both in the process of learning and in applying their knowledge.

Key words: Principles of anesthesiology. Anesthetic techniques.

Bibliography: * , Anesthesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4241 Medical Care in Anesthesiology IV

(0 - 60 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a clinical course that aims for residents to increase their participation in the management of patients

with moderate surgical risk and of critical patient in ICU, while under the supervision of a tutor. This phase includes a rotation in adult ICU. Some academic objectives are: basic knowledge of the physiopathology of critical patients, identifying pulmonary, cardiac, renal and neurological problems and possible treatments. It requires previous knowledge of the basics of Anesthesiology and basic anesthetic techniques. As a learning outcome, resident must create a portfolio of evidences that show their participation in a general OR and the Adult Intensive Care Unit.

General objective: Fourth semester residents will be able to:

- Collaborate in the perioperative management of adult ICU patients with simple, complex, common and rare problems, under supervision.
- Develop collaborative and execution centered skills.
- Practice the preoperative assessment of a patient, and register it correctly in the patient's file.
- Prepare the anesthetic equipment, medications and materials used in anesthetic procedures.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control.
- Register the anesthetic control.
- Participate in the transportation of a patient to recovery.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.
- Demonstrate analytical skills while discussing clinical cases with professors.

Key words: Preoperative assessment. Anesthetic register. Anesthetic equipment.

Bibliography: Anesthesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME4250 General Surgery I (3 - 0 - 12. Prerequisites: None. REC13) Equivalence: None

It is a theoretical course that aims for residents to acquire a general vision of the evolution of the specialty; of the basic sciences of surgery: of the main pre and transoperative cares, as well as, the general vision of the role of the anesthesiologist in surgery. It requires previous knowledge of general medicine. As a learning outcome, residents must show their knowledge of the scientific bases of surgical pathology and their comprehension of preparation of a surgical patient and their new responsibility, through the resolution of a written exam and participation in clinical case discussion.

General objective: Residents will be able to:

- Understand the evolution of current general surgery as the basic surgical specialty.
- Know the participation the specialty has in other medical areas.
- Understand the participation of pathologist in identifying the cause of a disease.
- Understand the main elements of basic science involved in the comprehension of physiopathology, diagnostic processes and treatment of surgical diseases and their complications.
- Know the metabolic principles of the nutritional support of surgical patients.
- Understand the scaring process.
- Acquire knowledge of the infectious processes in surgical patients, their prevention and basis of treatment.
- Acquire knowledge on the treatment of patients with burns or trauma.
- Understand the role and pharmacological bases of anesthesiologists, whom collaborate with the management of surgical pathologies and pain management.

Key words: Trauma. Burns. General surgery. Infection.

Bibliography:* , Robbins and Cotran pathologic basis of disease / Vinay Kumar .. [et al.] ; with illustrations by James A. Perkins., 8th ed., Philadelphia, PA: Saunders/ Elsevier, c2010., [9781416031215], [1416031219], [9780808924029 (International ed.)], [0808924028 (International ed.)], [9781437707922 (Professional ed.)], [1437707920 (Professional ed.)].

ME4251 Medical Care in General Surgery I (0 - 60 - 12. Prerequisites: None. REC13) Equivalence: None

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty; which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Develop a sense of responsibility for the care of their patients.
- Acquire skill for interviewing and exploring patients through the supervised development of a History and Physical.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams.- Perform basic diagnostic and therapeutic maneuvers.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical patients with common pathologies.
- Classify surgical patients based of their surgical and anesthetic risks.

Key words: Diagnostic and therapeutic maneuvers for patients in ICU. Diagnostic and therapeutic maneuvers for patients in general surgery.

Bibliography: * , Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors]

Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME4252 General Surgery II

(3 - 0 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a theoretical course that aims for residents to acquire knowledge on the basics and principles related to transplant surgery, malignant lesions, soft tissue surgery, mammary gland surgery and head and neck surgery. It requires previous knowledge of the basics sciences in surgery. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, residents will be able to:

- Understand the anatomical, physiopathological, ethical, pharmacological and surgical principles of transplant surgery.
- Understand the molecular biology principles that have influences the design of new surgical techniques in the area of oncological surgery.
- Understand the clinical and pathological bases of the management of surgical lesions in skin and soft-tissue.
- Understand the anatomical, embryological and physiological principles of mammary gland pathologies.
- Acquire knowledge on the technical bases for minimally invasive interventions, robotic surgery and surgery through natural orifices.

Key words: Transplant surgery. Oncosurgery. Soft-tissue surgery. Head-neck surgery.

Bibliography: * , Robbins manual de patología estructural y funcional / Stanley L. Robbins .. [et al.] ; tr. de Isabel Alvarez Baleriola., 3a ed., México . McGraw-Hill, 2002., spaeng, [9701037553].

ME4253 Medical Care in General Surgery II

(0 - 60 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on general complications of a surgery, abdominal wall pathologies and other abdominal structures, acute abdomen, radiological diagnosis and initial management of traumatology and orthopedics patients. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Develop a sense of responsibility for the care of their patients.
- Improve their skills for interviewing and exploring patients through the supervised development of a History and Physical.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams.
- Perform basic diagnostic and therapeutic maneuvers.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate in diagnostic and therapeutic decision-making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical patients with common pathologies.
- Classify surgical patients based of their surgical and anesthetic risks.

Key words: Diagnostic and therapeutic maneuvers for Emergency patient.

Bibliography: * , Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME4254 General Surgery III (3 - 0 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a theoretical course that aims for residents to acquire the necessary knowledge to understand, diagnose and treat pathologies that affect the abdominal wall, the sustenance and nutrition of viscera, as well as acute abdomen, inguinal hernias, and soft-tissue sarcomas. It requires previous knowledge of the basic sciences in surgery. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, residents will be able to:

- Understand the anatomical, physiopathological, and surgical principles related to the diagnosis and treatment of abdominal wall pathologies and the sustenance and nutrition of the viscera.
- Understand the clinical and pathological bases of the management of acute abdomen, inguinal hernias, and soft-tissue sarcomas.

Key words: Acute abdomen. Abdominal wall surgery. Inguinal hernia. Soft-tissue sarcomas.

Bibliography: * , Robbins and Cotran pathologic basis of disease / Vinay Kumar .. [et al.] ; with illustrations by James A. Perkins., 8th ed., Philadelphia, PA : Saunders/Elsevier, c2010., [9781416031215], [1416031219], [9780808924029 (International ed.)], [0808924028 (International ed.)], [9781437707922 (Professional ed.)], [1437707920 (Professional ed.)].

ME4255 Medical Care in General Surgery III

(0 - 60 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on the management of severe trauma, abdominal hernias, and of pathologies of the esophagus, stomach, duodenum, small intestine and appendix. As well as those cases that require evaluation by the Surgery service. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Continue developing and increasing their sense of responsibility for the care of their patients.
- Perfect their skills for interviewing and exploring patients through the supervised development of a History and Physical. They will begin supervising medical students in this area.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will begin supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic diagnostic and therapeutic maneuvers, as well as some more advanced procedures.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical patients with common pathologies.

- Classify surgical patients based of their surgical and anesthetic risks. They will begin supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program.
- Participate actively as an assistant in some of the programmed surgical procedures.
- Win the opportunity to perform minor surgical procedures.
- Develop the specific objectives of the following modules.

Key words: Diagnostic and therapeutic maneuvers of the emergency patient.

Bibliography: * , Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME4256 General Surgery IV (3 - 0 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a theoretical course that aims for residents to acquire the necessary knowledge to understand, diagnose and treat pathologies that affect the stomach, small intestine, appendix and urological emergencies. They will acquire the theory needed to manage morbidly obese patients. It requires previous knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, residents will be able to: Understand the management of patients with pathologies of the stomach, small intestine, appendix, as well as does candidates to undergo obesity control procedures and patients with a urological emergency.

Key words: Surgical pathology. Surgical sciences.

Bibliography: * , Robbins and Cotran pathologic basis of disease / Vinay Kumar .. [et al.] ; with illustrations by James A. Perkins., 8th ed., Philadelphia, PA : Saunders/Elsevier, c2010., [9781416031215],[1416031219],[9780808924029 (International ed.)], [0808924028 (International ed.)], [9781437707922 (Professional ed.)], [1437707920 (Professional ed.)].

ME4257 Medical Care in General Surgery IV (0 - 60 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on the management of patients with surgical pathologies of the colon, rectum, anus, liver, biliary tract, pancreas and spleen; as well as those cases that require evaluation by the Urology service. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Continue developing and increasing their sense of responsibility for the care of their patients.
- Perfect their skills for interviewing and exploring patients through the supervised development of a History and Physical. They will begin supervising medical students in this area.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will begin supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic diagnostic and therapeutic maneuvers, as well as some more advanced procedures.

- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical patients with common pathologies.
- Classify surgical patients based of their surgical and anesthetic risks. They will begin supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program.
- Participate actively as an assistant in some of the programmed surgical procedures.
- Win the opportunity to perform minor surgical procedures.

Key words: Diagnostic and therapeutic maneuvers in emergency patients. Diagnostic and therapeutic maneuvers in general surgery patients.

Bibliography: * , Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME4258 General Surgery V (3 - 0 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a theoretical course that aims for residents to acquire the necessary knowledge to understand, diagnose and treat pathologies that affect the colon, rectum, anus, liver, biliary tract, pancreas, spleen and pediatric emergencies. It requires basic knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, residents will be able to: Understand the management

of patients with pathologies of the colon, rectum, anus, liver, biliary tract, pancreas, spleen and pediatric emergencies that require an urgent surgical treatment. Residents will consolidate their knowledge in various disciplines, including Oncology and Physiological Follow-up of surgical patients.

Key words: Surgical pathology. Surgical sciences.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME4259 Medical Care in General Surgery V (0 - 60 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these activities with particular focus on tumors of skin and soft tissue, mammary glands, head and neck. They will also focus on advanced laparoscopy and pediatric surgery. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Continue developing and increasing their sense of responsibility for the care of their patients.
- Apply effectively their skills for interviewing and exploring patients through the development of a History and Physical. They will continue supervising medical students in this area.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will continue supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana

NOM) for patient files, as well as the hospital's regulations.

- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic diagnostic and therapeutic maneuvers, as well as some more advanced procedures.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it, especially for laparoscopic procedures.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical and critical patients with common pathologies.
- Classify surgical patients based of their surgical and anesthetic risks. They will continue supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program.
- Participate actively as an assistant in some of the programmed surgical procedures.
- Win the opportunity to perform minor and mayor surgical procedures.
- Participate in a health care system different to the Mexican system.
- Compare conventional general surgery with laparoscopic surgery.
- Learn from an international professor, who is an expert of his/her area.

Key words: Diagnostic and therapeutic maneuvers in emergency patients. Diagnostic and therapeutic maneuvers in pediatric patients.

Bibliography: * , Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753],[9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME4260 Pediatric Neurology I (3 - 0 - 12. Prerequisites: None. RNP13) **Equivalence: None**

It is a theoretical course that aims for students to comprehend and explain the phylogenetic and ontogenetic development, the structure, function and the correlation between the different areas of the central and peripheral nervous system; to recognize, identify and classify the etiology and diagnosis of a seizure, epileptic syndrome, headache, syncope and sleep disorders. It includes concepts of general and neonatal neuropediatrics, neuroanatomy and neurophysiology. As a learning outcome, student must elaborate a report on normal pediatric electroencephalograms and identify the component on a neonatal.

General objective: Resident will be able to:

- Understand the development, structure, function and relationships between these areas in the central and peripheral nervous system.
- Identify and evaluate the different stages of clinical neurologic development.
- Identify and interpret the clinical manifestations of the central and peripheral nervous system dysfunction.
- Understand the natural history, prevention procedures, diagnosis, treatment and rehabilitation of the most frequent disorders of the central and peripheral nervous system that occur during the neonatal period, infancy, childhood and adolescence.

Key words: Central and peripheral nervous system. Clinical Development neurological. Dysfunction of central and peripheral nervous system.

Bibliography: * Hendelman W. L., Atlas of Functional Neuroanatomy, CRC Press LLC , New York, 2000.

ME4261 Medical Care in Pediatric Neurology I (0 - 60 - 12. Prerequisites: None. RNP13) **Equivalence: None**

It is a clinical course that aims for resident to develop as health care professional and begin developing their clinical judgment and decision making skills while under continuous supervision; develop effec-

tive communication skills and interpersonal skills; they learn through their daily practice and develop ethical, citizenship and professionalism competences. The course includes concepts for the identification of problems and identifying syndromes while under supervision and evaluation of academic team. As a learning outcome, residents applied general technique for neurological examinations and must elaborate a syndromatic and topographic diagnosis; they must observe basic diagnostic and therapeutic maneuvers, participate in therapeutic decisions and develop effective communication skills and professionalism in their daily consultations.

General objective: Resident will be able to:

- Be involved in a progressive and continuous manner in the detection, diagnosis and solution of health problems of neuropsychiatric patients with common, simple and complex disease situations that are not in a critical condition performing history and neurological examination. In the more complex problems his activity will be observation and / or collaboration under supervision of his tutor.
- Perform a general neurological examination, with emphasis on neurological development and detection of neuropsychiatric health problems. The areas through which he will develop these clinical activities are: ambulatory services in first-time patients, hospital inpatient rounds and during the on call duties.

Key words: Neurological examination. Neuromotor and neurodevelopment. Neurological semiology.

Bibliography: * DeMyer, William, 1924-, Technique of the neurologic examination : a programmed text / William E. DeMyer., 4th ed., New York : McGraw-Hill, c1994., [0070163537],[0071125922 (rústica)].

ME4262 Pediatric Neurology II

(3 - 0 - 12. Prerequisites: None. RNP13)

Equivalence: None

It is a theoretical course that aims for students to comprehend, identify, classify and diagnose the degenerative disease, innate neurometabolic pathologies and demyelinating diseases; to understand the application of neuroembryology to different central

nervous system pathologies and phenotype alterations. Students are expected to recognize the electroencephalogram sequences of different syndromes and dysfunctions of the white and gray matter, as well as to identify and comprehend the characteristic abnormal activity of the different seizures and epilepsies. It includes concepts of neuropsychiatrics, neurophysiology (abnormal EEG) and neuroembryology. It requires previous knowledge of neurophysiology. As a learning outcome, student must elaborate, while under supervision, a management plan for different types of epilepsy and must identify the different paraclinical abnormalities.

General objective: Resident will be able to: Understand the development, structure, function and relationships between these areas in the central and peripheral nervous system. Identify and interpret the clinical manifestations of the central and peripheral nervous system dysfunction. Understand the natural history, prevention procedures, diagnosis, treatment and rehabilitation of the most frequent disorders of the central and peripheral nervous system that occur during the neonatal period, infancy, childhood and adolescence.

Key words: Development of peripheral and central nervous system. Central nervous system malformation. Electrical brain activity abnormalities.

Bibliography: * Hendelman W. L., Atlas of Functional Neuroanatomy, CRC Press LLC , New York, 2000.

ME4263 Medical Care in Pediatric Neurology II

(0 - 60 - 12. Prerequisites: None. RNP13)

Equivalence: None

It is a clinical course that aims for resident to develop as health care professional and begin developing their clinical judgment and decision making skills while under continuous supervision; develop effective communication skills and interpersonal skills; they learn through their daily practice and develop ethical, citizenship and professionalism competences. The course includes concepts for the identification of problems and identifying syndromes while under supervision and evaluation of academic team. They will participate in daily hospital rounds, ambu-

latory consultations, overnight work and pediatric emergencies while under continuous supervision by senior residents and the academic professors. As a learning outcome, residents applied the general technique for neurological examinations and must elaborate a syndromatic, topographic, nosological, etiological and functional (from newborns to adolescents) diagnosis; they must observe basic diagnostic and therapeutic maneuvers, participate in therapeutic decisions to integrate neurological syndromes and develop effective communication skills and professionalism in their daily consultations.

General objective: Resident will be able to:

- Participate in a progressive and continuous manner in the detection, diagnosis and solution of health problems of neuropsychiatric patients with common, simple and complex disease situations, that are not in a critical condition, performing history and neurological examination, as well as performing Emergency and Pediatric consultations. In the more complex problems his activity will be observation and / or collaboration (formulation of a plan for diagnostic studies) under supervision of his tutor.
- Identify the normal neurological development (neurodevelopment, neuromotor) in order to detect and diagnose neuropsychiatric health problems. The areas through which he will develop these clinical activities are: ambulatory services, inpatient rounds, emergency room, ICU and during the on call duties.

Key words: Neurological examination. General neurological syndromes.

Bibliography: * DeMyer, William, 1924-, Technique of the neurologic examination : a programmed text / William E. DeMyer., 4th ed., New York : McGraw-Hill, c1994., [00701637],[0071125922 (rústica)].

ME4264 Pediatric Neurology III (3 - 0 - 12. Prerequisites: None. RNP13) **Equivalence: None**

It is a theoretical course that aims for students to know the different clinical manifestations, image studies, prevention, diagnosis and treatment of tumors of the CNS and cerebrovascular diseases. They

will also develop skills to identify stimulant narcotics, antipsychotics, antidepressants, antimigraine medications and anxiolytics. It includes concepts of neuropsychiatry, neurophysiology (EMG, action potentials and neuroconduction) and neuropharmacology. It requires previous knowledge of Neurophysiology II. As a learning outcome, student must elaborate, while under supervision, a management plan for different types of migraine, development disorders, and ADD, while showing optimized resource administration.

General objective: Resident will be able to:

- Understand the basic principles of the function of the central and peripheral nervous system, including neuromuscular junction and the skeletal muscle, during the different stages of development (from the premature child, up to the adult).
- Understand the basic principles of the strategies of investigation and electro-diagnosis of the central and peripheral nervous system, including neuromuscular junction and the skeletal muscle during the different stages of development. (from the premature child up to the adult).
- Identify the natural history, prevention procedures, diagnosis, treatment and rehabilitation of the most frequent disorders of the central and peripheral nervous system in the adult.
- Understand and recognize the neuropathologic fundamentals of the neurologic diseases most frequent of the central and peripheral nervous system and skeletal muscle that occur from the newborn period to adolescence.

Key words: Neuromuscular junction and skeletal muscle. Neuropathological fundamentals of Neurologic Disorders.

Bibliography: * Geiringer S. R., Anatomic Localization for needle electromyography, Mosby.

ME4265 Medical Care in Pediatric Neurology III (0 - 60 - 12. Prerequisites: None. RNP13) **Equivalence: None**

It is a clinical course that aims for resident to develop as health care professional and begin developing their clinical judgment and decision making skills

while under continuous supervision; develop effective communication skills and interpersonal skills; they learn through their daily practice and develop ethical, citizenship and professionalism competences. The course includes concepts for the identification of problems and identifying syndromes while under supervision and evaluation of academic team. They will participate in daily hospital rounds, ambulatory consultations, overnight work and pediatric emergencies while under continuous supervision by senior residents and the academic professors. As a learning outcome, residents applied the technique for neurological examinations in premature and mature newborns; elaborate a diagnosis of neonatal neurological syndromes; they must observe and participate in basic to complex diagnostic and therapeutic maneuvers, participate in therapeutic decision-making and develop effective communication skills and professionalism in their daily consultations.

General objective: Resident will be able to:

- Be involved in a progressive and continuous manner in the detection, diagnosis and solution of health problems of neuropediatric patients with common, simple and complex disease situations, that are not in a critical condition, performing history and neurological examination, developing a therapeutic plan, and performing a short and long term follow up.
- Observe and help in the execution and report of diagnostic procedures: pediatric and neonatal EEG, and auditory, visual and somatosensory evoked potentials.
- Identify the different types of convulsive episodes (epilepsy), neurodevelopment disorders (language disorder), generalized development disorders (autism, Asperger's, Rhetts', non-specified and disintegrative disorders), as well as establish therapeutic strategies while under the supervision of a tutor. The areas through which he will develop these clinical activities are: ambulatory services (Clinics for ADD, epilepsy, headache, neurodevelopment), inpatient rounds, emergency room, ICU and during the on call duties.

Key words: Neurological examination in premature and mature newborns. Neonatal neurological syndromes.

Bibliography: * DeMyer, William, 1924-, *Technique of the neurologic examination: a programmed text* / William E. DeMyer., 4th ed., New York : McGraw-Hill, c1994., [0070163537],[0071125922 (rústica)].

ME4266 Fundamentals in Obstetrics and Gynecology I

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is theoretical course that have the proposal that the student acquire basic knowledge in Obstetrics and Gynecology in different subjects: Preconception and prenatal care, contraception and in related subjects such as general physiology, pregnancy physiology and physiology during special conditions and reproductive physiology, anatomy, embryology, histology and ultrasound basis; that allow the student to learn in the future deeper knowledge in every area related with Obstetrics and Gynecology. Requires basic knowledge acquired previously in premed, about general, reproductive and during pregnancy physiology. The outcome of this course should be that the student acquires solid principles in his formation as a gynecologist, documenting his knowledge by written and oral examination, as well as quizzes and a team work developed during the course time and delivered at the end. All the knowledge achieves will be documented in a portfolio with personal evidence and from professors and classmates from the same level and superiors. The student should accomplish a documented list of procedures, under supervision, related with the learning level.

General objective: Resident will be able to:

- Understand fundamental principles of Obstetrics and Gynecology and take them to the excellence level.
- Know about internal and external genital structure and function, in normal conditions.
- Know about general human body physiology and normal changes during pregnancy.
- Understand the physiology of reproductive axis, ovary and the reproductive tract.
- Know about structure, synthesis and regulation of steroid and glucoproteic hormones.
- Understand and know the physiologic changes in critical conditions of hypovolemia.

- Acquire the basic knowledge about contraception in healthy patients and in patients with systemic disease.
- Understand the normal pregnancy evolution and prenatal and during delivery care.
- Utilize the evidence base medicine in obstetrics and gynecology concept and use it as woman primary care physician to promote health in women at all ages.
- Know the basic methods of fetal wellbeing, mainly about cardiocographic register, his fundamentals, performance and interpretation.
- Know the ultrasound basic principles, ultrasound equipment, techniques and interpretation of basic ultrasound, type I.

Key words: Gynecology and obstetrics. Pregnancy. General physiology, pregnancy physiology and reproductive physiology. Contraception. Prenatal and delivery care.

Bibliography: * , Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME4267 Medical Care in Obstetrics and Gynecology I

(0 - 60 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a clinical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire in premed, with special emphasis in obstetric aspects. During the course development, the student will be going deeper. He should achieve predetermined procedures previously in a list of procedures with objectives clearly established, under supervision and feedback. As learning outcome, it is expected that the student perform basic obstetric procedures, under supervision. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Participate solving urgent Health problems in hospitalized patients in the Ob Gyn department, during his first year of training, according to his level of training, during the time period assigned.
- Learn to offer properly medical care.
- Apply the knowledge mainly in healthy women, in prevention aspects and learn from superior degree residents and professors.
- Learn daily through the everyday work with hospitalized gynec-obstetrical patients, in labor and delivery areas, hospitalization and surgery room, to solve the most frequent health problems in a hospitalized patient in obstetric care.
- Develop a logical system of clinical follow up of a gynec-obstetrical hospitalized patient, making emphasis in the process of evaluation, analysis and therapeutic strategies to recover health and also develop a system to register this information
- Develop the necessary competence to provide care to gynec-obstetrical patients with the method of ambulatory medical care, in a first level setting and prenatal care in an office
- Educate the patient and his family to promote health through positive habits, promote early detection disease methods and known office management aspects in a private office.
- Develop skills, attitudes and values in this phase. One of the main academic objectives it is to understand and practice the normal obstetrics (no pathologic) and apply the basic sciences related with gynecology and obstetrics.

Key words: Abortion. Pregnancy. Gynecology and obstetrics.

Bibliography: * , Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME4268 Fundamentals in Obstetrics and Gynecology II

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is a theoretical course that intends that the student acquire the fundamental knowledge in general Gynecology, Basic genetics and gynecologic anatomo-

mopathology in subjects such as benign uterine tumors, dysfunctional bleeding disorders, sexual transmitted disease and pelvic chronic pain. Also in subjects about elemental genetics such as the genetic human body composition, chromosomes, genes and the human genome. In subjects of anatomopathology related with benign and malignant conditions. Requires the basic knowledge of obstetrics and gynecology and basic sciences such as physiology, embryology, histology and anatomy, acquired during the first semester. As learning outcome it is expected that the student finish his basic formation in subjects that allow him to acquire in the future clinical knowledge well fundamented. This will be correlated with a list of procedures that he will understand, know and be able to perform, as it is established at the end of the semester. The student will be evaluated with written, oral and quiz tests. Also with integrative work about the acquired knowledge, working in a team with classmates. Everything will be documented in a portfolio, with the supervision of professors and classmates of the same grade and superiors.

General objective: Resident will be able to:

- Know and apply the fundamental concepts in gynecology ,gynecologic anatomopathology and genetic.
- Know the heritage basis and the genetic diseases transmission pattern.
- Know the anatomopathologic basis to identify microscopically the most common gynecologic disease.
- Describe the most common techniques to fix tissues for microscopic examination.
- Apply the clinical reasoning process, using the learning based problems method, participating actively in the solution of health problems of patients with common and no common diseases, simple and complex, no under critical condition.
- Collaborate in interprofessional teamwork.

Key words: Gynecology and obstetrics. Genetics. Gynecologic anatomopathology.

Bibliography: Office gynecology / [edited by] Morton A. Stenchever., 2nd ed., St. Louis : Mosby, c1996., [0815182252].

ME4269 Medical Care in Obstetrics and Gynecology II

(0 - 60 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a clinical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire during the first semester, with special emphasis in obstetric aspects. During the course development, the student will be going deeper. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established, under supervision and feedback. As learning outcome, it is expected that the student perform basic obstetric procedures, under supervision. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Learn and participate solving urgent Health problems in hospitalized patients in the Ob Gyn department, during his first year of training, according to his level of training, during the time period assigned.
- Learn to offer properly medical care.
- Apply the knowledge mainly in healthy women, in prevention aspects and learn from superior degree residents and professors and participate in the teaching process with residents in the inferior degrees.
- Learn daily through the everyday work with hospitalized gyneco-obstetrical patients, in labor and delivery areas, hospitalization and surgery room, to solve the most frequent health problems in a hospitalized patient in obstetric care.
- Develop a logical system of clinical follow up of a gyneco-obstetrical hospitalized patient, making emphasis in the process of evaluation, analysis and therapeutic. Strategies to recover health and also develop a system to register this information
- Develop the necessary competence to provide care to gyneco-obstetrical patients with the method of ambulatory medical care, in a first level setting and prenatal care in an office.

- Learn to educate the patient and his family to promote health through positive habits, promote early detection disease methods and known office management aspects in a private office.
- Develop skills, attitudes and values in this phase. One of the main academic objectives it is to understand and practice the normal obstetrics (no pathologic) and apply the basic sciences related with gynecology and obstetrics.
- The resident at this time, will participate in the premed students learning process.

Key words: Abortion. Pregnancy. Gynecology and obstetrics.

Bibliography: * , Office gynecology / [edited by] Morton A. Stenchever., 2nd ed., St. Louis : Mosby, c1996., [0815182252].

ME4270 Ambulatory Care in Obstetrics and Gynecology

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a course about theoretical fundamentals that intends that the student learn to identify, diagnose and resolve the most common clinical problems in general gynecology, contraception and first contact medicine, in the office. Requires the basic knowledge of obstetrics and gynecology and basic sciences such as physiology, embryology, histology and anatomy. As learning outcome, the student analyzes and solves clinical cases in written, oral and quiz tests, and integrative teamwork about the acquired knowledge.

General objective: Resident will be able to:

- Acquire the necessary knowledge for the prevention and the primary attention to gynecologic patients, with the main interest in early diagnosis, treatment and follow up of health problems in ambulatory care or in the office.
- Identify the most common medical problems that are seen in the gynecologic consultation, etiology, diagnosis and management.
- Know the more recommendable preventive measurements to diminish the incidence of more frequent disease that occurs during reproductive age, postmenopausal and senescent women.

- Apply clinical reasoning process using the learning base problem method, participating actively in the health problem solution of patients with common and no common, complex and no complex diseases under no critical condition.
- Learn to work as a team.

Key words: Ambulatory care in obstetrics and gynecology. Primary care and preventive medicine.

Bibliography: Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME4271 Medical Care in Obstetrics and Gynecology III

(0 - 60 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a clinical and practical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire during the first year, combining obstetrics and gynecology aspects in equal proportions. During the course development, the student will be going deeper. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established, under supervision and feedback. As learning outcome, it is expected that the student perform basic obstetric procedures, under supervision. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Learn and participate solving urgent Health problems in hospitalized patients in the Ob Gyn department, during the second year of the residence, according to his level of training, during the time period assigned.
- Learn to properly offer medical care.
- Apply the knowledge mainly in women with simple gynecologic diseases, defining hypothesis

about diagnosis and treatment possibilities, in prevention aspects and in therapeutic management and learn from superior degree residents and professors and participate in the teaching process with residents in the inferior degrees.

- Learn daily through the everyday work with hospitalized gynecological patients, in labor and delivery areas, hospitalization and surgery room, to solve the most frequent health problems in a hospitalized patient in obstetric and gynecologic care.
- Develop a logical system of clinical follow up of a gynecological hospitalized patient, making emphasis in the process of evaluation, analysis and therapeutic strategies to recover health and also develop a system to register this information
- Develop the necessary competence to provide care to gynecological patients with the method of ambulatory medical care, in a first level setting and prenatal care in an office and first level gynecological evaluation and treatment.
- Learn to educate the patient and his family to promote health through positive habits, promote early detection disease methods and known office management aspects in a private office.
- Develop skills, attitudes and values in this phase. One of the main academic objectives it is to understand and practice the normal obstetrics (no pathologic) and pathologic or complicated obstetrical patients and apply the basic sciences related with gynecology and obstetrics.
- The student should be able to establish diagnostic hypothesis, differential diagnosis and to perform related procedures.

Key words: Pregnancy. Obstetrics. Normal and complicated delivery. Gynecology.

Bibliography: * , High-risk pregnancy : a team approach / [edited by] Robert A. Knuppel, Joan E. Drukker., 2nd ed., Philadelphia : Saunders, c1993., [0721634559].

ME4272 Obstetrics and Gynecology Specialties I

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is a theoretical fundamentals that intends that the student learn to identify and manage the most

common and important problems about child and adolescent gynecology and menopausal women. Also about maternal-fetal medicine and fetal wellbeing test and ultrasound type II. As learning outcome, is expected that the student acquires the necessary skills to diagnose and resolve problems in the above areas. The student will document his experience in a portfolio with the necessary evidence.

General objective: Residents will be able to:

- Understand the basic knowledge of gynecology in children and adolescents, menopause, perinatal medicine, ultrasounds and cardiotocography, so that they can diagnose problems related to this areas of general Obstetrics and Gynecology, through the knowledge obtained in classes, as well as delivery room, the OR, and the ultrasonography and cardiotocography areas.
- Solve the most common problems of perinatal medicine, child and adolescent gynecology, and menopause, while under the supervision of expert professors of these areas.
- Perform and interpret a cardiotocography and ultrasound.
- Apply critical reasoning skills to patients in the areas of perinatal medicine, child and adolescent gynecology, and menopause, through problem based learning (PBL) and active participation in the solution of health problems in non-critical patients with common and uncommon, simple and complex diseases.
- Learn from working as a team.

Key words: Childhood and adolescent gynecology. Menopause. Perinatal medicine. Ultrasound type II. Cardiotocografic study.

Bibliography: Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME4273 Medical Care in Obstetrics and Gynecology IV

(0 - 60 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a clinical and practical course that intends that the student acquire practical knowledge and skills

through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire during the first three semesters, combining obstetrics and gynecology aspects in equal proportions. During the course development, the student will be going deeper every time. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established, under supervision and feedback. As learning outcome, it is expected that the student perform obstetric procedures and assist in some gynecologic procedures, under supervision. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Participate in the solution of obstetrical and gynecological problems in adult patients hospitalized in the department of obstetrics and gynecology, during his fourth semester of residency, according to his level of training, during the period of time assigned.
- Learn to offer proper medical care.
- Apply knowledge, mainly in patients with medium complexity problems, in the child and adolescent gynecology and in the menopause area. The student will make diagnosis in these patients and will participate in the learning process of residents with greater and lower level of training and with professors.
- Learn daily through the everyday work with hospitalized gynecological patients, in labor and delivery areas, hospitalization and surgery room, to solve the most frequent health problems in a hospitalized patient in obstetric and gynecologic care, with main interest in child and adolescent gynecology, menopause and maternal fetal medicine
- Develop in the student a logical system of clinical follow up in a gynecological patient hospitalized, in the areas mentioned above, focusing in the study process, analysis, therapeutic strategies development that help the patient to recover her health and to register this information.
- Participate in the ambulatory medical care in the office patients and collaborate actively in the solution of health problems in all gynecological

patients that come in critical and no critical conditions, performing most of diagnostic and therapeutic procedures under professor supervision.

- Develop competencies related with the clinical care of patients that come to the obstetrical and gynecological ambulatory service in different gynecological subspecialties, with main interest in child and adolescent gynecology, menopause and maternal-fetal medicine.
- Develop skills, attitudes and values in this phase. One main goal is focused in the diagnosis, treatment and performance of related diagnostic and treatment procedures. The student will be guided to perform and interpret cardiotocographic procedures and first and second level obstetrical ultrasound.

Key words: Menopause. Obstetrics and gynecology. Child and adolescent gynecology.

Bibliography: * , High-risk pregnancy : a team approach / [edited by] Robert A. Knuppel, Joan E. Drukker., 2nd ed., Philadelphia : Saunders, c1993., [0721634559].

ME5183 Doctoral Research Proposal I (3 - 0 - 12. Prerequisites: None. DCL12) Equivalence: None

In this course, the student will generate his doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate his project proposal.

General objective: Students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information. Initiate the development of an applied research project or technological development, with advice from a teacher researcher and submit periodic reports of progress. Define a work plan and budget for the project.

Key words: Doctoral research. Project proposal.

ME5184 Research and Innovation Methods

(1.5 - 0 - 6. Prerequisites: None. DCL12)

Equivalence: None

Advanced course with the intention to provide the methods for developing a thesis project in applied research and/or technology development. The student will be able to justify and plan an applied research and/or technology development project.

General objective: Justify the relevance of the thesis topic for the development of the applied research and/or technology development project. Identify the advances in the selected thesis topic, based on literature review and utilizing various information sources. Define the hypothesis for the applied research and/or technology development project. Define specific and relevant research methods in the context of the selected thesis topic. Define a project plan and budget for the development of the thesis project.

Key words: Doctoral research. Project proposal.

ME5185 Doctoral Research Proposal II

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

In this course, the student will generate his doctoral research project proposal and present a progress report publicly within the framework of collective discussions. Learning outcome: the student will consolidate his project proposal.

General objective: Students will further develop their research projects with advice from a teacher researcher and submit periodic reports of progress.

Key words: Doctoral research. Project proposal.

ME5186 Doctoral Research Proposal III

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

In this course, the student will finish his doctoral research project proposal and present a progress report publicly within the framework of collective dis-

cussions. Learning outcome: the student will consolidate his project proposal and express it in a written document and an oral presentation before his thesis committee, in which the objectives, goals, deliverables and expected findings will be clearly defined.

General objective: Students will be able to justify the relevance of a research topic, identifying the progress on the theme selected based on a literature review using various sources of information. Initiate the development of an applied research project or technological development, with advice from a teacher researcher and submit periodic reports of progress. Define a work plan and budget for the project.

Key words: Doctoral research. Project proposal.

ME5187 Research Seminar I

(1 - 0 - 4. Prerequisites: None. DCL12)

Equivalence: None

It is an ongoing investigation with the intention for the student to present his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

Key words: Doctoral research.

ME5188 Research Seminar II

(1 - 0 - 4. Prerequisites: None. DCL12)

Equivalence: None

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

Key words: Project proposal. Doctoral research.

ME5189 Research Seminar III (1 - 0 - 4. Prerequisites: None. DCL12) **Equivalence: None**

It is an ongoing investigation with the intention that the student presents his progress in the context of group discussions. As a result of learning, the student is expected to strengthen a critical stance on the approach and demonstrate his project through achievements in his presentations.

General objective: The aim of this course is for students to make public presentations on the progress of doctoral research.

Key words: Doctoral research. Project proposal.

ME5190 Thesis Project II (3 - 0 - 12. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13) **Equivalence: None**

This is a research course that aims to develop the clinical research competencies in the specialty program of the student. Specifically, it is pretended that the student finishes his thesis following a research group of the Faculty Board of his program, developing his in-field investigation capability, of analysis, and scientific reasoning. Progress in the thesis project is required. As a learning outcome, the resident will conclude, defend, and publish his thesis, according to the established standards, criterion and procedures.

General objective: Resident will be able to:

- To apply the evaluation instruments designed in Thesis Project I according to the established method, previously approved by the Ethics Committee of the School of Medicine and Health Sciences.

- To analyze and document each of the obtained results making a contrast with the described theory in the literature review, looking for precision and clarity in each of the findings. Likewise, there must be contrasted the detail of the collected information with the proposed research question, objectives, and hypothesis.
- Redact in a critical form the conclusions, establishing clearly their use and making emphasis in each of the limitations, as well as making recommendations for future projects.

Key words: Clinical research. Thesis. Research Method.

Bibliography: * Houser, Janet, 1954-, Clinical research in practice : a guide for the bedside scientist / Janet Houser, Joanna Bokovoy., Sudbury, Mass. : Jones and Bartlett, c2006., [0763738751 (rústica: papel alcalino)],[9780763738754].

ME5191 Elective Specialty I (0 - 30 - 6. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13) **Equivalence: None**

This is an elective course in which the student chooses an area of his interest in a national or international academic center, participates in the academic sessions of the department of the rotation, in which the most relevant and actual themes are reviewed.

General objective: Student will be able to acquire deeper knowledge and clinical practice in areas of their interest that they have chosen, with the supervision and authorization of their directors, in order to receive training in a specific subspecialty or area of investigation.

Key words: Elective. Medical specialties. Medical subspecialties.

Bibliography: * Malagón-Londoño, Gustavo., Garantía de calidad en salud / Gustavo Malagón -Londoño, Ricardo Galán Morera, Gabriel Pontón Laverde., 2a ed., Bogotá : Editorial Médica Panamericana, 2006., [9589181953],[9789589181959].

ME5192 Elective Specialty II

(0 - 30 - 6. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

This is an elective course in which the student chooses an area of his interest, participates in the academic sessions of the department of the rotation, in which the most relevant and actual themes are reviewed. Learning outcome: case studies; portfolio and/or reports.

General objective: Student will be able to acquire deeper knowledge and clinical practice in areas of their interest that they have chosen, with the supervision and authorization of their directors, in order to receive training in a specific subspecialty or area of investigation.

Key words: Elective. Medical specialties. Medical subspecialties.

Bibliography: * Malagón-Londoño, Gustavo., Garantía de calidad en salud / Gustavo Malagón -Londoño, Ricardo Galán Morera, Gabriel Pontón Laverde., 2a ed., Bogotá : Editorial Médica Panamericana, 2006., [9589181953],[9789589181959].

ME5193 Medical Care in Psychiatry V

(0 - 60 - 12. Prerequisites: None. RPS13)

Equivalence: None

It is a clinical course that aims to have residents continue treating outpatients, while involving themselves in a more global spectrum of psychiatric pathologies, including chronic schizophrenia, affective disorders, anxiety disorders, drug and alcohol abuse, sexual disorders, forensic problems, psychopharmacology of chronic diseases, couples therapy and family therapy, which will be provided under supervision and in a series of conferences. They will also see community psychiatry and psychiatric emergencies. As a learning outcome, residents most develop a portfolio of the clinical cases they have encountered in outpatient, emergency department, intensive care, ward and when on-call.

General objective:

1. Perform evaluations and treatment of more complex patients in outpatient settings.
2. Develop diagnostic skills to identify psychiatric disorders that may complicate medical and surgical diseases, and the ability to provide this information to primary physicians in hospitalized and outpatient settings.
3. Identify the role of professional interaction in a general hospital setting.
4. Apply the theory and identify the problems of applying psychotherapy in outpatients, both in time limited settings and long term treatments focused on "insight".
5. Practice, under supervision, community psychiatry in outpatient community programs.
6. Participate as a member of a medical team, by diagnosing and treating ambulatory patients.

Key words: Liaison psychiatry. Psychiatric emergencies.

Bibliography: * Pierre Pichot., El abordaje clínico en psiquiatría., [9879954564].

ME5194 Psychiatry V

(3 - 0 - 12. Prerequisites: None. RPS13)

Equivalence: None

It is a theoretical course that aims for students to acquire knowledge on the principle biological and physiological mechanisms of the mental functions studied in neuropsychology; the bases and application of psychopathology measuring scales; the epidemiology and treatment methods for patients with addictions. At the same time, they will acquire deeper knowledge of psychotherapeutic methods for the treatment of psychiatric disorders. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective: Resident will be able to:

1. Know the basic biological principles and mechanism of mental functions and neuropsychology, evaluation procedures, diagnosis and treatment in central nervous system pathologies.

2. Analyze the basic principles, indications, strategies and results of the different scales used to measure psychopathology, social, family and patient evolution.
3. Analyze the basic principles of psychotherapy, the different techniques and indications in psychiatric disorders.
4. Analyze the diagnostic and therapeutical principles of patients and families with drug addictions (especially alcohol).
5. Know the basic principles and mechanisms of genetics in peripheral and central nervous system pathologies, including neuromuscular junctions and muscle-skeleton.

Key words: Psychotherapy. Neuropsychology. Addictions.

Bibliography: * Alejandro Avila Espada., Manual de Técnicas de Psicoterapia, SIGLO XXI, [843230848X].

ME5195 Medical Care in Psychiatry VI

(0 - 60 - 12. Prerequisites: None. RPS13)

Equivalence: None

It is a clinical course that aims to increase the competencies acquired by residents in the care of ambulatory and hospitalized patients, in more complex settings of psychiatry. Residents will continue treating outpatients, while involving themselves in a more global spectrum of psychiatric pathologies, including chronic schizophrenia, affective disorders, anxiety disorders, drug and alcohol abuse, sexual disorders, forensic problems, psychopharmacology of chronic diseases, couples therapy and family therapy, which will be provided under supervision and in a series of conferences. They will also see community psychiatry and psychiatric emergencies. Learning outcome: Residents most develop a portfolio of the clinical cases they have encountered in outpatient, emergency department, intensive care, ward and when on-call.

General objective:

1. Perform evaluations and treatment of more complex patients in outpatient settings.
2. Apply the theory and identify the problems of applying psychotherapy in outpatients, both in time limited settings and long term treatments focused on insight.

3. Evaluate and treat psychiatric disorders seen most commonly in outpatient settings, especially: affective disorders, anxiety, family problems, marriage and sexual problems, as well as drug abuse.
4. Practice, under supervision, community psychiatry in outpatient community programs.
5. Participate as a member of a medical team, by diagnosing and treating ambulatory patients.

Key words: Liason psychiatry. Psychiatric emergencies.

Bibliography: * James Rundell., Fundamentos de la Psiquiatría de Enlace.

ME5196 Psychiatry VI

(3 - 0 - 12. Prerequisites: None. RPS13)

Equivalence: None

It is a theoretical course that aims for students to acquire deeper knowledge on the different psychotherapeutical techniques and their indications; the diagnosis and treatment of sexual disorders; the diagnosis and treatment of sleep disorders. They will also discuss specific current themes (Direction and leadership, Mental Health Care Services models, quality and efficiency evaluation of care, etc.) As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective: Resident will be able to:

1. Understand the general principles of psychotherapy, the different techniques and indications.
2. Analyze the diagnosis and treatment process for affective, schizophrenic, psychotic, anxiety, family system, partner relationship, sexual and addiction disorders.
3. Know the diagnosis, treatment and evolution of the main sleep disorders, including an experience in the polysomnography unit.

Key words: Sleep disorders. Clinimetry. Sexual disorders.

Bibliography: * James Rundell., Fundamentos de la Psiquiatría de Enlace.

ME5197 Medical Care in Psychiatry VII (0 - 30 - 6. Prerequisites: None. RPS13) **Equivalence: None**

It is a clinical course that aims to have residents develop competencies in child psychiatry and deeper experience of treatment and follow-up of outpatient care. Residents will also rotate in different high specialty units like organ transplant, cancer, neurology and other subspecialties. As a learning outcome, residents most develop a portfolio of the clinical cases they have encountered in outpatient, emergency department, intensive care, ward and when on-call.

General objective: Residents will be able to:

1. Evaluate patients in child and adolescent psychiatry, developing a clear idea of the subspecialty.
2. Obtain a clear comprehension of the constant evolution of mental health care and of the competencies needed to have a successful practice, as well as of other leadership roles of the profession.
3. Broaden their expertise in outpatient psychiatry and long-term psychotherapeutical follow-up of specific patients they have seen for a while.
4. Understand the management behind administrative decisions and processes inside the psychiatric health system.

Key words: Child and adolescent psychiatry. Day Hospital.

Bibliography: * , Tratado de psiquiatría del niño y del adolescente / [editado por] Serge Lebovici, René Diatkine, Michel Soulé ; prólogo y traducción, Ignacio Avellanosa, tr. Alberto Lasa.. [et al.], Madrid : Biblioteca Nueva, D.L. [1988-1993], spafre, [8470303155 (set)].

ME5198 Psychiatry VII (3 - 0 - 12. Prerequisites: None. RPS13) **Equivalence: None**

It is a theoretical course that aims for students to acquire knowledge of the diagnosis and treatment of the most common psychiatric disorder of child and adolescent and old age; the bases of imagenology applied to psychiatry; the bases of psychotherapy used in child and adolescent psychiatry and psychogeriatric. They will also acquire knowledge of

principles of rehabilitation used in psychiatry; the psychiatric aspects of rehabilitation used in other subspecialties; and the principles and applications of resources to mental health in our country and in some international models. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills through written examinations, oral presentation and clinical case discussions.

General objective: Resident will be able to:

1. Understand the basic principles of child and adolescent psychiatry, including the most common disorders and their biological, psychotherapeutical and social treatments.
2. Understand the basic principles of psychogeriatrics, the most common disorders, diagnostic methods, and their treatments.
3. Know the basic principles of imagenology related to the most common geriatric psychiatric disorders.
4. Analyze the basic principles of psychotherapy applied to child and adolescent psychiatry, to the family system and long term psychotherapy.
5. Analyze the principles and indications of rehabilitation techniques used in psychiatry, and the psychiatric aspects of rehabilitation used in other subspecialties.
6. Analyze the principles and indications of resource administration for mental health care in the private and public sector of our country, while having knowledge of the models applied in other countries.

Key words: Sleep disorders. Sexual disorders. Clinimetry.

Bibliography: * Krassoievitch, Miguel., Psicoterapia Geriátrica/ Miguel Krassoievitch., México: Fondo de Cultura Económica, 1998., spa, [9681638832].

ME5199 Medical Care in Psychiatry VIII (0 - 30 - 6. Prerequisites: None. RPS13) **Equivalence: None**

It is a clinical course that aims to have residents continue developing competencies in child psychiatry and deeper experience of treatment and follow-up of outpatient care. Residents will also rotate in different high specialty units like organ transplant, cancer,

neurology and other subspecialties. They will also learn about administrative aspects of mental health care. As a learning outcome, residents most develop a portfolio of the clinical cases they have encountered in outpatient, emergency department, intensive care, ward and when on-call.

General objective: Residents will be able to:

1. Evaluate patients in child and adolescent psychiatry, developing a clear idea of the subspecialty.
2. Obtain a clear comprehension of the constant evolution of mental health care and of the competencies needed to have a successful practice, as well as of other leadership roles of the profession.
3. Broaden their expertise in outpatient psychiatry and long-term psychotherapeutical follow-up of specific patients they have seen for a while.
4. Understand the management behind administrative decisions and processes inside the psychiatric health system.

Key words: Liason psychiatry. Psychiatric emergencies.

Bibliography:*; Tratado de psiquiatría del niño y del adolescente / [editado por] Serge Lebovici, René Diatekine, Michel Soulé ; prólogo y traducción, Ignacio Avellanosa, tr. Alberto Lasa.. [et al.], Madrid : Biblioteca Nueva, D.L. [1988-1993], spafre, [8470303155 (set)].

ME5200 Psychiatry VIII

(3 - 0 - 12. Prerequisites: None. RPS13)

Equivalence: None

It is a theoretical course designed to strengthen the student's knowledge in the areas of Liaison Psychiatry, Paidopsychiatry, Psychosocial rehabilitation of persons with severe mental illness, as well as those areas of knowledge that the student selected in elective clinical rotations, in national or international clinical contexts. As a learning outcome, students are expected to demonstrate their knowledge and analytical skills by solving written examinations, oral presentations and discussion of clinical cases.

General objective: Residents will be able to: Understand in depth concepts and principles related to Liaison Psychiatry, Paidopsychiatry, Psychosocial Reha-

bilitation and other subjects selected in their elective clinical rotations.

Key words: Sleep disorders. Clinimetry. Sexual disorders.

Bibliography: * Kaplan, Harold I., 1927-, Sinopsis de psiquiatría : ciencias de la conducta, psiquiatría clínica / Harold I. Kaplan, Benjamin J. Sadock., 10a ed., Madrid : Wolters Kluwer-Lippincott Williams & Wilkins, 2008., spaeng, [9788496921184].

ME5209 Medical Care in Urology V

(0 - 60 - 12. Prerequisites: None. RUR13)

Equivalence: None

This is a clinical care course that aims the student to develop the competencies of clinical judgment and decision-making under continuous surveillance, correlate the results of urologic pathologies with further investigations, the clinical history, and medical explorations, and certify the present state and staging of the disease; discuss the principal diagnosis and discard differentials based on evidences; make recommendations about surgical and medical treatments. He will continue to develop interpersonal abilities and effective communication, learn based on the patient and in daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of evidence levels and recommendation grades, essential paraclinical studies, tumor markers, further investigations, bone and renal gammagraphy, computed axial tomography, nuclear magnetic resonance. He will do daily visits to the hospital, outpatient visits, medical resident work hours, and urologic emergencies service under the surveillance of senior residents and of the Faculty Board. As a result of learning, the student is expected to know the evidence levels and grades of recommendation for present treatments; be accurate in diagnostic decisions, know the normal lab values and interpret the results of studies associated with the clinical history. The student will develop skills of effective communication and professionalism with the medical morning report.

General objective: The resident will be able to identify and solve, under advanced surveillance, the complex and critical urological problems of patients

in medical care during medical visits, preoperative areas, and in the resident work hours; develop skills of interview and physical examination; integrate syndromes; execute diagnostic and therapeutic maneuvers; make and evaluate therapeutic decision-making, and advise the health team in care activities.

Key words: Outpatient visit. Medical morning report. Intensive care. Medical Resident Work Hours. Emergency room.

Bibliography: * , Health services research [electronic resource] : work force and educational issues / Committee on Health Services Research: Training and Work Force Issues, Division of Health Care Services, Institute of Medicine ; Marilyn J. Field, Robert E. Tranquard, Washington, D.C. : National Academy Press, 1995., [0585030235 (electronic bk.)].

ME5210 General Urology V (3 - 0 - 12. Prerequisites: None. RUR13) **Equivalence: None**

This theoretical course intends the student to learn and recognize clinic data of erectile dysfunction, classify it, determine the supporting diagnosis elements, and select appropriate treatments. Recognize symptoms in lithiasis, describe imaging studies, and success in treatment selection. Determine the etiology of end stage renal disease and determine the best moment to select a transplant. Classify and stage with precision the urinary system trauma and participate in the therapeutic decision-making in renal trauma. Recognize the anatomic changes of pathologic alterations of the suprarenal glands. There would be included concepts of erectile dysfunction, urolithiasis, urologic trauma, and suprarenal glands. As a result of learning it is expected that the student coordinates the erectile dysfunction diagnosis, evaluates the need of treatment and involves in surgical processes under supervision. It is also expected his participation in decision-making of endourological, extracorporeal, and surgical treatments for lithiasis, under supervision; his involvement with procedures for the organ procurement, related live donor and cadaveric transplantation; he will start transabdominal surgical processes for renal trauma under supervision. Participate in the decision-making of treatments for suprarenal tumors.

General objective: The student will be able to describe the erectile physiological response; describe the natural history of urinary calculus, and select the priority model treatment for the optimal resolution of erectile dysfunction problems, urolithiasis, and end stage renal disease.

Key words: Erectile dysfunction. Phosphodiesterase-5 inhibitors. Prostaglandins. Urolithiasis. Endourology.

Bibliography: * , Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME5211 Medical Care in Urology VI (0 - 60 - 12. Prerequisites: None. RUR13) **Equivalence: None**

This is a clinical care course that aims the student to develop the competencies of clinical judgment and decision-making under continuous surveillance; correlate the results of urologic pathologies with further investigations, the clinical history, and medical explorations; certify the present state and staging of the disease; discuss the principal diagnosis and discard differentials based on evidences, and make recommendations about surgical and medical treatments. He will continue to develop interpersonal abilities and effective communication, learn based on the patient and in daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of evidence levels and grades of recommendation, essential paraclinical studies, tumor markers, further investigations, bone and renal gammagraphy, computed axial tomography, and nuclear magnetic resonance. He will do daily visits to the hospital, outpatient visits, medical resident work hours, and urologic emergencies service under the surveillance of senior residents and of the Faculty Board. As a result of learning, the student is expected to know the evidence levels and grades of recommendation for present treatments; be accurate in diagnostic decisions, know the normal lab values and interpret the results of studies associated with the clinical history of the patient. The student will develop skills of effective communica-

tion and professionalism with the medical morning report.

General objective: The resident will be able to: identify and solve, under advanced surveillance, the complex and critical urological problems of patients in medical care during medical visits, preoperative areas, and in the resident work hours; make endoscopic surgeries; collaborate wholly as a first assistant; understand the concepts of absolute surgical indications; supervise patients and actions of junior residents and, finally, participate in the decision-making for the medical-surgical care of urological patients.

Key words: Molecular biology. Pediatric urology. Sexual bioavailability disorders. Renovascular hypertension.

Bibliography: Health services research [electronic resource] : work force and educational issues / Committee on Health Services Research: Training and Work Force Issues, Division of Health Care Services, Institute of Medicine ; Marilyn J. Field, Robert E. Tranquad, Washington, D.C. : National Academy Press, 1995., [0585030235 (electronic bk.)].

ME5212 General Urology VI (3 - 0 - 12. Prerequisites: None. RUR13) **Equivalence: None**

This theoretical course intends the student to comprehend the pediatric urologic pathologies and appreciate their limits as the urologist of adult patients; classify sexual differentiation disorders, identify clinic signs of hypertension of renal origin, discuss innovative endovascular and endoscopic treatments and make therapeutic decisions, and knowledge of the principal basis of molecular immunology and molecular biology. There will be included concepts of pediatric urology, sexual differentiation disorders, renovascular hypertension, and molecular biology. The student will participate actively in the diagnosis and decision-making of pediatric urologic ailments; will be involved, with strict adherence and supervision, in sexual development disorders surgeries; maintain understandable communication for the patient and his family in relation to renovascular hypertension ailments.

General objective: The student will be capable of presenting a flux diagram and arguing pediatric urologic problems from the description of the physiological response and the natural history of diseases of childhood, as well as selecting priority models of treatment for the optimal resolution of urologic pediatric problems.

Key words: Molecular biology. Pediatric urology. Sexual bioavailability disorders. Renovascular hypertension.

Bibliography: Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME5213 Medical Care in Urology VII (0 - 30 - 6. Prerequisites: None. RUR13) **Equivalence: None**

This is a clinical care course that aims the student to give a certain clinical judgment and make diagnostic and therapeutic decisions discussing the evidence with the Faculty Board; correlate the results of urologic pathologies with further investigations, clinical history, and medical explorations; certify the present state and staging of the disease; discuss the principal diagnosis and discard differential diagnosis based on evidence; identify the early complications and discuss the late ones. Explain, with equanimity, the development of the process of medical care to the patient and to his family; program surgical processes under the Faculty Board surveillance. He will continue to develop interpersonal abilities and effective communication, learn based on the patient and in daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of evidence levels and grades of recommendation, international clinical guidelines; endourologic, open, laparoscopic, and robotic medical and surgical procedures. He will do daily visits to the hospital, outpatient visits, medical resident work hours, and urologic emergencies service under the surveillance of senior residents and the Faculty Board. As a result of learning, the student is expected to know the evidence levels and grades of recommendation for present treatments; manage interna-

tional recommendations and discuss the present results of medical and surgical procedures to be done. The student will develop effective communication and professionalism skills with the medical morning report.

General objective: The resident will be able to analyze, integrate, and solve common, frequent, and critical urologic problems in medical care of patients during medical visits, operatory areas, intensive care unit, and in the urologic cancer clinic.

Key words: Outpatient visit. Medical morning report. Intensive care. Medical Resident Work Hours. Emergency room.

Bibliography: * , Health services research [electronic resource] : work force and educational issues / Committee on Health Services Research: Training and Work Force Issues, Division of Health Care Services, Institute of Medicine ; Marilyn J. Field, Robert E. Tranquand, Washington, D.C. : National Academy Press, 1995., [0585030235 (electronic bk.)].

ME5214 General Urology VII (3 - 0 - 12. Prerequisites: None. RUR13) **Equivalence: None**

This theoretical course is intended for the student to comprehend the importance of the depth of his knowledge in urologic oncology in order to understand the biologic behavior of each tumor. The resident will learn to identify positive signs in patients with risk factors in order to give an opportune diagnosis through the use of appropriate diagnosis methods and be able to describe the current, innovative, and state-of-the-art therapies discussing the risks and benefits under medical evidence of each one of the treatments. There will be included concepts such as renal cancer, benign renal tumors, cabinet studies, and tumor markers; also diagnosis strategies, clinic guidelines, and state-of-the-art methods with their corresponding results. As a result of the learning, the student will identify in the outpatient service practice risk factor patients, signs and clinic symptoms of specific urologic oncology for each component of the urinary system; suggest and classify the appropriate laboratory and cabinet studies and develop the more suitable treatment plan for the patient.

General objective: The student will be able to identify, argue, classify, and diagnose oncologic problems of general urology from the description of the natural history of oncologic pathologies of the urinary system, and to participate in the decision-making on the priority models of the treatment for the optimal resolution of these problems.

Key words: Oncologic urology. Kidney Tumors. Urothelium tumors. Penis tumors. Testicle tumors.

Bibliography: * , Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME5215 Medical Care in Urology VIII (0 - 30 - 6. Prerequisites: None. RUR13) **Equivalence: None**

This is a clinical care course that aims the student to give a certain clinical judgment and make opportune diagnostic and therapeutic decisions discussing the evidence and supporting his decision; correlate the results of urologic pathologies with further investigations, clinical history, and medical explorations; certify the present state and staging of the disease; discuss the principal diagnosis and discard differential diagnosis based on evidence; identify the early complications and discuss the late ones. Explain, with equanimity, the development of the process of medical care to the patient and to his family; program surgical processes under the Faculty Board surveillance; clearly explain the surgical procedure and carry it out under academic surveillance. He will continue to develop interpersonal and effective communication abilities, learn based on the patient and in daily practice, and develop the competencies of ethics, citizenship, and professionalism. There will be included concepts of evidence levels and grades of recommendation, international clinical guidelines; endourologic, open, laparoscopic, and robotic medical and surgical procedures. He will do daily visits to the hospital, outpatient visits, medical resident work hours, and urologic emergencies service under the surveillance of senior residents and of the Faculty Board. As a result of learning the student will be expected to know the evidence levels and grades of

recommendation for present treatments; manage the international recommendations, and discuss the present results of medical and surgical procedures to be done. The student will develop effective communication and professionalism skills with the medical morning report.

General objective: The student will be able to analyze, integrate, and solve common, frequent, complex, and critical urologic problems in medical care of patients during medical visits, in operatory areas, in intensive care unit, and in the specific disease areas of each specialty.

Key words: Outpatient visit. Medical morning report. Intensive care. Medical Resident Work Hours. Emergency room.

Bibliography: Health services research [electronic resource] : work force and educational issues / Committee on Health Services Research: Training and Work Force Issues, Division of Health Care Services, Institute of Medicine ; Marilyn J. Field, Robert E. Tranquid, Washington, D.C. : National Academy Press, 1995., [0585030235 (electronic bk.)].

ME5216 General Urology VIII (3 - 0 - 12. Prerequisites: None. RUR13) **Equivalence: None**

This theoretical course intends the student to identify with certainty patients with high-risk of suffering from clinically evident prostate cancer which can endanger the life of the patient; to select the appropriate laboratory studies, to identify with precision the patients who need a biopsy, to comprehend the importance of the systematic mapping of the prostate; to manage with exactness the Gleason score and give a certain interpretation of it. There will be included the concepts prostate tumor, adenocarcinoma, localized and advanced cancer, and metastatic cancer. As a result of learning, the student will know the scientific advancement throughout time; recognize biologic and histological fundamentals of the tumor, be able to make decisions when suggesting the most appropriate treatment for each patient, based in the clinic history evidence, physical exploration, laboratory findings, Gleason score, and extension studies.

General objective: The student will be able to know the scientific advances of this disease throughout time, to recognize the biologic and histological fundamentals of the tumor; to identify, argue, classify, and diagnose prostate cancer from the natural history description of prostatic neoplasia, and to participate in the decision-making on the priority treatment models for the optimal resolution of these problems.

Key words: Prostate cancer. Radical prostatectomy. Laparoscopy and Robotics. Active surveillance. Hormone therapy.

Bibliography: Glenn's urologic surgery / editor-in-chief, Sam D. Graham, Jr. ; [consultant editors, James F. Glenn, Thomas E. Keane ; associate editors, Charles B. Brendler .. et al.], 6a ed., Philadelphia : Lippincott Williams & Wilkins, c2004., [0781740827].

ME5217 Clinical Practice in Internal Medicine V (0 - 60 - 12. Prerequisites: None. REM13) **Equivalence: None**

This is an in-service course that intends the Resident to acquire the skills for the diagnosis and therapy of patients with Neurologic and Renal disorders, in ambulatory and in-hospital settings, and to participate in teaching and supervising activities directed upon other residents and medical students. This course requires knowledge in Internal Medicine areas, particularly in Cardiology, Endocrinology, Neurology, and Kidney disorders. Learning outcome: It is expected that the student documents his activities and actively seeks the evaluation and feedback of his tutors, though the use of the Clinical Activities evaluation form.

General objective: Resident will be able to:

- Develop the abilities and skills to take care of critically ill patients or patients that require subspecialty consultation.
- Develop the abilities and skills for the care of ambulatory or hospitalized patients with acute or chronic Neurologic or Renal diseases.
- Practice and improve their teaching capabilities, and take awareness of their role as educators of lower level residents, medical students, hospital staff, and the patient and his family.

Key words: Neurology. Internal medicine. Nephrology.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)],[9780071632447 (v.1 : print)],[9780071748872 (v.2 : print)].

ME5218 Internal Medicine V (3 - 0 - 12. Prerequisites: None. REM13) **Equivalence: None**

This is a theoretical course that is intended for the student to increase the broad and depth of his knowledge in cardiac and metabolic diseases. This course requires previous basic knowledge on Emergency Medicine, Cardiology and Endocrinology. As a learning outcome, it is expected that the student prepares keynote presentations about the common cardiac and metabolic diseases, as well as their differential diagnosis and therapy.

General objective: Resident will be able to:

- Acquire advanced theoretical knowledge in Cardiology and Endocrinology, both areas within Internal Medicine, based on, and integrating previous knowledge, with emphasis in diagnosis and therapy of the adult patient.
- Know the differential diagnosis and diagnostic methodology of cardiac and metabolic diseases. Know the diagnostic approach of cardiac and metabolic disorders.

Key words: Cardiology. Endocrinology.

Bibliography: Heart disease : a textbook of cardiovascular medicine / editado por Eugene Braunwald, Douglas P. Zipes, Peter Libby., 6th ed., Philadelphia: Saunders, c2001., [0721685617 (obra completa)], [0721685625 (v.1)],[0721685633 (v.2)].

ME5219 Clinical Practice in Internal Medicine VI

(0 - 60 - 12. Prerequisites: None. REM13)
Equivalence: None

This is an in-service course that intends the Resident to acquire the skills for the diagnosis and therapy of patients with Lung and infectious diseases, and Geriatric patients, in ambulatory and in-hospital settings, and to participate in teaching and supervising activities directed upon other residents and medical students. This course requires knowledge in Internal Medicine areas, particularly in Cardiology, Endocrinology, Neurology, and Pulmonary disorders. Learning outcome: It is expected that the student documents his activities and actively seeks the evaluation and feedback of his tutors, though the use of the Clinical Activities evaluation form.

General objective: Resident will be able to:

- Acquire the skills to act as team leaders in in-hospital and emergency situations, and continue to develop his teaching capabilities with residents, medical students, hospital personnel, and patients and their families.
- Develop the abilities and skills for the care of ambulatory or hospitalized patients with acute or chronic Pulmonary Medicine and Geriatrics.
- Practice and improve their teaching capabilities, and take awareness of their role as educators of lower level residents, medical students, hospital staff, and the patient and his family.

Key words: Geriatrics. Internal medicine. Infectious diseases. Pulmonary diseases.

Bibliography: Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)], [9780071632447 (v.1 : print)],[9780071748872 (v.2 : print)].

ME5220 Internal Medicine VI (3 - 0 - 12. Prerequisites: None. REM13) **Equivalence: None**

This is a theoretical course in which the student is expected to increment and deepen his knowledge in

areas of specialty of Internal Medicine, mainly in the areas of Kidney Diseases, Pulmonary Medicine and Neurology. Learning outcome: discussion of clinical cases.

General objective: Resident will be able to acquire advanced theoretical knowledge in the areas of Kidney Diseases, Pulmonary Medicine and Neurology and other areas of Internal Medicine considered electives. The student has to build upon previous knowledge and integrate the new, with emphasis in diagnosis and therapy.

Key words: Neurology. Pulmonary medicine.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadrado: papel alcalino)], [007149992X (encuadrado: papel alcalino)].

ME5221 Clinical Practice in Internal Medicine VII

(0 - 30 - 6. Prerequisites: None. REM13)

Equivalence: None

This is a Clinical and in-service course that intends that the student participate in the clinical care of the population that is served at the second level hospital of the Nuevo Leon's ministry of health, know the epidemiology of the rural areas of the state, and apply the knowledge acquired at the Residency's Home Hospitals. Requires knowledge in Internal Medicine, particularly in areas of Cardiology and Endocrinology, as well as in the management of Medical Emergencies. As a result, it is expected that the student gets an evaluation from the Hospital where his Social Service takes place, which will be attached to the students file. Social Service is a requirement for graduation.

General objective: Resident will be able to:

- Contribute through his knowledge, skills, attitudes, and values, to the medical care of the rural population.
- Impact in the community as stated in Mission of Tec

de Monterrey.

- Collaborates with National Programs of Health.

Key words: Chronic degenerative diseases. Internal medicine.

Bibliography: Harrison's principles of internal medicine : self-assessment and board review / edited by Charles Wiener, contributing editors, Cynthia D. Brown, Anna R. Hemnes, Phillip J. Nivatpumin., 16th ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071435344].

ME5222 Internal Medicine VII

(3 - 0 - 12. Prerequisites: None. REM13)

Equivalence: None

This is a theoretical course in which the student will meet the more common pathologies of the rural population of this region. Requires basic knowledge of all the areas of Internal Medicine. As a learning outcome the student it is expected to present a portfolio with clinical cases discussions.

General objective: Resident will be able to:- Understand concepts and principles of Internal Medicine knowledge required for the attention of chronic degenerative diseases in rural areas.- Apply this knowledge in clinical cases discussions.

Key words: Chronic degenerative diseases. Internal medicine.

Bibliography: * , Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo., 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)], [9780071632447 (v.1 : print)], [9780071748872 (v.2 : print)].

ME5223 Clinical Practice in Internal Medicine Specialties

(0 - 30 - 6. Prerequisites: None. REM13)

Equivalence: None

This is an in-service clinical course that intends the Resident to acquire the skills for the diagnosis and therapy of patients with Cardiac, Dermatologic, and

Psychiatric disorders, in ambulatory and in-hospital settings, and to participate in teaching and supervising activities directed upon other residents and medical students. This course requires knowledge in Internal Medicine areas, particularly in Cardiology, Endocrinology, and Neurology. Learning outcome: It is expected that the student documents his activities and actively seeks the evaluation and feedback of his tutors, though the use of the Clinical Activities evaluation form.

General objective: Resident will be able to:

- Develop abilities and skills to take care of critically ill patients and those who require subspecialty consultation.
- Bring an honorable therapy to critically ill and terminal patients.
- Improve their teaching capabilities and their awareness of their role as co-educators to fellow residents, medical students, hospital staff, and the patient and his family.

Key words: Dermatology consultation. Psychiatric consultation.

Bibliography: Harrison's online [recurso electrónico] / editors, Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser, Joseph Loscalzo. 18th ed., New York : McGraw-Hill, 2011., [9780071748896 (set : print)], [9780071632447 (v.1 : print)], [9780071748872 (v.2 : print)].

ME5224 Internal Medicine Specialties

(3 - 0 - 12. Prerequisites: None. REM13)

Equivalence: None

This is a theoretical course that intends the student to deepen his knowledge of subspecialty areas of Internal Medicine. Requires general knowledge of internal medicine. As a learning outcome it is expected that the student evidences through the resolution of cases, their knowledge in areas of internal medicine, including patient care in critical condition, oncology and gastroenterology.

General objective: Resident will be able to:

- Acquire advanced theoretical knowledge in areas of Internal Medicine, including Oncology, Gastroenterology and Critical Care Medicine, based upon and

integrating previous knowledge, with emphasis in the adult patient.

Key words: Hematology. Critical care medicine. Oncology.

Bibliography: Sleisenger and Fordtran's gastrointestinal and liver disease : Pathophysiology/Diagnosis/Management / [edited by] Mark Feldman, Lawrence S. Friedman, Lawrence J. Brandt., 9th ed., Philadelphia , PA : Saunders/Elsevier, c2010., [9781416062073],[1416062076],[9781416061892 (v.2)], [1416061894 (v.2)].

ME5225 Management in Clinical Care IV

(3 - 0 - 12. Prerequisites: None. RCA13)

Equivalence: None

It is a course of development of skills intended that students apply and integrate concepts involving the quality of clinical care defined in three moments of awareness of quality: contextualization of the quality, measurement and evaluation and intervention. Led in three areas of the field of application of knowledge such as: patient, evaluation and improvement of the quality and management. It requires knowledge of clinical processes and management, application of methodology for research, as well as understanding of organizations of health for the identification and evaluation of processes and structure of care and planning for the implementation of the change. As a learning outcome is expected that the student perform projects specific gathering of the content of this field-aligned to hospital practice.

General objective: Residents will be able to:

- Identify the specific aspects related to the contextualization, measurement and evaluation and intervention of the in general health services, hospital processes, outpatient units as well as the concepts of quality, safety and management.
- Get involved in the health care environment, understanding the complexity of organizations of attention to the health and the patient-centered approach.
- Apply knowledge of evidence-based medicine. Implement of the theorists/academic concepts in clinical practice implementation of evaluations of clinical processes and management.

Key words: Quality management in health services. Patient safety. Adverse event.

Bibliography: Quality by design : a clinical microsystems approach / Eugene C. Nelson, Paul B. Batalden, Marjorie M. Godfrey, editors ; foreword by Donald M. Berwick., 1st ed., [Lebanon, NH] : Center for the Evaluative Clinical Sciences at Dartmouth ; San Francisco : Jossey-Ba, [9780787978983 (rústica)], [0787978981 (rústica)].

ME5226 Hospital Practice IV (0 - 60 - 12. Prerequisites: None. RCA13) **Equivalence: None**

It is a clinical course intended for the student to develop and strengthen skills and competencies aligned to the academic program of the specialty. It requires knowledge and implementation of management skills that support care in clinical and supportive services. As learning outcome, is expected that the student is able to address and engage in follow-up meetings of multidisciplinary group, to improve the implementation of systems, processes of improvement of quality and safety to the level of mesosystem. Identification and evaluation of systems.

General objective: Resident will be able to acquire and develop skills of leadership and management of health units in the hospital services of specialties reflecting their ability to direct and modify processes and the culture of work and organizational structure to consolidate changes and improve the quality of its patient-centered and patient safety culture in hospitals. Strategic planning and directorate-general for health, hospital committees, medical management, Administrative Council units. · Follow-up on its Protocol of research according to the methodology of the tutor.

Key words: Continuous improvement. Patient safety. Clinical microsystems. Clinical care processes. Adverse event.

Bibliography: * , Value by design : developing clinical microsystems to achieve organizational excellence / Eugene C. Nelson .. [et al.], 1st ed., San Francisco : Jossey-Bass, c2011., [9780470385340 (pbk.)], [0470385340 (pbk.)].

ME5227 Management in Clinical Care V (3 - 0 - 12. Prerequisites: None. RCA13) **Equivalence: None**

It is a theoretical course which intends that the student integrate and generate concepts that involve the quality of clinical care applying methodologies and tools focused on the improvement of the safety of the patient. It requires implementation of clinical processes and management knowledge, monitoring systems; management and organizational structure. As a learning outcome is expected that the student perform projects specific integrators of the content of this field-aligned to hospital practice.

General objective: Residents will be able to:

- Control and improve the specific aspects related to the contextualization, measurement and evaluation and intervention of the general health services, hospital processes, outpatient units as well as the foundations of quality, safety and management.
- Get involved in the health care environment, understanding the complexity of organizations of attention to the health and the patient-centered approach.
- Apply knowledge of evidence-based medicine.
- Implement of the theorists/academic concepts in clinical practice developing of improvement of clinical processes and management.

Key words: Quality management in health services. Patient safety. Adverse event.

Bibliography: Quality by design : a clinical microsystems approach / Eugene C. Nelson, Paul B. Batalden, Marjorie M. Godfrey, editors ; foreword by Donald M. Berwick., 1st ed., [Lebanon, NH] : Center for the Evaluative Clinical Sciences at Dartmouth ; San Francisco : Jossey-Ba, [9780787978983 (rústica)], [0787978981 (rústica)].

ME5228 Hospital Practice V (0 - 30 - 6. Prerequisites: None. RCA13) **Equivalence: None**

It is a clinical course intended for the student to develop and strengthen skills and competencies aligned to the academic program of the specialty.

It requires knowledge and implementation of management skills that support care in clinical and supportive services. As a learning outcome, is expected that the student is able to address and engage in follow-up meetings of multidisciplinary group, to improve the implementation of systems, collaborating with service chiefs, medical direction and quality coordinator responsible of hospital processes of improvement of quality and safety to the level of macro system. Identification and evaluation of systems.

General objective: Resident will be able to:

- Develop skills of leadership and management of health units in the hospital services of specialties reflecting their ability to direct and modify processes and the culture of work and organizational structure to consolidate changes and improve the quality of its patient-centered hospitals.
- Conclude and communicate the results of the protocol of research and publication.

Key words: Patient safety. Clinical microsystems. Clinical care processes. Adverse event. Continuous improvement.

Bibliography: * , Value by design : developing clinical microsystems to achieve organizational excellence / Eugene C. Nelson .. [et al.], 1st ed., San Francisco : Jossey-Bass, c2011., [9780470385340 (pbk.)],[0470385340 (pbk.)].

ME5229 Management in Clinical Care VI

(3 - 0 - 12. Prerequisites: None. RCA13)

Equivalence: None

It is a course of development of management skills, where the student integrates all the learned concepts and generates changes impacting the quality of clinical care in any of the 3 fields of the application of knowledge as they are intended: safety of the patient, evaluation and improvement of the quality and direction. It requires knowledge of implementation, continuous improvement, managerial skills, research, monitoring systems. As a learning outcome is expected that the student perform projects specific integrators of the content of this field-aligned to hospital practice.

General objective: At the end of the course, resident will be able to:

- Improve and control the specific aspect related to the contextualization, measurement, evaluation and intervention of the general health services, hospital procedures, ambulatory units, as well as, basic quality, security and direction.
- Integrate the clinical knowledge in health care environments, while understanding the complexity of health care organization and focusing on the patient.
- Apply evidence-based knowledge.
- Design innovations for research areas.

Key words: Quality management in health services. Patient safety. Adverse event.

Bibliography: * , Quality by design : a clinical microsystems approach / Eugene C. Nelson, Paul B. Batalden, Marjorie M. Godfrey, editors ; foreword by Donald M. Berwick., 1st ed., [Lebanon, NH] : Center for the Evaluative Clinical Sciences at Dartmouth ; San Francisco : Jossey-Ba, [9780787978983 (rústica)],[0787978981 (rústica)].

ME5230 Hospital Practice VI

(0 - 30 - 6. Prerequisites: None. RCA13)

Equivalence: None

A clinical course intended for the student to develop and strengthen is skills and competencies aligned to the academic program of the specialty. It requires knowledge and implementation of management skills that support the care in clinical services and support care. As a learning outcome is expected that the student is able to address and engage in follow-up meetings of multidisciplinary group, to improve the implementation of systems, collaboration with heads of service, medical area and coordination of quality in charge hospital processes of improvement of quality and safety to the level of Macrosystem. Identification and evaluation of systems, and he/she serves as an advisor and generates specific recommendations that allow to improve hospital care systems.

General objective: Resident will be able to:

- Develop skills of leadership and management of health units in the hospital services of specialties reflecting their ability to direct and modify pro-

cesses and the culture of work and organizational structure to consolidate changes and improve the quality of its patient-centered hospitals.

- Conclude and communicate the results of the protocol of research and publication.

Key words: Patient safety. Clinical microsystems. Clinical care processes. Adverse event. Continuous improvement.

Bibliography: * , Value by design : developing clinical microsystems to achieve organizational excellence / Eugene C. Nelson .. [et al.], 1st ed., San Francisco : Jossey-Bass, c2011., [9780470385340 (pbk.)],[0470385340 (pbk.)].

ME5231 Ambulatory and Hospitalized Care in Pediatrics V

(0 - 60 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to perfect the physical exam on a pediatric patient, with emphasis on the subspecialties of cardiology, neurology, pneumology and dermatology. It requires previous knowledge of pediatrics. As a learning outcome, residents must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this Ambulatory and Hospitalized Care in Pediatrics V course, residents will be able to:

- Recognize and solve, with the help of subspecialized physicians, the clinical problems of pediatric in cardiology, neurology, pneumology and dermatology.
- Do a complete and perfect pediatric physical exam.
- Perfectly interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Communicate with patients and with different members of the Health Care system, in an objective, warm and humane manner.
- Teach younger residents and students, and share the knowledge and experience they've acquired.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037], [0323053033].

ME5232 Pediatrics V

(3 - 0 - 12. Prerequisites: [ME4190]. REN13)

Equivalence: None

It is a theoretical course that aims for residents to develop deeper knowledge on pediatrics, from a nephrology and endocrinology perspective. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatrics V course, students will be able to:

- Understand pediatric pathologies from the perspective of the following subspecialties: nephrology and endocrinology.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Pediatric nephrology. Pediatric endocrinology.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037], [0323053033].

ME5233 Ambulatory and Hospitalized Care in Pediatrics VI

(0 - 60 - 12. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to perfect the skills needed for the examination on a pediatric patient, with emphasis on the subspecialties of cardiology, neurology, pneumology and dermatology; and to perfect the skills needed to analyze and integrate information from paraclinical studies to a complete physical exam, in order to formulate an accurate diagnosis and actualized treatment plan. It requires previous knowledge of pediatrics. As a learning outcome, residents must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this Ambulatory and Hospitalized Care in Pediatrics VI course, residents will be able to:

- Recognize and solve, with subspecialized physicians, clinical problems of pediatric consultations in cardiology, neurology, pneumology and dermatology.
- Do a complete and perfect pediatric physical exam for the mentioned subspecialties.
- Perfectly interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Communicate with patients and with different members of the Health Care system, in an objective, respectful, warm and humane manner.
- Teach younger residents and students, and share the knowledge and experience they've acquired.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME5234 Pediatrics VI

(3 - 0 - 12. Prerequisites: [ME5232]. REN13)

Equivalence: None

It is a theoretical course that aims for residents to develop deeper knowledge on pediatrics, from a perspective of hematology and oncology. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatrics VI course, students will be able to:

- Understand pediatric pathologies from the perspective of the following subspecialties: hematology and oncology.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Pediatric oncology. Pediatric Hematology.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME5235 Ambulatory and Hospitalized Care in Pediatrics VII

(0 - 30 - 6. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to perfect the skills needed for the examination on a pediatric patient, with emphasis on the subspecialties of rheumatology, immunology and genetics. It requires previous knowledge of pediatrics. As a learning out-

come, residents must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this course, residents will be able to:

- Recognize and solve clinical problems of pediatric consultations in rheumatology, immunology and genetics.
- Do a complete and perfect pediatric physical exam for the mentioned subspecialties.
- Perfectly interpret paraclinical studies which will enable residents to, along with the physical exam, establish a diagnosis, treatment plan and prognosis of pediatric patients.
- Communicate with patients and with different members of the Health Care system, in an objective, respectful, warm and humane manner.
- Teach younger residents and students, and share the knowledge and experience they've acquired.
- Show altruism and an obligation to the community.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME5236 Pediatrics VII

(3 - 0 - 12. Prerequisites: [ME5234]. REN13)

Equivalence: None

It is a theoretical course that aims for residents to develop deeper knowledge on pediatrics, from the perspective of immunology and rheumatology. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this Pediatrics VII course, students will be able to:

- Understand pediatric pathologies from the perspective of the following subspecialties: rheumatology and immunology.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Pediatric immunology. Pediatric rheumatology.

Bibliography: * , The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME5237 Ambulatory and Hospitalized Care in Pediatrics VIII

(0 - 30 - 6. Prerequisites: None. REN13)

Equivalence: None

It is a clinical course that aims for students to perfect the skills needed for the examination on a pediatric patient, with emphasis on the subspecialties of rheumatology, immunology and genetics; and to perfect the skills needed to analyze and integrate information from paraclinical studies to a complete physical exam, in order to formulate an accurate diagnosis and actualized treatment plan. It requires previous knowledge of pediatrics. As a learning outcome, residents must present a portfolio with the minimal requirements of their rotations.

General objective: At the end of this course, residents will be able to:

- Recognize and solve clinical problems of pediatric consultations in rheumatology, immunology and genetics.
- Do a complete and perfect pediatric physical exam for the mentioned subspecialties.
- Perfectly interpret paraclinical studies which will enable residents to, along with the physical exam,

establish a diagnosis, treatment plan and prognosis of pediatric patients.

- Communicate with patients and with different members of the Health Care system, in an objective, respectful, warm and humane manner.
- Teach younger residents and students, and share the knowledge and experience they've acquired.
- Show altruism and an obligation to the community.

Key words: Development of clinical skills. Solving problems with ethics and proper patient care.

Bibliography: The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME5238 Pediatrics VIII

(3 - 0 - 12. Prerequisites: [ME5236]. REN13)

Equivalence: None

It is a theoretical course that aims for residents to develop deeper knowledge on pediatrics, from a genetics perspective. It requires previous knowledge of physiopathology, anatomy and pediatrics. As a learning outcome, residents are expected to show their knowledge and analytical skills through written examinations, and clinical case presentation and discussion.

General objective: At the end of this course, students will be able to:

- Understand pediatric pathologies from the perspective of the following subspecialty: genetics.
- Know and dominate the correct clinical management, diagnosis and treatment of these pathologies.
- Apply acquired knowledge to the implementation of preventive actions, health promotion and treatment of diseases at the highest level.
- Understand the importance of constantly acting in a professional, warm and comprehensive way with patients and society.

Key words: Genetics in Pediatrics clinical application.

Bibliography: The Harriet Lane handbook : a manual for pediatric house officers / the Harriet Lane Service, Children's Medical and Surgical Center of the Johns Hopkins Hospital ; editors, Jason W. Custer, Rachel E. Rau., 18th ed., Philadelphia, PA : Mosby/Elsevier, c2009., [9780323053037],[0323053033].

ME5239 Medical Care in Neonatology

IV

(0 - 60 - 12. Prerequisites: None. RNE13)

Equivalence: None

It is a course that is intended to help students acquire the skills of interviewing the care-taker and performing supervised medical history and physical examination of patients seen in consultation and / or admitted to the Department of Neonatal Intensive Care and Neonatal Intermediate Care. Identify problems and make the integration of syndromes, under the supervision of senior residents and supervision of their teachers. Interpret and discuss the testing laboratory and perform diagnostic and therapeutic maneuvers. Knowing the natural history of diseases and the effect of therapeutic maneuvers on it. Integrate and maintain a respectful and effective communication with the patient, family, the attending physician and other staff that integrates the healthcare team. Requires basic propaedeutic, ethics and professionalism. As a result of learning the student is expected to understand and value the importance of maintaining a full clinical record.

General objective: During the fourth semester, the resident is an active part of comprehensive care of patients with neonatal pathology. Learns through the solution of health problems, urgent and emergent, in patients hospitalized in the Department of Neonatology, develops skills and abilities focus on supervised execution, and continues to develop the habit of willingness to provide ongoing and timely medical care. When passing this course, their academic objectives focus on the complementary phase of the second level of breadth and depth in the care of common neonatal health problems, both simple and complex, relating to: Immunology, Neonatal Dermatology, Epidemiology, Orthopedic Surgery Neonatal and Physician-Patient-Family Relationships. Learn to use critical thinking, analysis, synthesis and evaluation of neonatal health problems. Monitors

and acts as a teacher with junior residents and students. Delves into the chosen research project.

Key words: Neonatal Immunology. Physician-patient-family relationships. Epidemiology, orthopedic and surgery neonatal. Neonatal Dermatology.

Bibliography: * Young, Thomas E., Neofax / Thomas E. Young y Barry Mangum., 18a ed., Buenos Aires ; Madrid : Medica Panamericana, c2006., spaeng, [9500615827],[8479036257].

ME5240 Neonatology IV

(3 - 0 - 12. Prerequisites: None. RNE13)

Equivalence: None

It is a theoretical course that is intended to introduce students to the abilities to diagnose immune, dermatological, surgical and orthopedic diseases; understand the interaction of epidemiology with neonatal illness plus understanding the patient-physician relationship especially from the point of view of the neonatologist to take into account family circumstances, as influencing the resolution of neonatal pathologies and pivot data to request the intervention of the psychiatrist in the management of psychopathology. Requires basic Embryology, Histology, Anatomy, Pathology, Epidemiology and Psychopathology. As learning outcome is expected that students be able to analyze clinical cases, appraise scientific literature and solve written examinations.

General objective: Master the skills inherent in the following general topics: Immunology, Neonatal Dermatology, Epidemiology, Orthopedic Surgery Neonatal and Physician-Patient-Family interaction. It must also develop expert skills in their specialty and analytics related to the above premises.

Key words: Neonatal immunology. Early interactions. Neonatal epidemiology. Neonatal surgical and orthopedics. Neonatal dermatology.

Bibliography: Neonatal dermatology / [edited by] Lawrence F. Eichenfield, Ilona J. Frieden, Nancy B. Esterly., 2nd ed., Philadelphia, PA. : Saunders Elsevier, c2008., [1416034323 (rústica)], [9781416034322 (rústica)].

ME5241 Medical Care in Neonatology

V

(0 - 30 - 6. Prerequisites: None. RNE13)

Equivalence: None

It is a course that is intended for the student's analytical skills, decision making, administrative, professional and information, which offer value in the relationship with patients, peers, teachers and other members of the health care team. The student integrates and maintains a respectful and effective communication with the patient, family, the attending physician and other staff that are part of the health-care team. Uses the information fluently, approaches electronic databases and performs electronic search of information. Requires basic knowledge of ethics, professionalism, English as a second language. As a result of the course the student is expected to integrate the learning, and perform a dissertation on the chosen thesis topic, aimed to publish his research project.

General objective: During the fifth semester, the resident is an active part in the comprehensive care of patients with neonatal pathology that includes the full range of clinical entities. Collaborates and performs procedures under minimal supervision or unsupervised, their elective rotation includes international settings, for a minimum of one month, during which the student will be evaluated by a tutor at the receiving hospital. In addition to developing skills and abilities, attitudes and values, their goals are expected to focus on clinical care of neonatal pathology in the third phase of the levels of breadth and depth, less common, but complex and critic neonatal health problems. To develop effective communication skills in a foreign language for academic, care and research purposes. Resident trains to perceive socio-cultural differences in other human populations, and become aware in order to accept new and different aspects to their usual environment in order to improve the doctor-patient-family relationship. Learning to communicate with the patient and family in a different cultural environment, to educate on health habits, activities to promote early detection of diseases and establish treatment guidelines. He concludes, disserts and publishes his research project.

Key words: International neonatology.

Bibliography: * Young, Thomas E., Neofax / Thomas E. Young y Barry Mangum., 18a ed., Buenos Aires ; Madrid : Medica Panamericana, c2006., spaeng, [9500615827], [8479036257].

ME5242 Neonatology V

(3 - 0 - 12. Prerequisites: None. RNE13)

Equivalence: None

In this course it is intended that the student masters the knowledge inherent in elective subjects to study at an overseas institution for a period of one to three months, with remote evaluation and on his return to the unit headquarters. It is intended that the student analyze, categorize and discuss the results of advanced scientific information applied to neonatology. To be able to pursue this elective, the student is required to have completed the thesis. As a learning outcome it is expected that students could develop skills in their field of expertise and analytics related to the above premises.

General objective: Residents will be able to: Analyze and understand systems and models of neonatal medical care in other countries. Develop effective communication skills in foreign language for academic, clinical and research goals. Perceive the socio-cultural differences from other human populations, and have the sensitivity to be able to accept new and different aspects to their usual environment in order to improve family doctor-patient relationship.

Key words: International neonatology.

Bibliography: Atlas de procedimientos en neonatología / editores, Mhairi G. MacDonald, Jayashree Ramasethu ; con 40 colaboradores ; ilustradores, Judy Guenther, Virginia Schoonover ; fotografía, Audio Visual Departments, The George Washington University Medical Ce, 3a ed., Buenos Aires : Médica Panamericana, c2005., [9500614693].

ME5243 Medical Care in Neonatology VI

(0 - 30 - 6. Prerequisites: None. RNE13)

Equivalence: None

This clinical course is intended for the student to become a supervisor and be able to develop integrated management of clinical records and their components, as per the Official Mexican Norm (NOM) for the clinical record, together with the specific hospital policies. Interprets and discusses the laboratory tests with his tutor. Demonstrates clinical competence with analytical, decision-making, administrative, professional and information skills, builds a strong value in the relationship with patients, peers, teachers and other professionals in the health care team. Demonstrate supervisory skills, as well as being an advice and support facilitator and coordinator in the direction of the residency program, in the learning activities of junior residents and students. Use fluently electronic databases and electronic information search, and teaches others to use. Reinforces the leadership skills of the team of Clinical Research. Requires basic knowledge of ethics and professionalism. As a result of learning the student is expected to become a leader in the health care team, encouraging the interaction with nurses and patient's family.

General objective: During the sixth semester, the resident is an active part of the comprehensive care of patients with neonatal pathology that includes all entities served by the specialty clinics. Collaborates and runs under supervision highly specialized procedures. In addition to developing skills and abilities, attitudes and values in relation to patients in the complementary part of the third phase of breadth and depth, academically integrates all the previous phases of clinical reasoning for the solution of neonatal health problems, from the simple and frequent to the least frequent, complex and critical, emphasizing critical thinking, analysis, synthesis, evaluation, decision making and excellent oral and written communication. Leads the working group of residents, and serves as faculty coordinator of the activities of the residents of first and second years, and students. Advises Residents of lower grades in their research projects.

Key words: Neonatology research.

Bibliography: * Young, Thomas E., Neofax / Thomas E. Young y Barry Mangum., 18a ed., Buenos Aires ; Madrid : Medica Panamericana, c2006., spaeng, [9500615827],[8479036257].

ME5244 Neonatology VI

(3 - 0 - 12. Prerequisites: None. RNE13)

Equivalence: None

In this course it is intended that the Resident masters the knowledge needed for the comprehensive clinical care of any of the diverse illnesses that can affect a newborn. The Resident must be able to analyze, to weight and to discuss all pertaining scientific information that could be applied in Neonatology. As a result of the learning experience, it is expected that the Resident can offer evidence of being an expert acting as a consultant for the analysis and discussion of complex clinical cases, as well as being competent in literature search and analysis and the resolution of written tests related to clinical scenarios.

General objective: At the end of the course, students will dominate knowledge on the neonatal stage, pregnancy and labor, as well as, the human systems and functions during these stages.

Key words: Neonatal research.

Bibliography: Atlas de procedimientos en neonatología / editores, Mhairi G. MacDonald, Jayashree Ramasethu ; con 40 colaboradores ; ilustradores, Judy Guenther, Virginia Schoonover ; fotografía, Audio Visual Departments, The George Washington University Medical Ce, 3a ed., Buenos Aires : Médica Panamericana, c2005., [9500614693].

ME5245 Critical Care Medicine III

(3 - 0 - 12. Prerequisites: None. REE13)

Equivalence: None

It's a course based on theoretical concepts intended for the students to be formed as experts in the physiology, clinical features, and management of the trauma patient, as well as in the metabolic basis of clinical nutrition and basic principles of toxicological diseases in the intensive care unit (ICU) patients. It requires basic knowledge of the pathophysiology and

the major syndromes associated with these systems. As a result it is expected that the student will be capable of answering multiple-choice tests, exposing clinical cases and bibliographic reviews from the literature and making self-criticism of the knowledge acquired in these areas.

General objective: Residents will be able to:

- 1) Understand the basic clinical features pathophysiology, diagnostic and therapeutical principles and interpretation of laboratory tests that evaluate the trauma patient in the intensive care unit (ICU)
- 2) Describe the clinical features, pathophysiology, therapeutic principles, and interpretation of laboratory tests that evaluate the nutritional requirements of the critically ill patient.
- 3) Understand the clinical features, pathophysiology, therapeutical principles, diagnostic and laboratory tests that evaluate the toxicological and immunologic pathologies, as well as extreme exercise and high altitude related diseases in the ICU patients.

Key words: Burns. Trauma. Nutritional monitoring. Artificial nutrition. Rabdomyolisis.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME5246 Medical Care in Critical Medicine III

(0 - 30 - 6. Prerequisites: None. REE13)

Equivalence: None

It's a course based on clinical activities intended for the students to acquire high degree medical skills in the management of trauma, specialized nutrition and special situations in the ICU (such as poisoning, extreme exercise diseases and organ transplantation). It requires basic knowledge from the Critical Care Medicine III course. As a result it is expected that the student will be capable of performing procedures related to the area of interest, exposing clinical cases and clinical reviews from the literature and making self-criticism of the knowledge acquired in these areas.

General objective: Residents will be able to:

- 1) To learn the diagnostic approach and the selection of the laboratory tests for the evaluation of the critically ill trauma patient under the supervision and monitoring of a senior resident or professor.
- 2) To learn the interpretation of monitoring (clinical evaluation scales) and diagnostic tools for nutritional requirements of the critically ill patient under the supervision and monitoring of senior resident or professor.
- 3) To learn about the diagnostic tools and laboratory tests that are useful in critically ill patient with severe intoxications and poisonings, high altitude diseases, immunologic diseases, and diseases from extreme exercise under the supervision of a senior resident or professor.

Key words: Trauma. Special situations. Specialized nutrition.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME5247 Critical Care Medicine IV

(3 - 0 - 12. Prerequisites: None. REE13)

Equivalence: None

It's a course based on theoretical concepts intended for the students to be formed as experts in the management of gynecologic, obstetric, organ transplantation and administrative processes in Critical Care Medicine. It requires basic knowledge of pathophysiology and basic administration as well as of the major syndromes associated with these systems. As a result it is expected that the student solves multiple-choice tests, presents clinical cases and bibliographic reviews and makes self-criticism of the knowledge acquired in these areas.

General objective: Residents will be able to:

- 1) Learn the clinical features pathophysiology, diagnostic and therapeutical principles and interpretation of laboratory tests for the evaluation of the critically ill gynecologic and obstetric patient.

- 2) Understand the clinical features pathophysiology, diagnostic and therapeutical principles and interpretation of laboratory tests for the evaluation of organ and tissue donation from the procurement to the transplantation of the organ.
- 3) Learn the administrative processes necessary for the design, operation and administration of an ICU according to the specific characteristics of the hospital, including the quality of attention and patient's security.

Key words: Pregnancy associated hipertensive diseases. Preeclampsia, eclampsia. Management of the potential multiorgan donors. Intensive care costs. Quality indicators.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME5248 Medical Care in Critical Medicine IV

(0 - 30 - 6. Prerequisites: None. REE13)

Equivalence: None

It's a course based on clinical activities intended for the students to acquire high degree medical skills in the advanced aspects of monitoring the potential donor patient, surveillance of the patient previous, though and after transplantation surgery, administrative practice and quality control indicators in the attention of patients of the ICU. It requires basic knowledge from the Critical Care Medicine advances course. As a result it is expected that the student will be capable of performing procedures related to the area of interest, exposing clinical cases and files reviews and making self-criticism of the knowledge acquired in these areas.

General objective: At the end residents will be able

- 1) To learn the approach of the patient who is a potential organ donor, selecting the appropriate laboratory tests according to their needs, under the advice and supervision of a senior resident or a professor.
- 2) To learn about the administrative processes that take place in the ICU as well as indicators of qual-

ity control in the care of patients in the unit under the advice and supervision of a of a senior resident or a professor.

Key words: FODA evaluation. Multiorgan donors. Administration in intensive care units.

Bibliography: * , Principles of critical care / editors, Jesse B. Hall, Gregory A. Schmidt, Lawrence D.H. Wood ; Cora D. Taylor, editorial assistant., 3rd ed., New York : McGraw-Hill, Medical Pub. Division, c2005., [0071416404 (papel alcalino)].

ME5249 Geriatrics and Gerontology I

(3 - 0 - 12. Prerequisites: None. RGE13)

Equivalence: None

During this course, residents will acquire knowledge, skills and attitudes necessary to complete geriatric assessments, become experts in the global geriatric evaluation, geriatric syndromes, geriatric pharmacology, terminal patients and psychogeriatrics. They will also acquire the essential elements needed for team work. It requires previous knowledge of Internal Medicine. Learning outcome: residents will show their knowledge through written examinations and geriatric patient evaluations.

General objective: Residents will be able to:

- Enlist the sensibility, specificity, positive and negative predictive values of the assessment instrument used in geriatrics.
- Coordinate at least 20% of academic activities related to geriatric syndromes, terminal patients, geriatric pharmacology and psychogeriatrics.
- Participate in at least 90% of academic activities with actualized, pertinent and evidence-based commentaries.
- Show his knowledge on global geriatric evaluation, geriatric syndromes, terminal patient care, geriatric pharmacology and psychogeriatrics through a written exam.
- Apply standardized assessment instruments in simulated settings.
- Formulate and present the diagnosis of geriatric syndromes in every presentation and clinical case discussion.
- Identify and explain the pharmacological aspects of every presentation and clinical case discussion.

- Identify and explain the different aspects involved in the care of terminal patients, in every presentation and clinical case discussion.
- Formulate and present the diagnosis of psychiatric diseases in every presentation and clinical case discussion.
- Understand the importance of the patient's, families' and doctor's beliefs and values in the management plan.
- Value the role of the family and/or career as part of the interdisciplinary team.-Understand the importance of an interdisciplinary management.

Key words: Global geriatric evaluation. Geriatric syndromes. Psychogeriatrics. Geriatric pharmacology. Palliative care.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5250 Medical Care in Geriatrics and Gerontology V

(0 - 60 - 12. Prerequisites: None. RGE13)

Equivalence: None

This clinical course aims for residents to learn how to do full geriatric evaluations of multiple patients using current information pertaining to the biology of growing old, geriatric syndromes, care of the terminal patient, geriatric pharmacology and psychogeriatrics. They will also practice their leadership and team work skills. It requires previous knowledge of Geriatrics and Gerontology. Learning outcome: residents are expected to elaborate a portfolio of clinical cases and medical procedures.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence, with emphasis of geriatric syndromes, terminal care patients, geriatric pharmacology and psychogeriatrics.
- Enlist the indications, medicines and solutions available subcutaneously.
- Explain the responsibilities of every member of the interdisciplinary medical team.
- Apply a complete standardized geriatric evaluation in at least a patient per week, in different set-

tings (ambulatory, hospitalization and prolonged care).

- Elaborate a diagnosis, with emphasis of geriatric syndromes, terminal care patients, geriatric pharmacology and psychogeriatrics.
- Elaborate a diagnostic, therapeutic and preventive plan for the geriatric patient, with emphasis of geriatric syndromes, terminal care patients, geriatric pharmacology and psychogeriatrics.
- Be able to indicate and do a subcutaneous administration of fluids and medicines.
- Guide the interdisciplinary team in the evaluation of a patient.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Show respect to every patient and their autonomy.
- Take into considerations the patient's, physician's and families' religious and moral beliefs into the health care management plans.
- Include the family and care-giver of the patient into the interdisciplinary team.

Key words: Geriatric syndromes. Palliative care. Global geriatric evaluation. Polipharmacology and inappropriate medication in old age patients. Psychogeriatrics.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5251 Geriatrics and Gerontology II

(3 - 0 - 12. Prerequisites: None. RGE13)

Equivalence: None

During this course, residents will acquire knowledge, skills and attitudes necessary to become experts in Biological, Social and Psychological Gerontology, old age nutrition, as well as topics like physical therapy and rehabilitation, surgery, prevention and health education. It requires previous knowledge of Internal Medicine. Learning outcome: residents will show their knowledge through written examinations and clinical cases related to Biological, Social and Psychological Gerontology, and old age nutrition.

General objective: Residents will be able to:

- Coordinate at least one academic activity related to Biological, Social and Psychological Gerontology.
- Coordinate at least 20% of academic activities related to old age nutrition, physical therapy and rehabilitation, surgery, prevention and health education.
- Participate in at least 90% of academic activities with actualized, pertinent and evidence-based commentaries.
- Show his knowledge on gerontology, old age nutrition, physical therapy and rehabilitation, surgery, prevention and health education through a written exam.
- Formulate pertinent commentaries during case presentations and discussions.
- Formulate and present the diagnosis of surgical diseases in every presentation and clinical case discussion.
- Elaborate the preoperative evaluation and plan during case presentations and discussions.
- Formulate a preventive plan in every case discussion and case presentation.
- Identify the physical therapy and rehabilitation aspects in every presentation and clinical case discussion.
- Understand the importance of the biological, social and psychological changes on the personality of geriatric patients and the doctor-patient relationship.
- Understand the influence of the geriatric patient's disabilities and the doctor-patient and family-patient relationships.
- Understand the social importance of a preventive management in the elder patient.

Key words: Social gerontology. Biological gerontology. Rehabilitation in the elder. Nutrition in the elder. Psychological gerontology.

Bibliography: Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5252 Medical Care in Geriatrics and Gerontology VI

(0 - 30 - 6. Prerequisites: None. RGE13)

Equivalence: None

This is a clinical course aimed to apply current knowledge to the clinical practice, as well as, knowledge on biological, social and psychological gerontology, geriatric nutrition, physical therapy, surgery, prevention and health education, and critical patient care. It requires previous knowledge of Geriatrics and Gerontology. Learning outcome: residents are expected to elaborate a portfolio of clinical cases and medical procedures.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence, with emphasis on old age nutrition, physical therapy and rehabilitation, surgery, prevention and health education, and critical patient care.
- Elaborate a diagnosis for patients, with emphasis on old age nutrition, physical therapy and rehabilitation, surgery, prevention and health education, and critical patient care.
- Elaborate a diagnostic, therapeutic and preventive plan for the geriatric patient, with emphasis on old age nutrition, physical therapy and rehabilitation, surgery, prevention and health education, and critical patient care.
- Elaborate a basic nutritional assessment and elaborate a nutritional management.
- Elaborate a basic assessment and physical therapy/rehabilitation management.
- Generate a preventive plan for their patients.
- Develop a pre and post-operative assessment.
- Develop a pre-operative plan for a patient, and discuss it with the surgical and anesthesiology team.-Indicate and do the following procedures: insertion, use and interpretation of a floating pulmonary catheter, invasive and non-invasive mechanical ventilation, calculation of a parenteral nutrition.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Understand the importance of biological, social and psychological changes in the elder patient, and the importance it has on the doctor-patient relationship.

- Understand the importance of old age disabilities in the doctor-patient relationship.-Understand the social importance of preventive actions in geriatrics.

Key words: Biological gerontology. Old age rehabilitation. Old age nutrition. Psychological gerontology. Social gerontology.

Bibliography: Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5253 Geriatrics and Gerontology III

(3 - 0 - 12. Prerequisites: None. RGE13)

Equivalence: None

During this course, residents will acquire knowledge, skills and attitudes necessary to complete become experts on the most common diseases in the elder patient of the following systems: cardiovascular, pulmonary, muscular and bone, endocrine, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological. It requires basic knowledge of Geriatrics and Gerontology. Learning outcome: residents will show their knowledge through written examinations and formulate diagnosis and management plan of clinical cases.

General objective: Residents will be able to:

- Coordinate at least 20% of academic activities related to the most common geriatric diseases of several systems and organs (cardiovascular, musculoskeletal, endocrine, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological).
- Participate in at least 90% of academic activities with actualized, pertinent and evidence-based commentaries.
- Show his knowledge the most common geriatric diseases of several systems and organs (cardiovascular, musculoskeletal, endocrine, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological) through a written exam.
- Formulate the diagnosis and management plan in his clinical case presentations, focused on the most common geriatric diseases of several sys-

tems and organs (cardiovascular, musculoskeletal, endocrine, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological).-Show his understanding of the importance of the elder patient in our society and while formulate 5 possible actions to better their role.

- Understand the importance of the increasing older population as a guide to social and institutional changes.
- Understand the importance of the family dynamics to evaluate the possible rehabilitation plans.
- Understand the importance of eradicating "viejismo" from our society.

Key words: Common diseases of old age. Endocrine diseases. Muscle and bone diseases. Pulmonary diseases. Cardiovascular diseases.

Bibliography: Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5254 Medical Care in Geriatrics and Gerontology VII

(0 - 60 - 12. Prerequisites: None. RGE13)

Equivalence: None

This is a clinical course aimed to apply knowledge to the clinical practice, as well as, to the most common geriatrics diseases of the cardiovascular, respiratory, musculoskeletal, endocrinological, neurological, gastrointestinal, hematological, urinary systems, as well as to infectious, oncological and dermatological diseases. It requires basic knowledge of Geriatrics and Gerontology. Learning outcome: residents are expected to elaborate a portfolio of clinical cases and medical procedures.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence, with emphasis on the most common geriatric diseases of the cardiovascular, pulmonary, musculoskeletal, endocrinological, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological systems.
- Elaborate a diagnosis, with emphasis on the most common geriatric diseases of the cardiovascular,

pulmonary, musculoskeletal, endocrinological, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological systems.

- Elaborate a diagnostic, therapeutic and preventive plan for the geriatric patient, with emphasis on the most common geriatric diseases of the cardiovascular, pulmonary, musculoskeletal, endocrinological, neurological, gastrointestinal, hematological, urinary, infectious, oncological and dermatological systems.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Comprehend the role of elder patients in modern society and formulate at least 5 possible actions to better this role.
- Understand the importance the growing elder population as a guide for future social and institutional changes.
- Understand the importance of a dynamic family assessment in the formulation of a rehabilitation plan.
- Understand the importance of eradicating "viejismo" from our society.

Key words: Common diseases of old age. Endocrinological diseases. Muscle and bone diseases. Pulmonary diseases. Cardiovascular diseases.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5255 Geriatrics and Gerontology IV

(3 - 0 - 12. Prerequisites: None. RGE13)

Equivalence: None

It is a theoretical course that aims for residents to acquire knowledge, skills and attitude needed to be a greater expert in the two conditions that have greatest impact in the quality and longevity of life in the geriatric patient: fragility and cognitive impairment. It requires basic knowledge of Geriatrics and Gerontology. As a learning outcome, residents must pass written exams and must formulate a diagnosis, treatment plan and improvement projects related to ge-

riatric patients with the clinical conditions previously mentioned.

General objective: Residents will be able to:

- Demonstrate comprehension on the consequences of fragility and cognitive impairment on the family, and will propose at least 5 actions to improve such consequences.
- Coordinate at least 40% of academic activities on fragility and cognitive impairment.
- Participate in at least 90% of academic activities through actualized, pertinent and evidence-based commentaries.
- Formulate diagnosis and treatment plans in the presentation of cases of fragility and cognitive impairment.
- Design a project for the improvement of the public sector aimed at prevention and/or minimizing the impact of fragility and/or cognitive impairment in our society.

Key words: Fragility. Mild cognitive impairment. Determinants of fragility. Dementia. Alzheimer's disease.

Bibliography: * , Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5257 Medical Care in Geriatrics and Gerontology VIII

(0 - 30 - 6. Prerequisites: None. RGE13)

Equivalence: None

This is a clinical course aimed to apply acquired knowledge, skills and attitude to the clinical practice. The resident will also demonstrate their abilities as leaders of an interdisciplinary team. It is a integration course of clinical and research abilities. Learning outcome: residents are expected to pass their certification exams by a medical board of their specialty.

General objective: Residents will be able to:

- Base their diagnosis and management on evidence.
- Elaborate a diagnosis emphasizing the unique aspects involved in geriatric care.

- Elaborate a diagnostic, therapeutic and preventive plan for the geriatric patient.
- Develop effective communication skills for the presentations of diagnostic impressions and therapeutic plans.
- Show their leadership abilities.
- Understand the role of geriatric physicians in the health system and society.
- Develop an interest for problem solving related to old age in a health care and social setting.
- Develop indiscriminate interest in the quality of life and health of older patients.

Key words: Integral Geriatrics. Focusing on the professional life of the geriatric.

Bibliography: Principles and practice of geriatric medicine / editors, M. S. John Pathy, Alan J. Sinclair, John E. Morley, 4th ed., Chichester : John Wiley, 2006., [0470090553],[9780470090558].

ME5258 Radiology and Image V

(3 - 0 - 12. Prerequisites: None. RER13)

Equivalence: None

It is a theoretical course that aims for residents to study the radiology of the genitourinary system. As a learning outcome, residents are expected to present classes, reports and pass a final exam.

General objective: In this course the student will be able to understand the embryology, histology and the anatomy of the genitourinary system and will be able to describe and apply all the diagnostic and therapeutic studies of this area.

Key words: Diagnostic Studies of the Genitourinary System. Therapeutic Studies of the genitourinary system.

Bibliography: * , Paul and Juhl's essentials of radiologic imaging / edited by John H. Juhl, Andrew B. Crummy., 6th ed., Philadelphia : J.B. Lippincott, c1993., [0397510993].

ME5259 Medical Care in Radiology and Image V

(0 - 60 - 12. Prerequisites: None. RER13)
Equivalence: None

It is a clinical course that aims to provide students with the knowledge and practice of different studies and procedures available in their area of study, emphasizing diagnostic invasive studies. It does not require previous knowledge. As a learning outcome, residents are expected to develop a portfolio of diagnostics studies and procedures developed during their rotation.

General objective: In this course the student will help the teacher to perform all the studies and procedures done in Radiology, particularly invasive studies.

Key words: Invasive studies.

Bibliography: * Taveras J.M., Ferucci J.T., Radiology: Diagnosis Imaging Intervention, Lipincot ,Williams and Wilkins.

ME5260 Radiology and Image VI

(3 - 0 - 12. Prerequisites: None. RER13)
Equivalence: None

It is a theoretical course that aims for residents to study the radiology of the head and neck. As a learning outcome, residents are expected to present classes, reports and pass a final exam.

General objective: In this course the student will be able to understand the embryology, histology and the anatomy of the head and neck and will be able to describe and apply all the diagnostic and therapeutic studies of this area.

Key words: Diagnostic Studies of the Head and Neck. Therapeutic Studies of the Head and Neck.

Bibliography: * , Paul and Juhl's essentials of radiologic imaging / edited by John H. Juhl, Andrew B. Crummy., 6th ed., Philadelphia : J.B. Lippincott, c1993., [0397510993].

ME5261 Medical Care in Radiology and Image VI

(0 - 60 - 12. Prerequisites: None. RER13)
Equivalence: None

It is a clinical course that aims to provide students with the knowledge and practice of different studies and procedures available in their area of study, emphasizing MRI, Nuclear Medicine and Interventional Radiology. It does not requires previous knowledge. As a learning outcome, residents are expected to develop a portfolio of diagnostics studies and procedures developed during their rotation.

General objective: In this course the student will develop all the necessary skills and competencies to perform, under supervision, all the studies and procedures done in Radiology, with particular attention to Magnetic Resonance Imaging, Nuclear Medicine and Interventional Radiology.

Key words: Nuclear medicine. Magnetic resonance imaging. Interventional radiology.

Bibliography: Mettler, Fred A., 1945-, Essentials of nuclear medicine imaging / Fred A. Mettler, Jr., Milton J. Guiberteau., 5th ed., Philadelphia, Pa. : Saunders/Elsevier, c2006., [9780721602011],[0721602010].

ME5262 Radiology and Image VII

(3 - 0 - 12. Prerequisites: None. RER13)
Equivalence: None

It is a theoretical course that aims for residents to study pediatric radiology. As a learning outcome, residents are expected to present classes, reports and pass a final exam.

General objective: In this course the student will be able to understand the pertinent embryology, histology and the anatomy of the newborn, child and adolescent and will be able to describe and apply all the diagnostic and therapeutic studies in Pediatric Radiology.

Key words: Diagnostic studies in Pediatric Radiology. Therapeutic studies in pediatric radiology.

Bibliography: * , Paul and Juhl's essentials of radiologic imaging / edited by John H. Juhl, Andrew B. Crummy., 6th ed., Philadelphia : J.B. Lippincott, c1993., [0397510993].

ME5263 Medical Care in Radiology and Image VII

(0 - 30 - 6. Prerequisites: None. RER13)

Equivalence: None

It is a clinical course that aims to provide students with the knowledge and practice of different studies and procedures available in their area of study, emphasizing MRI, Nuclear Medicine and Interventional Radiology of the pediatric patient. As a learning outcome, residents are expected to develop a portfolio of diagnostics studies and procedures developed during their rotation.

General objective: In this course the student will be able to perform under supervision, all the studies and procedures done in Radiology, with particular attention to Magnetic Resonance Imaging, Nuclear Medicine and Interventional Radiology with emphasis in the Pediatric Patient.

Key words: Nuclear medicine. Magnetic resonance imaging. Interventional radiology.

Bibliography: * Hach/Hach-Wunderle, Flebography and Sonography of the Veins, Springer-Verlag.

ME5264 Radiology and Image VIII

(3 - 0 - 12. Prerequisites: None. RER13)

Equivalence: None

It is a theoretical course that aims for residents to study the radiology of the cardiovascular system. As a learning outcome, residents are expected to present classes, reports and pass a final exam.

General objective: In this course the student will be able to understand the embryology, histology and the anatomy of the cardiovascular system and will be able to describe and perform all the diagnostic and therapeutic studies of this area.

Key words: Diagnostic studies of the cardiovascular system. Therapeutic studies of the cardiovascular system.

Bibliography: * , Paul and Juhl's essentials of radiologic imaging / edited by John H. Juhl, Andrew B. Crummy., 6th ed., Philadelphia : J.B. Lippincott, c1993., [0397510993].

ME5265 Medical Care in Radiology and Image VIII

(0 - 30 - 6. Prerequisites: None. RER13)

Equivalence: None

It is a clinical course that aims to provide students with the knowledge and practice of different studies and procedures available in their area of study, emphasizing studies of the cardiovascular system. As a learning outcome, residents are expected to develop a portfolio of diagnostics studies and procedures developed during their rotation.

General objective: In this course the student will be able to describe and perform all the diagnostic and therapeutic studies of endovascular area.

Key words: Diagnostic studies of the cardiovascular system. Therapeutic studies of the cardiovascular system.

Bibliography: * Hach/Hach-Wunderle, Flebography and Sonography of the Veins, Springer-Verlag.

ME5266 Thesis Defense

(0 - 0 - 1. Prerequisites: None. RCA13, RCR13, REA13, REC13, REE13, REG13, REM13, REN13, REO13, RER13, REU13, RGE13, RNE13, RNP13, RPS13, RUR13)

Equivalence: None

This course corresponds to the final phase of the elaboration of the thesis. The student must orally expose and defend his thesis.

General objective: The student will expose and defend his thesis.

Key words: Thesis. Thesis defense.

Bibliography: * , Ethical and regulatory aspects of clinical research : readings and commentary / edited by Ezekiel J. Emanuel .. [et al.], Baltimore : Johns Hopkins University Press, 2003., [0801878136 (rústica : papel alcalino)].

ME5267 Neurology IV

(3 - 0 - 12. Prerequisites: None. REU13)

Equivalence: None

In this theoretical course, the student will describe and recognize the possible abnormal movements and their relation with the underlying pathology, besides the classification and diagnosis of the principal demyelinating diseases and neuromuscular disorders, as well as their etiology. He will be able to establish a clinicopathologic diagnosis of the principal tumors of the nervous system, both central and peripheral. He requires basic knowledge about neuroanatomy, neurophysiology, neuroradiology, and detailed neurologic physical examination. As a learning outcome, the student will do a differential diagnosis between the possible etiologies of the disorders characterized by abnormal movements, demyelinating diseases, and neuromuscular disorders; carry out the optimal management of the pharmacologic or non-pharmacologic patient, and to do the differential diagnosis of the different tumors of the nervous system.

General objective: At the end of the course, the resident will be able to:

- Develop critic knowledge in the following areas: abnormal movements, neoplasia, neuromuscular diseases, and demyelinating diseases.
- Understand the molecular basis and the genetics, physiopathology, clinical signs, prevention, diagnosis, treatment, and rehabilitation of each one of the studied diseases.

Key words: Movement disorder. Dysmyelinating disease. Neuroncology. Disorders of neuromuscular transmission.

Bibliography: * , Merritt's neurology / edited by Lewis P. Rowland., 10th ed., Philadelphia, PA : Lippincott Williams & Wilkins, c2000., [0683304747 (cloth)].

ME5268 Medical Care in Neurology IV

(0 - 60 - 12. Prerequisites: None. REU13)

Equivalence: None

In this clinical and care course, the student will be able to join a neurologic emergency room and to familiarize with an intensive care unit. It requires basic knowledge in neurophysiology, neuroradiology, neuropathology and neuroepidemiology. As a result of learning, the student is expected to join a neurologic emergency room team.

General objective: At the end of the course, the resident will have developed attitudes, skills, and professional abilities of a neurologist towards his patients, his family, and other health professionals, emphasizing his capacity for:

- Taking the medical history.- Proposing diagnostic hypotheses.
- Formulating indications.- Reviewing and interpreting paraclinical studies.
- Doing procedures, final diagnosis, and therapeutic, preventive, and rehabilitation plans, and communicating this information effectively regarding: degenerative diseases, abnormal movements, neoplasia, neuromuscular diseases, neuropathies, and demyelinating diseases.

Key words: Medical history. Paraclinical exams. Degenerative diseases.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadernado: papel alcalino)], [007149992X (encuadernado: papel alcalino)].

ME5269 Neurology V

(3 - 0 - 12. Prerequisites: None. REU13)

Equivalence: None

In this theoretical course, the student will analyze the current affairs in the immunologic and genetic fields in Neurology integrate the different pathologies in the genetic field, and its lesion pattern at molecular level, besides linking the infectious disorders with their immunologic interaction. He requires basic knowledge about neurophysiology, neuropathology,

genetics, molecular biology, neuroepidemiology, and intensive care neurology. As a learning outcome, the student will recognize and expose the different mechanisms of lesions of immunologic diseases with disorders of the nervous system; determine the genetic pattern, the genetic and molecular basis of the different neurologic pathologies previously studied; and know the differential diagnosis and, mainly, the timely treatment of the different infectious diseases of the nervous system, both central and peripheral.

General objective: At the end of the course, the resident will be able to:

- Develop critical knowledge of the following neurologic diseases categories: systemic symptoms of neurological diseases, neuroimmunology, mitochondrial encephalomyopathies, neurocutaneous syndromes, autonomic diseases, genetic diseases; and incorporate the recent advances in technological scientific knowledge.
- Determine the etiologies of the infectious diseases of the nervous system, as well as, advances in neuroepidemiology.

Key words: Genetics and neurology. Neuroimmunology. Neurology of infectious diseases.

Bibliography: * , Merritt's neurology / edited by Lewis P. Rowland., 10th ed., Philadelphia, PA : Lippincott Williams & Wilkins, c2000., [0683304747 (cloth)].

ME5270 Medical Care in Neurology V

(0 - 30 - 6. Prerequisites: None. REU13)

Equivalence: None

In this clinical and care course, the student will be able to integrate the medical diagnosis with the therapeutics and the support of paraclinical studies of the neurological disorders in patients seen in consultation, hospital units, and in intensive care units. It requires basic knowledge in neuroanatomy, neurophysiology, neuropharmacology, theoretical neurophysiology, theoretical neuroradiology, and neurorehabilitation. As a result of learning, the student is expected to face any neurology case and carry out an adequate diagnosis with the adequate therapy, assessment of the social environment, and complications' management.

General objective: At the end of the course, the resident will have developed attitudes, skills, and professional abilities of a neurologist towards his patients, his family, and other health professionals, emphasizing his capacity for:

- Taking the medical history.
- Proposing diagnostic hypotheses.
- Formulating indications.
- Reviewing and interpreting paraclinical studies.
- Doing procedures, final diagnosis, and therapeutic, preventive, and rehabilitation plans, and communicating effectively this information, as well as the theory and practice of clinical neurophysiology.

Key words: Medical history. Neuroimmunology. Paraclinical exams.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadernado: papel alcalino)], [007149992X (encuadernado: papel alcalino)].

ME5271 Neurology VI

(3 - 0 - 12. Prerequisites: None. REU13)

Equivalence: None

In this theoretical course, the student will acquire knowledge about the main techniques of paraclinical studies and of inborn errors of metabolism that disturb the nervous system in adulthood. The student requires basic knowledge in physics, mathematics, pathology, physical examination, neuroanatomy, neurophysiology, and molecular biology. As a learning outcome, the student will interpret the different paraclinical techniques in neurology and their theoretical basis; recognize and manage the different disorders of the peripheral nervous system and the systemic metabolic alterations that affect the nervous system.

General objective: At the end of the course, the resident will be able to: Develop critical knowledge in the following clinical areas: neurophysiology, neuroradiology, and neuropathology, in which the student will learn the foundations for neurophysiological studies, imaging, and pathological studies, the

technical specifications, indications, and interpretation; the student can choose a clinical rotation of 3 months in particular areas of interest in domestic and international affiliated institutions.

Key words: Clinical neurophysiology.

Bibliography: Neurología clínica / Walter G. Bradley .. [et al.], España : Elsevier, 2010., [9788480864893 (Obra completa)], [9788480864855 (v.1)], [9788480864862 (v.2)].

ME5272 Medical Care in Neurology VI (0 - 30 - 6. Prerequisites: None. REU13) **Equivalence: None**

In this clinical and care course, the student will be able to integrate the medical diagnosis with the therapeutics and the support of paraclinical studies of the neurological disorders in patients seen in consultation, hospital units, and in intensive care units. It requires basic knowledge in neuroanatomy, neurophysiology, neuropharmacology, theoretical neurophysiology, theoretical neuroradiology, and neurorehabilitation. As a result of learning, the student is expected to face any neurology case and carry out an adequate diagnosis with the adequate therapy, assessment of the social environment, and complications' management.

General objective: At the end of the course, the resident will have developed attitudes, skills, and professional abilities of a neurologist towards his patients, his family, and other health professionals, emphasizing his capacity for:

- Taking the medical history.
- Proposing diagnostic hypotheses.
- Formulating indications.
- Reviewing and interpreting paraclinical studies.
- Doing procedures, final diagnosis, and therapeutic, preventive, and rehabilitation plans, and communicating effectively this information, as well as the theory and practice of clinical neurophysiology.

Key words: Clinical neurophysiology. Paraclinical exams. Neuroradiology. Neuropatology.

Bibliography: * Ropper, Allan H., Adams and Victor's principles of neurology / Allan H. Ropper, Martin A. Samuels., 9th ed., New York : McGraw-Hill Medical, c2009., [9780071499927 (encuadernado: papel alcalino)], [007149992X (encuadernado: papel alcalino)].

ME5273 Cornea, External Diseases and Refractive Surgery (3 - 0 - 12. Prerequisites: None. REO13) **Equivalence: None**

It is a theoretical course intended for the student to understand Corneal and external diseases and immunology, student should be able to identify, understand and apply their knowledge in the clinical field. Requires basic fundamentals in ophthalmology. As a learning outcome, residents are expected to show their knowledge and skills through written examinations, reports and/or clinical case studies

General objective: Resident will be able to:

- Understand and apply their knowledge in the clinical surgical field of Corneal diseases.
- Understand and apply this knowledge in the clinical and surgical field of Anterior segment.
- Understand the diagnosis and treatment of diseases in the clinical field of Immunology and its interaction with other subspecialties.
- Understand and apply this knowledge in the clinical and surgical field of Refractive surgery.

Key words: Cornea. Refractive surgery. Ocular Immunology. External diseases.

Bibliography: * Pepose JS, Holland GN, Wilhelmus KR., Ocular Infection & Immunity., Mosby Year-Book, Inc.

ME5274 Medical Care and Surgery in Ophthalmology V (0 - 60 - 12. Prerequisites: None. REO13) **Equivalence: None**

It is a clinical and surgical course intended for the initial practice for the student in diagnostic eye examination and required equipment, paraclinical studies

and surgical methods and materials in cornea and external diseases. Requires basic knowledge of ophthalmology and knowledge in general medicine. Learning outcome is expected that students develop a portfolio that contains evidence of the activities which he appeared.

General objective: Residents will:

- Know the basics of an ocular exam for the diagnosis of corneal and external diseases and ocular immunology.
- Know the instruments, paraclinical studies and surgical methods needed for the resolutions of diseases of these subspecialties.
- Know the indications, contraindications and possible complications.
- Observe and/or assist in diagnostic and/or therapeutic procedures.
- Direct participation under supervision.

Key words: Refractive surgery. Clinical and surgical cornea.

Bibliography: * Pepose JS, Holland GN, Wilhelmus KR., Ocular Infection & Immunity., Mosby Year-Book, Inc.

ME5275 Retina and Uveitis (3 - 0 - 12. Prerequisites: None. REO13) **Equivalence: None**

It is a theoretical course intended for the student to understand and treat Retina and Uveitis diseases. It requires basic knowledge in ophthalmology and ocular immunology. As a learning outcome, residents must prove their knowledge and skills through the resolution of a written exam, a report and/or a clinical case study.

General objective: Residents will be able to:

- To study and understand the prevention, screening and treatment of diseases of the retina.
- Study and understand the uveitis and its prevention, appropriate treatment, the disease progression and relationship to other diseases.
- Study and understand the basics and clinical application of Lasers in ophthalmology.

Key words: Retinal diseases. Systemic diseases affecting the eye. Management of uveitis. Retinal treatments.

Bibliography: * , Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976., .

ME5276 Medical Care and Surgery in Ophthalmology VI (0 - 30 - 6. Prerequisites: None. REO13) **Equivalence: None**

It is a clinical and surgical course intended for the student to apply their knowledge of Ocular Immunology, inflammatory diseases and infectious diseases of ocular tissue and uvea, as well as their knowledge on the prevention, diagnosis and treatment of such diseases. It requires basic knowledge of ophthalmology. Learning outcome is expected that students develop a portfolio that contains evidence of the activities in which he participated.

General objective: At the end of the course, residents will:

- Know the basics of an ocular exam for the diagnosis of retinal and uveal diseases, as well as the clinical application of lasers.
- Know the instruments, paraclinical studies and surgical methods needed.
- Know the indications, contraindications and possible complications of these procedures.
- Observe and/or assist in diagnostic and/or therapeutic procedures. Participate under direct supervision.

Key words: Clinical ophthalmology in uveitis. Surgical and medical retina.

Bibliography: * , Retina, vitreous, macula / [edited by] David R. Guyer .. [et al.], Philadelphia : Saunders, c1999., [0721667562 (set)], [0721676073 (v. 1)], [0721676081 (v. 2)].

ME5277 Ophthalmology Specialties (3 - 0 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a theoretical course intended for the student to study the main subspecialties in Ophthalmology, related to their international or national rotation. It requires basic knowledge on Ophthalmology. As a learning outcome, residents must prove their knowledge and skills through the elaboration of a portfolio of academic activities.

General objective: At the end of the course:

- Acquire deeper and broader knowledge on Ophthalmology, in the area chosen by the student, as well as study additional subspecialties that are not included in the curriculum.
- Acquire knowledge and skills needed in the ophthalmological care of international patients.

Key words: Ophthalmological subspecialties. International ophthalmology.

Bibliography: * Tasman and Jaeger, Duane's Clinical Ophthalmology .

ME5278 Medical Care and Surgery in Ophthalmology VII

(0 - 30 - 6. Prerequisites: None. REO13)

Equivalence: None

It is a clinical and surgical course intended for the student to perform a rotation on a subspecialty clinic in an internationally recognized center and which have interagency agreement. Requires basic knowledge in ophthalmology and knowledge in general medicine. Learning outcome is expected that students develop a portfolio that contains evidence of the activities which he appeared.

General objective: Residents will be able to

- Acquire knowledge on the ocular examination of the subspecialty they have chosen, the equipment required, paraclinical studies used and the surgical method used for the resolution of its diseases.
- Acquire knowledge on the indications, contraindications and possible complications.
- Elaborate complex diagnostic and therapeutic methods.

- Directly participate in clinical and/or surgical activities, while under supervision.

Key words: Surgical and medical retina.

Bibliography: Adler's physiology of the eye : clinical application / edited by Paul L. Kaufman, Albert Alm., 10th ed., St. Louis : Mosby, c2003., [0323011365].

ME5279 Diagnostic Procedures in Ophthalmology

(3 - 0 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a theoretical course that aims for residents to acquire knowledge on the ancillary diagnostic studies used in ophthalmology. It requires basic knowledge of diagnostic studies in ophthalmology. As a learning outcome, residents must prove their knowledge and skills through the resolution of a written exam, a report and/or a clinical case study.

General objective: Residents will be able to:

- Study and understand the information and consents necessary to perform diagnostic procedures in ophthalmology.
- Review technical concepts in the different apparatus for performing diagnostic studies.
- Review and interpret the studies, based on information and quality provided to the ophthalmic subspecialties.

Key words: Diagnostic studies. Information from studies in ophthalmology. Making quality education.

Bibliography: Clinical ophthalmology / editor, Thomas D. Duane., 1st ed., Hagerstown, Md. : Medical Dept., Harper & Row, 1976.

ME5280 Medical Care and Surgery in Ophthalmology VIII

(0 - 60 - 12. Prerequisites: None. REO13)

Equivalence: None

It is a clinical and surgical course intended for the student to do and interpret auxiliary and imaging studies used in ophthalmology. It requires basic knowl-

edge of general ophthalmology and its specialties. Learning outcome is expected that students develop a portfolio that contains evidence of the activities in which he participated.

General objective: Residents will be able to:

- Acquire knowledge of the basics of ocular diagnostic examination of the subspecialty or clinical activity of Ophthalmology chosen, the equipment required, as well as the paraclinical studies and surgical methods involved.
- Acquire knowledge of the indications, contraindications and possible complications.
- Do complex diagnostic and therapeutic procedures.
- Participate directly in these clinical and/or surgical activities, while under supervision.

Key words: Diagnostic procedures in ophthalmology.

Bibliography: * Berkow JW, Kelley JS, Orth DH, Fluorescein Angiography. A Guide to the Interpretation, American Academy of Ophthalmology.

ME5281 Cardiology IV

(3 - 0 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is an advanced level course with the intention that students learn in depth all the different cardiovascular diseases that will become the basis of their general cardiology practice. It will include advance level concepts on cardiovascular pathology identified by electrocardiographic recordings, such as cardiac arrhythmias, as well congenital heart diseases, pulmonary hypertension and aneurismal disease of the great vessels. As a learning outcome, it is expected that the students demonstrate their competency to identify, diagnose and get to know all the elements regarding therapy of these diseases.

General objective: The students will learn the diagnosis, preventive measures and therapy of all the different cardiovascular diseases, structure and function of the heart; analyze the etiology factors that conduct to a pathological state; understand the necessary elements for the clinical and paraclinical diag-

nosis of the mentioned cardiovascular diseases, as well as to learn specific therapeutic measures in the different and specific clinical cases of the previously mentioned diseases.

Key words: Congenital heart disease. Pulmonary hypertension. Heart research. Cardiac arrhythmias. Aneurysms of the great arteries.

Bibliography: * Abraham Rudolph M, Congenital Diseases of the Heart: clinical-physiological considerations, 2da, Futura Publishing Company, [0-87993-471-9].

ME5282 Medical Care in Cardiology IV

(0 - 60 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is an advance level course with the intention to help the students increase and continue learning attitudes, dexterities and clinical skills of medical care in patients with cardiovascular diseases, applying the knowledge acquired on the theoretical cardiology course which will be developed simultaneously. The course will focus on the medical care of common, urgent and critical cardiovascular problems. As a learning outcome, the students will be a collaborators and executors; they will perform with and without supervision within the medical team caring for the cardiovascular patients which will be lead by an attending physician and responsible course professor. At this level the student will be exposed to, and will develop international experience.

General objective: The students will be able to perform with and without supervision, in a national and international medical team caring for cardiovascular patients, where they will work and collaborate in the process of making the diagnosis and implementing medical therapy, as well as be able to follow up on patients in a general cardiovascular practice and focusing on congenital heart diseases, pulmonary hypertension and aneurismal disease of the great vessels. They will develop excellent communication skills and will perform with high levels of responsibility within the areas of the emergency department, hospital wards, intensive care and outpatient clinics.

Key words: Care of pediatric patients and adults. Outpatient cardiology services. Decision making in complex process. Medical evaluation with the health team.

Bibliography: * Kirby Loewn, Margaret, Cardiac Development, Oxford, [13: 978-0-19-517819-7].

ME5283 Cardiology V

(3 - 0 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is an advanced level course with the intention that students learn in depth the techniques of the non-invasive cardiology used in this specialty, in order to perform diagnosis of the cardiovascular diseases. It will include basic, intermediate and advanced concepts of each one of the main non-invasive cardiovascular diagnostic techniques. As a learning outcome, it is expected that the students will know the involvement of these techniques to explain any kind of cardiovascular problem and will be able to make qualitative and quantitative diagnosis.

General objective: The students will understand and perform advanced diagnostic of non-invasive studies in order to be able to perform diagnosis, identifying the main diseases of the cardiovascular system, the way that these diseases manifest themselves in the different non-invasive diagnostic techniques, the qualitative and quantitative data particular to each of the pathologies, and complementing with these the clinical information, in a way that fundamentals the indication of the treatment of the diseases, with an emphasis in the appropriate timing of treating diseases as well as the treatment ways that must be instituted.

Key words: Noninvasive cardiology. Echocardiography. Electrocardiography and Cardiovascular Imaging.

Bibliography: * Pallares, D. Sodi., Electrocardiografía Clínica : Análisis deductivo / D. Sodi Pallaries .. [et al.], México : Mendéz Editores, 2010., [9686596305].

ME5284 Medical Care in Cardiology V

(0 - 30 - 6. Prerequisites: None. RCR13)

Equivalence: None

This is an advanced level course with the intention of inducing the students to increase and continue learning attitudes, as well as clinical and non-invasive skills of medical care in patients with cardiovascular diseases, applying the knowledge acquired on the theoretical cardiology course which will be developed simultaneously. The course will be focused in medical care of common, urgent and critical cardiovascular problems. As a learning outcome, it is expected that the students will collaborate and execute, with and without supervision; coordinate, lead and integrate the studies of non-invasive diagnosis. These activities will be performed alongside their expert professors.

General objective: The students will be able to perform the fundamental non-invasive cardiovascular studies in a general cardiology practice scenario. They will learn to choose, indicate, perform and interpret highly specialized non invasive cardiovascular studies. The students will work as part of a medical team caring for patients with cardiovascular diseases, working up the diagnosis, implementing medical therapy and following cardiovascular patients. They will perform their duties at the non-invasive cardiovascular laboratory, hospital wards, emergency department an intensive care units, with a sense of great responsibility, excellent attitude and willingness and a very efficient communication with patients, family, peers and teachers.

Key words: Echocardiography. Patient care-health. Noninvasive diagnosis. Radiology and imaging. Electrocardiography.

Bibliography: * Pallares, D. Sodi., Electrocardiografía Clínica : Análisis deductivo / D. Sodi Pallaries .. [et al.], México : Mendéz Editores, 2010., [9686596305].

ME5285 Cardiology VI

(3 - 0 - 12. Prerequisites: None. RCR13)

Equivalence: None

This is an advance level course with the intention that students learn in depth the invasive diagnostic

techniques in order to be able to make diagnosis with each one of the different techniques of invasive cardiology. Basic, intermediate and advanced level concepts will be introduced, for each one of the invasive diagnostic techniques and cardiovascular diseases. As a learning outcome, it is expected that the students will be able know, establish and use these techniques to make qualitative and quantitative diagnosis. It is also expected that they will learn to give indications and use the interventional techniques in the therapy of the cardiovascular diseases.

General objective: The students will be able to learn and perform advanced level invasive cardiovascular diagnosis in order to be able to establish diagnosis and identify the ways the different cardiovascular pathologies manifest themselves, and the way in which such invasive test change the quantitative and qualitative information regarding the pathology of the heart and vascular bed, it is also expected that they will combine the clinical and invasive diagnostic tests for clinical and therapeutical decision making, either for medical as well as interventional endovascular therapy or surgical therapy.

Key words: Endovascular treatment. Invasive cardiology: hemodynamic. Medical treatment. Surgical treatment.

Bibliography: * Pallares S., Medrano, Bisteni, Ponce de León, Electrocardiografía Clínica, Análisis Deductivo, Méndez Cervantes.

ME5286 Medical Care in Cardiology VI

(0 - 30 - 6. Prerequisites: None. RCR13)

Equivalence: None

This is an advance level course with the intention that students learn and develop skills and attitudes of medical care in patients with cardiovascular diseases, applying the knowledge acquired at the simultaneous theoretical course of hemodynamics, invasive cardiology and endovascular intervention for cardiovascular diseases. The course will focus on the medical care of common, urgent and critical cardiovascular problems. As a learning outcome, the students will work as collaborators, performing with and without supervision at the invasive cardiovascu-

lar laboratory. They will carry out their duties together with their expert professors.

General objective: The students will be able to perform the fundamental invasive diagnostic cardiovascular studies and therapeutic procedures within the scope of a general cardiology practice. They will learn, understand, choose, indicate and interpret the endovascular therapeutic procedures, working as part of the medical team caring for the cardiovascular patients, helping to work out the diagnosis and the therapeutic activities. They will perform their duties at the invasive cardiovascular laboratory, hospital wards, emergency department and intensive care units, with a sense of great responsibility, excellent attitude and willingness and a very efficient communication with patients, family, peers and teachers.

Key words: Endovascular treatment. Patient care-health. Invasive diagnostic cardiology. Hemodynamic studies. Medical and surgical treatment.

Bibliography: * Ragosta, Michael, Textbook of clinical hemodynamics, Saunders Elsevier, [978-1-4160-4000-2].

ME5287 Anesthesiology V

(3 - 0 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a theoretical course that aims to provide residents with basic and specialized knowledge of anesthesiology in Cardiothoracic Surgery, Vascular Surgery and Nephro-urology Surgery. It requires previous knowledge of the basic theory and technique of anesthesia. As a learning outcome, resident must participate in clinical case discussion; demonstrate their knowledge of the principles and techniques of anesthesiology used in the management of patients in Cardiothoracic Surgery, Vascular Surgery and Nephro-urology Surgery, the effects of anesthesia and treatment of possible complications.

General objective: Residents will be able to:

- Obtain knowledge on the anesthesiology management of patients from Cardiothoracic Surgery, Vascular Surgery and Nephro-urology Surgery, that will undergo a surgical procedure.

- Acquire knowledge of the anesthetic techniques used in the management of these patients, its effects and treatment of its complications.
- Demonstrate their analytic skills, effective communication skills, and an adequate management of information, self-study capacities and research skills.
- Perform with a high level of professionalism, both in the process of learning and in applying their knowledge.

Key words: Principles of anesthesiology. Clinical anesthesia.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5288 Medical Care in Anesthesiology V

(0 - 30 - 6. Prerequisites: None. REA13)

Equivalence: None

It is a clinical course that aims for residents to increase their participation in the management of patients with moderate to high surgical risk with neurological, cardiac, renal and pulmonary problems, which must undergo an anesthetic procedure. Its activities are centered in the direct collaboration with a multidisciplinary medical team. Some main academic objectives are: basic knowledge of the physiopathology of different organs and systems, identifying problems and possible treatments in the critically ill patient. It requires previous knowledge of the basics of Anesthesiology and basic anesthetic techniques. As a learning outcome, resident must create a portfolio of evidences that show their participation in pre and postoperative visits, general OR, the Adult Intensive Care Unit, Emergency Room and hemodynamics.

General objective: Fifth semester residents will be able to:

- Collaborate in the perioperative management of patients with rare, complex, and critical problems, with or without supervision.
- Develop collaborative and execution centered skills, with or without supervision.
- Practice the preoperative assessment of a patient, and register it correctly in the patient's file.

- Prepare the anesthetic equipment, medications and materials used in anesthetic procedures.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control.
- Register the anesthetic control.
- Participate in the transportation of a patient to recovery.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.
- Demonstrate analytical skills while discussing clinical cases with professors.

Key words: Preoperative assessment. Anesthetic register. Anesthetic equipment.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5289 Anesthesiology VI

(3 - 0 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a theoretical course that aims to provide residents with basic and specialized knowledge of anesthesiology in Endocrinological Surgery, Orthopedics, Organ Transplant, Pain Management Surgery and some special circumstances like morbid obesity, full stomach, drug problems, politrauma, burnt patients, intoxicated patients, genetic alterations and degenerative diseases. It requires previous knowledge of the basic theory and technique of anesthesia. As a learning outcome, resident must participate in clinical case discussion; demonstrate their knowledge of the principles and techniques of anesthesiology used in the management of patients in Endocrinological Surgery, Orthopedics, Organ Transplant, Pain Management Surgery and some special circumstances, the effects of anesthesia and treatment of possible complications.

General objective: Residents will be able to:

- Obtain knowledge on the anesthesiology management of patients from Endocrinological Sur-

gery, Orthopedics, Organ Transplant, and Pain Management Surgery.

- Obtain knowledge on the anesthesiology management of patients in special circumstances like morbid obesity, full stomach, drug problems, polytrauma, burnt patients, intoxicated patients, genetic alterations and degenerative diseases
- Acquire knowledge on the management of acute and chronic pain.
- Acquire knowledge of the anesthetic techniques used in the management of these patients, its effects and treatment of its complications.
- Demonstrate their analytic skills, effective communication skills, and an adequate management of information, self-study capacities and research skills.
- Perform with a high level of professionalism, both in the process of learning and in applying their knowledge.

Key words: Principles of anesthesiology. Clinical anesthesia.

Bibliography: * , Anesthesia / Ronald D. Miller, 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5290 Medical Care in Anesthesiology VI

(0 - 30 - 6. Prerequisites: None. REA13)

Equivalence: None

It is a clinical course that aims for residents to participate in the management of patients with varied surgical risk, both in the aspects related to their disease and the therapeutic objective. This phase includes a rotation in the Pain Clinic and general Anesthesiology Department. It requires previous knowledge of the basics of Anesthesiology and basic anesthetic techniques. As a learning outcome, resident must create a portfolio of evidences that show their participation in pre and postoperative visits, hospital visits, general OR, and the Adult Intensive Care Unit.

General objective: Sixth semester residents will be able to:

- Collaborate in the perioperative management of patients with rare, complex, and critical problems, with or without supervision.

- Develop collaborative and execution centered skills, with or without supervision.
- Practice the preoperative assessment of a patient, and register it correctly in the patient's file.
- Prepare the anesthetic equipment, medications and materials used in anesthetic procedures.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control.
- Register the anesthetic control.
- Participate in the transportation of a patient to recovery.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.
- Demonstrate analytical skills while discussing clinical cases with professors.

Key words: Preoperative assessment. Anesthetic register. Anesthetic equipment.

Bibliography: Anesthesia / Ronald D. Miller, 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5291 Anesthesiology VII

(3 - 0 - 12. Prerequisites: None. REA13)

Equivalence: None

It is a theoretical course that aims for residents to understand the anesthesiology techniques used in the management of patients with particular characteristic, the effects of the anesthesia and treatment of its possible complications. It requires previous knowledge of the basic theory, principles and technique of anesthesiology. As a learning outcome, resident must demonstrate their knowledge through the resolution of a written exam and their participation in clinical case discussions.

General objective: Resident will be able to:

- Acquire knowledge on the basic and specialized aspects of anesthesiology in certain areas of the specialty, like cardiovascular surgery, neurosurgery and endocrinological surgery.
- Acquire knowledge on the anesthetic techniques

used in the management of patient with very particular characteristic, the effects of the anesthesiology and the treatment of its complications.

Key words: Principles of anesthesiology. Clinical anesthesia.

Bibliography: * , Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5292 Medical Care in Anesthesiology VII (0 - 60 - 12. Prerequisites: None. REA13) Equivalence: None

It is a clinical course that aims for residents to participate in the management of specialized anesthesiology techniques, its effects and possible complications. It requires previous knowledge of the basics of Anesthesiology and basic anesthetic techniques. As a learning outcome, resident must create a portfolio of evidences that show their participation in pre and postoperative management of patients with rare, complex, and critical problems.

General objective: Seventh semester residents will be able to:

- Collaborate in the perioperative management of adult U patients with rare, complex, and critical problems, with or without supervision.
- Develop collaborative and execution centered skills, with or without supervision.
- Practice the preoperative assessment of a patient, and register it correctly in the patient's file.
- Prepare the anesthetic equipment, medications and materials used in anesthetic procedures.
- Participate in the administration of anesthesia and the invasive procedures of monitoring and trans-anesthetic control.- Register the anesthetic control.
- Participate in the transportation of a patient to recovery.
- Participate in a post-anesthesia follow-up.
- Demonstrate a positive attitude and values when interacting with patients.
- Demonstrate collaborative skills, as well as the management techniques of patient preoperative and during surgery.

- Demonstrate analytical skills while discussing clinical cases with professors.

Key words: Preoperative assessment. Anesthetic equipment. Anesthetic equipment. Anesthetic register.

Bibliography: Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5293 Anesthesiology VIII (3 - 0 - 12. Prerequisites: None. REA13) Equivalence: None

It is a theoretical course that aims for senior residents of anesthesiology to contribute in the medical care of rural areas through their knowledge, skills, attitudes and values in a rural hospital of the state of Nuevo Leon, assign by the Secretary for Health. As a learning outcome, resident must show their knowledge of the most common pathologies in rural areas and rural hospitals of the state of Nuevo Leon, assigned to them by the Secretary for Health.

General objective: Residents will be able to:

- Show their commitment to the service of the community, as well as the mission of the Tecnológico in its community activities.
- Collaborate in national health programs.
- Integrate their knowledge and apply it for the benefit of the community.
- Develop analytic skills, effective communication skills, and an adequate management of information, self-study capacities and research skills in rural areas.
- Perform with a high level of professionalism, both in the process of learning and in applying their knowledge.
- Publish and expose their research project.

Key words: Regional hospital. Epidemiology. Common Pathologies.

Bibliography: * , Anestesia / Ronald D. Miller., 4a ed., Madrid : Harcourt, 1998., spaeng, [8481741221 (O.C.)],[8481741205 (v.1)],[8481741213 (v.2)].

ME5294 Medical Care in Anesthesiology VIII

(0 - 60 - 12. Prerequisites: None. REA13)
Equivalence: None

It is a clinical course that aims for residents to contribute in the medical care of rural areas through their knowledge, skills, attitudes and values. As a learning outcome, resident must develop a summary of the medical attention they have given in a rural hospital of the state of Nuevo Leon, assigned to them by the Secretaria de Salud of the state.

General objective: Residents will be able to:

- Participate in the medical care and academic activities of the Anesthesiology Department of the hospital they have been assigned to.
- Improve their communication skills with patient, families and health care personnel.
- Acquire knowledge on the particular limitations of a specific hospital.
- Participate in medical care programs of the government's Secretaria de Salud.

Key words: Professional social service.

ME5302 General Surgery VI

(3 - 0 - 12. Prerequisites: None. REC13)
Equivalence: None

It is a theoretical course that aims for residents to acquire the necessary knowledge to understand, diagnose and treat pathologies that affect the endocrine and exocrine glands, including tumors and MENs; as well as the general management of surgical pathologies of the hand and neurosurgery. It requires basic knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, residents will be able to:

- Understand the clinical and pathological bases of managing surgical endocrine diseases.
- Understand the anatomical, embryological and physiological principles involved in the patholo-

gies of the endocrine pancreas, thyroid glands, parathyroid glands and suprarenal glands.

- Understand the etiology, diagnosis and treatment of urgent neurosurgical pathologies, with the purpose of providing the initial management of the disease.
- Understand the etiology, diagnosis and treatment of urgent surgical pathologies of the hand, with the purpose of providing the initial management of the disease.

Key words: Surgical pathology. Surgical sciences.

Bibliography: * , Robbins and Cotran pathologic basis of disease / Vinay Kumar .. [et al.] ; with illustrations by James A. Perkins., 8th ed., Philadelphia, PA : Saunders/ Elsevier, c2010., [9781416031215], [1416031219], [9780808924029 (International ed.)], [0808924028 (International ed.)], [9781437707922 (Professional ed.)],[1437707920 (Professional ed.)].

ME5303 Medical Care in General Surgery VI

(0 - 60 - 12. Prerequisites: None. REC13)
Equivalence: None

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on pathologies of the thyroid gland, parathyroid gland, suprarenal glands; as well as, MEN (Multiple Endocrine Neoplasia) syndromes and obstetric patients with surgical pathologies. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Continue developing and increasing their sense of responsibility for the care of their patients.
- Apply effectively their skills for interviewing and exploring patients through the development of a History and Physical. They will continue supervising medical students in this area.

- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will continue supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic and advanced diagnostic and therapeutic maneuvers.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it, especially those involved in gynecological and endocrinological surgery.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate actively in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical and critical patients.
- Classify surgical patients based of their surgical and anesthetic risks. They will continue supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program.
- Participate actively as an assistant in some of the programmed surgical procedures.
- Win the opportunity to perform minor and mayor surgical procedures.
- Compare conventional general surgery with minimally-invasive surgery.

Key words: Diagnostic and therapeutic maneuvers in patients in gynecological surgery. Diagnostic and therapeutic maneuvers in general surgery patients.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5304 General Surgery VII (3 - 0 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a theoretical course that aims for residents to acquire the necessary knowledge to understand, diagnose and treat pathologies that affect the arterial, venous and lymphatic systems; as well as the surgical management of geriatric patients, and plastic/reconstructive surgery emergencies. It requires basic knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, residents will be able to:

- Understand the clinical and pathological bases of managing peripheral vascular diseases.
- Understand the physiopathological principles involved in the surgical management of geriatric patients.
- Understand the basic maneuvers needed to collaborate in the management of urgent diseases of plastic and reconstructive surgery.
- Acquire knowledge on the basic ethical principles involved in the care of surgical patients.

Key words: Surgical pathology. Surgical sciences.

Bibliography: * , Robbins and Cotran pathologic basis of disease / Vinay Kumar .. [et al.] ; with illustrations by James A. Perkins., 8th ed., Philadelphia, PA : Saunders/Elsevier, c2010., [9781416031215], [1416031219],[9780808924029 (International ed.)], [0808924028 (International ed.)], [9781437707922 (Professional ed.)], [1437707920 (Professional ed.)].

ME5305 Medical Care in General Surgery VII (0 - 60 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR

and activities during hospital on-call hours. All these aspects with particular focus on pathologies of the lymphatic, venous, and arterial systems. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Continue developing and increasing their sense of responsibility for the care of their patients.
- Effectively apply their skills for interviewing and exploring patients through the development of a History and Physical. They will continue supervising medical students in this area.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will continue supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic and advanced diagnostic and therapeutic maneuvers.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it, especially for vascular surgery.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate actively in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical and critical patients.
- Classify surgical patients based of their surgical and anesthetic risks. They will continue supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program.
- Participate actively as an assistant in some of the programmed surgical procedures.
- Win the opportunity to perform minor and mayor surgical procedures.

Key words: Diagnostic and therapeutic maneuvers in general surgery patients. Diagnostic and therapeutic maneuvers in vascular surgery patients.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5306 General Surgery VIII

(3 - 0 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a theoretical course that aims for residents to acquire an extensive knowledge on the management of the patient with thoracic, pleural, mediastinum and heart pathologies. It requires basic knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion.

General objective: At the end of the course, resident will be able to comprehend extensively the management of patient with pathologies of the thoracic wall, pleura, mediastinum and heart.

Key words: Surgical pathology. Surgical sciences.

Bibliography: * , Robbins and Cotran pathologic basis of disease / Vinay Kumar .. [et al.] ; with illustrations by James A. Perkins., 8th ed., Philadelphia, PA : Saunders/Elsevier, c2010., [9781416031215], [1416031219], [9780808924029 (International ed.)], [0808924028 (International ed.)], [9781437707922 (Professional ed.)], [1437707920 (Professional ed.)].

ME5307 Medical Care in General Surgery VIII

(0 - 60 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a clinical course that aims to develop residents as General Surgeons through the surgical activi-

ties of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on pathologies of the thoracic wall, pleura, lungs, mediastinum and heart. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Continue developing and increasing their sense of responsibility for the care of their patients.
- Effectively apply their skills for interviewing and exploring patients through the development of a History and Physical. They will continue supervising medical students in this area.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will continue supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic and advanced diagnostic and therapeutic maneuvers.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it, especially for thoracic and cardiovascular surgery.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate actively in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical and critical patients.- Classify surgical patients based of their surgical and anesthetic risks. They will continue supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program. Participate actively as an assistant in some of the programmed surgical procedures.

Key words: Diagnostic and therapeutic maneuvers in general surgery patients. Diagnostic and therapeutic maneuvers in thoracic surgery patients. Diagnostic and therapeutic maneuvers in cardiovascular surgery patients.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5308 General Surgery IX (3 - 0 - 12. Prerequisites: None. REC13) **Equivalence: None**

It is a theoretical course that aims for residents to undergo a selective revision of the themes related to their specialty, with a particular focus on the applied basic sciences of surgery in trauma, burns, oncology, skin, vascular and thorax. It requires basic knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion, while at the same time showing an outstanding performance in the surgical board exams.

General objective: At the end of the course, resident will be able to formal teaching and posterior evaluation on the diagnosis and treatment of patients with trauma, burns, oncological diseases, skin diseases, TICS, vascular surgical diseases and thoracic diseases.

Key words: Surgical pathology. Surgical sciences.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5309 Medical Care in General Surgery IX

(0 - 30 - 6. Prerequisites: None. REC13)

Equivalence: None

It is a clinical course that aims for residents to participate in the medical care of the rural population through their knowledge, skills, attitudes and values, and their performance in rural hospital of the State of Nuevo Leon, assigned to them by the Health Department of the state. It will also aim to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on Transplant Surgery and the basic sciences related to it. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Participate actively in the General Surgery service they have been assigned to.
 - Be exposed to and understand medical care systems that are different to the ones they already know.
 - Actively participate in making a positive change in the medical care systems they are exposed to.
 - Compare and evaluate the medical care system in which they have been developing.
 - Recognize their limitations (capacity, infrastructure)
 - Practice their skills, attitudes and values as physician responsible for the medical attention of patients in their General Surgery service.
 - Learn to value the importance of a proper use of resources for the care of patients.
 - Continue developing and increasing their sense of responsibility for the care of their patients.
 - Effectively apply their skills for interviewing and exploring patients through the development of a History and Physical. They will continue supervising medical students in this area.
 - Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will continue supervising medical students in this area.
- Manage patient files, and its components, per the official regulations (Norma Oficial Mexicana NOM) for patient files, as well as the hospital's regulations.
 - Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
 - Perform basic and advanced diagnostic and therapeutic maneuvers.
 - Understand the natural evolutions of diseases and the effect therapeutic procedures have on it, especially for transplant surgery.
 - Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
 - Participate actively in diagnostic and therapeutic decision making for hospitalized patients.
 - Identify the pre-operative, trans-operative and post-operative need of the non-critical and critical patients.
 - Classify surgical patients based of their surgical and anesthetic risks. They will continue supervising medical students in this area.
 - Supervise medical students in their clinical activities per the pre-graduate program.
 - Participate actively as an assistant in some of the programmed surgical procedures.
 - Win the opportunity to perform minor and mayor surgical procedures.

Key words: Diagnostic and therapeutic maneuvers in general surgery patients. Diagnostic and therapeutic maneuvers in transplant surgery patients.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5310 General Surgery X

(3 - 0 - 12. Prerequisites: None. REC13)

Equivalence: None

It is a theoretical course that aims for residents to undergo a selective revision of the themes related to their specialty, with a particular focus on the applied

basic sciences of surgery of the digestive tract, liver, biliary tract, spleen and endocrine system. It requires basic knowledge of the basics sciences in surgery and the surgical techniques. As a learning outcome, residents must show their knowledge and skills through the resolution of a written exam, reports and/or participation in clinical case discussion, while at the same time showing an outstanding performance in the surgical board exams.

General objective: At the end of the course, resident will be able to formal teaching and posterior evaluation on the diagnosis and treatment of patients with surgical diseases of the digestive tract, liver, biliary tract, spleen and endocrine system.

Key words: Surgical pathology. Surgical sciences.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadelphia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5311 Medical Care in General Surgery X

(0 - 30 - 6. Prerequisites: None. REC13)

Equivalence: None

It is a clinical course that aims to develop residents as General Surgeons through the surgical activities of this specialty: which include the follow-up of hospitalized patients, ambulatory and emergency patients, the clinical sessions, the activities in the OR and activities during hospital on-call hours. All these aspects with particular focus on specialized areas in Surgery. As a learning outcome, residents must demonstrate their skills through a report of clinical activities, the 360° evaluation and the analysis of their patient files.

General objective: Residents will:

- Participate actively in the General Surgery service they have been assigned to.
- Be exposed to and understand medical care systems that are different to the ones they already know.

- Actively participate in making a positive change in the medical care systems they are exposed to.
- Compare and evaluate the medical care system in which they have been developing.
- Recognize their limitations (capacity, infrastructure)
- Practice their skills, attitudes and values as physician responsible for the medical attention of patients in their Specialized Surgery service.
- Learn to value the importance of a proper use of resources for the care of patients.
- Continue developing and increasing their sense of responsibility for the care of their patients.
- Effectively apply their skills for interviewing and exploring patients through the development of a History and Physical in the area of their elective. They will continue supervising medical students in this area.
- Identify problems and integrate syndromes, while under the supervision of a senior residents or a professor. They will continue supervising medical students in this area.
- Interpret patient's laboratory and imaging exams. They will begin supervising medical students in this area.
- Perform basic and advanced diagnostic and therapeutic maneuvers.
- Understand the natural evolutions of diseases and the effect therapeutic procedures have on it.
- Maintain an effective and respectful communication with patients, family members, treating physicians and the rest of the health care personnel.
- Participate actively in diagnostic and therapeutic decision making for hospitalized patients.
- Identify the pre-operative, trans-operative and post-operative need of the non-critical and critical patients.
- Classify surgical patients based of their surgical and anesthetic risks. They will continue supervising medical students in this area.
- Supervise medical students in their clinical activities per the pre-graduate program.
- Participate actively as an assistant in some of the programmed surgical procedures.

Key words: Intensive care.

Bibliography: Sabiston textbook of surgery : the biological basis of modern surgical practice / [editors] Courtney M. Townsend Jr. [et al.], 18th ed., Philadel-

phia, PA. : Saunders/Elsevier, c2008., [141603675X], [141605233X (ed. premium)], [080892401X (ed. internacional)], [9781416036753], [9781416052333 (ed. premium)], [9780808924012 (ed. internacional)].

ME5312 Pediatric Neurology IV

(3 - 0 - 12. Prerequisites: None. RNP13)

Equivalence: None

It is a theoretical course that aims for students to identify the different alterations that correspond to EEG of the different epileptic syndromes in pediatric patients. They will identify the use, interactions and side effects of antiepileptic medication. They will also identify the different electroencephalogram patterns found in the different dysfunctions of the white and gray matter, as well as identify and comprehend the abnormal activity found in seizures and epilepsy. It includes concepts of neuropediatrics, neurophysiology, and neuropharmacology. It requires previous knowledge of neurophysiology. As a learning outcome, student must elaborate, while under supervision, a management plan for different types of epilepsy and must identify the different paraclinical abnormalities.

General objective: Resident will be able to:

- Understand the basic principles of the function of the central and peripheral nervous system, including neuromuscular junction and the skeletal muscle during the different stages of development (from the premature child up to the adult).
- Understand the basic principles of the strategies of investigation and electro-diagnosis of the central and peripheral nervous system, including neuromuscular junction and the skeletal muscle during the different stages of development (from the premature child up to the adult).
- Understand the basic principles for the functioning, application and interpretation of the different procedures of diagnostic imaging and intervention radiology for the study of the central nervous system pathology during the different stages of development(from the newborn period to adulthood).
- Recognize the basic neuro-immunological principles and mechanisms that participate in the pathology of the central and peripheral nervous system, including the neuromuscular junction and

the skeletal muscle (from the premature newborn to adulthood).

- Identify the basic principles of pharmacokinesia, action mechanisms, indications and side effects of the drugs used in the treatment of diseases of the central and peripheral nervous system, including the neuromuscular junction and the skeletal muscle (from the premature newborn to adulthood).

Key words: Diagnostic imaging and interventional radiology. Principles and basic mechanisms neuro-immunological. Basic principles of pharmacokinetics.

Bibliography: * Barkovich A J., Pediatric Neuroimaging , 3th. Edition, Lippincott Williams & Wilkins, Philadelphia, 2000.

ME5313 Medical Care in Pediatric Neurology IV

(0 - 60 - 12. Prerequisites: None. RNP13)

Equivalence: None

It is a clinical course that aims for resident to develop as health care professional and begin developing their clinical judgment and decision making skills while under continuous supervision; develop effective communication skills and interpersonal skills; they learn through their daily practice and develop ethical, citizenship and professionalism competences. The course includes concepts for the identification of problems and identifying syndromes while under supervision and evaluation of academic team. They will participate in daily hospital rounds, ambulatory consultations, overnight work and pediatric emergencies while under continuous supervision by senior residents and the academic professors. As a learning outcome, residents identify and evaluate different mental states, coma and cerebral death in newborns to adolescents; they must correlate between different neurological syndromes, participate in basic to complex diagnostic and therapeutic maneuvers, participate in therapeutic decision-making and develop effective communication skills and professionalism in their daily consultations.

General objective: Residents will be able to:

- Elaborate a diagnostic and therapeutic plan for patients in Neurodevelopment, ADD, Epilepsy, Headache and Neuromotor Clinics.

- Participate in the formulation of a diagnostic plan in the consultation of Emergency and PICU (Pediatric Intensive Care Unit) patients.
 - Master the basic mechanisms of central and peripheral nervous systems, involves in the identification of specific neurological syndromes.
 - Master the basic principles of the strategies of investigation and electro-diagnosis of patients with alterations of their mental state and for determining brain death (from the premature child up to the adult).
 - Master the basic principles of pharmacokinetics, action mechanisms, indications and side effects of the drugs used in the treatment of diseases of the central and peripheral nervous system, including the neuromuscular junction and the skeletal muscle (from the premature newborn to adulthood).
- Key words:** Neurological syndromes. Mental state.

Bibliography: * DeMyer, William, 1924-, *Technique of the neurologic examination : a programmed text* / William E. DeMyer, 4th ed., New York : McGraw-Hill, c1994., [0070163537], [0071125922 (rústica)].

ME5314 Pediatric Neurology V

(3 - 0 - 12. Prerequisites: None. RNP13)

Equivalence: None

It is a theoretical course that aims for students to know the clinical presentation of hypotonic states, posture and movement abnormalities, and mental state alterations, including coma. They will also develop skills to recognize the basic neurogenic alterations and their comorbidities, and will be able to use the appropriate diagnostic tools. It includes concepts of neuropediatrics, neurophysiology, neuropsychology and neurogenetics. It requires previous knowledge of neurophysiology IV. As a learning outcome, students must interpret neuropsychological evaluations and must implement the appropriate interventions for neuropsychological problems, while showing optimized resource administration.

General objective: Resident will be able to:

- Understand the principles and basic mechanisms of the neuropsychology, evaluation procedures, diagnosis and treatment of pathologies of the

central and peripheral nervous system during the different stages of development (from the newborn period up to the adolescence).

- Identify the strategies, indications and result of the different neurorehabilitation procedures in the management of the most common disorders of the central and peripheral nervous system and neuromuscular system during the different stages of development (from the newborn period to adulthood)
- Understand the principles and basic mechanisms of genetic that participate in the central and peripheral nervous system pathology, including neuromuscular junction and skeletal muscle during the different stages of development (from the newborn period to adolescence).
- Understand the principles and basic mechanisms of Neuro-Ophthalmology evaluation, diagnosis and treatment of the pathologies from the newborn period to the adolescence.

Key words: Principles and basic mechanisms of neuro-ophthalmology. Principios y mecanismos básicos de la neurología.

Bibliography: * Levitt S., *Tratamiento de la Parálisis Cerebral y retardo motor*, 3era. Edición, Panamericana, 2001.

ME5315 Medical Care in Pediatric Neurology V

(0 - 30 - 6. Prerequisites: None. RNP13)

Equivalence: None

It is a clinical course that aims for resident to develop as health care professional and begin developing their clinical judgment and decision making skills while under continuous supervision; develop effective communication skills and interpersonal skills; they learn through their daily practice and develop ethical, citizenship and professionalism competences. The course includes concepts for the identification of problems and identifying syndromes while under supervision and evaluation of academic team. They will participate in daily hospital rounds, ambulatory consultations, overnight work and pediatric emergencies while under continuous supervision by senior residents and the academic professors. As a

learning outcome, residents evaluate nerve root lesions of the superior and inferior extremities, as well as spinal cord; they must correlate between different neurological syndromes, participate in basic to complex diagnostic and therapeutic maneuvers, participate in therapeutic decision-making and develop effective communication skills and professionalism in their daily consultations.

General objective: Residents will be able to:

- Participate in a progressive and continuous manner in the detection, diagnosis and solution of health problems of neuropsychiatric patients with common, simple and complex disease situations, that are or aren't in a critical condition, performing history and neurological examination, developing a therapeutic plan, and performing a short and long term follow up.
- Observe and help in the execution and report of diagnostic procedures: electromyography, motor and sensory neuroconduction, EEG, auditory, visual and somatosensory brainstem evoked potentials, skull and spine X rays, CT scan, and MRI.
- Participate in the selection and interpretation of neuropsychological tests when these are indicated, and while under supervision.
- Identify, evaluate and diagnose lesions of the nerve root of superior and inferior extremities and cervical spinal cord, as well as establish therapeutic strategies; and prescribe and participate in the design and supervision of neurorehabilitation strategies, and issue short and long term prognosis, while under supervision of his tutor. The areas through which he will develop these clinical activities are: ambulatory services, inpatient rounds, emergency room, ICU and during the on call duties.

Key words: Evaluation of nerve root lesions of superior and inferior extremities. Cervical Spinal cord Lesions.

Bibliography: * DeMyer, William, 1924-, Technique of the neurologic examination : a programmed text / William E. DeMyer., 4th ed., New York : McGraw-Hill, c1994., [0070163537],[0071125922 (rústica)].

ME5316 Pediatric Neurology VI (3 - 0 - 12. Prerequisites: None. RNP13) **Equivalence: None**

It is a theoretical course that aims for students to know the different aspects of the neuropsychological functions and what is considered abnormal, as well as the different neuropsychological syndromes seen in pediatric patients. They will develop skills to identify neurological comorbidities present in delays of the psychomotor and language development. It includes concepts of neuropediatrics, neurophysiology, and neuropsychology. It requires previous knowledge of neurophysiology IV. As a learning outcome, students must implement the appropriate interventions for neuropsychological problems, while showing optimized resource administration.

General objective: Resident will be able to:

- Understand the principles and basic mechanisms of the neuropsychology, evaluation procedures, diagnosis and treatment of pathologies of the central and peripheral nervous system during the different stages of development (from the new born up to the adolescent).
- Understand the principles and basic mechanisms of neonatal neurology, evaluation procedures, diagnosis and treatment of pathologies of the central and peripheral nervous system, including neuromuscular junction and skeletal muscle during the different stages of development from the premature to infancy.

Key words: Basic principles and mechanisms of neuropsychology. Principles and basic mechanisms of neonatal neurology.

Bibliography: * Calderón González, Raúl., El niño con disfunción cerebral : trastornos del lenguaje, aprendizaje y atención en el niño / Raúl Calderón González, México : Limusa, 1990., [9681832671].

ME5317 Medical Care in Pediatric Neurology VI (0 - 30 - 6. Prerequisites: None. RNP13) **Equivalence: None**

It is a clinical course that aims for resident to develop as health care professional and begin developing

their clinical judgment and decision making skills while under continuous supervision; develop effective communication skills and interpersonal skills; they learn through their daily practice and develop ethical, citizenship and professionalism competences. The course includes concepts for the identification of problems and identifying syndromes while under supervision and evaluation of academic team. They will participate in daily hospital rounds, ambulatory consultations, overnight work and pediatric emergencies while under continuous supervision by senior residents and the academic professors. As a learning outcome, residents evaluate lumbosacral spinal cord lesions and the mechanisms that produce spinal cord lesions, as well as the evaluation of meningomyelocele; they must also correlate between different neurological syndromes, participate in basic to complex diagnostic and therapeutic maneuvers, participate in therapeutic decision-making and develop effective communication skills and professionalism in their daily consultations.

General objective: Residents will be able to:

- Participate in a progressive and continuous manner in the detection, diagnosis and solution of health problems of neuropsychiatric patients with common, simple and complex disease situations, which are or aren't in a critical condition, performing history and neurological examination, developing a therapeutic plan, and performing a short and long term follow up.
- Observe and help in the execution and report of diagnostic procedures: electromyography, motor and neural conduction, EEG, auditory, visual and somatosensory brainstem evoked potentials, skull and spine X rays, CT scan, and MRI.
- Participate in the selection, execution, and interpretation of neuropsychological tests when these are indicated, and while under supervision.
- Identify, evaluate and diagnose lesions of the lumbosacral spinal cord and evaluation of a meningomyelocele, as well as establish therapeutic strategies; and prescribe and participate in the design and supervision of neurorehabilitation strategies, and issue short and long term prognosis, while under supervision of his tutor. The areas through which he will develop these clinical activities are: ambulatory services, inpatient rounds, emergency room, ICU and during the on call duties.

Key words: Lumbar spinal cord lesions. Mechanism that produce spinal cord lesions. Evaluation of meningomyelocele.

Bibliography: * DeMyer, William, 1924-, Technique of the neurologic examination : a programmed text / William E. DeMyer., 4th ed., New York : McGraw-Hill, c1994., [0070163537],[0071125922 (rústica)].

ME5318 Obstetrics and Gynecology Specialties II

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is a course of theoretical fundamentals that intends that the student learn the aspects related with reproductive medicine and minimal invasion surgery in obstetrics and gynecology, necessary to resolve the common clinical problems at low and medium difficulty level that face an obgyn in his daily practice. As learning outcome, is expected that the student acquires the necessary skills to diagnose and resolve problems in the above areas. The student will document his experience in a portfolio with the necessary evidence.

General objective: Resident will be able to:

- Understand the basic concepts in the reproductive process in normal and in pathological conditions, common diseases that impairs the reproductive process, diagnostic methods and therapeutic alternatives
- Describe the fundamentals in minimal invasion surgery, techniques and the role, at the present time of these techniques in gynecology.
- Apply the clinical reasoning process by base learning problems methods, participating actively in the solution of health reproductive problems.
- Learn to work as a team.

Key words: Reproductive medicine. Minimal invasion surgery.

Bibliography: * , Essentials of obstetrics and gynecology / [edited by] Neville F. Hacker, J. George Moore., 3rd ed., Philadelphia : W.B. Saunders, c1998., [0721674739 (rústica)].

ME5319 Medical Care in Obstetrics and Gynecology V

(0 - 30 - 6. Prerequisites: None. REG13)

Equivalence: None

It is a clinical and practical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire during the first fourth semesters, combining obstetrics and gynecology aspects, focusing in gynecological aspects, as well as reproductive medicine and minimal invasion surgery (endoscopy) . During the course development, the student will be going deeper every time. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established, under minimal supervision for low and medium difficulty level for obstetrical cases and procedures and with supervision for complex obstetrical cases and for gynecological cases and for reproductive medicine patients and procedures and for endoscopy procedures. As learning outcome, it is expected that the student perform obstetric and gynecologic procedures, under supervision as described above. This year the student will perform activities according to his international elective rotation. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Participate in the solution of obstetrical and gynecological problems in adult patients hospitalized in the department of obstetrics and gynecology, during his third semester of residency, according to his level of training, during the period of time assigned.- Learn to offer proper medical care.
- Apply knowledge, mainly in women with subspecialty disease entities or criticism, diagnostic integration and will participate in the learning process of residents with greater and lower level of training and with professors.
- Assess and resolve the most common health of hospitalized patients, through daily patient visit gyneco-obstetric.

- Integrate the previous phases of clinical reasoning to the solution of problems.
- Participate in the ambulatory medical care in the office patients and collaborate actively in the solution of health problems in all gyneco-obstetrical patients that come in critical and no critical conditions, performing most of diagnostic and therapeutic procedures under professor supervision.
- Act as coordinator and teaching activities of junior residents and medical students attending the consultation activities.
- Perform academic, clinical and research during their international elective rotation.
- Develop the skills, attitudes, values and execute procedures related to this phase of their training.

Key words: Reproductive medicine. Minimal invasion surgery. Gynecology and obstetrics. Endoscopy.

Bibliography: * , Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME5320 Obstetrics and Gynecology Specialties III

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is a fundamental theoretical course that intends that the student learn the necessary concepts about the more frequent urogynecologic pathologies that face a gynecologist in an everyday practice, besides the main concepts about malignant gynecologic disease. Requires basic knowledge about pelvic anatomy, histology and pathologic anatomy about internal genitalia, and also requires knowing the physiologic and mechanic mechanisms that maintain the homeostasis of the urinary continence. As learning outcome, is expected that the student acquires the necessary skills to diagnose and resolve urinary incontinence problems, and by the other hand, prevent and make early diagnosis and efficient management of oncologic problems as gynecologic cancer. The student will document his experience en related procedures with this area, in a portfolio with the necessary evidence.

General objective: Resident will be able to:

- Obtain the knowledge and skill needed in urologic and oncologic gynecology necessary to solve related problems with these areas at the general gynecology level.
- Increase the knowledge acquired previously in basic subjects related to this areas, and apply those, to understand, know and learn to solve the problems in urologic and oncologic gynecology.
- Acquire knowledge and skills that allow the student to perform a high level quality attention of patients in this areas, doing high technology procedures at an international levels.

Key words: Urologic gynecology. Gynecologic oncology.

Bibliography: * Gardner DK y cols., Textbook of Assisted Reproductive Techniques, Dunitz, 2001.

ME5321 Medical Care in Obstetrics and Gynecology VI

0 - 30 - 6. Prerequisites: None. REG13)

Equivalence: None

It is a clinical and practical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire during the first five semesters, combining obstetrics and gynecology aspects, focusing in gynecological aspects, as well as urologic gynecology and gynecologic oncology . During the course development, the student will be going deeper every time. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established, under minimal supervision for low and medium difficulty level for obstetrical cases and procedures and with supervision for complex obstetrical cases and for gynecological cases and for urologic gynecology and gynecologic oncology. In some procedures, the student will understand and know the procedure only, in some other cases; he will assist the surgeon during the procedure. As learning outcome, it is expected that the student perform obstetric and gynecologic, urogynecologic and oncologic gynecologic

procedures, under supervision as described above. This year the student will perform activities according to his international elective rotation. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Participate in the solution of urgent problems in adult patients hospitalized in the department of obstetrics and gynecology, during his third year of residency, in area chosen to perform high-tech procedures in different subspecialties, according to his level of training, during the period of time assigned.
- Learn to offer proper and continuous medical care. Apply knowledge, mainly in the care of women with subspecialty or critical problems in the gynecological oncology and urology, and in the resolution of complex problems of these subspecialties. The student will participate in the learning process of residents with lower level of training and with students.
- Learn through the everyday work with hospitalized gynecologic-obstetrical and high specialty patients, to evaluate and solve the most frequent health problems in a hospitalized patient in subspecialty services of obstetric and gynecologic care, with main interest in oncological and urological gynecology, as well as the elective international area chosen by the student.
- Develop in the student a logical system of clinical follow up in a gynecologic-obstetrical patient hospitalized, focusing in the study process, analysis, therapeutic strategies development that help the patient to recover her health and to register this information.
- Participate in the ambulatory medical care in the office patients and collaborate actively in the solution of health problems in all gynecologic-obstetrical patients that come in critical and no critical conditions, performing most of diagnostic and therapeutic procedures under the supervision of a tutor, in particular in the subspecialty areas mentioned above.
- Develop competencies related with the clinical care of patients that come to the ambulatory service of gynecologic-obstetrical subspecialty chosen by the student in their international elective (Reproductive medicine/ Oncology/ Maternal and Fetal

Medicine/ Urology) and during their regular rotations.

- Develop skills, attitudes and values in this phase. One main goal is focused in the diagnosis, treatment and performance of high tech procedures related to the ObGyn area of their elective and their regular hospitals.

Key words: Pregnancy. Gynecology and obstetrics. Gynecologic oncology and urology.

Bibliography: High-risk pregnancy : a team approach / [edited by] Robert A. Knuppel, Joan E. Drukker., 2nd ed., Philadelphia : Saunders, c1993., [0721634559].

ME5322 Advances in Obstetrics and Gynecology I

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is a fundamental theoretical course that intends that the student learn the basic principles in genomic medicine and his use in modern medicine, particularly in gynecology and obstetrics. Also, the student should know and understand the fundamental basic principles of the imaging techniques performed in obstetrics and gynecology. General knowledge in ObGyn is required. Learning outcome: solve written examinations and clinical cases in genomic medicine and imagenology in ObGyn.

General objective: Resident will be able to:

- Understand the fundamental principles in genomic medicine
- Know the present alternatives in and possible applications of genomic medicine in obstetrics and gynecology.
- Know the possible applications of genomic medicine in gynecology and obstetrics, in the future
- Describe the basic principles of imaging techniques.
- Know and utilize, in theory and practice, the different imaging techniques in gynecology and obstetrics.
- Apply the clinical reasoning process using the problem-based learning method (PBL), participating actively in the health problems solution in those cases that could be possible to apply genomic medicine and the student will have also, to

participate actively in the solution problems, utilizing the different imaging techniques.

- Learn how to work as a team.

Key words: Genomic medicine. Imagenology in obstetrics and Gynecology.

Bibliography: * , Essentials of obstetrics and gynecology / [edited by] Neville F. Hacker, J. George Moore., 3rd ed., Philadelphia : W.B. Saunders, c1998., [0721674739 (rústica)].

ME5323 Medical Care in Obstetrics and Gynecology VII

(0 - 60 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a clinical and practical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquire during the first six semesters, combining obstetrics and gynecology aspects at the same level. During the course development, the student will be going deeper every time. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established. As learning outcome, it is expected that the student perform obstetric and gynecologic procedures under minimal or none supervision. This year the student will perform activities according to his social service , depending the hospital and ObGyn department assigned. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Resident will be able to:

- Participate in the solution of urgent problems in adult patients hospitalized in the department of obstetrics and gynecology, during his fourth year of residency, according to his level of training, and during the period of time assigned.
- Learn to offer proper and continuous medical care. Apply knowledge, mainly in the care of women with any nosological entity, in the research of unresolved problems, and participate in the learning

process of residents with lower level of training and with students.

- Learn through the everyday work with hospitalized gynecological patients, to evaluate and solve the most frequent health problems in a hospitalized patient, while acting as coordinator and supervisors of the activities performed by residents with lower level of training and students.
- Incorporate early stages of clinical reasoning to the multidisciplinary solution of problems.
- Participate in the ambulatory medical care in the office patients and collaborate actively in the solution of health problems in all gynecological patients that come in critical and no critical conditions, performing most of diagnostic and therapeutic procedures while under minimal or no supervision.
- Act as coordinator and supervisors of the ambulatory services provided by residents with lower level of training and students.
- Perform their social service activities in the hospital assigned to them, and their academic activities through the incorporation of early stages of clinical reasoning to the global solution of problems.
- Develop skills, attitudes, values, and execute procedures related to this phase of their training.

Key words: Gynecology and obstetrics. Pregnancy.

Bibliography: * , Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME5324 Advances in Obstetrics and Gynecology II

(3 - 0 - 12. Prerequisites: None. REG13)

Equivalence: None

This is a theoretical course that intends the student to perform his social service as a gynecologist, practicing the knowledge achieved during his training. Requires basic knowledge in obstetrics and gynecology and in every area of specialties such as oncology, urology, maternal-fetal medicine, child and adolescent gynecology, menopause, minimal invasion surgery and ultrasound. As a learning outcome is expected that the student can provide medical attention in Obstetrics and Gynecology, with quality

and high human sense, documenting the cases and procedures performed in a portfolio with evidence of every activity performed, evaluating technical, procedural as well as ethical and human aspects.

General objective: Resident will be able to: · Provide clinical care to different rural populations, using his or her knowledge, skills, attitudes and values in the rural, local hospitals, depending of the assignment provided by Servicios de Salud de Nuevo Leon central office.

Key words: Clinical obstetric care. Clinical gynecologic care.

Bibliography: * Abraham S. Benenson, Informe Oficial de la Asociación Estadounidense de Salud Pública, 16ª. edición .

ME5325 Medical Care in Obstetrics and Gynecology VIII

(0 - 60 - 12. Prerequisites: None. REG13)

Equivalence: None

It is a clinical and practical course that intends that the student acquire practical knowledge and skills through the clinical practice with patients in a hospital and outpatient setting, under supervision, according to his training degree and to his theoretical course that the student is taking. Requires basic knowledge in obstetrics and gynecology acquired during the first six semesters, combining obstetrics and gynecology aspects at the same level. During the course development, the student will be going deeper every time. He should achieve predetermined procedures established previously in a list of procedures with objectives clearly established. As learning outcome, it is expected that the student perform obstetric and gynecologic procedures under minimal or none supervision. This year the student will perform activities according to his social service, depending the hospital and ObGyn department assigned. This experience will be documented in a portfolio with the necessary evidence to show that the course objectives have been accomplished satisfactorily.

General objective: Residents will be able to:

- Participate in the solution of urgent problems in hospitalized adult patients in the department of

obstetrics and gynecology, during his fourth year of residency, according to his level of training, and during the period of time assigned.

- Learn to offer proper and continuous medical care.
- Apply knowledge, mainly in the care of women with any nosological entity, in the research of unresolved problems, and participate in the learning process of residents with lower level of training and with students.
- Learn through the everyday work with hospitalized gynecological-obstetrical patients, to evaluate and solve the most frequent health problems in a hospitalized patient, while acting as coordinator and supervisors of the activities performed by residents with lower level of training and students.
- Incorporate early stages of clinical reasoning to the multidisciplinary solution of problems.
- Participate in the ambulatory medical care in the office patients and collaborate actively in the solution of health problems in all gynecological-obstetrical patients that come in critical and non-critical conditions, performing most of diagnostic and therapeutic procedures while under minimal or no supervision.
- Act as coordinator and supervisors of the ambulatory services provided by residents with lower level of training and students.
- Perform their social service activities in the hospital assigned to them, and their academic activities through the incorporation of early stages of clinical reasoning to the global solution of problems.
- Develop skills, attitudes, values, and execute procedures related to this phase of their training.

Key words: Gynecology and obstetrics. Pregnancy.

Bibliography: * , Williams obstetricia / F. Gary Cunningham .. [et al.] ; tr. Ana María Pérez Tamayo Ruiz .. [et al.], 23a ed., México : McGraw-Hill, 2011., [9786071504630].

ME6000 Bioethics and Regulations in Research

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

This is a research level course with the purpose to offer the student basic knowledge in bioethics; its origins, history and methods; it also discusses ethical

aspects of both, clinical and experimental research in health. Methodologically, the course will focus on the identification of relevant ethical issues in biomedical research and critical evaluation of the different moral points of view. This course will also review the ethical standards of research, including rules, standards and codes. From regulatory frameworks, this course will review in detail the main ethical, legal and social aspects, as well as national and international policies involved in the development of biomedical and clinical research. Some examples are those standards that regulate trails that include animals, genetically modified organisms, and human beings. Mechanisms of validation by regulatory agencies will be reviewed in animals and human beings. This course requires basic clinical medicine knowledge, as well as basic biological science knowledge. As a learning outcome, the student will present the design of an approval process for drugs, biological or biomedical devices.

General objective: Student will be able to raise and solve ethical problems of research in health, in its various aspects; as well as know and design an approval process for drugs, biological or biomedical devices.

Key words: Bioethics. Clinical research. Preclinical research. Human Research Ethics.

Bibliography: * Rivero Serrano., Ética en el ejercicio de la Medicina, 1ra. Edición, Panamericana, [9789687988719].

ME6001 Methodological Structure and Statistics in Biomedical and Clinical Research

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence:None

This is a research course which focuses on learning to structure a scientific research properly in clinical sciences, select the most appropriate statistical method, and select adequate literature to support the study depending on its evidence degree. Basic principles will be covered, as well as the design of research studies, basic and clinic, more frequent statistical test and data management. This course requires basic knowledge of statistics. As learning outcome, the student designs a research protocol, justifying the selected experimental design.

General objective: Students will be able to recognize and understand different scientific approaches for clinical research studies; most commonly statistical methods used, and based evidence articles to support their investigation. They will recognize and be able to choose between the most commonly used experimental designs in biomedical research and to communicate with statisticians about complex statistical analyses.

Key words: Evidence based medicine. Medicine scientific method. Medical sciences. Biostatistics. Medical statistic.

Bibliography: Jean-Louis Auget, N. Balakrishnan, Mounir Mesbah, Geert Molenberghs., Advances in Statistical Methods for the Health Sciences: Applications to Cancer and AIDS Studies, Genome Sequence Analysis, and Survival Analysis, Publisher: Birkhäuser Boston, [0817643680].

ME6002 Epidemiological Research

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

This is a research level course with the purpose to learn the basic principles and methods of epidemiological studies; emphasizing the design, conduct and interpretation of epidemiological studies, including definitions of epidemiology, experimental measurements of disease frequency, measures of associations and effects, design of epidemiological studies and screening for infectious diseases. No previous knowledge required. As a learning outcome, the student presents the design of a basic or clinical epidemiological study.

General objective: Students will be able to correctly design basic and clinical research studies, conduct them and analyze obtained information. They will learn the most common mistakes made in the design of these studies.

Key words: Public health. Epidemiological research. Epidemiology.

Bibliography: * Elwood, J. Mark., Critical appraisal of epidemiological studies and clinical trials / J. Mark Elwood., 3rd ed., Oxford ; New York : Oxford Uni-

versity Press, 2007., [9780199218257 (encuadernado)], [9780198529552 (rústica)].

ME6003 Doctoral Research I

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

This is a course of research that is intended for the student, guided by the teacher, to study specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

Key words: Research project. Clinical research

ME6004 Doctoral Research

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

This is a course of research that is intended for the student, guided by the teacher, to study specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

Key words: Research project. Doctoral research.

ME6005 Doctoral Research III

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

This is a course of research that is intended for the student, guided by the teacher, to study specific topics that will assist in the development of the research project. As a result of learning, the student will be able to develop a presentation that can be used to support the research project.

General objective: Choosing a topic of study conducted and implemented on a specific domain of interest advised by a professor in that area.

Key words: Doctoral research.

ME6006 Doctoral Research IV (3 - 0 - 12. Prerequisites: None. DCL12) **Equivalence: None**

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will finish writing the conceptual framework of his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

ME6007 Doctoral Research V (3 - 0 - 12. Prerequisites: None. DCL12) **Equivalence: None**

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will finish writing the conceptual framework of his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

ME6008 Doctoral Research VI (3 - 0 - 12. Prerequisites: None. DCL12) **Equivalence: None**

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. He will define the methodology, consistent with the topic proposal and the theoretical framework determined beforehand. Learning outcome: the student will have established

the methodology to be used in the doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

ME6009 Doctoral Research VII (3 - 0 - 12. Prerequisites: None. DCL12) **Equivalence: None**

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. He will define the methodology, consistent with the topic proposal and the theoretical framework determined beforehand. Learning outcome: the student will have established the methodology to be used in the doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

ME6010 Doctoral Research VIII (3 - 0 - 12. Prerequisites: None. DCL12) **Equivalence: None**

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will continue to generate preliminary findings that can be used for his final dissertation document.

General objective: Development of doctoral research.

Key words: Development of doctoral research.

ME6011 Doctoral Research IX (3 - 0 - 12. Prerequisites: None. DCL12) **Equivalence: None**

In this research course, the student continues with his research. He is guided by a local principal advisor

sor in writing his doctoral dissertation. Learning outcome: the student will continue to generate preliminary findings that will help him to identify whether or not the hypotheses put forward at the beginning of his research work are correct.

General objective: Development of doctoral research.

Key words: Development of doctoral research.

ME6012 Doctoral Research X

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will validate the findings obtained and begin an analysis of these findings that can be used for his final dissertation document.

General objective: Development of doctoral research.

Key words: Development of doctoral research.

ME6013 Doctoral Research XI

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

In this research course, the student continues with his research. He is guided by a local principal advisor in writing his doctoral dissertation. Learning outcome: the student will validate the findings obtained and begin an analysis of these findings that can be used for his final dissertation document.

General objective: Development of doctoral research.

Key words: Development of doctoral research.

ME6014 Doctoral Research XII

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

In this research course, the student will write the conclusion to his doctoral dissertation. He will be guided by a local principal advisor in writing his doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: the student will begin to write the conclusion to his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

Bibliography: * Browner, Warren S., Publishing and presenting clinical research / Warren S. Browner., 2nd ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781795060 (rústica)],[9780781795067 (rústica)].

ME6015 Doctoral Research XIII

(3 - 0 - 12. Prerequisites: None. DCL12)

Equivalence: None

In this research course, the student will write the conclusion to his doctoral dissertation. He will be guided by a local principal advisor in writing his doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: the student will begin to write the conclusion to his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

Bibliography: * Browner, Warren S., Publishing and presenting clinical research / Warren S. Browner., 2nd ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781795060 (rústica)],[9780781795067 (rústica)].

ME6016 Doctoral Research XIV
(3 - 0 - 12. Prerequisites: None. DCL12)
Equivalence: None

In this research course, the student will write the conclusion to his doctoral dissertation. He will be guided by a local principal advisor in writing his doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: the student will begin to write the conclusion to his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

Bibliography: * Browner, Warren S., Publishing and presenting clinical research / Warren S. Browner., 2nd ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781795060 (rústica)],[9780781795067 (rústica)].

ME6017 Doctoral Research XV
(3 - 0 - 12. Prerequisites: None. DCL12)
Equivalence: None

In this research course, the student will write the conclusion to his doctoral dissertation. He will be guided by a local principal advisor in writing his doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: the student will begin to write the conclusion to his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

Bibliography: * Browner, Warren S., Publishing and presenting clinical research / Warren S. Browner., 2nd ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781795060 (rústica)],[9780781795067 (rústica)].

ME6018 Doctoral Research XVI
(3 - 0 - 12. Prerequisites: None. DCL12)
Equivalence: None

In this research course, the student will write the conclusion to his doctoral dissertation. He will be guided by a local principal advisor in writing his doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: the student will begin to write the conclusion to his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

Bibliography: * Browner, Warren S., Publishing and presenting clinical research / Warren S. Browner., 2nd ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781795060 (rústica)],[9780781795067 (rústica)].

ME6019 Doctoral Research XVII
(3 - 0 - 12. Prerequisites: None. DCL12)
Equivalence: None

In this research course, the student will write the conclusion to his doctoral dissertation. He will be guided by a local principal advisor in writing his doctoral dissertation. The course includes the following concepts: problem proposal, theoretical framework and methodology. Learning outcome: the student will write the conclusion to his doctoral dissertation.

General objective: Development of doctoral research.

Key words: Doctoral research.

Bibliography: * Browner, Warren S., Publishing and presenting clinical research / Warren S. Browner., 2nd ed., Philadelphia : Lippincott Williams & Wilkins, c2006., [0781795060 (rústica)],[9780781795067 (rústica)].

ME6020 Doctoral Defense
(0 - 0 - 1. Prerequisites: None. DCL12)
Equivalence: None

This course constitutes the final phase of the student's doctoral research. The student will present and defend his thesis orally before the members of the doctoral committee.

General objective: The student will present and defend his doctoral research.

Key words: Doctoral research.

MP **Political Analysis and the Media****MP4000 Research Qualitative Methods****(3 - 0 - 12. Prerequisites: None. MPE09)****Equivalence: None**

This basic course seeks to reflect on Social Science research and the complementariness of the qualitative and quantitative methods. The student will learn about qualitative research techniques, such as: ethnography, case studies, history of life, participant observation, in-depth interviews and discussion groups. Learning outcome: the student will complete his own research project, defining the research variables and indicators and reflecting on the most appropriate qualitative research techniques for each research strategy. He will also write different types of reports to communicate his findings.

General objective: Identify the paradigm, methods, and qualitative investigation techniques as a way of reconstructing social reality. Learn how to use qualitative investigation techniques to collect information in the field. Set out, design, and formulate scientific investigation projects related to social problems based on qualitative investigation strategies.

Key words: Research methods. Qualitative methods.

MT

Marketing

MT4001 Marketing Management**(3.5 - 0 - 12. Prerequisites: [AD4001]. MBA09, MBA09G)****Equivalence: GA00208, GA00230, GA5071, MT96211**

It is a basic course in the area of marketing that provides the theoretical base and practical perspective to understand the marketing management and tactics that enable the firm to develop mutual beneficial relationship with customers. As learning outcome the student will develop a final project in which he/she will outline key marketing strategies.

General objective: The student will be able to understand strategic issues such as consumer behavior, segmentation and positioning. As well as managerial issues related to branding, pricing, distribution and promotion to both consumer and industrial markets.

Key words: Customer orientation. Demand and market share. Segmentation strategies. Product positioning. Competition analysis.

Bibliography: * Best, Roger J., Market-based management: Strategies for growing customer value and profitability/Roger J. Best, 5th. Edition, Upper Saddle River, N. J.: Pearson/Prentice Hall, c2009., [9780132336536 (rústica : papel alcalino)].

MT4004 Consumer-Client Behavior Analysis**(3.5 - 0 - 12. Prerequisites: None. MMT09, MMT09V)****Equivalence: GA00251**

This basic marketing course provides students with the skills to understand purchasing and consumer decision-making processes and the psychological and sociological factors involved when a person or a group selects, acquires, uses or disposes of products and services. Knowledge of marketing is required. Learning outcome: Students will understand the theoretical basis and practical perspective for supporting the development of marketing strategies in both consumer and business markets.

General objective: Understand the models and theories on which the consumer behavior discipline is based in order to apply this knowledge to strategic marketing decisions. This takes place within the framework of individual, group, and company purchasing decisions. Introduce to the business context the language of disciplines such as psychology, sociology, anthropology, among others, which provide support for the understanding and application of consumer behavior within national and international reality.

Key words: Purchase decision process. Factors that influence purchasing behavior. Marketing strategy.

Bibliography: * Del I. Hawkins, Roger J. Best, Kenneth A. Coney, Consumer Behavior, 10th. Edition, McGraw Hill.

MT4005 Marketing Intelligence Systems**(3.5 - 0 - 12. Prerequisites: [MT4004]. MMT09, MMT09V)****Equivalence: GA00252**

The aim of this basic market research course is for the student to apply his knowledge of basic marketing, consumer analysis and statistics. Knowledge of statistics and consumer behavior is required. Learning outcome: the student will know and handle the tools for designing, implementing and evaluating a market research process using qualitative and quantitative methodologies.

General objective: Develop managerial skills in order to use market investigation in the process of strategic market planning, differentiate when market investigation should and should not be used, and the qualitative and quantitative options available within the market. Identify the methodologies to carry out the following types of studies: market segmentation, customer satisfaction questionnaires, product and product positioning research, publicity, promotion and brand research. Generate creative solutions to acquire and utilize the information, as well as explore

new technologies for developing information that allows decisions to be taken that support the strategic planning process within organizations.

Key words: Quantitative market research. Analysis, SPSS, results. Group sessions. Sampling questionnaire design. Sample size.

Bibliography: * McDaniel, Carl D., Investigación de mercados/Carl McDaniel, Jr., Roger Gates, 6ta. Edición, México: Thomson, 2005, México, 2005, español, [9706863664].

MT4006 Pricing Strategy and Profitability

(3.5 - 0 - 12. Prerequisites: None. MMT09, MMT09V)

Equivalence: GA00439

The aim of this basic course is that the student should understand the importance of price function in today's companies and to learn about and apply the most relevant concepts and tools for attaining financial profitability. A basic knowledge of marketing and financial information is required. Learning outcome: the student will apply in a practical project his knowledge of the intelligent management of real-time prices, inventories and capacities, as well as revenue management and enterprise profit optimization.

General objective: On completion of the course, students will be able to understand the basic principles of pricing strategy and its role within the management of a company. They will have a new vision of markets based on the value perception of each different client segment. They will be able to develop the capacity to apply distinct analysis, modeling, and optimization tools in accordance with different products and segments. They will have a better understanding of how to evaluate diverse competitive environments, according to the pricing policies of the participants. They will also understand concepts and ideas to establish, apply and update pricing policies in different kinds of businesses and industries. They will be able to visualize the approaches and the most advanced tools that are being developed and applied in certain industries and environments.

Key words: Pricing strategy and management is a fundamental responsibility of the general director, with the support of diverse areas of the company.

Bibliography: * Nagle, Thomas T.; Hogan, John E., The Strategy and Tactics of Pricing, 4, Pearson/Prentice Hall.

MT4007 Marketing Communication

(3.5 - 0 - 12. Prerequisites: [MT4004]. MMT09, MMT09V)

Equivalence: GA00254

This basic course develops the student's innovation, empathy, creativity and critical analysis skills to improve communication between companies and their stakeholders. Knowledge of marketing is required. Learning outcome: the student will create an integral marketing communication program.

General objective: Analyze all the elements that make up an integrated system of marketing communication, in which all organizations should have and organize in order to communicate their market offers to their target markets. These elements are sales promotion, publicity, free publicity, public relations, corporate image, and direct marketing. Establish marketing communication programs in a coordinated and cohesive manner, which enables the organization to communicate its business proposals to its public and also obtain the good will of this public. Study and manage communication tools that currently dominate global commercial relations.

Key words: Public relations. Integrated marketing communication. Advertising. Sales promotion. Corporate image.

Bibliography: * Fill, Marketing Communications: Engagement, Strategies and Practice, Prentice Hall Europe.

MT4008 Commercial Strategies

(3.5 - 0 - 12. Prerequisites: None. MMT09, MMT09V)

Equivalence: GA00255

Es un curso básico en el área de conocimiento de la This basic marketing course provides the student with knowledge related to the merchandise marketing process through the supply chain, as well as the skills to set up and select alternative distribution and marketing channels for merchandise at the final point of sale. Knowledge of marketing is required. Learning outcome: the student will create a marketing strategy project applied to a company.

General objective: Students will be able to design and analyze strategies to evaluate systems for merchandise marketing through the supply chain. They will develop systems to ensure that the goods that are produced or purchased by an organization are available at different points of sale or sales channels at in time, quantity, presentation, and price which is attractive to the client and which allows the financial and customer service objectives of the company to be met. They will analyze the establishment and selection of alternative distribution channels and merchandise marketing at the final points of sale.

Key words: Merchandise distribution and channeling. Distribution decisions associated with transport systems, warehouse, inventory management. Customer service, order cycle and demand forecast. Retailing, types and store formats.

Bibliography: * Ballou, R., Business Logistics and Supply Chain Management, 5th. Edition, Pearson.

MT4009 Brands, Products and Services: Innovation and Management

(3.5 - 0 - 12. Prerequisites: [MT4004]. MMT09, MMT09V)

Equivalence: None

This basic course develops in students the competencies needed to innovate and manage their organization's brands in a sustainable manner. Knowledge of marketing is required. Learning outcome: Students

will develop an innovative concept for a real company.

General objective: Understand the important administration and innovation aspects related to brands of products and services. Be able to apply this knowledge to create an innovative concept for a business.

Key words: Innovation. Brand value. Brand management. Potential market. Situation analysis.

Bibliography: * Keller, Kevin Lane, 1956-, Strategic brand management: Building, measuring, and managing brand equity/Kevin Lane Keller, 3rd. Edition, Upper Saddle River, N. J.: Pearson/Prentice Hall, 2008, [9780131888593 (encuadrado)], [0131888595 (encuadrado)], [9780132336222 (International edition)], [0132336227 (International edition)].

MT4010 Selling and Negotiation Systems

(3.5 - 0 - 12. Prerequisites: None. MMT09, MMT09V)

Equivalence: GA00253

This basic course offers the student a solid foundation in the conceptual preparation of the sales process, using win-win negotiation techniques, capable of solving customers' problems, observing the ethical/legal aspects in his/her sales proposal by differentiating the attributes of the products/service for the development of communication strategies. Knowledge of marketing is required. Learning outcome: the student will be able to apply principled negotiations to any situation, in both major and daily negotiations, and will acquire a methodology in which he/she will develop his/her negotiating skills significantly. He/she will appreciate the sales process as an honorable professional experience, being aware of and accountable for the different steps needed to carry out a professional sale focusing on the buyer.

General objective: On completion of the course, students will be able to develop and perfect their abilities to understand the characteristics and needs of individual and organizational buyers. They will also be able to develop a sales process suited to each

client, in accordance with the organization's sales management systems and procedures.

Key words: Client relationship and ethics. Preparation: communication, prospects, planning the call and presentation. Distributive and win-win negotiation: strategies to distribute and expand market share. Negotiation styles: hard versus soft and principled negotiators. Handling complaints and closing sales. Sales management, sales territories organization and sales forecasting.

Bibliography: * Futrell, Charles M., *Fundamentals of Selling: Customers for Life*, 9th. Edition, McGraw Hill.

MT4011 Strategies of International Marketing Products and Services

(3.5 - 0 - 12. Prerequisites: None. MA 09)

Equivalence: None

This basic marketing course helps the student to understand the global trends in product and service marketing. Knowledge of business administration and marketing is required. Learning outcome: the student will solve cases by constructing and evaluating marketing strategies in a context of competitiveness and globalization.

General objective: Students will be able to understand the importance of commercial marketing in international commerce and of evaluating the cultural, political, and legal factors of the countries involved in order to select the strategy to follow in global business.

Key words: Strategy. International marketing. Distribution channels.

Bibliography: * Rajagopal, *International marketing: Global environment, corporate strategy, case studies*, New Delhi: Vikas, 2007, India, 2007, eng, [8125922962].

MT4013 Marketing Management (3.5 - 0 - 12. Prerequisites: [AD4001]. MGN10V) **Equivalence: None**

The course of Marketing Management has the following intentions: it is an intermediate level course in Marketing, in which the student acquires abilities to handle the main concepts of Marketing; the course requires knowledge of statistics, specifically analysis of market behavior, economic knowledge of consumer behavior and the influence of environmental factors. The course also requires basic knowledge of information technologies administration, as a means of communication or data analysis. The expected outcome is that the student will be able to make market decisions and/or proposing a marketing strategic plan from implementation to evaluation. This course prepares for specialization in other marketing areas, such as market research or administration of distribution channels, among others.

General objective: The course of Marketing Management has been designed to guide participants through the process of decision making focused on the market, using the knowledge acquired in the basic areas of administration. Its objective is for students to learn the characteristics and needs of the client (individuals and organizations), and how to influence their purchasing behavior through strategies and management of marketing concepts and tools, which imply knowing the competitive environment of the industry that the business belongs to, in order to be able to deploy the product or service, brand or business itself.

Key words: Strategies of market and business. Segmentation and added value for the client. Design, development and implementation of market-oriented strategies.

Bibliography: * Best, Roger J., *Market-based management: Strategies for growing customer value and profitability*/Roger J. Best, 5th. Edition, Upper Saddle River, N. J.: Pearson/Prentice Hall, 2009, [9780132336536 (rústica : papel alcalino)].

MT4014 Design of Research Measurement Instruments

(3 - 0 - 12. Prerequisites: None. DCA11)

Equivalence: None

This is a fundamental course aiming that the student learns to design and apply measurement research instruments. It includes complex topics such as large scale surveys and their analysis, computed assisted surveys, and more traditional instruments such as face to face, telephone and electronic mail interviews. It requires previous knowledge on ethics in order to know how to face adverse situations during the data collection and analysis stages. As a learning outcome, it is expected that the student designs and proves the instruments that he will use in his doctoral research work.

General objective: At the end of this course the student should be able to design, apply, interpret and report the results obtained through diverse measurement methods such as surveys and questionnaires. The student will learn survey construction theory, sampling, data gathering techniques, and computational data analysis. The students will practice the process for developing measurement tools and learn to adapt them when they are designed for other cultures, assuring their validity and reliability.

Key words: Measurement. Analysis. Instruments.

Bibliography: * Harkness, J. A., Edwards, B., Braun, M. and Johnson, T. P., Survey Methods in Multicultural, Multinational, and Multiregional Contexts .

MT4015 Multivariate Analysis

(3 - 0 - 12. Prerequisites: None. DCA11)

Equivalence: None

This is a statistics intermediate level course that intends for the student to learn statistical analysis through diverse multivariate tools such as factor analysis, discriminate analysis, analysis of variance, categorical data analysis, regression models, and structural equation modeling among others. This course requires that the student be familiar with the concepts of hypothesis testing, population, sampling, significance, correlation, regression, t-test and others. The learning outcome of this course is that the student should demonstrate his/her knowledge

on multivariate statistics tools through the use of SPSS or SAS statistical software.

General objective: At the end of this course the student will have learned multivariate analysis tools such as regression models, least squares (ANOVA and ANCOVA), correlations analysis, discriminant analysis, MANOVA, factor analysis, path analysis, structural equation modeling, cluster analysis, and linear modeling. The student will have learned to interpret and present the results in the format of a scientific publication.

Key words: Statistics. Analysis.

Bibliography: * Tabachnick, B. G., and Fidell, L. S., Using multivariate statistics , 5th, Boston: Allyn & Bacon.

MT5001 Applied Marketing Project

(3.5 - 0 - 12. Prerequisites: None. MMT09, MMT09V)

Equivalence: None

The marketing capstone course reinforces students' analytical, creative and organizational competencies developed in the previous courses of the program by requiring their application to the completion of a marketing project. This terminal course enhances students' knowledge and skills regarding the requirements for theoretical research or in relation to the operation of the marketing area in a company or institution. Learning outcome: Students will complete a project. This project can follow one of two different tracks: contribute to the solution of a marketing problem in a company or conduct theoretical research that contributes relevant knowledge on an area of marketing.

General objective: Integrate knowledge acquired on Master's in Marketing program by carrying out a project that helps solve a marketing problem in a company or contributes important knowledge to the marketing discipline.

Key words: Project management. Strategy. Innovation. Situation analysis. Market research.

Bibliography: * Schmelkes, Corina, Manual para la presentación de anteproyectos e informes de in-

vestigación: Tesis/Corina Schmelkes, 2da. Edición, México, D. F.: Oxford University Press México, 1998, México, 1998, español, [9706133542].

MT5005 Strategic Marketing Planning
(3.5 - 0 - 12. Prerequisites: None. MMT09, MMT09V)
Equivalence: None

This is an advanced course in marketing planning and strategy. Previous knowledge of marketing topics is required. As a learning outcome, the student will apply the marketing tools, concepts, principles, and theories to practical business situations in order to make effective marketing decisions. On completion of this course, the student will develop a strategic marketing plan for a company.

General objective: The objective of this course is to promote the students' ability to develop, analyze, and communicate marketing strategies that help companies to develop a sustainable competitive advantage, through value creation for its customers. The student will: understand the sources that generate competitive advantage through marketing strategies; develop suitable value propositions; understand the strategy's implementation process; understand the process of planning and evaluation of marketing strategies, aligning the organization to the market; and apply basic ethical values according to the Marketing code of ethics.

Key words: Strategic analysis. Marketing strategies. Strategic capacities and leadership. Strategy creation.

Bibliography: * Subhash C. Jain, Marketing: Planning & Strategy, 7, Thompson.

MT96306 Advanced Marketing Management
(3 - 0 - 12. Prerequisites: [EC96300]. MDE09)
Equivalence: None

General objective: Critical linkages exist between the company and its environment, particularly customer issues in analyzing market opportunities. Developing and implementing marketing strategies for manufacturing and service entities for global markets are studied.

NB

Basic Core for Graduate Programs in Public Administration

NB4001 Basic Core for Graduate Programs in Public Administration

(3 - 0 - 12. Prerequisites: None. MAP09, MDI09, MPE09)

Equivalence: None

The aim of this hallmark course is for the student to examine systematically the normative implications of ethical values related to the theme of leadership dealt with in classical and current texts on philosophy, politics and social sciences. No prior knowledge is required, but a diligent examination of course reading material and complementary texts, which offer a multidisciplinary panorama of leadership and ethics, is necessary. Learning outcome: the student will use conceptual tools to critically analyze real leadership and ethics case studies in the public and private spheres and in civil society, as well as to design strategies promoting efficient and ethical leadership whose objective is the common good.

General objective: The success of a leader rests frequently on his or her ability to handle conflicts and to create sustainable coalitions that lead to the common goals of the organization. In order to develop leadership skills, in the first part of this course, the student will apply analytical tools and concepts related to social psychology, organizational behavior and administrative conflicts. During the second part of the course, the ethic responsibility of public authorities in democratic societies will be examined. It also explores topics as the meaning of moral in leadership, the value of personal conscience in making public decisions; and the management of value conflicts.

Key words: Ethics. Transformative leadership. Transactional leadership. Corporate social responsibility.

Bibliography: * Confucius [K'ung Fu Tzu], *The Analects*, Simon Leys, W. W. Norton, 1997.

NB4002 Civil Society and Government(3 - 0 - 12. Prerequisites: None. MAP09)

Equivalence: None

This is a basic course with the educational aim of familiarizing the student with the mechanisms, actions and processes through which democratic practices are generated, both by citizens and the rest of society's actors involved in the construction of public affairs. No prior knowledge is required. Learning outcome: it is hoped that the student will understand the different mechanisms, advantages and conflicts generated in society by involving different actors, among them civil society, in the formulation, design, implementation and evaluation of public policy processes.

General objective: In order to conduct an effective policy action in government and civil society, both public managers and social leaders must assume a strong leadership; develop his negotiation capacity and the skill for policy making. The first part of this course provides the student with diagnostic skills, interpersonal capabilities and intervention capacity. The section is intended to foster the student's policy making skills. The second part of the course studies civil society as political, economic and social actors. After a theoretical revision, the section reviews the problematic of the civil society as a sector; its relationship with government and the private sector; and its role to identify, shape and formulate public policies.

Key words: Public politics. Civil society. The problem of governability. Negotiation capacity. Democracy and citizen participation. Social control and transparency.

Bibliography: Edited by Robert D. Putnam, *Democracies in flux: The evolution of social capital in contemporary society*, Oxford; New York: Oxford University Press, 2002, New York, 2002, eng, [0195150899 (cloth : alk. paper)].

NB4003 Political System and Public Administration in Mexico

(3 - 0 - 12. Prerequisites: None. MAP09)

Equivalence: P 99101

Este es un curso de nivel básico y tiene la intención This is a basic course allowing the student to analyze the main government institutions and actors on the Mexican political stage from a theoretical perspective. No previous knowledge is required apart from completing the course readings with a critical mind cast. Learning outcome: the student will develop tools to explore, classify and evaluate information on public policy and administration.

General objective: This course takes students right into the real life issues concerning public administration and public policies in Mexico. Through the understanding of theoretical perspectives, it analyzes the nature and the processes of the political and organizational environments. During the course, students will face issues concerning the three levels of government, and will be asked to work on potential solutions to specific problems.

Key words: Democratic-liberal reconfiguration of the state. Theory of the state. The modern state.

Bibliography: Woldenberg, José, La construcción de la democracia/José Woldenberg, 1era. Edición, México, D.F.: Plaza y Janés, 2002, México, 2002, español, [9681105699].

NB4004 Quantitative Methods Applied to Social Sciences

(3 - 0 - 12. Prerequisites: None. MAP09)

Equivalence: None

This is a basic course intended to familiarize the student with the use given to the main techniques of statistical analysis in social research. The course requires prior knowledge of how to use an Excel spreadsheet and ample willingness to complete the set exercises for each class. Learning outcome: it is hoped that the student will carry out the quantitative analysis of social phenomena with critical and methodological rigor. The student will also apply tools to explore,

classify and evaluate information about public policy and administration.

General objective: The goal of this course is to develop the student's ability for quantitative reasoning applied to relevant social, economic and demographic information within the field of public policy. At the end of the semester, the student will be able to handle a set of different statistical tools which may be applied to the understanding of distinct data sets, thus obtaining a "hands on" training on the empirical analysis of real life problems.

Key words: Quantitative reasoning of economic, social, and demographic information. Statistical modeling in order to analyze the economic and social reality. Construction of indicators. Public politics.

Bibliography: * Stock, James H., Introduction to econometrics/James H. Stock, Mark W. Watson, Boston, MA : Addison Wesley, 2003, [201715953].

NB4005 Legal Research and Writing in English

(3 - 0 - 12. Prerequisites: None. MDI09)

Equivalence: None

This basic level course will analyze the most relevant concepts in law, such as natural law, positivist, analytical and sociological theories, as well as the modern critical school, and other perspectives from contemporary legal trends for an integral and interdisciplinary understanding of the philosophy of law. Topics related to legal methodology and quantitative methods from the social sciences, which can contribute to the analysis of legal problems, will be covered. Also included will be the topics of formal and deontic logic and the theory of legal argumentation, epistemological models and scientific method based on conceptualizing operations and legal pragmatics. Legal interpretation and hermeneutics are relevant topics which will also be studied. Learning outcome: the student will acquire basic tools in the theory of law which will allow him to carry out legal analysis, as well as developing and discussing the project for his thesis. For this course no prior knowledge is required.

General objective: This course offers the necessary knowledge for the comprehension of the relevant

concepts and the appropriate conduction of legal research and writing in English. The diverse forms of legal writing in English will be analyzed, and practiced in order to improve the student's skills in this area. Also, the course offers a comparison of research methods and forms of legal reasoning. The student will be required to draft different legal documents during the course, including in them the appropriate logical reasoning and the suitable format.

Key words: Contemporary legal currents. Legal interpretation. Legal methodology.

Bibliography: Caracciolo, Ricardo A., El sistema jurídico: Problemas Actuales, Centro de Estudios Constitucionales, Madrid, español.

Key words: Ethics. Transformative leadership. Transactional leadership. Corporate social responsibility.

Bibliography: * Thiroux, Jacques P., Ethics: Theory and practice, 8th. Edition, Upper Saddle River, N. J.: Pearson Education, 2004, New Jersey, 2004, eng, [0131830023 (alk. paper)].and practice, 8th. Edition, Upper Saddle River, N. J.: Pearson Education, 2004, New Jersey, 2004, eng, [0131830023 (alk. paper)].

NB4006 Leadership and Ethics in Public Administration

(3.5 - 0 - 12. Prerequisites: None. MGP09V)

Equivalence: None

The aim of this hallmark course is for the student to examine systematically the normative implications of ethical values in the theme of leadership dealt with in classical and current texts on philosophy, politics and social sciences. No previous knowledge is required, but a diligent examination of course reading material and complementary texts, which offer a multidisciplinary panorama of leadership and ethics, is necessary. Learning outcome: the student will use conceptual tools to critically analyze real leadership and ethics case studies in the public and private spheres and in civil society.

General objective: General objective: The objective of this course is to incorporate ethical issues into the public servant's performance at the local government's level, beginning from an honest and clear exercise of governmental activities. This course's intent is to strengthen the student's skills to perform with an effective leadership and be able to implement changes in the subnational governmental organizations. Specific cases in which ethics and integrity play a major role in the decision making processes in the public sector are analyzed.

NI International Business

NI4006 International Trade (1.5 - 0 - 6. Prerequisites: None. MNL11V) Equivalence: EI4011

This is a basic course that does not require prior knowledge. As a learning result, the student will be able to determine the reasons for trading in a business and the instruments available for international trade policy, such as GATT and WTO, and to solve related problems.

General objective: At the end of this course, students will be able to understand the benefits and challenges of international business undertakings and the multilateral trade system. Contents included are: business ratios, trade theories, international trade policy instruments, General Agreement of Trade and Tariffs (GATT), and the World Trade Organization.

Key words: International finance. International trade. International business. Finance.

Bibliography: * Krugman, Paul R., International economics: Theory and policy/Paul R. Krugman, Maurice Obstfeld, 8th. Edition, Boston, Mass.; México: Pearson/Addison-Wesley, c2009, [0321493044], [9780321493040].

NI5001 Global Business Leadership for the 21st Century (3.5 - 0 - 12. Prerequisites: None. MNL11V) Equivalence: NI98239

This is an advanced course in international business, where students analyze different key variables which will allow them to manage a global corporation. Key elements include globalization of political and economic systems and businesses. Requires knowledge of a number of tools to interact in distance education. As a learning result, the student is expected to participate in debates relative to political, social, economic, and ethical issues that influence decision-making in 21st century businesses, and prove his leadership skills by directing a project dealing with the solution of current issues.

General objective: Students will be able to discuss complex situations that organizations face nowadays from a managerial viewpoint, as well as to debate political, social, economic, and ethical issues that have a bearing on current business decision-making; and propose ideas that are innovative, creative, and appropriate to the daily situations faced by business organizations.

Key words: Leadership. Strategy. International business.

Bibliography: * Balaam, David N., 1950-, Introduction to international political economy/David N. Balaam, Michael Veseth, 4th. Edition, Upper Saddle River, N. J.: Pearson/Prentice Hall, c2008, [9780136155638],[0136155634].

NI5002 International Business Interim Seminar

(1.5 - 0 - 6. Prerequisites: None. MNL11V) Equivalence: None

This advanced course of international business has the aim that the student acquires a hands-on view of international businesses by residing abroad. Requires prior knowledge of international business. As a learning product, the student is expected to prepare a report on the business environment in a country other than his own.

General objective: At the end of this course, students will be able to understand the chief aspects of the international business environment in other countries. The following contents will be included: guided visits to foreign and domestic firms, keynote lectures by business executives and internationally renowned scholars.

Key words: International trade. International relations. International business. International experiences.

Bibliography: * Fishman, Ted C., 1958-, China, Inc.: How the rise of the next superpower challenges America and the world/Ted C. Fishman, 1st. Edition, New York: Scribner, 2006, [9780743257350 (rústica)], [0743257359 (rústica)].

NI5003 Latin American Business Leadership for the 21st Century

3.5 - 0 - 12. Prerequisites: None. MNL11V)

Equivalence: NI98246

This is an advanced, intensive seminar-type course in leadership and strategy. Requires knowledge of marketing and strategy. The student will solve current case studies, face conflict simulations, and participate in discussions under group dynamics approaches moderated by an expert. As a learning result, the student will be expected to identify and apply the new 21st-century leadership trends in business situations.

General objective: At the end of this course, students will be able to make informed decisions that contribute to the permanence of a business group through time in a multinational competition context, by adding value for the different interest groups. For this purpose, they will analyze and synthesize information relevant to the business environment and submit strategic proposals to gain preference for the business group in relevant markets.

Key words: Leadership. Social responsibility. International business. Multinational competency.

NT Nanotechnology

NT5011 Thesis I

(3 0 12. Prerequisites: None. MNT16)

Equivalence: None

It is a graduate research course designed to instruct students to develop and report progress of the research project showing the domain specific knowledge area and appropriate to the Masters level. In addition, during the course the student will participate in the activities of the program seminar and submit a timetable of activities and deliverables for the development of his/her thesis. As a result of learning the student will acquire the skills to build a thesis proposal in which the research question, hypothesis and objectives are specified.

General objective: On completion of the course, students will be able to develop a thesis proposal in writing, specifying the research question, hypothesis and objectives.

Key words: Objectives: Thesis. Hypothesis. Thesis Proposal. Research Question.

Bibliography: * Michael P. Marder, Research Methods for Science, First Edition, Cambridge University Press.

NT5012 Thesis II

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course for a Master degree designed for the student to gather experimental data for his/her research. In addition, the student will participate in the research seminar of the program. As a learning outcome, the student must present the gathered data, as well as a preliminary analysis for the development of the thesis.

General objective: On completion of the course, students will be able to have data gathered for the thesis and a preliminary analysis of such data.

Key words: Data analysis. Thesis. Experimentation. Experimental Data. Data Gathering Techniques.

Bibliography: * Bock, Peter, 1941 , Getting it right : R & D methods for science and engineering / Peter Bock ; illustrations by Bettina Scheibe., San Diego : Academic Press, c2001., [9780080491370 (electronic bk.)],[0080491375 (electronic bk.)],[0121088529],[9780121088521].

NT5013 Thesis III

(3 0 12. Prerequisites: None. MNT16)

Equivalence: None

It is a graduate research course for a Master degree designed to enable the student to write the Master's thesis. In addition, the student will present his/her research results before the audience of the research seminar of the program. As a learning outcome, the student must present and defend his/her Master's thesis.

General objective: On completion of the course, students will be able to have the thesis in written and defend it before the committee.

Key words: Thesis. Presentation of results. Thesis Writing. Presentation of Conclusions. Defense before Committee.

Bibliography: * A.K. Haghi , Research progress in nano and intelligent materials, Apple Academic Press.

NT6021 Guided Research I

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course intended for the student, guided by the professor, to study the specific topics that contribute on the preparation of his line of research. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present evidence of learning on the topic of the line of research assigned.

Key words: Scientific Research. Line of Research. Scientific Topics. Scientific Training. Topic Guidance.

Bibliography: * Lin, Zhiquan, 1972 , Evaporative Self assembly of Ordered Complex Structures [recurso elctr@dnico], Singapore : World Scientific, 2012., [9789814304696 (electronic bk.)],[9814304697 (electronic bk.)],[9789814304689],[9814304689].

NT6022 Guided Research II

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course intended for the student, guided by the professor, to study the specific topics that contribute on the preparation of his line of research. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present evidence of learning on the topic of the line of research assigned.

Key words: Scientific Research. Line of Research. Scientific Topics. Scientific Training. Topic Guidance.

Bibliography: * Lin, Zhiquan, 1972 , Evaporative Self assembly of Ordered Complex Structures [recurso elctr@dnico], Singapore : World Scientific, 2012., [9789814304696 (electronic bk.)],[9814304697 (electronic bk.)],[9789814304689],[9814304689].

NT6025 Integrated Exam

(1.5 0 6. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate course intended for the student to develop a written report that integrates his/her research abilities and present a written exam before the Integrated Examination Committee. As a learning outcome the student will present the integrated exam that will permit him/her to continue with the following research work in the program.

General objective: On completion of this course, the student will be able to integrate his/her acquired

knowledge that allows him/her to continue the research work.

Key words: Scientific Training. Research Line. Knowledge Exam. Research Abilities. Integrated Examination Committee.

Bibliography: * Thomas J. Webster , Nanomedicine: technologies and applications, Woodhead Pub.

NT6031 Research Proposal I

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate course intended to allow the student to define his/her proposal for a doctoral research project and to publically present his/her progress in a collective discussion context. Furthermore, preliminary results will be defined as evidence for the proposal's viability. As a learning outcome it is expected that the student will start to plan for a project.

General objective: On completion of this course, the student will be able to define the development of his research project, advised by a research professor and submitting progress reports periodically.

Key words: Research proposal. Methodological framework. Research questions. Theoretical framework. Research Objectives.

Bibliography: * Juyoung Kim , Advances in nanotechnology and the environment, Pan Stanford.

NT6032 Research Proposal II

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate course intended to allow the student to finish his/her proposal for a doctoral research project and to publically present his/her progress in a collective discussion context. Furthermore, preliminary results will be defined as evidence for the proposal's viability. As a learning outcome it is expected that the student will finish to plan for a project.

General objective: On completion of this course, the student will be able to define the development of his research project, advised by a research professor and submitting progress reports periodically.

Key words: Research proposal. Methodological framework. Research questions. Theoretical framework. Research Objectives.

Bibliography: * Magnetic nanostructures : spin dynamics and spin transport / Hartmut Zabel, Michael Farle, eds., Heidelberg ; New York : Springer, c2013., [9783642320415],[3642320414].

NT6035 Research Proposal Defense

(1.5 0 6. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate course intended for the student to develop and present his doctoral research proposal to the thesis committee. As a learning outcome the student will present the proposal that will lead the following research work.

General objective: On completion of this course, the student will be able to integrate his(her) doctoral research proposal that will be the base for his(her) dissertation work.

Key words: Thesis committee. Scientific Research. Scientific Training. Research Line. Research Topics.

Bibliography: * Nanoelectronics and information technology : advanced electronic materials and novel devices / Rainer Waser (ed.), 2nd, corr. ed., Weinheim : Wiley VCH, c2005., [9783527405428 (alk. paper)],[3527405429 (alk. paper)].

NT6041 Research Integration I

(1.5 0 6. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course intended for the student to integrate in evidential documents the development of his academic research experience. As a learning outcome the student will present the needed documentation to a committee defined by the academic program.

General objective: On completion of this course, the student will be able to integrate his(her) research work with evidential documents.

Key words: Scientific Research. Scientific Product. Digital Portfolio. Scientific Database. Interaction Networks and Collaboration.

Bibliography: * Shatkin, Jo Anne., Nanotechnology : health and environmental risks / Jo Anne Shatkin., Boca Raton : CRC Press/Taylor & Francis Group, c2008., [9781420053630 (encuadernado : papel alcalino)],[1420053639 (encuadernado : papel alcalino)].

NT6042 Research Integration II

(1.5 0 6. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course intended for the student to integrate in evidential documents the development of his academic research experience. As a learning outcome the student will present the needed documentation to a committee defined by the academic program.

General objective: On completion of this course, the student will be able to integrate his(her) research work with evidential documents.

Key words: Scientific Research. Scientific Product. Digital Portfolio. Scientific Database. Interaction Networks and Collaboration.

Bibliography: * Manipulation of nanoscale materials [electronic resource] : an introduction to nanoarchitectonics / edited by Katsuhiko Ariga., Cambridge, U.K. : Royal Society of Chemistry, 2012., [9781849735124 (electronic bk.)],[1849735123 (electronic bk.)],[1849734151].

NT6101 Doctoral Research I (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to start the student's doctoral research through his work and the feedback on his research proposal, according to the work plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research proposal. Research Progress. Work Plan. Doctoral Thesis. Scientific Research.

Bibliography: * Michele Ciofalo, Michael W. Collins, Tom R. Hennessy, Nanoscale fluid dynamics in physiological processes : a review study. Southampton, WIT Press, Inglés.

NT6102 Doctoral Research II (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to start the student's doctoral research through his work and the feedback on his research proposal, according to the work plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research proposal. Research Progress. Work Plan. Doctoral Thesis. Scientific Research.

Bibliography: * Nanotechnology : integrated processing systems for ultra precision and ultra fine products / edited by Norio Taniguchi., Oxford [England] ; New York : Oxford University Press, 1996., [0198562837].

NT6103 Doctoral Research III (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Chemistry of advanced materials : an overview / edited by Leonard V. Interrante and Mark J. Hampden Smith., New York : Wiley VCH, c1998., [0471185906 (tela : papel ácido)].

NT6104 Doctoral Research IV (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Lampton, Christopher, Nanotechnology playhouse: building machines from atoms, Waite Group Press, Inglés.

NT6105 Doctoral Research V (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. At this stage, a decision should be made whether to change the research plan or continue as it is. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Nanotechnology : molecular speculations on global abundance / edited by B.C. Crandall, Cambridge, Mass. : MIT Press, c1996., [0262032376 (hc : alk. paper)], [0262531372 (pb : alk. paper)].

NT6106 Doctoral Research VI (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. At this stage, a decision should be made whether to change the research plan or continue as it is. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Köhler, J.M., Mejevaya, T., Saluz, H.P., Microsystem technology: a powerful tool for biomolecular studies, Birkhäuser Basel, Inglés.

NT6107 Doctoral Research VII (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Future trends in microelectronics / edited by Serge Luryi, Jimmy Xu, Alex Zaslavsky., New York : Wiley, 1999., [0471321834 (alk. paper)].

NT6108 Doctoral Research VIII (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee and the advisor according to the research plan. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Du Charme, Wesley M. , Becoming immortal: nanotechnology, you, and the demise of death, 1st ed. , Blue Creek Ventures;, Inglés.

NT6109 Doctoral Research IX (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers in their review of scientific articles. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Harvey C. Hoch, Lynn W. Jelinski, Harold G. Craighead. , Nanofabrication and biosystems: integrating materials science, engineering, and biology, Cambridge University Press, Inglés.

NT6110 Doctoral Research X (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers in their review of scientific articles. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Future trends in microelectronics / edited by Serge Luryi, Jimmy Xu, Alex Zaslavsky., New York : Wiley, 1999., [0471321834 (alk. paper)].

NT6111 Doctoral Research XI (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to continue the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers in their review of scientific articles. As a learning outcome, the student must present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the creation of scientific products and the construction of the doctoral thesis.

Key words: Research Progress. Work Plan. Doctoral Thesis. Scientific Research. Scientific Products.

Bibliography: * Nelson, Max , The potential of nanotechnology for molecular manufacturing, Rand, Inglés.

NT6112 Doctoral Research XII (3 0 12. Prerequisites: None. DNT16) **Equivalence: None**

It is a graduate research course intended to finish the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers. As a learning outcome, the student must present relevant research progress for the completion of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the completion of the doctoral thesis.

Key words: Work Plan. Doctoral Thesis. Scientific Research. Scientific Products. Completion of Thesis.

Bibliography: * Rietman, Edward A., Molecular engineering of nanosystems / Edward A. Rietman., New York : Springer, 2001., [0387989889 (alk. paper)].

NT6113 Doctoral Research XIII

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course intended to finish the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers. As a learning outcome, the student must present relevant research progress for the completion of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the completion of the doctoral thesis.

Key words: Work Plan. Doctoral Thesis. Scientific Research. Scientific Products. Completion of Thesis.

Bibliography: * Hordeski, Michael F., HVAC control in the new millennium / by Michael F. Hordeski., Lilburn, GA : Fairmont Press, 2001., [0881733997 (electronic bk.)],[9780881733990 (electronic bk.)],[0881733393],[9780881733396],[0130600822 (PH)],[9780130600820 (PH)],[0824755871 (electronic bk.)],[9780824755874 (electronic bk.)],[0203912764],[9780203912768],[9780824709150].

NT6114 Doctoral Research XIV

(3 0 12. Prerequisites: None. DNT16)

Equivalence: None

It is a graduate research course intended to finish the student's doctoral research through his work and the feedback on his research by the thesis committee, the advisor and a possible feedback from peers. As a learning outcome, the student must present relevant research progress for the completion of the doctoral thesis.

General objective: On completion of this course, the student will be able to present relevant research progress for the completion of the doctoral thesis.

Key words: Work Plan. Doctoral Thesis. Scientific Research. Scientific Products. Completion of Thesis.

Bibliography: * Bharat Bhushan, Fundamentals of tribology and bridging the gap between the macro and micro/nanoscales, Kluwer Academic Publishers, Inglés.

NT6120 Doctoral Defense

(0 0 1. Prerequisites: None. DNT16)

Equivalence: None

This is the last course of the graduate program and is intended for the student to present the doctoral research developed during his doctoral program to the thesis committee. As a learning outcome the student will present the proposal of his thesis to the thesis committee.

General objective: On completion of this course, the student will be able to demonstrate researcher skills through the defense of his doctoral thesis.

Key words: Thesis committee. Doctoral thesis. Scientific Research. Scientific Training. Research Results.

Bibliography: * Societal implications of nanoscience and nanotechnology : NSET workshop report / editor Mihail C. Roco, William Sims Bainbridge., Dordrecht ; Boston, MA : Kluwer Academic Publishers, 2001., [079237178X (alk. paper)].

OP Electives

OP4000 Quality Development Course
(1.5 0 6. Prerequisites: None. MCC16I, MNT16)
Equivalence: None

General objective: Core course

OP4036 Quality Development Course
(3.5 0 12. Prerequisites: None. MEM16)
Equivalence: None

General objective: Core Course

OP5042 Elective I
(3 0 12. Prerequisites: None. MCC16I, MNT16)
Equivalence: None

General objective: Elective I

OP5043 Elective II
(3 0 12. Prerequisites: None. MCC16I, MNT16)
Equivalence: None

General objective: Elective II

OP5044 Elective III
(3 0 12. Prerequisites: None. MCC16I, MNT16)
Equivalence: None

General objective: Elective III

OP5045 Elective IV
(3 0 12. Prerequisites: None. MCC16I, MNT16)
Equivalence: None

General objective: Elective IV

OP5053 Elective I
(3.5 0 12. Prerequisites: None. MEM16)
Equivalence: None

General objective: Elective I

OP5054 Elective II
(3.5 0 12. Prerequisites: None. MEM16)
Equivalence: None

General objective: Elective II

OP5055 Elective III
(3.5 0 12. Prerequisites: None. MEM16)
Equivalence: None

General objective: Elective III.

OP5056 Elective IV
(3.5 0 12. Prerequisites: None. MEM16)
Equivalence: None

General objective: Elective IV

OP5053 Elective I
(3.5 0 12. Prerequisites: None. MAF15)
Equivalence: None

General objective: General objective: Elective I.

OP5053 Elective II
(3.5 0 12. Prerequisites: None. MAF15)
Equivalence: None

General objective: General objective: Elective II.

OP5053 Elective III
(3.5 0 12. Prerequisites: None. MAF15)
Equivalence: None

General objective: General objective: Elective III.

OP5062 Elective I

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective I.

OP5063 Elective II

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective II.

OP5064 Elective III

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective I.II

OP5065 Elective IV

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective IV.

OP5066 Elective V

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective V.

OP5067 Elective VI

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective VI.

OP5068 Elective VII

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective I.

OP5069 Elective VIII

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective I.

OP5070 Elective IX

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective IX.

OP5071 Elective X

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective X.

OP5071 Elective XI

(3 0 12. Prerequisites: None. DEE15)
Equivalence: None

General objective: Elective XI.

OR Organization

OR00204 Administration

(3 - 0 - 12. Prerequisites: None. MTI081)

Equivalence: AD4016, OR95204, OR98204, OR99204

General objective: The objectives of this course are: to understand the different schools of management thinking and its trends; to learn, establish and analyze the management process and each of its stages from an integral perspective; to identify, describe and analyze the functional areas of modern corporations.

Bibliography: * Daft, Richard L., Management , 4th. Edition, Fort Worth: Dryden Press, c1997, [30179890].

OR96205 Strategic Management

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: GA00334

General objective: The creation and maintenance of long-term vision requires the determination of strategic direction and management of this process. In so doing, it is vital to achieve an analysis of those features of business that facilitate strategic change. This analysis is to be presented through six themes aimed at the development of corporate management.

Bibliography: * Davis & Newstrom, Comportamiento Organizacional en el Trabajo, Décima edición (corregida), Editorial Mc Graw Hill, México, 1999

OR96206 Topics in the Legal Environment

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: None

General objective: Dispute resolution and a fundamental knowledge of legal systems of the U.S. and Mexico are studied in order to lay the groundwork for understanding the constitutional basis for government regulation of business in these two nations. Commercial law, liability concepts, and international legal concepts are presented to augment a clearer understanding of the North American Free Trade Agreement.

OR96207 Corporate Diversification and Renewal

(3 - 0 - 12. Prerequisites: [OR96205]. MDE09)

Equivalence: None

General objective: The management of diversification, growth, and renewal from the perspective of the general manager drives this course towards strategies that fit changing global markets. How firms achieve this process via internal development, acquisitions, strategic alliances, learning, bench marking, and moving to best practices is delineated.

OR96208 Emerging Issues in Global Management

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: None

General objective: This is the capstone course of the EMBA Mexico curriculum. It consists of five segments, each covering a current topic of special importance in global management. These topics are International Finance, International Trade, Negotiation, Reengineering, and Ethical and Corporate Values.

Q

Chemistry

Q4001 Thermodynamics of Materials**(3 0 12. Prerequisites: None. MNT16)****Equivalence: None**

This is a basic graduate course in the area of materials with the intention is to achieve in the student his ability to apply thermodynamics to the description of the behavior of mixtures, reacting systems and materials, based on concepts such as chemical potential, fugacity, activity and equilibrium. It requires prior knowledge of differential and integral calculus, thermodynamics and materials science. As learning outcome the student will know the necessary thermodynamic functions that allow the thermodynamic analysis of processes and systems in equilibrium and will be able to interpret and construct phase diagrams of systems of two and three components. He(She) will also have a clear understanding of the connection between the microscopic and macroscopic properties of simple systems using the basic concepts of Statistical Thermodynamics.

General objective: AAfter completing the course the student will be able to:

- Use the fundamental principles of thermodynamics to analyze the spontaneity of processes and equilibrium state of materials, mixtures , reaction systems and electrochemical systems.
- Interpret and build phase diagrams with applications in the description of materials.
- Relate the macroscopic and microscopic aspects from his(her) knowledge of statistical mechanics.

Frases temáticas: Diagramas de fase. Termodinámica estadística. Termodinámica. Equilibrio. Sistemas reaccionantes.

Key words: * Phase diagrams. Statistical thermodynamics. Thermodynamics. Equilibrium. Reaction Systems.

Bibliography: * Lupis, C. H. P., Chemical thermodynamics of materials / C. H. P. Lupis., Englewood Cliffs, N. J. : Prentice Hall, c1983., [0130502383 (pbk.)].

RE Strategic Prospective

RE4000 Introduction to Strategic Prospective

(3 - 0 - 12. Prerequisites: None. MPE09)

Equivalence: RE4002

This basic level course provides the student with a vision of strategic and future studies as a discipline for the decision making process. The importance and validity of future studies in different areas of knowledge are emphasized. Learning outcome: through readings, essays and debate, the student will familiarize himself with the epistemology of future studies, examine its different schools and reflect on the future as an object of study. Finally, he will explore the role of future studies in the decision making process, using quantitative and qualitative information, and acquire a general panorama of future studies tools.

General objective: Understand the vision of strategic future studies as a discipline for the decision making process. Promote forward and strategic thinking through the examination of theoretical concepts and practical applications.

Key words: Prospective. Prospective thinking. Strategic thinking.

RE4010 Global Vision and World Trends

(3 - 0 - 12. Prerequisites: None. MPE09)

Equivalence: RE4003

This basic level course allows the student to understand the global system as a totality which develops and is modified through history. A global vision of the evolution of the international system allows us to predict its future and foresee systemic changes using theoretical models. Learning outcome: through case studies, the student examines major world trends to contrast them with national ones, reflecting on the so-called factors of change. A global vision is fostered in the student and the course reflects on the possible position of world powers by the year 2025, and on the importance of non-state actors in the transfor-

mations of the planet. No previous knowledge is required for admission to the course.

General objective: Study the main megatrends from a multidimensional point of view. Identify, analyze and reflect on the implications of domestic and global megatrends in the economic, social, political, technological, energetical, business, cultural and environmental spheres. Analyze the role of science and technology as an example of a factor influencing major changes in the world. Analyze the impact of megatrends in three areas of human activity: the state, organizations and society.

Key words: Megatrends. Global vision. Multidimensionality.

RE4011 Prospective Methods

(3 - 0 - 12. Prerequisites: [RE4000 , RE4010]. MPE09)

Equivalence: RE4005

This basic course gives the student the theoretical-methodological knowledge of strategic and future prospective scenarios studies, applying tools from this discipline to complex problems which will allow them to analyze and consider different possible future scenarios and decide on a desired outcome in their area of competence. Learning objective: the student will carry out an applied investigation through the instrumental use of specialized software, in which they will understand and learn how to use tools of future prospective analysis such as Marc Giget's competence trees, the FODA matrix, the Delphi technique, Mactor, IGO, morphological analysis, structural analysis, cross impact analysis and SMIC.

General objective: Understand and apply different future prospective studies' tools. Analyze and consider different possible futures and decide on desirable best choice scenario. Practice the concepts learned with specialized software.

Key words: Prospective methods. Future design and decision making.

RE4012 Strategic Planning**(3 - 0 - 12. Prerequisites: [RE4000 , RE4010]. MPE09)****Equivalence: RE4007**

This basic course adopts the perspective of senior management and emphasizes the roles, abilities and functions that a senior manager must have and use. The course aims to develop knowledge applicable and instrumental to the implementation of planning processes with a strategic vision in the private, public and non-governmental sectors, supported by different schools of planning. Learning outcome: through theoretical and case studies, the student analyze and diagnose organizational problems at different levels and develop solutions for these. They also acquire technical and instrumental abilities to develop strategic planning processes.

General objective: Learn the concepts and principles used by directors to diagnose strategy. Get to know and use tools to analyze institutions and identify opportunities and threats. Know the different organizational models for strategy implementation. Develop solutions and strategies for the organization's problems.

Key words: Leadership. Strategic planning. Strategic vision.

RE4013 Forecast Methods for Time Series**(3 - 0 - 12. Prerequisites: None. MPE09)****Equivalence: RE4004**

This basic level course equips the student with statistical and econometric methodological elements to project temporary series. Learning outcome: the student will produce forecasts through the practical application of E-views econometric software in the three most traditional fields of quantitative forecast analysis: time series softening and decomposition methods, regression and econometric methods and Box-Jenkins time series methods.

General objective: Study and apply methods of quantitative prognosis for time series. Practice the concepts learned with specialized software.

Key words: Time series. Projection. Forecasting.

Bibliography: * Michael P. Clements y David F. Hendry, A companion to economic forecasting , Blackwell Publishers.

RE4014 Scenario Modeling**(3 - 0 - 12. Prerequisites: [RE4000 , RE4010]. MPE09)****Equivalence: RE4006**

A basic course which enables the student to make practical and instrumental use of future studies through an understanding of the dynamics of a complex phenomenon in institutions and/or organizations, the modeling of complex decision making processes and the formulation of strategy and policy scenarios. Learning outcome: the student acquires the basic knowledge and the tools to model, in a holistic approach, the complexity of systems and their interactions. In addition, he will develop future studies models of a sectorial, territorial, business, governmental, urban and environmental nature through the use of dynamic simulation software for complex and dynamic systems (iThink, Simcity).

General objective: Adequately apply the Systems Thinking paradigm to the representation and modeling of the behaviors of organizations, industries and their ecosystems. Develop a simulation project for a real and highly complex phenomenon, applying the concepts of systems thinking and system dynamics simulation modeling. Practice the concepts learned with specialized software.

Key words: Scenarios. Modeling. Simulation. Systems.

Bibliography: * Senge P., The 5th. Discipline.

RE5001 Applied Research Project**(3 - 0 - 12. Prerequisites: [RE4004 , RE4005]. MPE09)****Equivalence: RI99200**

The aim of this advanced course is for students to write a dissertation or research project using theoretical and methodological tools from the discipline

that corresponds to their line of research. The project must integrate the knowledge acquired during the master's program. Learning outcome: Students will compile pertinent information, analyze a specific problem and integrate the findings in a project that offers alternative solutions.

General objective: During this seminary, the student will apply the knowledge acquired during the master's studies to real-life situations, originated in an institution related to the public or private sector. The student will assume the role of "consultant" while "working" for the institution by presenting sustainable solutions to the "client's" problems. This process is lead and monitored by EGAP professors and its orientation and theoretical foundation will be in accordance with the program to which the student belongs.

RH Human Resources

RH4000 Leadership and Organizational Behavior

3.5 - 0 - 12. Prerequisites: [AD4001 , AD4002 , FZ4000],[AD4016]. EEN13, MBA09, MBA09G, MGN10V)

Equivalence: GA00233, GA5074, SI00227

It is a basic course in subject area of human resources which intends to emphasize the importance of directing and leading human processes to ensure the competitive advantage of organizations and provides cutting-edge approaches to increase individual and group performance. This course requires previous knowledge of statistics, financial accounting and economy. As learning outcome the student will be able to resolve cases and exercises in which he recognizes the importance of understanding the people to impact the organization's performance.

General objective: Students will be able to know the importance of understanding people and direct their efforts to impact individual, group and organizational performance, as well as become aware that human resources can be a competitive advantage for the organization. The student will also be sensitive to the fact that through a work environment based on ethical leadership and organizational justice can achieve commitment (loyalty and retention) of people in the organization. Finally, the student will be able to diagnose, analyze and assess the situation and the business environment in order to apply the best model of direction and motivation for the situation.

Key words: Leaders, their followers and the context. Teamwork and effectiveness. Power, negotiation and conflict management. Organizational change. Organizational behavior in an international context.

Bibliography: * McShane, Steven Lattimore, Organizational behavior/Steven L. McShane, Mary Ann Von Glinow, 4th. Edition, New York, N. Y.; Boston, Mass.: McGraw-Hill/Irwin, c2008, [0071101047 (ed. internacional)],[9780071101042 (ed. internacional)],[9780073049779 (papel alcalino)],[0073049778 (papel alcalino)].

RH4002 Human Capital Management

(3.5 - 0 - 12. Prerequisites: None. MTI12, MTI12V)

Equivalence: None

It is a basic level course, which has the intention that the student knows and applies cutting-edge approaches and models of human capital management, and key elements from the attraction of human talent to retirement, into the context of the organization. The student requires basic knowledge of the principles and methods of the strategic perspective of human

talent management and the theoretical approach that considers human capital as an asset of knowledge of the organizations in their dimensions, individual, group and organizational. Also, student requires knowledge of the elements of management, from the attraction to the retirement of people in the organization. As a result of his/her learning, student will be able to design and implement efficient and comprehensive management of human capital in organizations.

General objective: After completing the course, students will be able to develop a holistic talent management program according to the strategic elements of the organization, promoting cutting-edge approaches and models with a focus on competencies, value practices, organizational learning and the fundamental elements of people management, from attraction to retirement.

Key words: Organizational learning. Human capital management. Competence systems. Value practices. Practice and social networks.

Bibliography: * Bohlander, George W., Administración de recursos humanos [recurso electrónico] / George Bohlander, Scott Snell., 14a ed., México : International Thomson, c2008., spaeng, [9786074814033].

RH96301 Interpersonal Behavior in Organizations

(3 - 0 - 12. Prerequisites: None. MDE09)

Equivalence: None

General objective: Successful management depends on the understanding and use of individual differences, group dynamics, and organizational design. Transnational management models delve into the dynamics of cultural diversity, team cooperation and collaboration, and post-industrial organizational features.

SC Knowledge Systems

SC00208 Strategy for Technological Competitiveness

(3 - 0 - 12. Prerequisites: [SI00268]. MTI08I)

Equivalence: SC99208, TI4009

General objective: The objectives of this course are:

- To train the participant in the use and integration of concepts, structures and tools required to generate and maintain competitive advantages through the effective use of strategy supported by the use of Information and Communication Technologies (ICT), in order to align these technologies to the business strategies and to the opportunities that the environment offers
- To apply a methodology to the process of strategic alignment of ICT in order to generate impact in the economic development of the region.

The methodology consists of the following stages:

1. Diagnosing the competitive positioning of the company.
2. Identification of World Class goals and Best Practices.
3. Technological assessment and selection of technological motivations to obtain world class positioning
4. Formulation of a Technological Strategy
5. Alignment of Technological Strategies and business strategies in order to achieve world class goals and high competitiveness.

SC00221 Innovation and Creativity Seminar

((3 - 0 - 12. Prerequisites: None. MTI08I)

Equivalence: AD5036, SC4005, SC95492, SC98492, SC99221

General objective: Application of the techniques and tools of innovation and creativity to identify areas of interest for research. The student exercises and applies his capacity of innovation, critical judgment, skills, knowledge experiences acquired during his professional formation, in the elaboration of a research proposal. This will require the description and clear presentation of the problem statement, the technological context, the contribution, the solution

proposed and limitations, the methodology that will be used to perform the research.

Bibliography: * Gill, John, 1930-, Research methods for managers/John Gill and Phil Johnson, 2nd. Edition, London: Paul Chapman Pub. Ltd., c1997, England, 1997, eng, [185396350X].

SC00227 Introduction to Knowledge Management

(3 - 0 - 12. Prerequisites: None. MTI08I)

Equivalence: SC95112, SC98112, SI95240, SI98240, SI99240, TI4008

General objective: This course provides an overview of the Knowledge Management origins and trends. Students will acquire an understanding of the Knowledge Economy, of the relationship between evolution and learning, as well as of the nature of representations. The concepts of Endogenous Growth and Knowledge Based Capital Systems are also studied. On those foundations, participants will be able to understand the application bases for major Knowledge Systems, such as Strategic Competencies, Value Practices and Intellectual Capital. Main support tools for Knowledge Management will be reviewed.

Bibliography: * Boddy, David, Take the lead: Interpersonal skills for project managers/David Boddy, David Buchanan, New York: Prentice Hall, 1992, New York, 1992, eng, [0138128278 (pbk.)].

SC00492 Thesis I

(3 - 0 - 12. Prerequisites: SC00221 , SC00229. MTI08I)

Equivalence: SC4006, SC95494, SC98494, SC99492

General objective: Development of a research project. In this course, the student will obtain the official approval of his research project from the thesis committee. He or she will have to select a knowledge domain and propose a research topic or develop a field project applied in an organization, providing prog-

ress reports to the thesis committee. Also the student will have to prepare a proposal that states the value of his research.

SC00494 Thesis II

3 - 0 - 12. Prerequisites: [SC00492]. MTI081)

Equivalence: SC4007, SC95496, SC98496, SC99494

General objective: Development of the thesis document; presentation and defense of his research work to the thesis committee. The student continues his research, providing periodic progress information to the committee.

SC00496 Thesis III

(3 - 0 - 12. Prerequisites: [SC00494]. MTI081)

Equivalence: SC95498, SC98498, SC99496

General objective: General objective: That the graduate student makes major progress in his thesis research, reflected in results. We expect that the student has written a final draft of his thesis, and that the thesis jury already has finished reviewing it and only the defense is left, which can be programmed at the first opportunity. Once the project is finished, the student will have to present the final version according to the current guidelines.

SI Information Systems

SI00213 Organizational Architecture for the New Economy

(3 - 0 - 12. Prerequisites: [OR00204]. MTI081)

Equivalence: OR95287, OR98287, OR99287, TI5006

General objective: This course studies the architecture of organizations that are competing in the new economy and are based on Information and Communication Technologies (ICT). The architecture of the organization involves the structure, organizational analysis and design, and the work culture of high performance teams. The course provides the foundations for the effective design of modern organizations that are involved in complex environments, characterized by intense competition and the surplus and shortage of resources. The course promotes the practice of the design and evaluation of organizational processes based on the context of the business and considering efficiency criteria for the purpose of generating value in the organization. The course includes a critical reflection about the role of the organizations in the societies and their impact in the economies of developed and developing countries. The course makes an emphasis on the impact of ICT in the economic, political and social perspective of the structure, design and organizational culture. The course analyzes the organizational forms that emerge from these impacts: global organizations, virtual organizations, networks, economic groups, joint ventures, strategic alliances, temporary organizations or assembly plants. The course studies organizational processes that are influenced by ICT such as, collaborative work, virtual teams, work systems, integrated manufacturing or integrated services, and group decisions, among others.

SI00219 Modeling Dynamic Systems

(3 - 0 - 12. Prerequisites: [SI00268]. MTI081)

Equivalence: SI95219, SI98219, TI5024

General objective: This course presents the principles and tools for the integral modeling of the organizations and their business ecosystems. It is based on the practice of systemic archetypes with appropriate simulation tools, and the concepts and structures of dynamic systems in order to apply the

paradigm of systemic thinking, to the representation and modeling of learning organizations. The course will promote the development of skills to: recognize patterns of complex phenomenon behavior; map the causality of the phenomenon to influence diagrams; understand the dynamics of complex phenomenon in the organizations; model complex decision making processes; describe dynamic strategies scenarios; model the formulation and the effects of the implementation of strategies. The student will work with an "I think" simulation tool and other packages to support the dynamic modeling of situations in environments of high complexity and variability. Case studies will be analyzed and used to apply the concepts of systemic thinking and the dynamics of ecosystems.

Bibliography: * Senge, Peter M., La quinta disciplina: Cómo impulsar el aprendizaje en la organización inteligente/Peter M. Senge ; tr. Carlos Gardini, México: Granica, 1998, [9685051007].

SI00227 Organizational Dynamics

(3 - 0 - 12. Prerequisites: [OR00204]. MTI081)

Equivalence: RH4000, RH95236, RH98236, RH99236

General objective: In this course the students will understand the three contexts of behavior analysis of people in the organizations: the environment, the structure of the organizations and the relationship of people in the organization. The student will be able:

- To identify the elements that are part of the organizational reality with a systemic vision (person, organization, environment).
- To understand the interactions of these variables
- To design and apply tools for organizational change management when these changes are due to the influence of the environment
- To understand the requirements and interests of clients or consumers.

Bibliography: * Stan Davis, Christopher Meyer , The Speeds of change in the connected economy .

SI00228 Information and Telecommunications Technology

((3 - 0 - 12. Prerequisites: [SI00268]. MTI081)
Equivalence: SI95220, SI98220, TI4007

General objective: In this course students will know the integrating elements of the architecture of information and communications technology that supports e-business projects and initiatives. The contents of the course are: business processes under an e-business approach, the enabling applications for business processes, the elements of the architecture for information and communications technology, the modern IT organization and its main processes.

Bibliography: * Korper, Steffano y Juanita Ellis, The E-Commerce Book Building the E-Empire, Academic Press , [0-12-421160-7].

SI00268 Introduction to IT

(3 - 0 - 12. Prerequisites: None. MTI081)
Equivalence: SI98268, TI4011

General objective: This course introduces the student to the basic concepts of computer science and information technology to prepare him for the basic and elective courses of his study plan. The student will learn basic concepts about computer organization, networking, telecommunications and databases. The student will apply Information Systems, and Software Engineering concepts to the development of a course project.

Bibliography: * White, Ron, How computers work/ Ron White; illustrated by Timothy Edward Downs and Stephen Adams,

SI96300 Information Technology (3 - 0 - 12. Prerequisites: None. MDE09) **Equivalence:** None

General objective: Current trends and key technologies are shaping the field of computing and communication. Major paradigm shifts in the field of information technology include the use of spreadsheets as decision support tools, trends in enterprise-wide computing, client/server computing, electronic commerce, and intra -and inter-organizational communication and coordination.

SO Social Sciences

SO5001 Qualitative Methods in Social Research

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

Given that qualitative methods are essential in social research, this graduate course is fundamental. The overall intention of this course is that students will command and apply specific techniques for qualitative-data collection. The student will employ these techniques in the design and execution of a research project.

General objective: The aim of this course is to introduce the student to qualitative research methods. The student will be introduced to the theoretical basis underlying qualitative research and to qualitative research techniques useful for social research. At the end, the student will have a total command of these techniques, which will be useful for and adequate design and development of the research project.

Key words: Observation. Interview. Research methods. Focus groups.

Bibliography: * Editors, Norman K. Denzin, Yvonna S. Lincoln, *Collecting and interpreting qualitative materials*, 2nd. Edition, Thousand Oaks, Calif.: Sage, c2003, California, 2003, eng, [0761926879 (rústica)].

SO5012 Development and Social Change

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: SO5002

It is postgraduate level course which aim is for the student to learn the main concepts from development theories. Development is understood through its initial definition as technological progress to its present definition. The learning purpose is for the student to understand the existing debates between the different theories of development in order to apply them in research work.

General objective: The student will be able to identify the schools of thought that have studied the phenomenon of development. The main goal is to interpret the concept within the context of the idea of progress, which characterizes the contemporary technical-financial view of development, understood as industrialization and the creation of capitalist markets. The course content will also comprise different debates regarding multiple dimensions (economic, political, and social) of development in a globalized world, including some of their implications for national and international public programs.

Key words: Development theory.

Bibliography: *Desarrollo con equidad: Hacia una articulación de políticas económicas y sociales en América Latina y el Caribe/CEPAL, CLAD, SELA, 1era. Edición*, Caracas, Venezuela: CEPAL: CLAD: SELA: Editorial Nueva Sociedad, 1996, [9803171038 (pbk.)].

SO5017 Theory and Contemporary Social Thinking

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: SO5003

It's a graduate course which intends that the student gets to know Sociology's paradigmatic multiplicity as well as the several ways to define it or understand it. As a learning outcome, the student should know Sociology's development, the basics of Structure and Social Change, the most outstanding sociological perspectives, Sociology's challenges in a globalization era, power, social institutions, social inequality, conflict and social deviation, and so on.

General objective: The student will be able to comprehend theoretical paradigms which give solutions to current political and social problems from social theory and, specifically, from Sociology.

Key words: Social problems. Contemporary thinking. Contemporary sociology.

Bibliography: * Beck, Ulrich, 1944-, Un nuevo mundo feliz: La precariedad del trabajo en la era de la globalización/Ulrich Beck, 1ra. Edición. en la colección Bolsillo, Barcelona: Paidós, 2007, español, [9788449319785].

SO5018 Political and Social Organizations Theory

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

As a graduate course, it intends to place the organization's problems as one of Modernity's core pillar, both in the political field and the social relations field in general. Its fundamental objective is to analyze social and political organizational processes. It encompasses both the study of sociological theory of organizations, and the state and international organizations' bureaucracies, analyzing the organizational and management facts' main elements, and suggesting some ideas to think the organization's future.

General objective: At the end of the course, the student will be able to analyze the organizational foundations of the social order in the social and political field.

Key words: Management. Political and social organizational processes. Bureaucracy.

Bibliography: * DiMaggio, Paul, The iron cage revisited: Conformity and diversity in organizational fields/Paul J. DiMaggio & Walter W. Powell, New Haven, Conn.: Institution for Social and Policy Studies, Yale University, 1982.

SO5019 Classical Theory and Social Thought

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

As a graduate course, its intentions are to reassert and to deepen in Sociological Theory's classical scholars, as well as in the historical context of their production. As a result of learning, the student will be able to consolidate his or her thesis approach over solid theoretical and methodological ground.

General objective: The course's objective is to study the discipline's four fundamental authors (Marx, Durkheim, Weber and Parsons) starting from a selection of their respective works and putting an emphasis on the strain between structure and agency in each of their theoretical contributions. At the same time, the student will analyze the ontological, epistemological and methodological assumptions' from these authors.

Key words: Social structure. Social changes. Sociological theory. Industrialization.

Bibliography: * Marx, Karl, 1818-1883, El papel del trabajo en la transformación del mono en hombre: Manifiesto del partido comunista: Ideología alemana/Karl Marx, Federico Engels, México, D. F.: Colofón, c2008, [9789688670019].

SO5023 Research Proposal I

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

In this research course, the student continues working on his doctoral research project and publicly presents a progress report within the framework of collective discussions. Learning outcome: the student will consolidate a critical position regarding his project proposal and demonstrate it through his accomplishments in the presentations.

General objective: On completion of this course, students will continue working on their research projects with the guidance of a research professor and will present periodical progress reports.

Key words: Research proposal.

SO5024 Research Proposal II

(3 - 0 - 12. Prerequisites: None. DCS11)

Equivalence: None

In this research course, students continue working on their doctoral research project and present a progress report publicly within the framework of collective discussions. Learning outcome: students will consolidate a critical position regarding their project



proposal and demonstrate it through their accomplishments in the presentations.

General objective: Upon completion of this course, students will be able to justify the relevance of a research topic, identifying the advancements made in the selected topic on the basis of a bibliographic review, using diverse sources of information; begin either an applied research or technological development project with the guidance of a research professor and will present periodical progress reports; define a work plan and budget for the project.

Key words: Research proposal.

TC Computer Technologies

TC4000 Programming Techniques (3 - 0 - 12. Prerequisites: None. MCC09, MIT12) Equivalence: CB99254, CS3001, CS4001

This basic course presents object-oriented programming, the relational database model, and programming capability in a high-level programming language. Learning outcome: the student will propose and solve any problem through a high-level programming language, data structure, and relational database.

General objective: Students will be able to implement the conceptual tools in the field of computer sciences, including the main structures used for data management.

Key words: Object oriented programming. High-level languages. Hierarchic data structures. Linear data structures.

Bibliography: * Weiss, Mark Allen, Data structures and algorithm analysis in Java/Mark Allen Weiss, 2nd. Edition, Boston: Peason Addison-Wesley, c2007, [0321370139 (papel alcalino)].

TC4001 Computing Fundamentals (3 - 0 - 12. Prerequisites: None. MCC09, MIT12) Equivalence: CB4003, CB99102, CS4003

The aim of this basic course is to provide the student with the theoretical foundations of computer science, emphasizing automata theory, formal languages, computability and complexity, and algorithm analysis. Learning outcome: the student will be able to comprehend, analyze, and apply basic and restricted models of computation.

General objective: Understand, analyze and apply the most basic and restricted computing models; understand, analyze and apply a non-deterministic computing model; analyze and apply techniques that allow one to determine if an algorithm is computable, and analyze problems outside the reach of algorithmic solutions, using Turing's machine; cat-

egorize algorithms in terms of their computing complexity; compare sort and data structure algorithms as well as algorithms for data manipulation, and identify problems that can be formulated and solved by using graph algorithms.

Key words: Computability and complexity. Analysis of algorithms. Languages and automata.

Bibliography: * Lewis, Harry R., Elements of the theory of computation/Harry R. Lewis, Christos H. Papadimitriou, 2nd. Edition, Upper Saddle River, N. J.: Prentice-Hall, c1998, [0132624788 :HRD],[,\$70.00].

TC4002 Software Analysis, Design and Construction

(3 - 0 - 12. Prerequisites: None. MCC09)
Equivalence: CB99228, CS5026

The aim of this basic course is for students to learn about the different techniques, life cycles, models, and languages used for analysis, design, implementation, and software testing. Learning outcome: Students will develop a software development project, taking into account all the aforementioned elements.

General objective: On completion of the course, students will be able to solve a problem of medium complexity through the construction of a software project, creating requirement analysis, designing the solution architecture, and implementing and evaluating the system tests.

Key words: Software analysis and design. Software engineering.

Bibliography: * Bruegge, Bernd, Object-oriented software engineering: Using UML, patterns, and Java/Bernd Bruegge & Allen H. Dutoit, 2da. Edición, Upper Saddle River, N. J.: Prentice Hall, c2004, New Jersey, 2004, eng, [0130471100].

TC4003 Distributed Systems (3 - 0 - 12. Prerequisites: None. MCC09) Equivalence: CS4002, CS5017, CS99213

The aim of this basic course is to demonstrate the basic key concepts of distributed systems development, its main characteristics, the different distribution models and the way in which they are applied. Learning outcome: Students will be able to communicate two or more computers in a distributed system.

General objective: At the end of the course, students will be able to understand the main characteristics of distributed systems and differentiate them from computer networks, as well as distinguish between distributed and non-distributed file systems; write programs based on sockets connecting two computers, understanding how the NFS (Network File System) and NIS (Network Information System) work; understand the difference between a system with only one processor and a system with distributed processes and processors; the principles of how a distributed shared memory works; how a RPC works; and use basic concepts of the above to connect two computers.

Key words: Distributed systems. Middleware.

Bibliography: * Coulouris, George F., Distributed systems: Concepts and design/George Coulouris, Jean Dollimore, Tim Kindberg, 4th. Edition, Boston, Mass.: Addison-Wesley; Essex, UK: Pearson Education, 2005, Massachusetts, 2005, eng, [0321263545], [9780321263544].

TC4016 Software Analysis, Design and Construction (3.5 - 0 - 12. Prerequisites: None. EIS11) Equivalence: None

The aim of this basic course is for the student to learn about the different techniques, life cycles, models, and languages used for analysis, design, implementation, and software testing.

General objective: At the completion of the course, students will be able to solve a problem of medium complexity through the construction of a software

project, defining the requirement analysis, designing the solution architecture, implementing and evaluating the system tests.

Bibliography: * Bruegge, Bernd, Object oriented software engineering: Using UML, patterns, and Java/ Bernd Bruegge & Allen H. Dutoit, 3rd. Edition, Boston: Prentice Hall, c2010, [0136061257],[9780136061250].

TC4017 Software Testing and Quality Assurance (3.5 - 0 - 12. Prerequisites: None. EIS11) Equivalence: None

Basic graduate course on the strategies and methods for developing systems, applying international quality standards for the software process. Learning outcome: Students will know, analyze and apply the two principal quality assurance approaches, ISO and CMM.

General objective: Students will be able to create a software quality system or quality assurance system within the organizations or groups which develop computer-based systems, using ISO and CMM as theoretical frameworks and taking into account the identification of the software development cycle, existing standards, the identification of software development attributes from a product and process point of view, the use of statistics as a way of analyzing software quality guarantees, as well as the documentation associated with each phase.

Bibliography: Handbook of software quality assurance/edited by G. Gordon Schulmeyer and James I. McManus, 3rd. Edition, Upper Saddle River, N. J.: Prentice Hall, c1999, [0130104701].

TC4018 Managing Software Development (3.5 - 0 - 12. Prerequisites: None. EIS11) Equivalence: None

This course presents the techniques, methods and processes for planning, executing, controlling and closing software development projects. Students will learn basic project management concepts, the

planning process, the selection and management of work teams, risk management, project leadership and software tools to manage projects, the elements of business plans for technological firms and the financial aspects during a project software planning.

General objective: At the end of this course, students, with an integral vision of software development projects management, will be able to successfully choose the projects which contribute to an organization's strategy; prepare and develop the definition, planning, realization and control of software projects; successfully bringing to a close the tasks related to software development projects, involving the basic variables of time, resources and costs.

Bibliography: * Gray, Clifford F., Project management: The managerial process/Clifford F. Gray, Erik W. Larson, Boston: Irwin/McGraw-Hill, c2000, [007365812X (alk. paper)], [007234685X (CD-ROM)].

TC5015 Field Project I

(3.5 - 0 - 12. Prerequisites: None. MTI12)

Equivalence: None

This is an advanced course. Learning outcome: the student will complete a preliminary project for research or the implementation of an e-commerce project.

General objective: The student adequately defines a protocol or a project proposal to develop, be it a research plan or a proposal about the implementation of a solution. The student will have two global thematic choices, concerning the curriculum covered by the MCE: E-business or information technology.

Key words: Field project.

Bibliography: * Hernández Sampieri, Roberto, Metodología de la investigación/Roberto Hernández Sampieri, Carlos Fernández Collado, Pilar Baptista Lucio, 3ra. Edición, México, D.F.: McGraw-Hill, c2003, México, 2003, español, [9701036328], [9789701036327].

TC5016 Field Project II

(3.5 - 0 - 12. Prerequisites: None. MTI12)

Equivalence: None

This is an advanced course. Learning outcome: the student will implement the formal research or the development of a specific project based on the preliminary project proposal created in Field Project I. The student will generate knowledge or results that should provide a contribution to his/her knowledge, skills or experience.

General objective: The students will be able to interpret and analyze research results in order to complete his/her final report.

Key words: Field project.

Bibliography: * Hernández Sampieri, Roberto, Metodología de la investigación/Roberto Hernández Sampieri, Carlos Fernández Collado, Pilar Baptista Lucio, 3ra. Edición, México, D.F.: McGraw-Hill, c2003, México, 2003, español, [9701036328], [9789701036327].

TE Electronic Technologies

TE4000 Advanced Mathematics for Electronics Engineering

(3 - 0 - 12. Prerequisites: None. MSE09E)
Equivalence: E4002

This course presents the principal mathematical techniques used in the analysis and design of discrete and continuous systems. The course requires prior knowledge of signal and systems theory, differential and integral calculus, and linear algebra concepts. Learning outcome: the student will use tools to design and analyze electronic, optic and telecommunications systems.

General objective: On finishing the course, students will be able to: adequately apply mathematical concepts to the analysis and design of discrete and continuous systems; represent in vector form deterministic and random signals, analyze systems through Fourier techniques, and apply mathematical sampling concepts to digitalization systems.

Key words: Z-transform. Fourier analysis. Complex variable. Spectral density.

Bibliography: * John G. Proakis, and Dimitris G. Manolakis, Digital signal processing: Principles, algorithms, and applications, 4th, Prentice Hall.

TE4001 Instrumentation

(3 - 0 - 12. Prerequisites: None. MIR09, MSE09E)
Equivalence: E5012

This basic course seeks to integrate the concepts of analog electronics, digital electronics, control, optoelectronics, sensors and actuators to help in the analysis, identification, modeling and development of process control and data acquisition. The course requires basic knowledge of analog and digital, electronics and linear systems theory. Learning outcome: the student will be able to analyze and design instrumentation systems to transform values to be measured in electro-optical signals, as well as to use industrial controllers.

General objective: On finishing the course, students will be able to: design data acquisition and process automation systems, reduce design verification time through the use of industrial methods and tools, analyze different kinds of measuring systems and relevant information for the creation of statistical methods applied to experiments, be familiar with security norms in the use of sources of electromagnetic emission.

Key words: Sensors. Data acquisition systems. Signal converters. Photometry. Radiation collection.

Bibliography: * Northrop, Robert B., Introduction to instrumentation and measurements/Robert B. Northrop, 2nd. Edition, Boca Raton, Florida: Taylor & Francis, c2005, [0849337739 (papel alcalino)].

TE4002 Stochastic and Random Processes

(3 - 0 - 12. Prerequisites: None. MSE09E)
Equivalence: E 99229

This basic course provides the mathematical tools needed to develop electronic and telecommunications engineering. Prior knowledge of probability and statistics and signals and systems is required. Learning outcome: the student will characterize through stochastic processes and random communication signals and systems, as well as processes involved in the same as a filter.

General objective: On completion of the course the student will be able to: apply basic theoretical knowledge and necessary study skills to the study of signals and systems through random and stochastic processes; describe the spectral densities of signals and the effects of the filtering of these; apply random process theory to characterize aspects of traffic, reliability and availability in communication networks, studying and defining service quality concepts; characterize noise in communication channels; describe with stochastic and random processes fundamental aspects of signals and telecommunications systems so they can be compared and evaluated.

Key words: Spectral density. Analysis of random signals. Traffic analysis. Reliability and availability of systems.

Bibliography: * R. Yates & D. Goodman, Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer engineers, John Wiley & Sons, Inc.

TE4010 Efficient Use of Electric Energy

(3 - 0 - 12. Prerequisites: None. MIE09)

Equivalence: None

This basic course provides students with the tools to achieve the maximum return per unit of energy consumed. Learning outcome: the student will be able to help his organization to achieve significant energy management results through the application of sound engineering principles and of creativity.

General objective: Students will be able to improve energy efficiency, reducing energy use as well as costs. Maintain good communication in energy matters. Develop and maintain effective monitoring, reporting and administrative strategies for intelligent energy use. Find new and better ways of increasing energy investment returns through R&D. Develop interest in and dedication to energy use programs among all employees. Reduce the impact of blackouts, dropouts, and brownouts.

Bibliography: * Barney L. Capehart, Wayne C. Turner, William J. Kennedy, Guide to Energy Management, 5th. Edition, The Fairmont Press.

TE4011 Cogeneration and Alternate Sources of Energy

(3 - 0 - 12. Prerequisites: None. MER11V, MIE09)

Equivalence: None

This basic course provides the student with the skills to develop cogeneration projects, considering technical, environmental and financial concerns, and evaluate and integrate energy generation projects using alternative sources. Learning outcome: the student will make decisions to select the best option for generating electrical energy.

General objective: Upon finishing the course, students will be able to evaluate the different alternatives for generating electrical and thermal energy with technical and economic efficiency, understand the advantages of cogeneration and trigeneration projects, apply thermodynamic models to the analysis of individual industrial devices or those in complex systems or cycles, and be familiar with the technologies used with alternative energy sources.

Key words: Sustainable development. Energy conversion. Energy resources. Combustion. Generation of electricity.

Bibliography: * Mukund R. Patel , Wind and Power Solar Systems .

TE4012 Regulations and Financing of Energy Resources

(3 - 0 - 12. Prerequisites: None. MIE09)

Equivalence: None

This basic course provides an overview of electrical systems, considering the different generation technologies, regulations and financing plans. It requires a basic knowledge of operating electrical systems. Learning outcome: the student will be able to evaluate and improve the operation of electrical and energy transportation systems.

General objective: Understand and apply engineering principles to the operation of electrical and energy transport systems, including conventional sources and those which use renewable energy. Compare procedures for operating nationwide electrical grids and companies which supply natural gas, regulations and financing strategies with those in other systems serving as paradigms.

Key words: Energy resources. Power sector regulations. Financing for energy resources. Energy policy.

Bibliography: * Harris, Chris, 1961-, Electricity markets: Pricing, structures and economics/Chris Harris, West Sussex: Wiley, c2006, [0470011580 (encuadrado)], [9780470011584 (encuadrado)].

TE4014 Industrial Applications of Renewable Energy

(3 - 0 - 12. Prerequisites: None. MER11V)
Equivalence: None

This is a basic level course in the discipline of electrical engineering with the intention that the student knows alternative sources of energy. Requires basic knowledge in the area of energy analysis. As learning result, the student will be able to propose innovative industrial uses of renewable sources to introduce its foundations to produce energy.

General objective: The student will create the bases to analyze and evaluate the technical and economic aspects of different industrial applications of alternative sources to generate electrical and thermal energy.

Key words: Energy analysis. Renewable energy. Alternative energy sources. Electric and thermal energy.

TE4015 Management and Efficient Use of Electrical Energy

(3 - 0 - 12. Prerequisites: None. MER11V)
Equivalence: None

This is a basic level course in the knowledge of electronic technologies with the intention that the student knows methods and procedures to identify the efficient use of energy. Requires basic knowledge in the area of energy analysis. As learning result, the student will be an entrepreneur in the energy management and will be able to implement economic criteria and indicators for better use in energy resources and technology used in organizations.

General objective: The student will be able to understand the basic concepts of the conservation of energy to analyze thermal process and electric systems, besides the student could evaluate the energy consumption of a process and identify opportunity areas for energy savings.

Key words: Energy diagnoses. Electrical energy management. Efficient use of electrical energy. Power system analysis.

Bibliography: * Capehart, Barney L., Guide to energy management/Barney L. Capehart, Wayne C. Turner, William J. Kennedy, 6th. Edition, Lilburn, GA: Fairmont Press; Boca Raton: CRC Press, c2008, [0881736058 (papel alcalino)], [9780881736052 (papel alcalino)], [1420084895 (Taylor & Francis)], [9781420084894 (Taylor & Francis)].

TE4016 Legislation and Funding of Energy Resources

(3 - 0 - 12. Prerequisites: None. MER11V)
Equivalence: None

This is a basic level course in the knowledge of electronic technologies with the intention that the student understands and applies the operating principles of electrical systems. Requires basic knowledge in the area of energy analysis. As learning result, the student will be able to make decisions to fulfill standards and regulations of operation of energy in an organization using conventional and renewable resources with support of electric project finance.

General objective: The student will be able to understand the engineering principles in the operation of electrical systems and power transmission including conventional and renewable energy sources, besides the student will be able to know the procedures required to operate the electrical and gas systems, their regulations and financing strategies.

Key words: Renewable energy. Energy resources financing. Electrical and gas systems. Funding strategies.

Bibliography: * Harris, Chris, 1961-, Electricity markets: Pricing, structures and economics/Chris Harris, West Sussex: Wiley, c2006, [0470011580 (encuadrado)], [9780470011584 (encuadrado)].

TI Information Technologies

TI4000 Legal Aspects of Technology (3.5 - 0 - 12. Prerequisites: None. MID09V) Equivalence: SC4000

This basic information technology course requires prior knowledge of the area of administration. Learning outcome: the student will solve problems that pose legal issues that he might face during the different stages of a new company and define intellectual property processes related to labor law, licensing options and joint ventures.

General objective: The student will be able to know the procedures performed for the protection, presentation and management of intellectual property in the world of business. A legal framework will be used for commercial protection for technology.

Key words: Business administration. Administration of own business.

Bibliography: * Bagley, Constance and Craig E. Dauchy, The Entrepreneur's Guide to Business Law, International Thompson Publishing.

TI4004 Mental Models and Innovation Methodologies (3.5 - 0 - 12. Prerequisites: None. MID09V) Equivalence: SC4009

This is a basic course in information technology. Student will define models.

General objective: Student will be able to recognize mental models; define the most appropriate mental model for his intended actions. To know what is a mental model. Analyze the stages to do the transformation of mental models, and the characteristics and objectives of all the stages. Learn how to create correct mental models considering internal and external factors. Know what an innovation is; know current methodologies for innovation and to know different approaches and processes for innovation.

Key words: Management. Planning.

Bibliography: * Andre Vandierendonck, Walter Schroyens, and Gery d'Ydewalle, The Mental Models Theory of Reasoning: Refinements and Extensions, inglés.

TI4005 Innovation Process and Techniques (3.5 - 0 - 12. Prerequisites: None. MID09V) Equivalence: SC4010

This is a basic course in the area of the information technologies. The student will apply different innovation technologies and business techniques in order to formulate and implement innovation in current processes or to generate new innovation processes that create value to the organization.

General objective: The student will be able to establish the main aspects related to innovation processes as well as the basic principles that support the strategic techniques for the generation of innovation ideas and concepts. Know the main role that research, development and innovation activities have over the value chain, considering its socio economic impact on competitiveness and leadership for technological innovation based companies.

Key words: Generation of innovation processes. Business strategic in technological innovations.

TI4006 Design of Technological Products and Services (3.5 - 0 - 12. Prerequisites: None. MID09V) Equivalence: None

This basic course in Information Technologies does not require previous knowledge. Learning outcome: the student will develop a project in which, in a team, a technology based product or service is developed to produce results for the selected business.

General objective: At the end of the course, the student will be able to: set up a business objective and its strategy; find out market opportunities; know the

concept of product as a new business and to prepare a business plan including financial statements, in order to commercialize the new product.

Key words: Strategy. Business plan. Market opportunity. Financial aspect.

Bibliography: * Annacchino, Marc A., The pursuit of new product development: The business development process/Marc A. Annacchino, Burlington: Butterworth-Heinemann/Elsevier, 2007, Massachusetts, 2007, eng, [075067993X],[9780750679930].

TI4007 Technology, Innovation and Knowledge

(3.5 - 0 - 12. Prerequisites: None. ENT11)

Equivalence: SI00228

This basic course in information technology management requires previous knowledge of information technologies. Learning outcome: student will examine the diverse fundamental concepts related to technology and information systems that allow him to design an adequate flow of information through its value chain.

General objective: The student will be able to examine different basic concepts related to technology and information systems providing organizations with an adequate information flow through their value chain.

Key words: Artificial intelligence. Business networks. Knowledge management.

Bibliography: * Laudon, Kenneth C., 1944-, Management information systems: Managing the digital firm/Laudon, Kenneth C, 9a. ed., Upper Saddle River, N. J.: Pearson, 2006, United States, 2006, español, [0131971921].

TI4008 Strategic Alignment and Business Knowledge

(3.5 - 0 - 12. Prerequisites: None. ENT11)

Equivalence: SC00227

The intention of this course is to introduce the student to the various information technology tools

which are necessary for the integration of the value chain. The student will be able to adequately define information flows within business processes.

General objective: This course examines the diverse elements that are essential for integrating an organization's value chain and analyzes matters related to systems and information technologies that should be implemented in a company in order to achieve an adequate flow of information through its internal and external business processes.

Key words: Supply chain. ERP. CRM.

Bibliography: * Grant Norris .. [et al.], E-Business and ERP: Transforming the enterprise, New York: Wiley, 2005, New York, 2005, eng, [9780471740995].

TI4009 Strategies for Technological Competitiveness

(3.5 - 0 - 12. Prerequisites: None. EEN13)

Equivalence: SC00208

The activity of modeling a strategy and making decisions is an art and basic ability that every strategist must handle with expertise. The previous one is more relevant if the decisions are affected by the impact that technology platforms have over the business strategy of an organization, that requires innovation, quick reactions to external changes, and knowledge about the best practices and the effects of globalization. All of these you need to compete in an effective way in hostile environments, oppressed by unpredictable and uncontrollable threats. Learning outcome: the student will be able to identify the strategic value of information, businesses key processes, and their leverage on support and complementary technologies, fundamental key to generate advantages that generate value. Student will be able to formulate strategic business plans aligned to modern forms of globalization and seek opportunities offered by external promoters, and the possibility to generate new technology-based businesses.

General objective: The student will be able to identify technological innovations in processes, products and services; identify activities that generate value and competitive advantage; formulate robust strategies to transform ideas into technological products;

evolve an innovative initiative into a competitive innovation; align business and technology strategies with business opportunities; and develop a strategic plan for technology innovation with the possibility to create new business models.

Key words: Technological innovation. Sources for innovation.

Bibliography: * Scheel Mayenberguer, Carlos, Competencia en arenas globales: Un enfoque metodológico para lograr alta competitividad/Carlos Scheel Mayenberguer, 1ra. Edición, México: Trillas, 2000, México, 2000, español, [9682462614].

TI4010 Managing Innovation and Business Process

(3.5 - 0 - 12. Prerequisites: None. EEN13)

Equivalence: None

The intention of this basic course is to develop the student's skills in the design, implementation, and analysis of the implications of technological innovations in organizations, as a means to increase competitiveness. The student will develop his knowledge in technological innovation administration in order to increase companies' competitiveness.

General objective: On completion of this course, the student will be able to understand business processes and design, implement and analyze the implications of technological innovations in organizations.

Key words: Technological innovation. Technological strategy.

Bibliography: * Burgelman, Robert A., Strategic management of technology and innovation/Robert A. Burgelman, Clayton M. Christensen, Steven C. Wheelwright, 4th. Edition, Boston, Mass.: McGraw-Hill, c2004, eng, [0071232303 (ed. internacional)], [0072536950 (papel alcalino)].

TI4011 Introduction to Information Technology

(3.5 - 0 - 12. Prerequisites: None. MTI12, MTI12V)

Equivalence: SI00268

This introductory course in information technology administration requires previous knowledge in the basics of information systems. Learning outcome: the student will determine, analyze, plan and evaluate the use of information technologies and the way in which these can positively impact organizations.

General objective: The student will be able to develop the ability to identify the characteristics of the main information technologies. Appreciate the usefulness of information technologies as a resource for making organizations' processes more efficient and sustainable, as well as the importance of ethics in handling these technologies.

Key words: ICTs fundamentals.

Bibliography: * Turban, Dorothy Leidner, Ephraim McLean y James Wetherbe, Information Technology for Management: Transforming Organizations in the Digital Economy, 6ta. Edición, John Wiley & Sons, [0471787124].

TI4012 IT Portfolio, Program and Project Management

(3.5 - 0 - 12. Prerequisites: None. ENT11)

Equivalence: None

This is a basic course intending that students acquire knowledge and develop skills in the application of strategies techniques and tools to manage resources, activities and project portfolios of all types and particularly those related to information technology. Sufficient knowledge is required around the utilization of office suite type software, technology based tools used to expedite communication, mobile technology and basic concepts on the management of project teams. As a result of the learning process, the student will be able to propose the necessary strategies, resources and processes to establish formal project management practices in organizations.

General objective: After completing the course students will be able to identify problems, design, solve and optimize project management processes therefore raising their professional potential to be able to lead projects, programs and portfolios.

Key words: Project management. Project portfolio management, program management. Project office. PMI Model. PRINCE2 Model.

TI4015 Business Technology Architecture

(3.5 - 0 - 12. Prerequisites: None. MTI12, MTI12V)
Equivalence: None

This is a basic level course whose intention is that the student knows the basic concepts of information technology and information systems. Their impact in an organization and acquire knowledge regarding data bases, telecommunications, internet, wireless technologies, Business Intelligence, E-business, ethics in information systems and future information technologies. Basic Knowledge of information technology and information systems is not required. As learning result, the student will be able to recommend the information technology needed in an organization.

General objective: Students will be able to:

1. Learn the basic concepts of information technologies and information systems and their impact in the organizations.
2. Identify the fundamental concepts of technology and information systems that are used by enterprises through the value chain to generate strategic impulses.

Key words: Information systems. Data base. Information technology architecture. ERP-CRM-SCM.

Bibliography: Laudon, Kenneth C., 1944-, Management information systems : managing the digital firm / Kenneth C. Laudon, Jane P. Laudon., 12th ed., Boston: Prentice Hall, 2012., [9780132142854],[0132142856].

TI4016 Information Technology Governance

(3.5 - 0 - 12. Prerequisites: None. MTI12, MTI12V)
Equivalence: None

This is a basic course that addresses the definition and elements of corporate governance of Information Technology. As a result, students will be able to handle the basics of planning, definition, implementation and maintenance of corporate policies, management and resource allocation, performance measurement, and, in general, how to guide and monitor information technology decisions in organizations.

General objective: The aim of the course is that the student understands the concepts of corporate governance of information technology, so that can design, implement and maintain effective policies for the operation of the information technology function in the organization. Learn to allocate resources and manage applications for investment in information technology. Establish performance metrics for computing role in the enterprise and master best practices and emerging standards in the industry.

Key words: policies of the information systems. Safety regulations. Information policies of confidentiality.

Bibliography: * Weill, Peter., IT governance : how top performers manage IT decision rights for superior results / Peter Weill and Jeanne W. Ross., Boston, MA. : Harvard Business School Press, 2004., [1591392535],[9781591392538].

TI4017 Strategic Enterprise Performance Management

(3.5 - 0 - 12. Prerequisites: None. MTI12, MTI12V)
Equivalence: None

This is a basic level course oriented to the definition and execution of the business strategy. The course requires previous business management knowledge. As learning results the student will be able to recognize the importance of a systematic work in the strategy execution, and the role of the business intelligence and knowledge management initiatives for the strategic deployment. Problem identification,

solutions design, and consultancy skills will be developed along the course.

General objective: At the end of the course the student will be able to: a) apply different models and tools for organizational diagnostics, strategy and measurements design, and information deployment; b) define and justify business intelligence and knowledge management initiatives for the corporate performance management.

Key words: Strategic alignment. Performance management. Intensive knowledge organizations. Strategic map.

Bibliography: * Paladino, Bob, 1959-, Innovative corporate performance management : five key principles to accelerate results / Bob Paladino., Hoboken, N.J. : Wiley, c2011., [0470627735 (encuadrado)], [9780470627730 (encuadrado)].

TI5008 Managing the Value Chain (3.5 - 0 - 12. Prerequisites: [AD4016 , AD4001]. MGN10V) **Equivalence: None**

This is an advanced course which offers the knowledge and tools necessary in order to identify opportunities for improvement in an organization competitively through value chain analysis. Students will be able to effectively utilize information technology in order to manage the value chain of a company.

General objective: To define the components of technology and communications architecture which are required in order to enable value chain processes. To understand the processes that make up the value chain of an organization, which include the supply chain, the management of client relationships, and also processes ranging from supplier and supplies management to product delivery and post-sales support.

Key words: Value chain. Supply chain management. Customer relationship management. SCOR model. Value chain performance metrics.

Bibliography: * Hugos, Michael H., Essentials of supply chain management, 2nd. Edition, Ho-

boken, N. J.: John Wiley, c2006, [0471776343 (rústica)], [9780471776345].

TI5024 Dynamic Systems Modeling (3.5 - 0 - 12. Prerequisites: None. MTI12, MTI12V) **Equivalence: SI00219**

This is an advanced course in the field of information technology which requires previous knowledge in business administration. The student will be able to resolve cases and develop projects in which he will apply the concepts of systems thinking and the dynamics of ecosystems, allowing to acquire new schema and thus interact better with their realities.

General objective: The student will be able to promote the development of skills to: recognize patterns of complex phenomena; map the causality of the phenomenon to influence diagrams; understand the dynamics of complex situations in the organizations; model complex decision making processes; describe dynamic strategies and scenarios; and model the formulation and the effects of the implementation of strategies. The student will work with an "I think" simulation tool and other packages to support the dynamic modeling of situations in environments of high complexity and variability.

Key words: Systems thinking. System archetypes. Simulation tools. Organization modeling. Behavioral patterns.

Bibliography: * Senge, Peter M., The 5th. discipline: The art and practice of the learning organization/Peter M. Senge, A Currency paperback., New York: Doubleday/Currency, 2006, c1990, [0385517254].

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