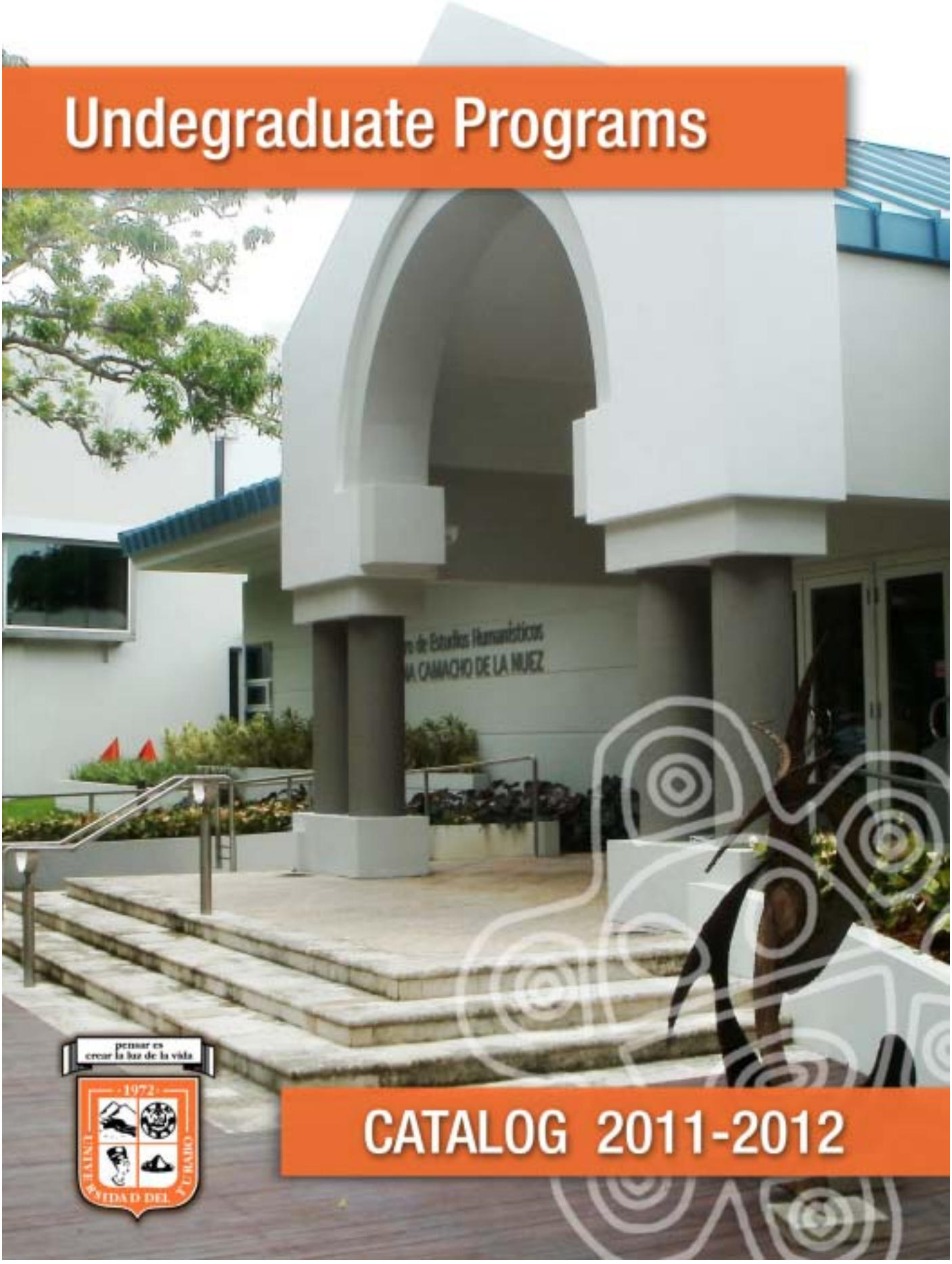
Undegraduate Programs



CATALOG 2011-2012

IMPORTANT NOTES:

Universidad del Turabo Catalog is published for informational purposes and should not be considered as a contract between a student and the Institution. Information contained herein supersedes that previously published and is subject to change.

The Ana G. Méndez University System and its institutions do not exclude from participation, nor deny benefits to, nor discriminate against, any person on the basis of race, sex, color, national origin, social status, physical or mental impediment, nor on the basis of an individual's political, religious or social creed.

At Universidad del Turabo (UT), every effort is made to provide accurate and up-to-date information. However, the University reserves the right to change without notice statements in the catalog concerning rules, policies, fees, curricula, courses, or other matters when necessary. Changes may apply to current and former students.

Universidad del Turabo reserves the right to make changes in course offerings, curricula, and other policies affecting its programs. In the specific case of a curriculum revision, current students will be moved horizontally to the new curriculum. Students will be required to take new courses at a level higher than that at which the student is currently enrolled but never courses at a level below. All current and former students enrolled in the Institution are subject to these conditions.

In addition, UT is currently reviewing and restructuring many of our academic programs in an effort to enhance their quality and improve our efficiency. In that process, some of the programs and courses mentioned in this catalogue may be modified, consolidated with other programs or courses, or eliminated. If you have questions about a particular program or course, you should contact the appropriate university school or department. In case that a program is eliminated, the program director will prepare a course schedule to assure the graduation of those students enrolled in the program.

It is the student's responsibility to know and comply with the rules expressed herein, which coincide with current bylaws and regulations of the University, the administrative resolutions and the federal laws on civil rights.

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OUR PROFILE

Universidad del Turabo is a nonprofit institution of higher education located 15 miles southeast of San Juan, Puerto Rico, within easy reach of the entire east-central part of the island. Its 140-acre suburban campus and its fifteen buildings provide an ideal atmosphere for the learning experience. The university also has centers in Yabucoa, Cayey, Naguabo, Isabela, Ponce, and Orlando (in the state of Florida).

It is a professionally oriented institution with a variety of offerings from technical certificates to doctoral degrees. The institution serves a diversified student body mostly from the surrounding communities, with a variety of economic and educational backgrounds.

Founded in 1972, Universidad del Turabo has continued to grow in the new millennium. The student population of more than 15,000 is composed of young adults and professionals.

The academic staff consists of more than one hundred seventy-six (176) full-time faculty members and two hundred (200) adjunct professors. The full-time faculty members hold doctorates and master's degrees in their fields of expertise. Nearly fifty-five (55) percent of Universidad del Turabo's full-time faculty are professors or associate professors, and forty-five (45) percent are assistant professors or instructors.

The gender distribution of the faculty is equally divided. Universidad del Turabo is a member of the Ana G. Méndez University System.

The academic offerings of the institution are organized into six main areas: Engineering, Science and Technology, Health Sciences, Education, Business Administration, and Human and Social Sciences.

VISION

The vision of Universidad del Turabo is to be a high quality learning community dedicated to enhancing education among its student population and promoting advanced technology with an international orientation.

MISSION

The mission of Universidad del Turabo is to enhance knowledge through excellence in teaching, and to foster research, innovation, and the internationalization of its programs.

The University is committed to graduating well-educated, professionally competent students who can think critically and are technologically literate. The institution also promotes the development of ethical principles and values that will allow our graduates to contribute to the well-being of the community through their knowledge of social systems and their role as responsible citizens.

VALUES

Universidad del Turabo is committed to:

- Freedom of thought and expression.
- Recognition of and respect for diversity.
- Respect for the dignity of the individual.
- Excellence in teaching and the generation, dissemination and application of knowledge.
- Promotion of ethical, social, and cultural values.
- Excellence in planning, operations and service.
- Respect for nature and the environment.
- Promotion of human and esthetic sensibility.

INSTITUTIONAL GOALS

To accomplish its mission, the institution recruits and develops quality human resources to excel in academic affairs, community involvement, cultural development, international collaboration, and sports. Universidad del Turabo will:

1. Maintain a flexible admissions policy in which each academic school establishes requirements for its programs.
2. Provide services to a diversified student body to help them achieve their academic and personal goals.
3. Foster research to strengthen the teaching and learning processes as well as to improve the quality of life in the surrounding communities.
4. Promote the internationalization of its academic programs through strategic alliances.
5. Develop and implement a systematic faculty development plan to improve academic credentials, pedagogical competencies and instructional technology skills.
6. Recruit and develop quality human resources.
7. Provide academic skills and career-oriented activities to precollege students, as well as opportunities for

continuing education, thus fulfilling the needs of the community.
8. Promote the use of innovative and nontraditional teaching methodologies.
9. Promote ethical values that will allow students to exert their professional judgment and performance responsibly.
10. Foster the preservation and dissemination of those values inherent to Puerto Rican culture in a global context.
1. Establish collaborative partnerships among universities, government, industry, and community organizations.
2. Contribute to students' awareness of their rights and responsibilities as citizens in a democratic society.

ACCREDITATION AND AFFILIATIONS

The Middle States Commission on Higher Education, a regional accrediting agency recognized by the U.S. Department of Education, accredits Universidad del Turabo.

The University is a member of the following organizations:
- College Entrance Examination Board
- American Council of Education
- American Association of Colleges for Teacher Education
- American Library Association
- Hispanic Association of Colleges and Universities
- American Assembly of Collegiate Schools of Business
- National Universities and Continuing Education Association

Universidad del Turabo is accredited by:
- Middle States Association of Colleges and Schools
- Council on Higher Education of Puerto Rico

Universidad del Turabo has established Memorandums of Understanding (MOUs) with several institutions in engineering and science. The affiliations include:
- New Mexico State University
- Georgia Institute of Technology
- Science and Technology Alliance: a consortium of Sandia National Laboratories, Oak Ridge National Laboratory, Los Alamos National Laboratory, New Mexico Highlands University, North Carolina A&T, and the Ana G. Méndez University System
- Rensselaer Polytechnic Institute
- Lawrence Berkeley Laboratories
- University of New Mexico
- Consortium for Minorities in Teaching Careers

Universidad del Turabo has extended its outreach through collaborative agreements on an international scale, promoting the exchange of students and professors with institutions such as:
- Universidad Andrés Bello in Chile
- Universidad Sergio Arboleda in Colombia
- Universidad Nacional Pedro Henríquez Ureña in the Dominican Republic

STATEMENT OF LICENSURE

Licensed by the Council of Higher Education of Puerto Rico. Licensed by the State of Pennsylvania to offer the master's degree in education in the teaching of English as a second language.

CENTRAL ADMINISTRATION & BOARD OF DIRECTORS

Universidad del Turabo is a member of the Ana G. Méndez University System. A fifteen (15)-member board of trustees governs the System. Of these, five (5) are permanent and the board appoints ten (10) for four-year terms. The board is composed of distinguished educators, experienced executives, and civic and community leaders.

The executive officers of the System are: the President, the Vice President for Academic Affairs, the Vice President for Administrative Affairs, the Vice President for Human Resources, the Vice President for Planning and Research, the Vice President for Marketing and Student Affairs, the Vice President for Financial Affairs, and the Legal Adviser. They are appointed by the Board of Trustees.

The System's bylaws define the objectives, powers, officers, committees, meetings and financial affairs of the institutions. They also specify the way in which the bylaws and regulations of each one of the autonomous institutions will be approved.

The Board is the policy-making, legislative and fiscal body of the System. It approves the mission of the System and its institutions, and its annual and special budgets; administers its business; confirms appointments; establishes compensations; approves academic programs and long-range institutional plans; and supervises the distribution of funds.

The Board has four standing committees:
- Executive
- Academic
- Student Affairs
- Finance and Auditing
- Planning and Institutional Advancement

BOARD OF DIRECTORS

Mr. Antonio J. Colorado, President of the Board
Dr. Florabel Mullick, Vicepresident & Permanent Member
Mr. José F. Méndez, President of SUAGM & Permanent Member
Mr. José F. Méndez, Jr., Permanent Member
Mr. Rafael Nadal, Esq., Permanent Member
Mr. José Domingo Pérez
Ms. Zoraida Fonalledas, Esq.
Mr. Juan R. Melecio, Esq.

Dr. Víctor Hernández
Dr. Félix Rodríguez Schmidt
Ms. Daneris Fernández
Sr. Héctor Jiménez
S.E. René A. León
Mr. Ramiro Millán

Gloria Castillo, Secretary of the Board
José E. de la Cruz Skerrett, Esq., Legal Advisor

CAMPUS ADMINISTRATION

OFFICE OF THE CHANCELLOR

Dennis Alicea / Chancellor
Gladys Betancourt / Vice-Chancellor for Administrative Affairs
Iris N. Serrano / Director of Public Relations
Alba Rivera / Assistant Vice-Chancellor of Development
Maricruz Rolón / Alumni Director
Jacqueline Mullen-Hunt / Vice Chancellor of External Resources
Carmen T. Ruiz / Director, Josefina Camacho de la Nuez Musseum and Center for Humanistic Studies
David Méndez / Vice-Chancellor for International Affairs

OFFICE OF THE VICE CHANCELLOR

Roberto Lorán / Vice-Chancellor
María Del C. Santos / Associate Vice-Chancellor
Edna Orta Anés / Associate Vice-Chancellor for Administrative Affairs
Rafael Lozano / Associate Vice-Chancellor for Retention
José R. Pérez Colón / Assistant Vice-Chancellor for Assessment
René Rodríguez / Assistant Vice-Chancellor for Faculty Evaluation and Development
José R. Pérez Jiménez / Interdisciplinary Research Institute Director
Armando Soto / Webmaster

DOCTORAL STUDIES

Sharon A. Cantrell / Dean

SCHOOL OF BUSINESS AND ENTREPRENEURSHIP

Marcelino Rivera / Dean
Brunilda Aponte / Associate Dean
Virgin Dones / Associate Dean
Linda S. Miranda / Administrative Director
Marlin Brignoni / Director of Special Projects
Lillian Hernández / Director of Student Services

SCHOOL OF EDUCATION

Angela Candelario / Dean
Jorge H. Garófalo / Associate Dean, Physical Education Department
Israel Rodríguez Rivera / Associate Dean
Debbie A. Quintana / Associate Dean
Maritza Oyola / Student Services Director
Carmen D. Rodríguez / Administrative Services Director

SCHOOL OF ENGINEERING

Jack T. Allison / Dean
José R. Deliz / Associate Dean
Oscar A. Sáenz / Director, Industrial Engineering Department
Juan C. Morales / Director, Mechanical Engineering Department
José L. Colón / Director, Electrical Engineering Department
Luz C. Vilches / Director, Student Services
Rafael M. Rivera / Director, Institute of Telecomunications (IT+)
Nelson Martínez / Director, Institute of Engineering Technology

SCHOOL OF HEALTH SCIENCES

Ángel L. Rivera / Dean
Carmen M. Pérez Velázquez / Associate Dean for Academic Affairs
Nilda I. Boria / Associate Dean for Administrative Affairs
María E. Rosa / Director, Nursing Department
Nydia V. Bou / Director, Health Professions Department
Milva Vega / Director, Naturopathic Medicine Doctoral Program
Carmen Santiago / Nursing Clinical Coordinator
Nelly González / Student Services Officer
Joannie Ortiz / Administrative Affairs Director
Ana D. Serrano /Administrative Affairs Coordinator
Angeliz Pérez / Academic Affairs Coordinator

SCHOOL OF SCIENCE AND TECHNOLOGY

Teresa Lipsett-Ruiz / Acting Dean & Associate Dean Undergraduate Programs
Fred Schaffner / Associate Dean for Graduate Programs and Research
Carlos J. Olivo / Associate Dean
Griselda Correa / Acting Director, Center for Excellence in Advanced Technologies (CETA)
Ruth Vallejo / Director, Department of Biology
José J. Ducongé / Director, Department of Chemistry and Physics
José Sánchez / Director, Department of Mathematics
Rolando Roque / Director, Institute of Physical and Chemical Applied Research

SCHOOL OF SOCIAL AND HUMAN SCIENCES

Marco A. Gil de Lamadrid / Dean
Tomasita Pabón / Associate Dean, Social Sciences Department
Edward Fankhanel / Associate Dean
Félix R. Huertas / Associate Dean, General Studies Department
Phillip Murray / Director, Language Department
Víctor Manuel García / Director, Communications Department
María M. Ortiz / Director, Social Work Department
Jessica Velázquez / Director, Psychological Services Clinic

INTERNATIONAL SCHOOL OF DESIGN

Aurorisa Mateo / Dean
Rosa Musí / Administrative Director

SCHOOL OF PROFESSIONAL STUDIES

Mildred Y. Rivera / Assistant Vice-President and Dean
José A. Sánchez / Associate Dean

SCHOOL OF TECHNICAL PROGRAMS

José R. Del Valle / Assistant Vice-President and Dean
María E. Flores / Associate Dean

INFORMATION RESOURCES

Sarai Lastra / Vice Chancellor of Information Resources and Director Virtual Library
Luis A. Arroyo / Director, Information Technologies
José Medina / Director, Informatics and Telecommunications
Luisa Torres / Director of the Library
Julie Malavé / Director, Administrative Services

OUTREACH

Héctor N. Miranda / Vice Chancellor of Outreach

OFF-CAMPUS CENTERS

Glorymary Cruz / Director, Off-Campus Center Naguabo and Yabucoa
Juan Rosado / Director, Off-Campus Center Cayey
Carmen L. Rivera / Director, Off-Campus Center Isabela
Carlos E. Maldonado / Director Off-Campus Center Ponce

STUDENT AFFAIRS

Ana Ortega / Vice Chancellor of Student Affairs
Juanita Cruz / Associate Vice Chancellor of Student Affairs
María V. Figueroa / Associate Vice Chancellor of Student Affairs
Betsy Vidal / Assistant Vice Chancellor for Wellness and Quality of Student Life
María del C. Santos Rodríguez / Assistant Vice Chancellor for Internship and Honor Scholarship Program
Carmen Pulliza / Assistant Vice Chancellor, Career and Placement
Zoraida Ortiz / Registrar
Rosa E. Toledo / Associate Vice-Chancellor of Admission and Marketing
Carmen J. Rivera López / Director, Financial Aid
Gabriel López / Bursar
Vacant / Director, Health Services
Angel Vázquez / Director, Social and Cultural Activities
Eva Merced / Administrative Director
Nilda L. Toledo / Student Services Officer
Virginia González / Director, Admissions
Anabel Solá / Director, Recruitment

PHYSICAL FACILITIES, OPERATIONS AND MAINTENANCE

Mayra Rodríguez / Manager, Physical Facilities and Operations
Edwin Calderón / Assistant Manager of Physical Facilities
Julio Colón / Director, Administrative Services
José E. Machuca / Director, Security
Rigoberto Dones / Maintenance Supervisor

Statement of Legal Control
The Ana G. Méndez University System is a private nonprofit corporation registered under the laws of the Commonwealth of Puerto Rico. Its Board of Directors under the systemwide bylaws governs the corporation.

Non-Discrimination Statement
The Ana G. Méndez University System and its institutions do not discriminate on the basis of race, handicap, national or ethnic origin, creed, color, gender, social condition or political, religious, social or trade union beliefs.

LEGISLATIVE BOARDS

The Administrative Council of Universidad del Turabo is the legislative body of the Institution. Its main function is to establish the institutional policy of the University in accordance with the bylaws of the Ana G. Méndez University System. The Administrative Council includes the chancellor, who chairs it, the vice chancellor, the vice chancellor of student's affairs, the manager of physical facilities and operations, the deans of the academic divisions, five (5) faculty representatives, and two (2) student representatives.

The Academic Board recommends the academic policy of the Institution, adopts new academic programs, approves the awarding of degrees and evaluates hiring, contract renewals, promotions, and leaves of absence for faculty members.

The Academic Board consists of the vice chancellor, the library director, six (6) school deans, two (2) student representatives, one (1) faculty representative for each school, and as many elected faculty members as needed to provide for their majority on the board. The chancellor is an ex officio member of the Academic Board.

DOCTORAL STUDIES CENTER

Science and Technology Building
Office 1.2
787-743-7979 Ext. 4270
Fax 787- 743-7979 Ext. 4275
www.suagm.edu/ced
E-mail ced@suagm.edu

Established in 2003, the Doctoral Studies Center (DSC) is an administrative unit whose main responsibility is to provide resources and support services for graduate students who wish to pursue doctoral studies. Through workshops, seminars and conferences, the Center contributes to the University's image of academic excellence and leadership. The DSC also promotes scholarly research among students and faculty.

The DSC is located in the Science and Technology Building and is directed by the Dean of Doctoral Studies. The Dean interacts with all the UT Schools and their respective coordinators of doctoral programs. In this way, the Doctoral Studies Center and the coordinators work together to ensure that all doctoral students are well attended and supported.

MISSION

The DSC is devoted to the advancement of knowledge through research activities and to the establishment of ideal support conditions for UT doctoral students. The Center also collaborates with the six UT Schools to stimulate and enhance academic and scientific experiences.

VISION

The DSC is a key facilitation agent that promotes excellence through academic and leadership opportunities for graduate students by encouraging the development of research activities.

SUPPORT SERVICES

The Doctoral Studies Center is actively involved in the recruitment, retention and graduation of doctoral students at UT. To this end, the Center provides assistance from the initial application stages to the completion of a doctoral degree. Hence, the Center supports the following initiatives:

- Academic and career advising
- Professional development seminars
- Group study areas
- Doctoral resources study room
- Doctoral level bibliographical services
- Laptop loan program for doctoral students
- National and international conferences
- Science authors recognition program
- Doctoral studies council
- Doctoral fellowships and scholarships database
- Teaching assistant and research assistant programs

Ultimately, the Doctoral Studies Center is a clearinghouse of information and resources to ensure the graduate students' successful completion of an advanced degree while enhancing their personal, social, academic and professional experiences.

MULTIDISCIPLINARY ENTREPRENEURIAL PROGRAM FOR INNOVATION (MEPI)

The aim of this program is to instill entrepreneurial skills, in order to facilitate graduates' transition from the academic environment to professional life, and to increase their motivation to start their own businesses. It presents students with the option of a non-traditional learning environment which allows them to apply technical skills long before they would learn about them in traditional lecture classes. This initiative fosters the creation by UT students of small business enterprises, thus providing a pathway toward the diversification of employment in Puerto Rico. It also promotes and encourages a framework of collaboration between the university and industry, contributing in this way to the economic development of Puerto Rico's East Central region.

Important MEPI activities include an extensive learning environment that is centered on multi-disciplinary, active, discovery-based learning, and the formation of student enterpreneural work teams that operate using real life private enterprise paradigms.

Objectives:

- Develop in students an entrepreneurial attitude resulting in the creation of new services and enterprises.
- Contribute to Puerto Rico's economic development

Students must enroll in the MEPI for six continuous semesters. Each student enterprise will be required to address and complete at least two major projects. Over a three-year period, student tasks and responsibilities will vary, contributing different elements as students progress in their levels of technical expertise, maturity and seniority. The MEPI track is registered on the student's transcript.

The MEPI Option replaces 12 credits of existing courses within the programs. These twelve credits are distributed as follows:

MEPI 351	New Venture Creation	1
MEPI 352	Legal Issues of Entrepreneurship	1
MEPI 353	The Business Plan	1
MEPI 455	Enterprise Project I	3
MEPI 456	Enterprise Project II	3
Elective (to be chosen from a list provided by the school)		3

RESEARCH INSTITUTES

TELECOMMUNICATIONS INSTITUTE (IT+)

Under the direction of Dr. Jintao Xiong, and Dr. Jeffrey Duffany, The Telecommunications Institute (IT+) of the School of Engineering of the Universidad del Turabo has installed the most advanced technology in the area of convergence of telecommunications technologies and in the critical area of Network Security in Central America.

The Telecommunications and Information Resources Center specializes in the following research areas:

- Design of Convergence Networks
- Network Security Practices and Issues
- Verification, Validation and Certification of Software Products

The installations are divided among three laboratory facilities: the Telecommunications Technologies lab, the Operating Systems lab and the Network Security lab. The main technologies available in these labs are as follows,

- IP Telephony and Digital Telephony
- Layer two and three switches
- Wireless Network
- Windows Servers
- HP-Unix Servers
- Linux Development Environment
- PABX Optic Fiber
- Cisco Routers
- Sun Microsystems Blade Servers
- Computers available: over 100
- Digital and Plasma projection facilities and equipment
- Conference Room
- Windows, Unix and Linux programming environments

PUERTO RICO ENERGY CENTER (PREC)

The Puerto Rico Energy Center will be an R&D facility in solid waste disposition and renewable energy. The technological areas of the center are plasma gasification and vitrification, photovoltaic solar cells, and fuel cells. The center will be available for demonstrations of potential applications benefiting municipalities, the pharmaceutical industry, and other private and public partners, helping to promote R&D efforts and business development. It will provide education, awareness, and technical assistance activities on renewable energy, with a particular interest in environmentally friendly solid waste treatments.

Under the leadership of Dr. Jack T. Allison, Dean of the School of Engineering, PREC will concentrate its efforts on the implementation of the project´s first phase activities:

- Construction of new PREC facilities
- Development of Cruise Ship Solid Waste Disposal Prototype
- Establishment of initial research activities related to:
- Residue Composition Analysis
- Hydrogen Production
- Fuel Cell Laboratory activities

INTERDISCIPLINARY RESEARCH INSTITUTE (I^3 FOR ITS SPANISH ACRONYM)

The goal of the Interdisciplinary Research Center is to establish research projects that transcend basic research in the basic sciences, environmental and biomedical sciences. The objectives of this Center are to:

- Foster internal interdisciplinary research projects to support the professional development of UT faculty

- Foster interdisciplinary research projects with external collaborators that are relevant to the UT vision and mission.

- Establish a high-quality research center that acts as a liaison between academic and research institutions in the United States and Latin America.

The I^3 Research Center is funded through federal and local research grants. In addition, the Center will sponsor conferences, workshops, educational trips, and consulting opportunities to supplement their grant funded income.

The Center will concentrate its efforts to establish partnership with federal agencies such as: NASA, NSF, and NIH, as well as, US EPA, NFWF, USGS, NOAA, and TNC.

The Director of the Center, Dr. José R. Pérez Jiménez, is currently involved in various interdisciplinary research projects with all the previously mentioned agencies. Some examples are:

- Las Cucharillas: Wetlands Management Project
- Environmental Health and Toxicology Vieques Project
- Disaster Prevention and Management
- SIG and Environmental Informatics
- Environmental Disaster Mitigation
- Bridges to the Doctorate
- Environmental Assessment Center in Cabo Rojo
- Fellows Enhancing Science and Research
- Environmental Education School Network
- Asthma Prevention and Management
- Justice, Education and Environmental Information Awareness Program
- Professional Development Initiatives for Teachers
- Environmental Professional Development Certification Institute

INTERNATIONAL CENTER OF ENVIRONMENTAL AND SUSTAINABLE DEVELOPMENT STUDIES (CIEMADES)

CIEMADeS is an international R & D initiative involving Puerto Rico, the Dominican Republic and Haiti; its purpose is to address environmental and sustainable development issues in these three Caribbean countries. This

collaboration is driven by the Caribbean area's insufficient environmental protection, increasing population density, territorial limitations, lack of social awareness regarding the environment, increasing and urgent economic developments, and the need to strengthen specialized government infrastructures.

Through CIEMADeS, these three countries will be able to: focus attention on regional issues, share experiences and available resources, and facilitate academic and scientific synergy-related activities. The following initial projects have been proposed to establish this international initiative:

- Host a regional conference to discuss environmental and sustainable development issues
- Develop a human resources (environment and sustainable development) experts inventory
- Characterize environmental and sustainable development parameters
- Create a regional environmental resources database to be used as a baseline
- Establish a post graduate scholarship program
- Develop a formal and informal environmental curriculum

IMPORTANT NOTE:
This catalog contains the major points of the current agreements between the students and Universidad del Turabo. The University limits its agreement to the semester or session in which the student is duly enrolled and for which (s)he has paid the corresponding fee.

It is the student's responsibility to know and comply with the rules expressed herein, which coincide with current bylaws and regulations of the University, the administrative resolutions, and the federal laws on civil rights.

ADMISSIONS

GENERAL ADMISSIONS REQUIREMENTS

Students wishing to be admitted to Universidad del Turabo undergraduate programs must meet the following requirements:

1. File an application with the Admissions Office within the stipulated time limit.
2. Graduate from an accredited high school or complete studies equivalent to high school and submit the necessary certifications.
3. If 25 years of age or less, take the College Entrance Examination Board and the test of the Diagnostic and Placement Center (DPC) of Universidad del Turabo. Students over the age of 25 will take the DPC test.
4. Possess the minimum admission index approved by the Academic Board. Candidates with an index below the minimum must be interviewed to determine eligibility.
5. Submit a $15.00 nonrefundable application fee.
6. Candidates for programs with additional admission requirements, such as additional tests, interviews and letters of recommendation, must comply with these requirements.

ADMISSIONS FORMULA

Admissions will be determined by the Admission Index formula. It is computed using the results of the following areas of the College Entrance Examination Board: verbal aptitude, mathematics aptitude and English achievement. The high school grade point average is also considered.

ENGLISH/SPANISH PLACEMENT TEST

1. Incoming first-year students **MUST** take the UT placement exam. Information about when and where the tests are offered is provided to entering students by the Vice Chancellor of Student Affairs.
2. The placement exams are used to assess the performance of entering students in the fundamental subjects of Spanish and English. The scores of these tests are used to place students in courses that are appropriately challenging.
3. Students with Advanced Placement College Board Scores of 4 or higher in English or Spanish are exempt from taking the English/Spanish Placement Test and are placed automatically in second year English/Spanish.
4. If you are a **transfer student** and your transcript has been evaluated by your admitting college, then you may have already received credit for a particular English/Spanish course. Your college will alert you to the next English/Spanish course you will need to take.
5. If you are a **transfer student who has NOT been given transfer credit for an English/Spanish course**, you will need to take the placement test.
6. Students who have not taken English/Spanish **MUST** take the Universidad del Turabo placement exam before enrolling in any English/Spanish course.

READMISSION

1. Students must apply for readmission if they interrupted their studies and did not attend the university for one semester or longer. (Summer sessions do not count as interruptions.)
2. Students must complete the required number of credits for their **year of study.**
3. Students must comply with the requirements of the study program of their choice as well as other general requirements that may apply.
4. In order to be readmitted, the period of suspension for academic or disciplinary reasons must have elapsed.

5. Candidates for readmission may be required to have an interview with the Admissions Committee. It is comprised of the Vice Chancellor of Student Affairs or his representative, the Director of Admissions, the Vice Chancellor for Wellness, the Registrar, the Vice Chancellor or his representative and the dean of the school. In special cases, the Committee will have the final authority to determine admissions.

TRANSFER STUDENTS

Transfer students are considered for admission if they have followed a course of study in an accredited university and have completed no fewer than 12 credits in the institution from which they proceed. Their grade point average (GPA) must be above the institutional minimum requirement. The students must not be under academic or disciplinary sanction in the institution from which they proceed.

In order to be admitted, students wishing to transfer must meet the requirements of the program of their choice. The Admissions Committee can evaluate applications.

COURSE VALIDATION

Transfer students have the option of validating courses taken no more than 12 years prior to admission for equivalent courses offered at Universidad del Turabo. The students must have a minimum grade of C in each course.

ADVANCED PLACEMENT TEST

Credit will be granted for the Advanced Placement Tests of the College Entrance Examination Board if the score obtained is 3 or more, on a scale of 1 to 5.

PRE-COLLEGE COURSES

Credit will be granted to students for courses offered by Universidad del Turabo at the high school level. These courses must be in addition to those required for graduation and must be approved with a grade of A, B or C. The various schools will establish the grades required in the courses to be credited.

The Pre-College Program will keep record of the student's progress and will send evidence of the completed courses to the Registrar's Office, after the student is officially admitted to the University. This documentation will become part of the student's file.

RESIDENCE

All transfer students must observe the following rules to obtain residence at the University in order to qualify for graduation:

1. Complete the last (30) thirty credits of their bachelor's degree at Universidad del Turabo, (12) of which must be in their major field of study.
2. Successfully complete the last twelve (12) credits of the associate degree at Universidad del Turabo.
3. Twelve (12) credits of residence (set by each program) will be required of students from Off-Campus Centers.

TRANSIENT STUDENTS

Transient students must be authorized by their own university to take courses at Universidad del Turabo for no longer than two academic semesters.

Universidad del Turabo admits visiting students or auditors. They must apply for admission within the time limit established by the Admissions Office. They must attend their regular courses but will receive no credits or grades. These students are not eligible for financial aid.

Authorization for enrollment of transient students and auditors does not constitute a formal admission into the institution, and it terminates at the end of the academic session for which it was granted. To obtain regular student status, students must comply with the admission requirements in force at the time when the application for admission was filed. All applications are subject to an interview by the Admissions Committee.

INTERNATIONAL STUDENTS

The Universidad del Turabo accepts foreign students as permitted by immigration laws. Foreign students are subject to the admission, readmission and transfer requirements established by the Universidad del Turabo.

EFFECTIVE DATES

Admission or readmission at Universidad del Turabo will be valid for one semester of the academic year, beginning on the date it is granted. Applications that do not include the required documents, or that do not meet all the established requirements, will be considered provisional. If all the documents are not received within 60 days from the first day of class, the institution may invalidate the provisional admission.

Applications forms should be requested from:

UNIVERSIDAD DEL TURABO
ADMISSIONS OFFICE
P O BOX 3030
UNIVERSITY STATION
GURABO PR 00778
TELEPHONE: (787) 746-3009

TUITION AND SPECIAL FEES

Once a year the Office of the Vice President of Financial Affairs publishes a circular letter with information about tuition costs for all academic programs, and special fees for student services at Universidad del Turabo. Upon request, this document is available at the Bursar's Office to students and to anyone in the institution who requests it.

Tuition, fees and service charges must be paid in full during registration or at the time the student requests services. Payments can be made in cash or by check, money order, debit cards or credit cards. Receipts for all transactions must be requested and retained, and presented with any claim or request for adjustment. The Bursar's Office will not accept claims without receipts.

In accordance with established rules and regulations of the institution, the Ana G. Méndez University System may amend standards and tuition fees.

The Deferred Payment Plan is available to parents, tutors or adult students who do not receive financial aid. The recipient will sign a promissory note and payments will be made on or before the specified date on the promissory note. If the University is forced to contract legal or collection services in order to collect, the student will pay the legal and/or agency fees.

CLEAR STATEMENT

Students with an outstanding debt balance will not be allowed to take final examinations until such balance is paid in full. Upon receipt of payment, the Bursar's Office will issue a Clear Statement, which must be presented by the student at each examination. Students who do not comply with this requirement will receive a grade of Incomplete and will be required to pay a $20.00 fee for each Incomplete grade in order to have it removed from the record.

ADJUSTMENTS AND REFUNDS

Active students who request total withdrawal before 60% of the registration period has ended will receive an adjustment in the fees and assigned funds in accordance with federal regulations for programs with Title IV funds. In addition, students identified as NA (not attending) a course will be charged a 12% fee for each course in which they enrolled. These fees will not be covered by federal funds. During the add/drop course adjustment period, students can add or drop sections without additional cost.

FINANCIAL AID

Universidad del Turabo makes every effort to help its students obtain government financial aid for those who are unable to begin or continue their university education without such aid. There are three categories of financial aid: scholarships, loans and work-study programs.

SCHOLARSHIPS

Scholarships are granted according to the educational and financial needs of the student. Only undergraduate students are eligible to receive funds through Pell Grants. However, a Free Application for Federal Student Aid (FAFSA) application is needed to determine the student's eligibility for other federal aid programs.

STATE FUNDS

The Council of Higher Education of Puerto Rico provides funds to supplement the cost of graduate education. This aid applies to all students who are eligible according to the student's eligibility index provided by the FAFSA evaluation.

FEDERAL DIRECT LOANS

The Financial Aid Office will recommend and process the loan directly to the U.S. Department of Education in its electronic form. This loan must be repaid in cash; the repayment should begin six (6) months after the student graduates or ceases to study. The Federal Government will pay the interest while the student is enrolled in a recognized post-secondary institution. The interest is variable but does not exceed 8.25 percent. Borrowers should check the interest rate on their promissory note.

WORK-STUDY PROGRAM

This program provides jobs for undergraduate and graduate students. The Financial Aid Office assigns a specific amount of hours that the student works on campus.

FAMILY FEDERAL EDUCATIONAL LOANS PROGRAM

The Financial Aid Office will recommend and process the loan directly to WACHOVIA in its electronic form. This loan must be repaid in cash; the repayment should begin six (6) months after the student graduates or ceases to study. The guaranty agency HIGHER EDUCATION SERVICES CORPORATION will pay the interest while the student is enrolled in a recognized post-secondary institution. The interest is variable but does not exceed 8.25 percent. Borrowers should check the interest rate on their promissory note.

FINANCIAL AID APPLICATION AND RENEWAL

The deadline for application or renewal of financial aid for the academic year is May 2. Applications received after this date will be classified as late applications and will be processed as such after receiving the applications submitted on time. Late applications will be reviewed if funds are available. Students who have participated in the financial aid program during the first term do not need to renew their financial aid program during the same academic year if they comply with the requirements for continuing in the program. Financial aid must be requested through the FAFSA form on the Web, in person at the Financial Aid Office or by mail at:

Universidad del Turabo
Admissions & Financial Aid
P O Box 3030 University Station

Gurabo, Puerto Rico 00778

The FAFSA includes the list of requirements and documentation necessary to apply for financial aid.

Important Note
The above-mentioned aid is conditioned to the availability of the respective federal, state and institutional funds. It is the student's responsibility to take the steps necessary to obtain financial aid from the government. Such aid is directed to the student as a citizen and not necessarily to the University. Universidad del Turabo is a private, secular, nonprofit institution, and is independent of any government.

The institution fully complies with the Privacy Rights of Parents and Students Act of 1974 (Title IV of the U.S. Public Law 90-247), as amended, which specifically governs access to records maintained by institutions to which funds are made available under any federal program for which the U.S. Commission of Education has administrative responsibility, and the release of such records. Such institutions must give parents of students access to official records that are directly related to the students and an opportunity for a hearing to challenge such records on the grounds that they are inaccurate, misleading or otherwise inappropriate.

Institutions must obtain the written consent of parents before releasing or relinquishing data with personal identification from the records, except to certain specified parties. (Parents and students must be notified of these rights transfer to students at certain points, and an office and review board has been designated at the federal office of Health, Education and Welfare to investigate and decide on complaints and violations of this law.

*In order to receive financial aid, students must comply with the Satisfactory Academic Progress Policy.

ACADEMIC REGULATIONS

REGISTRATION FOR COURSES

a. The Vice Chancellor of Student Affairs establishes the period for the registration process and includes the enrollment period in the calendar.
b. Students are required to register during the period specified in the calendar.
c. The official notification of admission is required to begin the enrollment process.
d. For registration to be official, the bursar must validate the student's program-receipt.

Students are also required to register during the assigned calendar period, for day or evening, sessions, and this information will become part of their academic record. The institution has the right to change the time, the calendar or the classrooms of announced courses and to close or eliminate sections or courses from its academic offerings.

CLASSIFICATION OF STUDENTS

Full-time regular students are those who have registered for programs of no less than twelve (12) credit hours and are degree-seeking candidates. Part-time students are those with an academic workload of six (6) to eleven (11) credits hours and are degree-seeking candidates.

ACADEMIC LOAD

Academic load will not exceed twelve (12) credits per term for students with a GPA of 2.00 or less, and eighteen (18) credits per term for students with a GPA of 2.01 to 3.00. An academic load or more than twenty-one (21) credits will require prior approval by the dean of the school.

For summer sessions, academic load will not exceed twelve (12) credits, distributed over two (2) sessions. An academic load or more than twelve (12) credits will require prior approval by the dean of the school and a referral by a counselor.

ATTENDANCE

Class attendance is required. Students are responsible for the academic work done in class during their absence. The professor will report to the Office of the Registrar those students who have not attended three (3) consecutive classes during a semester without a reasonable excuse, or two (2) classes in a summer session. The professor will also refer the student to the Student Services Coordinator. WN (Non Attendance) will be placed on those students' academic records at the end of the term.

GRADING SYSTEM

The Office of the Registrar distributes final grades after the end of each term. Students are graded according to the following system of letters and percentage values.

A	(90-100)	=	excellent
B	(80-89)	=	good
C	(70-79)	=	average
D	(60-69)	=	deficient
F	(0-59)	=	failure

A – 4 grade points per credit hour
B – 3 grade points per credit hour
C – 2 grade points per credit hour
D – 1 grade point per credit hour
F – O grade points per credit hour

In special cases the following grading system will be used:

W - Official Withdrawal
I - Incomplete Work
IP - To be awarded only with the Registrar's permission in courses that span more than one term.

P - Passing Grade – Grades of P are not counted toward grade point average.
NP - Failure
NR - Not Reported
* - Repeated Course
WA - Administrative Withdrawal
WN - Non Attendance – enrolled but did not attend classes.
AU – Audit Course
T – Transfer Credit

GRADE CHANGES

Students who believe that there is an error in one or more grades should notify the Office of the Registrar within the first thirty (30) calendar days of the beginning of the next session. Students who do not receive their grades at the end of any semester should immediately contact the Office of the Registrar.

An instructor may change a previously assigned grade by processing an official change of grade form in the Registrar's Office. The instructor must request the grade change form, cite the reason for changing the grade, and submit it to the school or program dean(s) for approval. All grade changes must be submitted to the Registrar's Office no later than the last day of class of the following semester.

GRADE APPEALS

If the student feels that he or she has not been graded fairly, (s)he should first consult the professor. If this proves unsatisfactory, the student should then consult the dean of the school or program. If still unsatisfied, the student may consult the Vice Chancellor and submit an official grade appeal to the Registrar's Office. A committee hearing will be scheduled.

INCOMPLETE "I" GRADE

The student will receive a provisional grade of INCOMPLETE only in the case of a justifiable absence from the final examination and if there are a minimum of three partial grades required in the course.

The opportunity to make up the examination or final project will be offered only to those students who have a chance of obtaining a minimum final grade of "D".

It will be the responsibility of the student in question to make the necessary arrangements with the professor or dean of the corresponding area to determine the final project and to change the INCOMPLETE.

The INCOMPLETE (I) status can be changed if the student completes the required work within the first thirty (30) days of the next academic session, in accordance with the established dates of the academic calendar.

The student who, due to the INCOMPLETE received in one or more courses, does not demonstrate academic progress will recuperate financial aid once the INCOMPLETE is removed in accordance with institutional norms, providing that this occurs within the deadline established by the federal government for assigning such aid has not elapsed.

For the purpose of evaluating a student's satisfactory academic progress at the end of the academic year, the (I) will be considered. After the removal of the Incomplete (I), he or she can appeal the institutional decision regarding academic standing.

REPEATING COURSES

Students may repeat a course in order to improve their academic average. Credit will be given for the higher grade, which will be used to compute the grade point average. If the grade in the second attempt is the same as the first, only one will be used to calculate the cumulative average.

a. Students who wish to repeat a course may do so. However, they **must** repeat all courses required for graduation where a D, F, W, or WF grade was obtained.
b. The institution will allow students who earned a C, D, F, W or WF, WN in a course, to receive financial aid to repeat the course provided that 150% of the intended courses have not been exceeded.
c. Students who repeat a course will receive the higher grade.
d. If the grade obtained in a repeated course is the same as the previous grade, it will count for the cumulative average but will count only once for the graduation GPA.
e. eWith respect to practicum courses, the student will have only two opportunities to repeat the course pending the recommendations and approval of the program dean and practicum supervisor.
f. A student will not be able to repeat the course until a grade has been posted.

WITHDRAWALS

Students wishing to officially withdraw from a course or from the institution must file an application with the Office of the Registrar within the period established in the academic calendar. A reduction in course workload may jeopardize the student's financial and/or veteran's benefits. The academic standing of the student will not be affected by partial or full withdrawals from the institution so long as the withdrawal is carried out before the end of the period specified by the institution for tuition refund eligibility. In the case of full withdrawal from the institution, the student will be considered not to have studied that semester.

Dropping courses or withdrawing from the institution after the end of the above-mentioned specific period will affect the academic standing of the student. The student will be classified in the category in which he or she falls at the end of the period for withdrawal eligible for refund of registration fees.

CHANGES IN THE PROGRAM OF STUDIES

Students can apply for a reclassification in a program or major if they comply with the following:

1. Have an interview with the school dean
2. Apply for reclassification at the Office of the Registrar.

Students can apply for only one reclassification during a semester. No applications will be considered during the summer. The applications must be submitted within thirty (30) calendar days after the third week of class of each semester.

All enrolled credits and the cumulative average from the student's previous program will be considered for the purposes of the Satisfactory Academic Progress norm of the program into which the student has been reclassified.

STANDARDS FOR ACADEMIC PROGRESS

There are three categories of regular students according to their grade point average and number of courses completed: students with excellent achievement; students with satisfactory achievement; and students on probation. Students with a satisfactory academic progress are those with a grade point average equal to or higher than the established retention index and who satisfy the percentage of approved credit hours established by the academic norms.

At the end of each academic year, the Registrar will determine the grade point average (GPA) and the credit hours required of each student per academic year. This information will be measured against the established retention standards in order to determine the academic status of the student.

Academic progress of students admitted as transfer students will be evaluated for retention purposes at the end of their first year; credits and grade point average prior to that year will not be considered.

ACADEMIC PROBATION

Students whose academic achievement is below the established retention index or who do not complete the percent of approved credit hours required according to regulations will be placed on academic probation for one (1) year, during which time they will be eligible for economic assistance. For students of Technical Programs, the probation period will be for one (1) semester.

Upon completion of the probation period, students must meet the required percentage of credit hours and grade point average as established by their academic degree program.

For retention indexes, and percentage of credits required see Appendix.

ACADEMIC SUSPENSIONS

Students will receive a one (1) year academic suspension if the cumulative academic index is lower than the retention index, or if they have not met the percentage of required credit hours upon completion of their probation period.

The University will not accept courses, diplomas or degrees earned by a student during the academic suspension period.

Students who wish to be readmitted upon completion of their academic suspension period must meet the current university readmission requirements.

Students who interrupt their studies or program during the probation period will still be considered on probation during the readmission process.

Readmitted students who have completed their one (1) year suspension period will be evaluated by the Admissions Committee of their academic program. Upon readmission, students will be placed on probation for a second period.

If a student does not meet the required retention index and the percentage of approved credit hours during the second probation period, he or she will be suspended academically for a maximum period of two (2) years.

The institution may suspend a student on recommendation of the Disciplinary Committee or the Vice Chancellor of Student Affairs, following the dispositions of the Student Regulations available in the Students' Rights and Responsibilities Manual.

Under extraordinary conditions, the Academic Suspension Appeals Committee may approve an additional probation period of one (1) year if a student is able to complete all the graduation requirements within that academic year.

APPEALS

a. A student may appeal an institutional decision regarding satisfactory academic progress, if under extenuating or crisis circumstances he or she was not able to meet the requirements or conditions established by the University.
b. The University will consider the following crisis or extenuating circumstances to accept a student's appeal and to grant an exemption from the Academic Progress

Policies: illness of the student or a relative, economic crisis due to illness affecting the head of household, natural disasters, divorce, death in the immediate family, family problems, legal circumstances, and justified changes in academic objectives which cause an impact on the student's academic progress.

Appeals Committee

A. The Appeals Committee will be composed of one representative from each of the following offices: Dean of the School, Registrar, and Vice Chancellor for Student Affairs or designated representatives.

Appeals Application

A. Students who meet any of the academic progress appeals criteria must submit all the necessary documentation to justify their request.
B. If a student requests an appeal based on a mathematical or calculation error, and it is corrected by the Office of the Registrar, he or she will not go through the full Appeals process.

REINSTATEMENT OF FINANCIAL AID

If a student's appeal is accepted by the Appeals Committee, he or she will be eligible to receive financial aid as long as he or she meets the federal financial aid deadlines and guidelines.

Appeals decisions are issued in writing by the Office of the Vice Chancellor for Student Affairs. This communication is issued by the Office of Admissions and Financial Aid to reinstate a student's financial aid package.

If a student meets the conditions regarding his or her academic progress or those related to any academic sanction, he or she will be eligible to receive financial aid during the following enrollment period.

STUDENT RIGHTS AND RESPONSIBILITIES

A Students' Rights and Responsibilities Manual, available to all students, sets forth the rights of students, along with corresponding responsibilities. This document also addresses issues associated with the relationship between the student and the University. It provides information on protection in academic pursuit and privacy of records; sets forth all the conditions for responsible behavior on the campus; lists the various appeal and grievance procedures available to students; and includes a section on student discipline with control and discipline of college students. This document complies with relevant federal regulations such as the awarding of financial aid, protection of privacy of records, and equal access/equal opportunity.

FAMILY RIGHTS AND PRIVACY ACT INFORMATION STATEMENT

Universidad del Turabo has a longstanding commitment to protect students' rights and privacy of information. This commitment will continue as a matter of University practice. The University complies with the provisions of the federal Family Rights and Privacy Act. These federal and state requirements relate to accessibility and confidentiality, provide pertinent and detailed information concerning classification of student records, and access and release provisions.

University procedures are available to students, faculty, administration, and staff in the Office of the Vice Chancellor of Students Affairs, as well as in other offices and departments of the campus. In addition, the complete procedures are published in the Student Manual.

RELEASE OF STUDENT INFORMATION

In accordance with Public Law 93-380, FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT, students at Universidad del Turabo have the right to inspect educational records and to correct such records as warranted. The institution protects students from release of information for inspection and review unless he or she waives this right. The parent(s) of U.S.C.S.s. 152 Internal Revenue Code also has the right to inspect records, which are maintained by the University on behalf on the student.

There are two distinct categories of records: (1) directory information records, and (2) limited access records.

1. Directory information, which may be made public, includes the student's name, last known address, telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student. The office of the Vice Chancellor of Student Affairs will only release this information after the petitioner has demonstrated a legitimate need to have such information. Students who do not wish release of "directory information" must complete a statement in the Office of the Registrar no later than the last day of each term; otherwise, directory information may be disclosed by the University for legitimate purposes.

2. Limited access records pertain to the permanent academic records of the student, disciplinary records, financial information, and testing data. This category also includes all records maintained officially by the institution which do not come under the categories of

directory information, or sole possession records. The institution will not release information in limited access records unless it has the written permission of the student or parent.

GRADUATION REQUIREMENTS

Undergraduate students of Universidad del Turabo will be eligible to receive academic degrees after meeting the following requirements and procedures:

1. Students must apply for graduation at the Registrar's Office during the period established in the academic calendar.
2. Completion of the courses required for the degree as set down by the institution.
3. Completion of the number of credit hours required for the degree with a minimum grade point average of 2.00.
4. The minimum grade point average in the major is 2.30.
5. To compute the grade point average for graduation, only successfully completed courses which were requirements for the degree or certificate will be considered.
6. All students who enter Universidad del Turabo will be subject to the graduation requirements in force during the year they were admitted. Nevertheless, if the curriculum was modified, the student can choose to graduate under the new curriculum, but not by a combination of both.
7. Transfer students must complete at Universidad del Turabo at least the last thirty (30) credit hours of a bachelor's degree and the last twelve (12) credit hours of an associate degree. The student must complete the last twelve (12) credits of his/her major at Universidad del Turabo.

Students must also settle any debts with the institution. No document certifying graduation will be given until documentation has been presented that there are no outstanding debts.

All students applying for readmission will be subject to the requirements for graduation in effect during the year they are readmitted.

Commencement exercises will be held once a year, at the end of the second academic semester. Students who meet graduation requirements at the end of any term or summer session may apply to the Office of the Registrar for a certification to that effect.

GRADUATION WITH HONORS

Students are eligible for the following honor designations:

Cum Laude	Average of 3.50 to 3.69
Magna Cum Laude	Average of 3.70 to 3.89
Summa Cum Laude	Average of 3.90 to 4.00

Transfer students may graduate with honors if they obtain a grade point average of 3.50 or higher in a minimum of 60 credits at Universidad del Turabo.

COURSE VALIDITY

Credits earned through courses taken at Universidad del Turabo or at an accredited institution will be valid for a maximum of 7 years. After that period the credits will lapse.

STUDENT SERVICES

Universidad del Turabo improves and advances the student experience by streamlining its student services into one centralized location, the Integrated Student Services Center (CISE, from its Spanish acronym). The purpose of this Center is to provide competent professional assistance in two areas: (1) Enrollment management services and (2) Academic and personal support services. The Vice Chancellor of Student Affairs oversees the development and growth of these areas.

ENROLLMENT MANAGEMENT SERVICES

The **Office of Marketing and Recruitment** recruits new students, transfers and readmissions. It disseminates information on UT academic offerings, strengths and services through various promotion and recruitment activities. It coordinates and offers orientation activities to recruit students into doctoral and graduate programs by means of integrated campaigns. The Office develops year-round activities of recruitment with key personnel of the schools.

The **Admission and Financial Aid Office** offers financial aid orientation, evaluates and processes admission requests and admits students within the parameters established by each school. It also analyzes documentation and assigns state, federal and institutional funds, while maintaining communication with the student on the status of his/her request for admission and financial aids. Among others essential functions, the Office coordinates the process of interviews and admission of prospective students with the different schools. It also administers and coordinates Title IV programs and processes the funds of proposals, athletic, administrative and honor scholarships.

The **Bursar** is responsible for applying the fee policies and administering the payment plans that guarantee institutional incomes. This officer notifies and monitors the compliance of the fiscal policy established by the Vice Presidency of Financial Affairs, establishes the process of validation of registration, administers the application of federal funds refund policies and registers the private and public contracts of agencies. It also applies refund processes and the emission of checks to students, registers payments and maintains the collection system of the students' accounts.

The **Office of the Registrar**, in addition to handling student registration each term, provides various services for students. This office provides transcripts of students' academic records, verifies and certifies enrollment status, mails final grade reports, processes grade changes, orders and issues diplomas, processes changes in name, address, and telephone number.

ACADEMIC AND PERSONAL SUPPORT SERVICES

These services are provided in a variety of forms and settings, including individual counseling and educational groups, workshops, seminars, formal classes, as well as the traditional one-on-one tutorial sessions. The Center's staff has been professionally trained and they are committed to helping students to make the most of their university experience. All services are provided on a strictly confidential basis, and respect the individuality of each student.

Counseling Services are available to students with educational, personal, and decision-making concerns. A wide variety of programs, workshops, counseling opportunities and informational materials are provided to help Turabo students meet the challenges of university programs and experiences. There are individual counseling and testing services for occupational and educational assessment. These services are offered by two units, each targeting different needs and special populations: (1) Quality of Life and Student Well-Being Services and (2) Student Development and Retention Services. These services are offered from 8:00 am to 7:00 pm, Monday through Thursday, 8:00 to 5:00 pm on Fridays and from 9:00 to 12:00 on Saturdays.

The **Quality of Life and Student Well-Being Office** designs, develops, and promotes an extensive system of programs, services and activities that facilitate the integration of multidisciplinary resources to create an atmosphere of respect, welfare and quality of life. The office promotes an ecological model of health, which encourages healthy life styles through activities related to awareness and education on topics such as violence prevention and the use of drugs, alcohol, and cigarettes. The Office encompasses, counseling and multidisciplinary services, a health services program, an education and prevention program (PREVEA), a community connection program, volunteer projects and student organization support. It also serves as a resource center for Internship and practicum students.

In addition, this office coordinates the "Easy Access" Program, which offers special services for disabled students. These services include: parking, educational goal planning, tutoring and other student needs. The students should register with the program at the beginning of their admission process.

The **Student Development and Retention Services Office** is responsible for promoting the integration and adjustment of new students. It articulates the administration of diagnostic tests and carries out the academic orientation and counseling of first and second year students. The Office articulates projects for the improvement of the academic performance and retention in association with the schools and off-campus centers. Individual and group counseling services, tutoring, extra-curricular activities and peer support groups are offered to improve new students' adjustment processes to university life.

Academic Development and Support Services are available through two complementary programs of the Student Development and Retention Services Office. Their services are developed through funds awarded by the federal Department of Education and by other institutional funds. The Complementary Educational Services Program and the Supplementary Instruction Program promote support services for students with academic difficulties through tutoring, mentorships and supplementary instructional activities.

Career and Placement Services are offered by the Office of the Assistant Vice Chancellor of Career and Placement. This office is responsible for satisfying the employment needs of students, alumni and community members and for improving their employment skills, increasing productivity and competences, thus bringing about the client's effective placement. The office functions as a "one-stop" career center and through diverse alliances with the government's Employment Center (Consortium Caguas-Guayama), integrated services are offered such as counseling, vocational testing, evaluation of employment skills, preparation of resumés and letters of presentation, referrals to governmental agencies and access to Puerto Rico's Department of Labor updated employment offerings through a technological laboratory of resources.

To assist students in career planning, a career reference library is provided with the center's printed, audio and videotape materials about specific occupations, skills, and requirements for jobs, educational and career matters. The computerized occupational information system provides current educational, and labor market requirements, skills specification and other information to be used in the decision-making process. Consulting services for student, faculty, administration and community members are offered through this unit. An active job placement assistance program maintains continuous communication with employers. A computer database of prospective

employers is in use. Students may register for part-time and full-time jobs or seasonal employment while pursuing their academic programs. Vocational counseling services are also offered to high school students from nearby communities.

The services are sponsored by institutional funds and with funds from two federal proposals: Hispanic-Serving Institutions Assisting Communities (HSIAC) Program and AmeriCorps Vista.

The **Scholarship and Internship Program** provides the opportunity for active students to request special scholarships and permits students to participate in academic-professional and research opportunities in different companies and educational institutions globally. The activities promoted by this office complement the student's academic development and allow the development of professional abilities and personal skills to be integrated successfully in the work force. It also assists talented high school students in completing their university studies in the SUAGM. This program is funded by corporate, private, public, and institutional funds.

HEALTH SERVICES

Services are located in the CISE building. The health services staff consists of a part-time physician and a registered nurse. Their primary purpose is to provide students with emergency and ambulatory services. The student health services stress the concept of well-being and preventive medicine. Health education and counseling are available as well as treatment for medical problems. The staff is on duty Monday through Thursday from 8:00 a.m. to 8:30 p.m., Friday from 8:00 a.m. to 5:00 p.m. and Saturday from 8:00 a.m. – 12:00 p.m., and is available for emergencies, first aid, referral sources and medical counseling. Basic medical care is provided, but students are ultimately responsible for making arrangements for their own complete health care.

ARMY, AIR FORCE (ROTC)

A formal agreement has been established between Universidad del Turabo and University of Puerto Rico for cross-enrollment of students in the Army Reserve Officers Training Corps (ROTC) and the Air Force Training Corps.

Students from Universidad del Turabo are authorized to enroll and attend classes in the ROTC Program at the University of Puerto Rico. Those courses will be considered as Universidad del Turabo resident courses. Credit will be granted and students will be entered in the official academic record.

Students will not be charged for courses taken in the ROTC Program. The United States Army and Air force through the University of Puerto Rico will provide ROTC textbooks, military type equipment, uniforms and military training. Students will have equal opportunity to compete for two and three year scholarships on a nationally competitive basis.

Semester credit hours for ROTC course are as follow (Military Science-MS)

MSI 2 credit hours (Fall Semester)
(1 hour classroom; 1 hour Leadership Lab)

MSI 2 credit hours (Spring Semester)
(1 hour classroom; 1 hour Leadership Lab)

MSII 3 credit hours (Fall Semester)
(2 hours classroom; 1 hour Leadership Lab)

MSII 3 credit hours (Spring Semester)
(2 hours classroom; 1 hour Leadership Lab)

MSIII 4 credit hours (Fall Semester)
(3 hours classroom; 1 hour Leadership Lab)

MSIII 4 credit hours (Spring Semester)
(3 hours classroom; 1 hour Leadership Lab)

MSIV 4 credit hours (Fall Semester)
(3 hours classroom; 1 hour Leadership Lab)

MS 400-01 3 credit hours (Advanced Camp, Fort Riley, Kansas)

MS 300-01 2 credit hours (Basic Camp, Fort Knox, Kentucky)

AS 100 2 credit hours (Fall & Spring)
(1 hour classroom; 1 hour Semester Leadership Lab)

AS 200 2 credit hours (Fall & Spring)
(1 hour classroom; 1 hour Semester Leadership Lab)

AS 300 4 credit hours (Fall & Spring)
(3 hours classroom; 1 hour Semester Leadership Lab)

AS 400 4 credit hours (Fall & Spring)
(3 hours classroom; 1 hour Semester Leadership Lab)

SERVICES FOR DISABLED STUDENTS

Federal and state regulations guarantee disabled students equal opportunity in post-secondary education. The university has created special support services to assist disabled students. These services include, but are not limited to, assistance in registration, counseling, financial aid, readers for the blind, interpreters for the deaf, class notes, as well as individualized classes and/or tutoring. Transportation services are available through a special partnership between Universidad del Turabo and the government's Department of Vocational Rehabilitation. Services are coordinated in the Quality of Life and Student Well-Being Office.

BOOKSTORE

Universidad del Turabo has a bookstore on campus. The store is operated as a service to students, faculty and staff. Textbooks, school and office supplies, and other course-related materials are available. In addition, gift items, stationery, greeting cards, paperbacks, and other articles are in stock.

AUTOMOBILES ON CAMPUS

The security director enforces traffic and parking regulations on and around campus. Traffic tickets may be issued for traffic and parking violations. Student parking stickers are issued to each student upon registration. The cost of parking is $.35 for students and $1.00 for visitors.

DINING SERVICES

The Student Dining Service provides a variety of options for students who wish to dine on-campus. The cafeteria offers breakfast, lunch and dinner, Monday through Saturday. Hot meals and fast food are available. Vending machines for snacks and refreshments are also located throughout the campus.

STUDENT ACTIVITIES

A combination of both extra-curricular and co-curricular activities is available on campus providing all opportunities for all students to enhance their educational experience. The Office of Cultural and Social Activities is responsible for the diffusion and promotion of artistic events for the enjoyment and enrichment of the university community according to its needs and interests. Each year through the establishment of a visiting artists series, outstanding musicians, singers, artists, dancers, lecturers and other performers share their talents and expertise with students. In addition to on-campus art exhibits, the academic schools present dance programs, musical concerts, athletic competitions, and theatrical productions.

STUDENT GOVERNMENT

Through student governing bodies, students have an opportunity for self-government and to participate with the faculty and administration in formulating appropriate policies. Student Council members are elected by secret vote by the members of the Student Government Assembly. The Council meets once a month. Students are represented in the institution's governing bodies through this Council. Opinions and recommendations are presented to the Vice Chancellor of Students Affairs. Its members participate in academic, discipline, sports, and cultural activities committees.

STUDENT PUBLICATIONS

The institutional newspaper ***El Turabón*** is published four times a year by students of the communication program. It serves as a medium for all institutional activities and as a practicum experience for the students.

STUDENT ORGANIZATIONS

According to their interests, students may join religious, social service, academic, professional, and honorary groups. A fair is held at the beginning of each term to help new students get acquainted with and select the group or groups that interest them. All students are encouraged to participate actively in clubs and organizations.

UNIVERSIDAD DEL TURABO CHOIR

The Universidad del Turabo choir offers students the opportunity to cultivate their musical abilities and talents and enables them to represent the University in activities on and off campus.

UNIVERSIDAD DEL TURABO THEATER WORKSHOP

The theater workshop provides students with the opportunity to develop their abilities in the performing arts. The workshop organizes and produces one play per semester for the enjoyment of the university community and the community at large.

ATHLETIC AND INTRAMURAL PROGRAMS

Athletic and Intramural Programs within the Department of Physical Education, of the School of Education play an important role in the educational process of Universidad del Turabo. The programs offer a wide range of recreational and intercollegiate competitive sports for all eligible students. Both individual and team sports have brought the university and individuals national recognition. An outstanding staff of administrators, coaches, and expert trainers work in unison to make the campus athletic programs for men and women a first-class endeavor. The university boasts 27 men's and women's varsity teams, which have won 102 champion and sub-championships since 1975. These triumphs include the record-setting achievement of winning the Intercollegiate Athletic League track and field championship 10 times since 1987. Universidad del Turabo athletes have also been champions in basketball, weight lifting, decathlon, heptathlon, cross-country, and relays. Each year, the intramural program allows participation of more than 7,000 active and passive students and faculty members. The teams are called the "Taínos" with their orange, black, and white colors. The sports facilities include indoor basketball and volleyball courts, tennis courts, free weight and Hammer machines

gym, a 400-meter track, swimming pool, a baseball park, jogging trail and wellness center.

VETERANS'SERVICES

The Veterans' Services Office, located in the Registrar's Office, is primarily concerned with the motivation of veterans and their dependents to effectively exercise their right to an education.

Veterans are assisted in the completion and processing of required documents for the purpose of establishing eligibility, certification of services and academic progress. These services are offered in close coordination with the Veterans Administration Office of Puerto Rico.

Veterans and their beneficiaries must complete their program of studies within the time established by their curriculum. Students who extend their studies beyond the time established by the program cannot continue to receive veterans' benefits. If the student is a recipient of the Pell Grant, he may resort to the 150% additional time established by the institutional standard for Satisfactory Academic Progress. Veterans will be evaluated utilizing both veterans' benefits and Pell Grant criteria, if they are beneficiaries of these.

Veterans Administration Office will not pay courses in order to raise GPA. It will only pay failed courses (F, NP-Failure) or those that requires a minimum approval grade. Veteran's Administration Office will reduce benefits to the students as of the last day of attendance to class.

EDUCATIONAL RESOURCES

One of the most important features of Universidad del Turabo is the Academic Resources Center, under the Office of the Vice Chancellor of Information Resources. The center is dedicated exclusively to helping students and faculty share a variety of academic resources that support, complement and enrich the teaching and learning processes. The center is comprised of the following five areas:

INFORMATION RESOURCE CENTER

The Information Resource Center provides library resources, audiovisual material, archives, computer programs, electronic information systems, microcomputers, fax machines, audio and recording studios, graphic arts workshops, audience halls, and a gallery.

LIBRARY SERVICES

The Library Services Division provides printed resources, electronic resources through the virtual library, audiovisual material, and technological systems that facilitate obtaining information. In order to train students in the effective use of the library services and resources, the division maintains a program of bibliographic instruction, given both in the classroom and in the library. Its reference services have the latest in information systems and a wide variety of reference books. Access to resources is gained through an online electronic catalog (OPAC) that allows subject searches in Spanish and English. This electronic catalog provides access to external resources at many institutions in Puerto Rico and the world, through the Internet.

The Center has access to other databases and various full-text databases such as: ProQuest, DIALOG, Books in Print, Literary Market Place, ULRICH, The Engineering Index, ERIC, Cambridge Index, Chemical Abstracts, and HAPI. Local databases available are CONUCO, PCIP, ITS and ADENDI.

COLLECTIONS DEVELOPMENT

The internal collection of Universidad del Turabo totals up to 140,000 volumes. This includes books, journals, documents, microfilms, recordings, films, maps, drafts, plates, photographs, transparencies, slides, models and objects. The Center's main objective is to develop collections that respond to academic needs, contribute to the humanistic education of the students, facilitate research and ratify accreditation.

COMPUTER RESOURCES

There are 115 computers for student and faculty use at various service points throughout the library. There are eleven computers in the Reference and Periodicals Service Area, two in the Circulation and Reserve Service Area and eight in the library lobby. In the Electronic Information Room (Open Access Computer Lab), there are 74 computers and the Faculty Development Center has 20 computers available.

EDUCATIONAL TECHNOLOGY

The Educational Technology Division studies teaching methods, styles and strategies, so as to coordinate with the faculty in the creation of programs to improve curriculum, test new teaching methods and promote educational innovations. This division is also responsible for designing, producing and integrating into the curriculum didactic resources and materials that promote systematic improvement and innovation in university education. The integration of educational resources into the teaching-learning process is aimed at enabling faculty to attain their educational goals and the students to obtain a high level of academic achievement.

DISTANCE EDUCATION

Distance Education is a special program component offered by Universidad del Turabo. Its main objective is to serve as a facilitating unit to support program offerings. It also supports educational and service programs that depend on one of the distance education modalities requiring the transfer of knowledge through the use of technology. At Universidad del Turabo, distance education focuses on four delivery modalities: web-based, web-supplemented, web-enhanced and Instructional Television Fixed Services (ITFS)

A master's degree program in business administration is being offered online by the School of Business Administration. The School of Education is offering courses in education via television media (ITSF). For additional information, please contact the Admissions Office or academic schools.

MUSSEUM AND CENTER FOR HUMANISTIC STUDIES DRA. JOSEFINA CAMACHO DE LA NUEZ

The Museo y Centro de Estudios Humanísticos Dra. Josefina Camacho de la Nuez of the Universidad del Turabo has been a museum and center for the study of the humanities at the Universidad del Turabo since 1980's. Its mission is to collect, preserve, study, and disseminate the artistic and humanistic expressions of the regional and national Puerto Rican culture for the enjoyment and benefit of the university community and the general public. The museum started in one of the wooden historic buildings on campus of the sugar cane plantation Santa Juana. The Museum has a permanent collection of 3,000 objects. It has recently inaugurated a new 25,000 sq. ft. state of the facilities with galleries dedicated to the Archaeology of Punta Candelero, Puerto Rican Folk Arts, Puerto Rican Poster Collection, the History of the Central Oriental Region, Colonial Paintings from Latin America of the Lola and Antonio Roig collection, the Ana G. Méndez historical collection and a rotating exhibition space. It also has an Education Learning Center, the Walter Murray Chiesa Folk Art Archives, a 209-seat auditorium, an interior sculpture garden, a museum store and a café.

EVENING AND SATURDAY PROGRAM

Students may enroll in the regular academic programs offered by the Evening and Weekend College Program. The evening division operates Monday through Thursday from 12:00 noon to 10:00 p.m., and the Weekend College opens from 12:00 noon to 9:00 p.m. on Friday, and from 7:30 a.m. to 4:30 p.m. on Saturday.

CONTINUING EDUCATION

The Continuing Education Program endeavors to strengthen social structure and to foster and develop academic programs according to the educational needs of the individual. These programs do not necessarily function under traditional academic rules, and their intention is to:

1. Update the student's knowledge.
2. Supply educational opportunities for personal growth to people from a variety of educational backgrounds, thus satisfying certain social, personal or occupational needs.
3. Implement professional training, both on-campus and in-house, to enhance the occupational advancement and personal development of personnel in the public and private sectors.
4. Promote community activities that explore and seek solutions to social, political, and economic problems.
5. Organize service programs for people who want to enrich their leisure time.

The program designs seminars, continuing education courses, conferences and life enrichment courses. Industries, government agencies, community institutions and the community in general benefit from this program.

SCHOOL OF PROFESSIONAL STUDIES AHORA PROGRAM

The mission of the AHORA Program of the School of Professional Studies is to provide an accelerated educational process to adult students. The program differs from traditional methods of instruction in that the professional experience of participants is incorporated into the classroom to create an interactive, challenging and dynamic environment. Faculty members have professional experience and have been specially prepared to work with adults as innovative educational facilitators. AHORA is designed exclusively for the adult student; it offers a professional environment, as well as integrated, personalized and individualized services. To fulfill this mission, the School of Professional Studies intends to:

- Promote adults to value continuous learning and increase their contribution to the world of employment
- Facilitate adult students in attaining their educational goals
- Create a learning community that facilitates building new knowledge which is based on and is applicable to the professional and personal reality of adults
- Provide integrated student services of quality and easy accessibility to adult students
- Recruit and develop staff who know and are able to meet the needs of the adult students effectively.
- Integrate technology into the academic, service and administrative processes
- Develop academic offerings that respond to the present needs of the professional and business world
- Establish a continuous process of feedback and assessment of all the processes and services.

Description of the Accelerated Program of Studies

The AHORA Program is accelerated because all of its courses are offered in five or eight week sessions. During each session, classes meet once a week for four hours. The accelerated methodology is based on a learning process shared between the professor and the student. Each student receives a module which serves as a study guide and indicates the assignments and activities that must be

completed to prepare for class. Our faculty is specially selected and trained to work with adult students through the accelerated mode, facilitating a class environment where learning is built on experiences and the assignments performed by the students. This model of accelerated studies can be applied to the different academic programs of the institution, to new academic programs or any other academic program where adult students participate. The courses are offered evenings and Saturdays (morning and afternoon). The student may take a maximum of two classes per session, completing six credits every five or eight weeks. Registration is continuous, with courses beginning fourteen times a year, and the possibility of completing up to fifty-four credits in an academic year. This way, the program provides greater flexibility for students, since they can accelerate their academic progress or design a class program that conforms to the different commitments they may have during the year.

Admissions Requirements
To fulfill its mission and goals, the AHORA Program admits only adult students with academic and professional experience that meet the following requirements:

- 23 years of age or older
- 3 years of work experience
- 24 credits of academic work at the postsecondary level

Academic Programs
Presently, the School of Professional Studies offers accelerated studies in the programs at Universidad del Turabo which are listed below.
Bachelor's Degree in:
- Management
- Accounting
- Marketing
- Computerized Information Systems
- Office Systems
- Preschool Education (Cayey Off-campus Center)
- Criminology

Master's Degree in:
- Marketing
- Human Resources
- Criminal Justice

OFF-CAMPUS CENTERS

CENTRO PARA LA EXCELENCIA DE LA TECNOLOGÍA AVANZADA (CETA)

Griselda Correa, Acting Director
gcorrea@suagm.edu

Evelyn Rodríguez, Recruitment Officer
evrodríguez@suagm.edu

Postal Address
Universidad del Turabo-Barceloneta
PO Box 2049, Barceloneta, PR 00617

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Barceloneta, PR 00617

Phone: (787) 846-1777
Fax: (787) 846-1784

CAYEY

Juan Rosado Cardona, Director
ut_jrosado@suagm.edu

Postal Address
PO Box 9000, Suite 281
Cayey, Puerto Rico 00737

Physical Address
Sierra de Cayey Bldg., Third Level
Antonio R. Barceló Ave., Cayey, Puerto Rico

Phone: (787) 263-2177
Fax: (787) 263-0277

ISABELA

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State Road 112, Km. 2.3, Mora Ward
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NAGUABO

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Juan J. Maunes High School
Baldorioty de Castro Street, Barriada Buenos Aires
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Phone: (787) 874-3460
Fax: (787) 874-1366

YABUCOA

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Yabucoa, Puerto Rico 00767

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State Road 901, Km.4.1, Juan Martín Ward
Yabucoa, Puerto Rico

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PONCE

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PRINCIPAL CAMPUS

Dennis Alicea, Chancellor
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Physical Address
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Gurabo, Puerto Rico

Phone: (787) 743-7979
Fax: (787) 744-5394

Academic Offering

Bachelor's Degrees

Programs	Principal Campus	Barceloneta	Off-Campus Centers				
			Cayey	Isabela	Naguabo	Yabucoa	Ponce
Busines Administration							
Accounting	x		x		x	x	x
Management	x		x	x	x	x	x
Computerized Information Systems	x						x
Marketing	x						
Office Technology Management	x		x			x	
Materials Control and Management	x						
Education							
Elementary Education: Preschool	x		x	x	x	x	
Elementary Education: Primary K-3	x		x	x	x	x	
Elementary Education: Fourth to Sixth Grade	x		x	x	x	x	
Elementary Education: English	x			x		x	x
Secondary Education: Biology	x						
Secondary Education: Chemistry	x						
Secondary Education: Teaching English as a Second Language	x						
Secondary Education: General Science	x						
Secondary Education: History	x						
Secondary Education: Mathematics	x						
Secondary Education: Vocational Industrial	x		x**	x**		x**	
Special Education: Mild Handicaps	x						
Special Education: Speech, Language & Hearing Impairments	x						
Physical Education at Secondary Level	x						
Physical Education at Elementary Level	x						
Engineering							
Mechanical Engineering	x						
Electrical Engineering	x						
Industrial & Management Engineering	x						
International School of Design							
Graphic Design	x						
Industrial Design	x						
Health Sciences							
Nursing Sciences	x		x***			x***	
Nutrition and Dietetics	x						
Speech-Language Therapy	x	x				x	x
Science and Technology							
General Science	x						
Biology	x	x					
Chemistry	x						
Biotechnology		x					
Environmental Chemistry	x						
Social and Human Sciences							
General Program	x		x			x	
Psychology	x						
Criminology	x		x	x	x	x	x
Public Administration	x						x
Communication	x						
Social Work	x		x***	x	x	x***	x
Socio-Humanistic Studies	x						
Graphic Design	x						

*Program available on line
***Transfer program

SCHOOL OF BUSINESS AND ENTREPRENEURSHIP

UT's School of Business and Entrepreneurship is considered one of the largest and fastest growing in Puerto Rico with an enrollment of almost 4,000 students. Its academic offer ranges from certificates to doctoral studies. Programs that have been designed taking into consideration the needs and requirements of the industrial, entrepreneurial, professional and public sectors in the Island. The general areas of specialization in its academic programs are: Entrepreneurship, Management, Marketing, Accounting, Information Management and International Business. Other academic tracks such as quality, taxation, human resources and materials are offered under the main areas of specialization.

The School has a visiting faculty in the Management and Management Information System programs proceeding from countries such as: Spain, Mexico, India and the United States. Its regular faculty is integrated by 46 highly competitive members, 30 of which have doctoral degrees, 13 are in the process of completing one and 3 have a Master's degree.

In the interest and objective of providing the student with a global business vision, the School of Business and Entrepreneurship maintains relationships and collaborative agreements with prestigious universities around the world.

PARTICIPATING INTERNATIONAL ORGANIZATIONS

- Consejo Latinoamericano de Administración de Empresas, CLADEA
- AACBS International Academy of International Business
- Fundación para la Educación Internacional, FESI
- Red Latinoamericana Emprendedora
- World Economic Forum (WEF)

COLLABORATIVE RELATIONS WITH OTHER INTERNATIONAL BUSINESS SCHOOLS

- Universidad Veracruzana
- Instituto Politécnico Nacional de Méjico
- Universidad de las Américas, en Puebla
- George Washington University
- Instituto Tecnológico de Monterrey
- Universidad Autónoma de Madrid
- Universidad Politécnica de Madrid
- Universidad de San Pablo
- Groupe ESC Toulouse
- Oslo School of Management in Norway
- Argosy University
- Florida International University
- Other institutions in process in: Spain, Peru, Brazil, Chile, United States and Costa Rica.

SPECIALIZED ACCREDITATIONS

In April of 2011, the School of Business and Entrepreneurship has earned the specialized accreditation by the "Association to Advance Collegiate Schools of Business" (AACSB, International). The School position itself as the only institution to have that accreditation in Puerto Rico and the Caribbean. AACSB accreditation is the hallmark of excellence in business education, and has been earned by less than 5% of the world's business schools.

MISSION

"The Mission of the School of Business and Entrepreneurship at the Universidad del Turabo is to develop professionals, leaders and academics with a superior theoretical knowledge and practical skills for the creation and development of new enterprises and effective management of existing business. Our students acquire the skills, values and sense of social responsibility into its business practices through education that is entrepreneurial in spirit, ethical in their approach and global in orientation. Excellence in teaching is enhanced by a faculty committed with professional development, intellectual contributions and service. As a professional school of business, we want to impact positively the society, organizations and the communities in which our students and alumni are a part. "

VISION

The vision of the school is to be the leading School in business education and research in Puerto Rico and the Caribbean and the preferred partner for successful alliances for the government, private sector and non-profit organizations, both national and international.

STAFF

Marcelino Rivera-López / Dean

Brunilda Aponte / Associate Dean

Virgin Dones-Gonzalez / Associate Dean

FACULTY

Luz N. Addarich-Vega / Associate Professor
MA, University of Puerto Rico

Brunilda Aponte / Associate Professor
PhD, Interamerican University of Puerto Rico

Myrna E. Berríos-Pagán / Assistant Professor
PhD, University of Puerto Rico

Juan J. Carrasquillo-González / Assistant Professor
MA, New York University

Sylvia Cardona-Colón / Assistant Professor
MBA, Interamerican University

Pablo A. Colón-Gruñeiro / Professor
MBA, University of Puerto Rico

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PhD(c), Universidad de León, Spain
MBA, University of Phoenix

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MBA, Universidad del Turabo

Virgin Dones / Assistant Professor
PhD, Interamerican University

Edgar Ferrer-Moreno / Assistant Professor
PhD, University of Puerto in Mayaguez

Carlos R. Figueroa-Vega / Associate Professor
MS, Jackson State University

Angel A. Fuentes-Valentín / Associate Professor
PhD, Carlos Albizu University

Carmen M. Marín-Figueroa / Professor
DBA, University of Sarasota

Eulalia Márquez-Martínez / Associate Professor
PhD, Carlos Albizu University

Litza Meléndez-Ramos / Instructor
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PhD(c), Universidad de León, Spain
MBA, University of Phoenix

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CPA, MBA, Universidad del Turabo

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PhD, University of Puerto Rico

Alia E. Pérez-González / Emeritus Professor
PhD, Fordham University

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MBA, Universidad del Turabo

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Carlos M. Rosa-Vázquez / Assistant Professor
DBA, Universidad del Turabo

Alizabeth Sánchez / Assistant Professor
Ph(c), Autonomous University of Barcelona

María de los M. Santos-Corrada / Assistant Professor
PhD, Universidad Complutense, Madrid

César R. Sobrino / Assistant Professor
PhD, West Virginia University, US

Juan Carlos Sosa / Assistant Professor
PhD, University of Puerto Rico

Carmen Vargas-Segarra / Professor
EdD, Nova University

María Zayas-Ortiz / Associate Professor
PhD, Interamerican University

STUDENT ORGANIZATIONS

- Association of Office Administration Students
- Association of Accounting Students
- Association of Administration & Materials Control Students
- Association of Information Systems Students
- Association of Management Students
- Association of Trade Students
- Student Chapter of the Chamber of Commerce

The different student associations in the School of Business and Entrepreneurship are created in order to foster unity and communication among the students, professors and professionals in the Business Administration area. Students have the opportunity to express their ideas and to participate in activities promoting their professional development. This gives students the opportunity to demonstrate qualities and characteristics which contribute

to the success of all good employees and citizens. Students participate in activities both within and outside the Institution. Thus, students are offered opportunities to visit companies, to attend conventions and to participate in university competitions related to their profession.

PROGRAMS OF STUDY

ACCOUNTING

This major prepares the student in diverse aspects of accounting, such as the preparation of financial statements, analysis of costs, taxes, auditing, and principles of accounting posting. The student has the opportunity to take additional courses in the following areas: tax systems of Puerto Rico, federal taxes, computerized information systems of accounting, as well as accounting for government and nonprofit organizations.

COMPUTERIZED INFORMATION SYSTEMS

The courses in this major offer students the technical knowledge required to become qualified in the field of programming, as well as in the analysis and development of computer applications. Systems analysis and design, handling of applications in databases, and development of applications using a variety of equipment and computer systems are essential requirements of this specialty. Courses related to auditing and security of systems, telecommunications and networks of microcomputers, programming by objects, programs of productivity and information systems for decision-making are also offered. Upon graduation the student will be prepared to work in organizations and companies that use different computerized systems in their operations.

MANAGEMENT

The principal goal of this major is to enable students to occupy different administrative positions in commercial and industrial companies, government agencies, and nonprofit organizations. Among courses included in the program are: accounting for decision-making, administration of human resources, labor legislation, supervision, management of operations and managerial strategies. In addition, students can select courses in areas such as: administration of small businesses, real estate, government and business, principles of insurance and development of companies.

MARKETING

This major promotes technical competition and the development of skills to carry out market research, to prepare business plans, sales projections and promotional campaigns. The graduate can work in advertising agencies, public relations firms, market research firms and sales departments in diverse companies.

OFFICE TECHNOLOGY MANAGEMENT

This program provides fundamental information for students and the knowledge of Microsoft applications that is required in the employment market and for management competence. Graduates will be able to develop and design electronic publications and commercial pages on a network. They will also be able to work with portal workflow management to design, develop and maintain virtual projects. This program is unique, as it includes management courses and end-user office technology.

CURRICULUM

BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION

BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION: ACCOUNTING

Total Credits	**128-130**
General Studies Courses	**48**
Required Courses	**44**
Major Courses	**21**
Specialty Courses	**9**
Free Electives Courses	**6**

General Studies (for all majors)		**(48 credits)**
ADMI 105	Freshman Seminar	3
ECON 121	Economic Principles and Problems I	3
ECON 122	Economic Principles and Problems II	3
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HUMA 111	Universal Culture & Civilizations I	3
HUMA 112	Universal Culture & Civilizations II	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 199	Quantitative Methods I	3
PSYC 123	General Psychology	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SPAN 152	Introduction to Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Education Courses (44 credits)

ACCO 111	Introduction to Accounting I	4
ACCO 112	Introduction to Accounting II	4
COIS 201	Data Processing	3
ENTR 360	Entrepreneurship	3
FINA 202	Business Finance	3
INBU 350	International Business	3
MANA 204	Business Law and Entrepreneurial	3
MANA 210	Management Theory	3
MANA 230	Organizational Behavior	3
MANA 340	Operations Management	3
MARK 133	Principles of Marketing	3
QUME 202	Quantitative Methods for Administration	3
STAT 201	Business Statistics I	3
STAT 202	Business Statistics II	3

Major Courses (21 credits)

ACCO 301	Intermediate Accounting I	4
ACCO 302	Intermediate Accounting II	4
ACCO 303	Cost Accounting	4
ACCO 304	Auditing	3
ACCO 305	Income Tax for Puerto Rico	3
ACCO 453	Project	3

Specialty Courses (9-11 credits)

(Students must have approved 18 credits of the Major Courses Required in order to start Specialty Courses)

Taxes (9 credits)

ACCO 320	Federal Taxes I	3
ACCO 321	Federal Taxes II	3
ACCO 405	Puerto Rico Taxes II (Other obligation)	3
ACCO 406	Taxes System of Puerto Rico III (Partnerships and Corporations	3

Auditing (9 credits)

ACCO 307	Auditing II	3
ACCO 310	Forensic Accounting	3
ACCO 360	Corporate Governance	3
ACCO 340	EDP Auditing	3

Financial Analysis (10-11 credits)

ACCO 391	Cost Accounting II	4
ACCO 395	Managerial Accounting I	4
ACCO 396	Managerial Accounting II	3
FINA 410	Corporate Finance	3

Governmental & Nonprofit Accounting (10-11 credits)

ACCO 420	Governmental and Non Profit Accounting I	4
ACCO 421	Governmental and Non Profit Accounting II	4
ACCO 425	Governmental Auditing I	3
ACCO 430	Governmental Auditing II	3

Free Elective Courses (6 credits)

BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION: COMPUTERIZED INFORMATION SYSTEMS

Total Credits	**126**
General Studies Courses	**48**
Required Courses	**44**
Major Courses	**19**
Specialty Courses	**9**
Electives	**6**

General Studies (for all majors) (48 credits)

ADMI 105	Freshman Seminar	3
ECON 121	Economic Principles and Problems I	3
ECON 122	Economic Principles and Problems II	3
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HUMA 111	Universal Culture and Civilizations I	3
HUMA 112	Universal Culture and Civilizations II	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 199	Quantitative Methods I	3
PSYC 123	General Psychology	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SPAN 152	Introduction to Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Education Courses (44 credits)

ACCO 111	Introduction to Accounting I	4
ACCO 112	Introduction to Accounting II	4
COIS 101	Introduction to Computer-Based Systems	3
ENTR 360	Entrepreneurship	3
FINA 202	Business Finance	3
INBU 350	International Business	3
MANA 204	Business Law and Entrepreneurial	3
MANA 210	Management Theory	3
MANA 230	Organizational Behavior	3
MANA 340	Operations Management	3
MARK 133	Principles of Marketing	3
MATH 200	Math for Administration Studies II	3
STAT 201	Business Statistics I	3
STAT 202	Business Statistics II	3

Major Courses (19 credits)

COIS 102	Programming Principles	3
COIS 240	Object-Oriented Programing	4
COIS 250	Systems Analysis and Design	3
COIS 360	Telecommunications and Computers Networks	3
COIS 420	Introduction to Database Management and Design	3
COIS 450	Software Development Project	3

Specialty Courses (9 credits)

Note: Students must have approved 13 credits of the Major Courses Required in order to start the Specialty.

Database

COIS 421	PL/SQL Programming	3

COIS 422	Database Application Development	3
COIS 423	Database Administration	3

Telecommunications & Computer Network

COIS 432	Computer Network Design	3
COIS 433	Wireless Local Networks	3
COIS 434	Application Development for Mobile Devices	3
COIS 435	Data Communications and Computer Networks Management	3

E-Commerce Technology

COIS 440	E-Commerce Methodology and Technology	3
COIS 441	Application Development for E-Commerce	3
COIS 442	Portals Integration	3
COIS 443	E-Commerce Development	3

Object and Networks Oriented Programming

COIS 425	Object-Oriented Programming Language Java	3
COIS 470	Application Programming for the Web	3
COIS 471	Web Portals Development	3

Free Elective Courses (6 credits)

Note: Computer programming courses require four (4) hours of laboratory work per week.

BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION: MANAGEMENT

Total Credits	**125**
General Studies Courses	**48**
Required Courses	**44**
Major Courses	**18**
Specialty Courses	**9**
Elective Courses	**6**

General Studies (for all majors) (48 credits)

ADMI 105	Freshman Seminar	3
ECON 121	Economic Principles and Problems I	3
ECON 122	Economic Principles and Problems II	3
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HUMA 111	Universal Culture and Civilizations I	3
HUMA 112	Universal Culture and Civilizations II	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 199	Quantitative Methods I	3
PSYC 123	General Psychology	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SPAN 152	Introduction to Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Education Courses (44 credits)

ACCO 111	Introduction to Accounting I	4
ACCO 112	Introduction to Accounting II	4
COIS 201	Data Processing	3
ENTR 360	Entrepreneurship	3
FINA 202	Business Finance	3
INBU 350	International Business	3
MANA 204	Business Law and Entrepreneurial	3
MANA 210	Management Theory	3
MANA 230	Organizational Behavior	3
MANA 340	Operations Management	3
MARK 133	Principles of Marketing	3
QUME 202	Quantitative Methods for Administration	3
STAT 201	Business Statistics I	3
STAT 202	Business Statistics II	3

Major Courses (18 credits)

MANA 213	Human Resource Administration	3
MANA 316	Small Business Administration	3
MANA 302	Entrepreneurship and Business Development	3
MANA 321	Supervision and Leadership	3
MANA 401	Enterprise Strategy	3
MANA 450	Project	3

Specialty Courses (9 credits)

Note: Students must have approved 12 credits of the Major Courses Required in order to start the Specialty Courses in one of the following areas:

Human Resources

HURM 400	Safety and Occupational Health	3
HURM 412	Training and Development	3
MANA 404	Labor Relations	3
MANA 422	Compensation Management	3

Industrial Operations

INOP 320	Advanced Operations and Production Management	3
INOP 401	Statistical Quality Control	3
INOP 405	Inventory Control	3
INOP 409	Management and Physical Distribution	3

Entrepreneurship

ENTR 401	Identification and Assessment of Business Opportunities	3
ENTR 402	Design and Organizational Structure SMEs	3
ENTR 403	E-Commerce and Design of Systems and Networks	3
ENTR 404	Business Development of Biotechnology and Industrial Health	3

Free Elective Courses (6 credits)

BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION: MARKETING

Total Credits	**125**
General Studies Courses	**48**
RequiredCourses	**44**
Major Courses	**18**
Specialty Courses	**9**
Free Elective Courses	**6**

General Studies (for all majors) (48 credits)

ADMI 105	Freshman Seminar	3
ECON 121	Economic Principles and Problems I	3
ECON 122	Economic Principles and Problems II	3
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HUMA 111	Universal Culture and Civilizations I	3
HUMA 112	Universal Culture and Civilizations II	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 199	Quantitative Methods I	3
PSYC 123	General Psychology	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SPAN 152	Introduction to Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Education Courses (44 credits)

ACCO 111	Introduction to Accounting I	4
ACCO 112	Introduction to Accounting II	4
COIS 201	Data Processing	3
ENTR 360	Entrepreneurship	3
FINA 202	Business Finance	3
INBU 350	International Business	3
MANA 204	Business Law and Entrepreneurial	3
MANA 210	Management Theory	3
MANA 230	Organizational Behavior	3
MANA 340	Operations Management	3
MARK 133	Principles of Marketing	3
QUME 202	Quantitative Methods for Administration	3
STAT 201	Business Statistics I	3
STAT 202	Business Statistics II	3

Major Courses (18 credits)

MARK 206	Consumer Behavior	3
MARK 301	Marketing Management	3
MARK 306	Sales	3
MARK 320	Marketing Research	3
MARK 450	Marketing Internship	3
MARK 455	Project	3

Specialty Courses (9 credits)

Note: Students must have approved 12 credits of the Major Courses Required in order to start the Specialty.

Marketing Communications

MARK 403	Media Planning	3
MARK 402	Integrated Marketing Communications	3
MARK 405	Public Relations Business	3

International Marketing

MARK 350	International Distribution Channels	3
MARK 404	International Negotiation	3
MARK 410	International Marketing	3

Sales

MARK 318	Sales Management	3
MARK 406	Marketing Strategy	3
MARK 415	Sales Forecasting	3

Free Elective Courses (6 credits)

BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION: OFFICE TECHNOLOGY MANAGEMENT

Total Credits	**119**
General Studies Courses	**48**
Professional Courses	**38**
Major Courses	**18**
Specialty Courses	**9**
Free Elective Courses	**6**

General Studies

ADMI 105	Freshman Seminar	3
ECON 121	Economic Principles and Problems I	3
ECON 122	Economic Principles and Problems II	3
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HUMA 111	Universal Culture and Civilizations I	3
HUMA 112	Universal Culture and Civilizations II	6
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 199	Quantitative Methods	3
PSYC 123	Psychology	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SPAN 152	Introduction to Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Courses (38 credits)

ACCO 111	Introduction to Accounting I	4
ACCO 112	Introduction to Accounting II	4
ENTR 360	Entrepreneurship	3
FINA 202	Business Finance	3
INBU 350	International Business	3
MANA 204	Business Law and Entrepreneurial	3
MANA 210	Management Theory	3
MANA 230	Organizational Behavior	3
MARK 133	Principles of Marketing	3
QUME 202	Quantitative Methods for Administration	3
STAT 201	Business Statistics I	3
OTEM 101	Introduction to Office Systems Technology	3

Major Courses (18 credits)

OTEM 201	Information Technology	3
OTEM 202	End-User Solutions	3

OTEM 303	Introduction to Database Management	3
OTEM 310	Office Information Management	3
OTEM 404	Training and Development in Office Technology Management	3
OTEM 405	Integrated Applications	3

Specialty Courses **(9 credits)**

Documents Publishing

OTEM 401	Document Publishing	3
OTEM 402	Web Based Document Publishing	3
OTEM 410	End-User Project	3

Portal Workflow Management

OTEM 415	Portal Workflow Management	3
OTEM 416	Electronic Document Management	3
OTEM 420	End-User Project Electronic Content Management	3

Training for "Microsoft Office User Specialist"

OTEM 425	Microsoft Word and Microsoft PowerPoint	3
OTEM 426	Microsoft Excel and Microsoft Access	3
OTEM 427	End-User Project (MOUS)	3

Free Elective Courses **(6 credits)**

COURSE DESCRIPTIONS

(Courses marked with @ could be offered in both modalities, traditional or on-line.)

ACCO 101
Business Mathematics
Three Credits

Basic mathematics skills prepare students for accounting and finance courses. This course reviews percentages, simple interest, compound interest, discounts, commissions and proportions.

ACCO 111-112
Introduction to Accounting I and II
Eight Credits

The course presents the fundamentals of accounting, financial statements, theory of debit and credit, adjustments and principles of business analysis, voucher system and entries, procedure for issuing stock, problems related to corporations and partnerships, practice in handling accounts, fixed assets, obligations and an introduction to cost.

Prerequisite: ACCO 101

ACCO 301-302
Intermediate Accounting I and II
Eight Credits

The course is a review of the principles of accounting for corporations, inventory, fixed assets, accounts receivable and payable, theories of income determination.

Prerequisite: ACCO 112

ACCO 303
Cost Accounting
Four Credits

The course centers on the study of the principles of accounting related to costs and their functions. It includes cost and non-cost systems and methods of determining the basis of cost, as well as cost classification, preparation of cost reports and fixed standard costs.

Prerequisites: ACCO 201, ACCO 205

ACCO 304
Auditing
Three Credits

The course is a review of accounting theory, auditing procedures, worksheets, internal control and fraud, preparation of financial statements, reports, forms, method and procedures. Attention is given to the nature and purpose of auditing, auditing standards, professional conduct, auditors' legal liability and the approach followed in performing audits of financial statements. Special attention is devoted to auditors' decision processes in internal control, auditing sampling, and accumulative audit evidence.

Prerequisites: ACCO 202, ACCO 205, ACCO 305

ACCO 305
Income Tax for Puerto Rico I (Individuals)
Three Credits

Students study income tax, its history and its purposes. Topics include the tax laws of Puerto Rico, inclusions and exclusions, allowable deductions, as well as practice in filing individual, corporate and partnership returns.

Prerequisite: ACCO 112

ACCO 306
Accounting Information Systems
Three Credits

The course centers on the study of concepts, methods and tools used in the design of accounting information systems, and the function of budgeting in the management and control of business activities. Requires laboratory.

Prerequisite: ACCO 112

ACCO 307
Auditing II
Three Credits

Students will study the audit process, focusing on the practical part of procedures and emphasizing Risk Assessment SAS (SAS 104-111). Content includes the planning of the audit using analytical procedures, determination of materiality and risk, internal auditing controls, and fraud. Implementation of the processes of audit cycles in sales and collection, as well as other cycles such as payroll, disbursements, accounts payable, property, plant and equipment, prepaid expenses, accrued expenses and income and expenditure accounts, inventory, notes payable and capital accounts and cash. Finally, students learn about completing the audit process, reviewing contingencies and commitments, issuance of the auditor's report and subsequent events.

Prerequisite: ACCO 304

ACCO 308
Accounting Theory
Three Credits

Students will study accounting theory and its effect on the profession, recent changes in accounting practices, procedures and conflicting points of view. The course includes interpretation and critical analysis of reports, statements and other accounting activities.

Prerequisite: ACCO 201

ACCO 310
Forensic Accounting
Three Credits

This course presents the concept and development of Forensic Accounting (FA) through an analysis of its trends and institutions. Students also learn how research and fraud detection are conducted in this area. To fulfill this objective, each FA crime will be identified and explained; the methodology used to detect these crimes will also be studied. The main topic analyzed involves litigation services provided by accountants through proper evidence management and calculation of commercial damage. The course emphasizes a profound analysis of cyber crime.. Students also learn the methodology of correct business valuation. Finally, practical cases are discussed in order to promote understanding of principles, unusual procedures, and relationships of FA.

Prerequisite: ACCO 307

ACCO 320
Federal Taxes I
Three Credits

Students will study the history and objectives of the federal income tax system. Topics include basic concepts of federal taxes, the various types of federal income tax returns, accounting periods, accounting methods, income computation and method of filling out tax returns.

Prerequisite: ACCO 2112

ACCO 321
Federal Taxes II
Three Credits

Students will study taxes on federal income, as well as the regulations applicable to corporations and societies. The course also includes topics related to taxes on inheritances and donations.

Prerequisite: ACCO 320

ACCO 340
EDP Auditing
Three Credits

Auditing, assurance and internal control, information technology governance, operating systems and networks, data management systems, system evaluation and control, processing inancial reporting system, computer-aided audit tools, data structures, reveniue and expenditures cycle tests of controls and substantive
testing.

Prerequisite: ACCO 302

ACCO 350
Computerized Accounting Systems
Three Credits

The course centers on the use of computers and microcomputers to record accounting data. Topics include the use of available software in recording transactions in registers and journals and posting to general and subsidiary ledgers. Also included are computer preparations of trial balance, financial statements and payroll. Emphasis is placed on accounting principles in the development of data entry skills. Requires laboratory.

Prerequisite: ACCO 112

ACCO 360
Corporate Governance
Three Credits

BBA course that presents and introduces the student to the corporate world, especially with details of their key players. Includes: the importance of corporate governance for the twenty-first century, Rights and Obligations, as well as, the Legal and Ethical Challenger to the board of directors. Emphases are placed on monitoring the implementation and administration management and ensure the

effectiveness of the board of directors. It also presents aspects of corporate governance and international non-profit institutions vis a vis the American model.

Prerequisite: ACCO 307

ACCO 391
Intermediate Accounting I
Four Credits
Include the Activity Based Costing system and the management considering design, manufacturing and distribution Process; simple costing using a single indirect cost pool and the five steps decision making process. Consider the master budgets and operating budgets considering the timing, advantages and the responsibilities in the implementation. The inventory costing using variable, absorption and throughout methods is also part of the course. The strategies, the balanced scorecard in the profitability analysis are emphasizes. Also the course includes the cost allocation and methods analysis for different departments.

Prerequisite: ACCO 303

ACCO 395
Managerial Accounting I
Four Credits
Students will study the use and interpretation of financial statements by management in planning and controlling a business. This course provides a sound background for accounting-related decision making. Topics studied include cash budgets, financial reporting, and capital budgeting. It also emphasizes the study and analysis of managerial accounting problems.

Prerequisite: ACCO 112

ACCO 396
Managerial Accounting II
Three Credits
This course covers the second part of ACCO 395. Provides students with methods to report managerial information to internal users of the firm. Budgeting, standard cost systems, reporting and analyzing performance, management control systems, flexible budget systems, variance analysis are among the contents covered. The student taking this course will acquire a basic understanding of the most commonly used methods for using information from the firm's accounting and information systems to assist in making important managerial decisions.

Prerequisite: ACCO 395

ACCO 402
Advanced Cost Accounting
Three Credits
The course centers on the application of principles, systems and procedures of cost accounting, including historic and standard procedures for decision-making.

Prerequisite: ACCO 203

ACCO 405
Puerto Rico Taxes II
Three Credits
This course emphasizes the study and analysis of Puerto Rico's income tax law related to corporations, partnerships and special partnerships. It also includes other tax responsibilities: patents, property taxes, excise taxes and federal taxes applicable to employers in Puerto Rico.

Prerequisite: ACCO 305

ACCO 406
Puerto Rico Taxes III-Corporation & Partnerships
Three Credits
This course presents an introduction to the Puerto Rico Income Tax Law regarding corporations and partnerships. Themes to be covered include the characteristics and differences between the diverse types of entities within a framework of tax law.

Prerequisite: ACCO 405

ACCO 420
Government and Nonprofit Accounting I
Four Credits
The course centers on the study of regulations and procedures applicable to accounting in government and nonprofit organizations. Special emphasis will be given to accounting principles and financial statements such as: general funds, special funds, capital projects funds, debt equity funds, fiduciary funds, and retirement systems. Particular aspects of accounting for universities and other nonprofit organizations will be presented.

Prerequisite: ACCO 302

ACCO 421
Governmental and Nonprofit Accounting
Four Credits
This course is designed as the second part of ACCO 420. Provides an intense study of the accounting and financial reporting procedures for governmental and nonprofit organizations. Promulgated accounting standards, conceptual issues, and special topics will be examined. Although a variety of organizations are considered nonprofit, the emphasis in this class will be placed on state and local governments.

This course is designed for students interested in the accounting practices of governmental units. The conceptual foundation provided by the course will be especially beneficial to students who anticipate careers in the governmental sector. Students, who become practicing accountants, will find the course useful when called upon to provide accounting and auditing services for governmental organizations. In addition, the course will help students prepare for the relevant portion of the CPA examination.

Prerequisite: ACCO 420

ACCO 425
State and Local Government Auditing
Three Credits
Financial reporting, financial reporting entity, general audit considerations, cash, investments, and derivative instruments, revenues and receivables, capital assets, interfund, internal, and intra-fund activity and balances, expenses or expenditures and liabilities, net position and financial statement reconciliation, concluding the audit, and audit reporting.

Prerequisite: ACCO 420

ACCO 430
Not For Profit Entities Auditing
Three Credits
Overview and introduction, audit considerations: general, financial reporting, cash and cash equivalents, contributions received and agency transactions, split interest agreements, investments, property plant and equipment and other assets, debt and other liabilities, net assets, revenues and receivable, audit Reports and tax considerations.

Prerequisite: ACCO 425

ACCO 450
Advanced Accounting I
Three Credits
Students will study problems related to partnerships, parent corporations and subsidiaries, selling on consignment, long contracts and consolidated financial statements, foreign operations, concepts of prevent value, and related accounting theories.

Prerequisite: ACCO 202

ACCO 453
Project
Three Credits
This will be the most important experience in the academic life of students of the bachelor's degree. Students must synthesize and apply knowledge from an accounting perspective in simulated and practical situations in different scenarios. The financial decisions will be inspected from an integral perspective of the variables that affect them and are included in the specialty courses. Methodological strategies could include a classroom workshop, a research seminar, an individual or team project or a creative task carried out in a studio, a laboratory or a specific accounting research area.

Prerequisites: ACCO 302, ACCO 303, ACCO 304, ACCO 305 plus six specialty credits.

ACCO 455
Advanced Accounting II
Three Credits
This course emphasizes the study and analysis of problems related to partnerships, bankruptcies, trusts, queasier organizations, foreign operations, personal financial statements and other topics of financial accounting.

Prerequisite: ACCO 450

ADMI 105
Freshman Seminar
Three Credits
This course will provide students with activities, techniques and academic experiences in terms of the discipline they are studying. Students will able to identify and develop personal and academic skills to improve their performance.

COIS 101
Introduction to Computer-Based Systems
Three Credits
The course is an introduction to computers and electronic data processing. It includes historical development, data organization, storage systems and types of peripheral devices, as well as data input and output. Students are introduced to microcomputer use and applications, word-processing, and spreadsheets. Requires laboratory.

COIS 102
Programming Principles
Three Credits
The course is a practical and theoretical introduction to basic programming principles. It includes development of logic, as well as the use of flow charts, structured flow charts and pseudo codes. Students will become familiar with editing and compiling programs.

COIS 106
Business Programming in BASIC
Four Credits
The course centers on programming principles, emphasizing practical applications in business using BASIC. Structured programming techniques will be developed along with appropriate documentation for the programs, including flowcharts, hierarchy charts, and documentation sheets for the program and its modules. Requires laboratory.

Prerequisite: COIS 102

COIS 107
Programming in COBOL
Four Credits
The course is an introduction to computer programming in a business environment, emphasizing structural design of programs, development, testing implementation and documentation of common business applications in COBOL. Requires laboratory.

Prerequisite: COIS 102

COIS 201
Data Processing Principles
Three Credits Hours
This introductory course acquaints the student with organization, functions, capabilities, limitations and applications of modern computer systems in the field of business administration. Analysis and design methods and techniques for information systems and data processing are explained. Includes hands-on experience using word processing and spreadsheet applications on microcomputers. Requires laboratory.

COIS 213
Advanced Programming in COBOL
Three Credits
The course is an introduction to advanced programming techniques in COBOL. Topic discussed are: program design, module design, sequential and indexed file maintenance table, advanced data structure, character handling, design and production of reports, and program maintenance.

Prerequisite: COIS 107

COIS 231
Programming in RPG
Three Credits
The course is an overall study of the development cycle of a system, emphasizing the documentation of the present systems. It emphasizes the use of basic and structured tools and techniques to describe processes, data flow, data structures, file design, form design for data gathering, and preparation of reports. Requires laboratory.

Prerequisite: COIS 107

COIS 240
Object-Oriented Programming with C++
Four Credits
The course centers on fundamental concepts and principles of the programming language C++. It emphasizes an individualized style of modular programming, using object programming. It also promotes the use of extensions coding, modules, and applications for the development of competitive skills for today's employment market. Requires laboratory.

Prerequisite: COIS 101, COIS 102

COIS 250
Systems Analysis and Design
Three Credits
The course centers on the study of the systems development cycle, with emphasis on present system documentation, using classic tools and techniques as well as structured ones. It includes the use of these resources for describing processes, data flow, data structures, forms design for data gathering and reports. Data gathering activities and information, progress reports, and the transition from analysis to design are also discussed.

Prerequisite: COIS 102

COIS 290
Systems Development Workshop
Three Credits
This is a practice course in which students are required to develop a project with a real application. It includes analyzing, designing programming and implementing a simple computerized system. Requires laboratory.

Prerequisite: COIS 250

COIS 301
Programming in FORTRAN
Three Credits
The course centers on programming techniques for development of business applications in FORTRAN. The structure and commands of the language are discussed, with emphasis on topics such as alphanumeric constraints, integer and real variables, logical and arithmetic operations, data management, functions, sub-programs and sub-routines. Requires laboratory.

Prerequisite: COIS 106

COIS 350
Structured Design with Object Programming
Three Credits
The course is a study of fourth generation programming languages oriented toward systems development in an object/event driven environment. Students will have the opportunity to use different modeling methodologies in objects/events programming. The course will emphasize the development of application programs on a graphical, visual interface, using any of the object-oriented programming languages currently available. Requires laboratory.

Prerequisite: COIS 216, COIS 250

COIS 360
Telecommunications and Computer Networks
Three Credits
This course in telecommunications and computer networks is designed for individuals in the field of computerized information systems. The historical development and the concepts, terminology and modern products related to computer networks are described. The criterion for planning, acquisition and installation of computer networks is emphasized. It also includes the study of protocols, software, topologies, and products available.

Prerequisite: COIS 101

COIS 370
Productivity Programs for Microcomputers
Three Credits
Processing, analysis and presentation media and techniques for problem solving using the computer will be studied. The course emphasizes advanced skills dealing with productivity programs, including word processing, spreadsheets, and database application. It also includes the design and development of material for slide presentations, as well as production of graphs or charts using special effects.

COIS 390
Programming in PASCAL
Three Credits
Students will study the concepts, structures and specific commands of PASCAL, directed at programming business application. Topics discussed include top down design, logical and arithmetic operations, types of structured data, recursion, and file management.

Prerequisites: COIS 102, COIS 106

COIS 410
Information System for Decision-Making
Three Credits
The course centers on the analysis of high-level information systems, which provide quantitative data from one or more internal or external data banks of the organization to facilitate management decision-making. Theoretical concepts are applied to real life through analysis of specific organizational areas. Requires laboratory.

Prerequisites: ACCO 295, COIS 106

COIS 420
Database Program Development I
Three Credits
This introductory course on database program development will emphasize loading, editing and accessing the database. Topics discussed include: applications of data structure, index and directory organization of files, as well as hierarchical and relational models. Requires laboratory.

Prerequisite: COIS 250

COIS 421
PL/SQL Programming
Three Credits
Specialty elective course designed to provide a working introduction to PL/SQL programming within the Oracle RDBMS environment. The course begins with basic relational database concepts, the SQL query language, PL/SQL language fundamentals of block program structure, variables, cursors, and exceptions, object creation, including indexes, tables, triggers, and stored procedures, Oracle Forms, Oracle-supplied packages, SQL*Loader, SQL developer, dynamic SQL, and object technology. Students will work with real-life projects. Requires laboratory.

Prerequisite: COIS 420

COIS 422
Database Application Development
Three Credits
Specialty elective course, which will provide the student the necessary skills to design and create interactive applications through a graphical user interface in an information system complemented by relational database systems. The use of multiple strategies to support the managerial decision making within the company or business will be emphasized using complex reports, charts, complex forms and queries. The course will be complemented with real world scenarios applications in which the student will be able to design, develop and implement an application using a graphical user interface that uses all database objects. The course requires laboratory.

Prerequisite: COIS 421

COIS 423
Database Administration
Three Credits
Students will study and practice program development techniques related to a database management system. Emphasis will be given to functions such as: table files, append from, copy to, sort, report generator, queries, and many others. Object-linking embedding (OLE) and dynamic data exchange (DDE) are included as essential parts of the course in terms of knowledge integration with topics presented in other courses. Requires laboratory.

Prerequisite: COIS 420

COIS 425
Object-Oriented Programming with JAVA
Three Credits
The course centers on principles and fundamental concepts of the programming language JAVA. The course covers the design of well-structured applications, using clear and precise procedures. It promotes the effective use of control structures and optimal performance of the operational environment, in applications developed for the information highway. Requires laboratory.

Prerequisite: COIS 240

COIS 430
System Auditing and Security Management
Three Credits
The course is an introduction to the principles of auditing in computerized information systems, emphasizing control, types of auditing, auditing techniques and their effective system development. Topics studied include concepts of auditing computing, equipment and operations auditing, security, integrity and privacy of the system. Requires laboratory.

Prerequisite: COIS 420

COIS 432
Computer Networks Design
Three Credits
This specialized course is oriented to local area network design. Students will be able to learn the necessary methodologies for the design of computer-based networks using wired, wireless and optical media. They will learn to use application software in a simulation environment to prevent errors and time loss before the computer network installation. This environment will provide the students a knowledge base for diagnosing and anticipating problems that increase the costs and production loss in the business.

Prerequiste: COIS 360

COIS 433
Wireless Local Networks
Three Credits
This course describes the technologies involved in all aspects of a local area network and how personal devices can interact and communicate with each other. Using a practical approach, the students will learn how a wireless device communicates with a wireless network using protocols and a wireless LAN access point. They will learn how to design, install and troubleshoot a wireless LAN network on a safe-based environment, applying device security management.

Prerequisite: COIS 360

COIS 434
Application Development for Mobile Devices
Three Credits
In this course students are initiated to a mobile computing environment. The student will be able to develop tools and applications that access data and information from any device in a network while on the move. The course provides detailed skills for delivering true mobile computing on both the service creation and device fronts. Students are provided a guide through the complex web of acronyms and standards that wireless data runs on. They learn how to detect and diagnose security issues and new emerging technologies.

Prerequisite: COIS 240; COIS 360

COIS 435
Data Communications and Computer Networks Management
Three Credits
The course centers on fundamental elements for the management of computer networks and data communication. The course emphasizes skills development for the design and management of modern communication networks, using digital technology. It also utilizes ideal platforms for data transfer and telecommunications, oriented to client-server services and to the management of applications for the information highway. Requires laboratory.

Prerequisite: COIS 360

COIS 440
E-Commerce Methodology and Technology
Three Credits
This course presents the necessary technologies, protocols, and methodologies for the development of e-commerce or e-business. This course surveys the various business models that have been introduced in the last few years and analyzes their economic and managerial foundations. It also covers legal and security issues.

Prerequisite: COIS 250

COIS 441
Application Development for E-Commerce
Three Credits
The course provides the skills and methodologies needed for the development of e-business or e-commerce applications.

Prerequisite: COIS 240

COIS 442
Portals Integration
Three Credits
This course provides knowledge and skills needed to create and deploy portals. It integrates applications using portals.

Prerequisite: COIS 441

COIS 443
E-Commerce Development
Three Credits
This is a capstone course that provides the students the opportunity to plan, design, develop, and deploy an e-commerce site. This course includes setting up and maintaining a website; understanding site structure, presentation, navigation, and content management.

Prerequisite: COIS 442

COIS 450
Software Development Project
Three Credits
The course centers on the application of concepts, principles and practices of systems development and programming techniques in the development of an information system. Project management methodology, scheduling, task control, formal presentations and group dynamics are used to solve system design problems. Required files are designed and a program to implement the system is developed. Requires laboratory.

Prerequisite: 16 credits required plus two specialty courses

COIS 470
Application Programming for the Web
Three Credits
This course covers planning and development of home pages on the World Wide Web. Techniques for applications written in PHP with database interaction using MySQL are presented, as well as more complex pages than those developed with HTML. Cases studies are discussed and analyzed.

Prerequisites: COIS 240

COIS 471
Web Portals Development
Three Credits
This course covers planning and development of home pages on the World Wide Web. Techniques for applications written in PHP with database interaction using MySQL are presented. More complex pages than those developed with HTML are presented. Cases studies are discussed and analyzed.

Prerequisite: COIS 470

COIS 472
E-Commerce Object Oriented Programming
Three Credits
This course covers business issues related to electronic commerce, such as models for B2B and B2C electronic commerce, electronic payment mechanisms, technology infrastructure, privacy and competitive advantage.

Prerequisite: COIS 471

ECON 121-122
Economic Principles and Problems I and II
Six Credits
The course covers economic theories and practice: value and price, exchange, distribution, production, employment, national income, international commerce, public expenses, economics cycles, social welfare and influence of government on the economy.

ENTR 360
Entrepreneurship
Three Credits
This course provides students the opportunity to apply the basic concepts of small business management, using a teambuilding approach with participants from different disciplines. Different aspects for the small business management will be studied, emphasizing the formulation of solutions applicable to specific entrepreneurship problems. The preparation of a group project, including strategies and tactics for the development and administration of a small business, will be required.

ENTR 401
Identification and Assessment of Business Opportunities
Three Credits
Students will learn the concepts, techniques, and skills necessary to identify the two approaches to recognize entrepreneurship opportunities. Techniques for feasibility studies, development of a new business, and strategies for firm growth will be presented. In addition, personal characteristics needed to be a successful entrepreneur will be discussed.

Prerequisites: MANA 316, COIS 201, ENTR 360

ENTR 402
Design and Organizational Structure for SMEs
Three Credits
Design and organizational structure for small businesses is a course that will acquaint students with the tools to start a small business and manage it. Students will examine the challenges of entrepreneurship and the strategies used to face them. Organizational management theory will be discussed. This course will assist the students in developing a business plan and a description of the strategies used to develop the organizational structure.

Prerequiste: MANA 316, COIS 201, ENTR 360

ENTR 403
E-Commerce and Design of Systems and Networks
Three Credits
The course provides the principles and practices for the development of e-commerce and network systems design. It will familiarize the student with the basic concepts involved in different types of e-commerce applications.

Prerequiste: MANA 316, COIS 201, ENTR 360

ENTR 404
Business Development of biotechnology and Industrial Health
Three Credits
The course is designed to develop capabilities required to start companies in biotechnology. It also addresses issues on how to manage established companies in bioscience sectors, as well as the transitions from start-up to established company. The students will acquire knowledge on company formation, team building, intellectual property, financing, partnering and regulatory issues in biosciences industries.

Prerequiste: MANA 316, COIS 201, ENTR 360

FINA 202
Business Finance
Three Credits
The course is a study of fundamental principles of business finance and their analysis, planning and control functions: effects of income tax, basic financial ratio earnings, capital budgeting and cost of capital, interest factor in financial decisions, working capital and assets management.

Prerequisite: ACCO 112

FINA 204
Money and Banking
Three Credits
The course covers the nature and role of financing, varieties of money, theory of the origin of monetary value, monetary systems, commercial banking, Federal Reserve System, economic policies control, and international commerce.

Prerequisite: ECON 122

FINA 240
Risk and Insurance
Three credits
Students will study the different types of risk, the methods for dealing with them and, the insurance institution as an instrument for dealing with risk. The course will examine in detail what makes a risk insurable, the different types of insurers and their marketing systems, what factors should be considered in selecting an insurable, the functions and organization of the insurer, the legal principles applicable to the insurance contract, and the main types of insurance contracts.

Prerequisite: STAT 201

FINA 410
Corporate Finance
Three Credits
Studies concepts and problems of corporate finance for decision making under certainty and uncertainty. Examines working capital management and asset pricing and portfolio theories. Topics include capital budgeting, corporate valuation and restructuring, capital structure relevance, and dividend policy.

Prerequisites: FINA 202, ACCO 302

HURM 400
Safety and Occupational Health
Three Credits
In this course the students will learn basic concepts of security and occupational regulations and policies. Emphasis will be placed on the analysis and prevention of accidents, and records of industrial accidents. The course also focuses on theories of industrial accident incidence, workers' compensation, functions of the safety and industrial hygiene staff, standards achievement, risk avoidance concepts, industrial accident investigation, information systems, protection systems (security), self protection and first aid, as well as ergonomics, among others.

Prerequisite: MANA 210

HURM 412
Training and Development
Three Credits
The course covers the importance of training and development to achieve organizational goals. It includes training program design, training needs assessment and development, and identification of the appropriate training. It also integrates learning theories in the design of training programs. The course emphasizes the importance of learning effects on performance. Different training methods, the utilization of technology in training and comparison of methods with their costs, benefits, and characteristics of the learning process are discussed. It includes employee development and performance appraisal. Special topics such as a transcultural training, career management and organizational challenges, such as l skills obsolescence, employee advising and socialization, the balance between work and family, reductions and

displacement, as well as retirement issues are also discussed.

Prerequisite: MANA 210

INBU 350
International Business
Three Credits
This course centers on presenting the concepts and administrative implications of international business practices in the area of products and services merchandising all around the world. The course will emphasize the pros and cons of economic theories, government policies, business strategies and the organizational structure of international business.

INOP 320
Advance Operations and Production Management
Three Credits
This course examines the concepts, principles and techniques of operations management and production, which is the main functional area of business. Most of the principles, concepts and techniques discussed apply to a variety of products, including manufactured and non-manufactured items and a wide variety of services. The course will analyze the transaction process, in order to run an efficient and up-to-date business. Other topics included are: operations programming, quality, inventory, reliability and others.

Prerequisite: MANA 340, QUME 202

INOP 401
Statistical Quality Control
Three Credits
The course provides students with comprehensive coverage of the fundamental concepts of quality control in the manufacturing and service industry. It is designed to introduce students to the principles of management techniques, providing a basis for the use of quality tools, rules and standards in this area of specialization.

Prerequisite: STAT 202, MANA 210

Corequisite: STAT 202

INOP 405
Inventory Control
Three Credits
As a vital function of an organization's operational structure, effective inventory management is key to improving a company's customer service, cash flow and profitability margin. This course will focus on inventory control tools and techniques, with in-depth coverage of the latest practices in the field. This will provide relevant information involved in day-to-day decisions.

Prerequisite: ACCO 111, STAT 201

INOP 409
Management and Physical Distribution
Three Credits
This course provides general knowledge of theories and management aspects related to logistics management in manufacturing and services sectors. It is divided in three important phases: 1) Introduction to Logistics with a strong focus on production and distribution (essential methods used to obtain a high level of effectiveness and productivity); 2) Discussion of important and relevant aspects with respect to customer service and satisfaction (transportation, warehouse, inventories, purchase orders management and procedures) and 3) Detailed studies of management procedures and practices, both domestic and international. Other important methodologies for continuous improvement will also be discussed, such as Six Sigma and Lean Manufacturing, which help to increase productivity and customer satisfaction levels.

Prerequisite: MANA 210, MANA 340, QUME 202

MANA 131
Human Relations in Business
Three Credits
Students will study personal and interpersonal relationships in the decision-making process. They will analyze the dynamics of leadership and group behavior through discussions of different cases. Labor-management relations in production, communication and sales will also be examined.

MANA 204
Business Law and Entrepreneurial
Four Credits
The course covers the legal aspects of common business transactions with emphasis on Puerto Rican legislation. Special attention is given to contracts, sales, marketable securities, transfer of property, deeds and mortgages.

MANA 210
Management Theory
Three Credits
The course centers on traditional principles of business administration compared to new concepts. Students will analyze the management process through discussions of the four basic principles of business administration: planning, organization, administration, and control.

MANA 213
Personnel Administration
Three Credits
The course presents the theory and application of fundamental principles of human resources management in an enterprise. The dynamic role of the manager and his relationship to personnel is emphasized. The course also looks at issues in human resources management and their relation to the general objectives of the enterprise.

Prerequisite: MANA 210

MANA 230
Organizational Behavior
Three Credits
The course presents classical and contemporary organization theories; interpersonal and organizational behavior; motivation, communications, and leadership theories; and decision processes in organizations.

MANA 300
Ethics in Business
Three Credits
The course centers in ethical principles involved in the decision-making process in a business environment. The student will be learning concepts related to moral aspects of human behavior within the whole social system, and particularly in business settings or in groups where the individual operates.

MANA 302
Labor Legislation
Three Credits
Study the fundamental aspects on labor legislation in the state and federal level. Analyze regulations governing relations with workers, protective legislation work, personnel law, social work, security legislation, and occupational health and safety legislation.

Prerequisite: MANA 213

MANA 306
Government and Business
Three Credits
The course covers the role of government in the free enterprise system and legislation created to control or regulate commerce.

Prerequisite: MANA 204

MANA 308
Real Estate Management
Three Credits
The course covers fundamentals of real estate and the essentials of brokerage, financing, mortgages, investments, property administration, and appraisals.

Prerequisites: MANA 210, FINA 202

MANA 316
Small Business Administration
Three Credits
The course centers on planning, distribution of space and handling of materials, analysis of investments, inventory control, quality control, and the analysis of methods to determine employee efficiency for small businesses.

Prerequisites: MANA 210, STAT 201, MANA 340

MANA 321
Supervision and Leadership
Three Credits
This course provides a general view of the concepts, methods, and modern supervisory techniques needed to become efficient business managers. It emphasizes the supervisor's responsibility and authority, and highlights the role and functions of the supervisor. Theory is combined with practical observations, so that the student can become aware of all the fiscal, human and psychological resources that the supervisor must use in order to administer efficiently and effectively.

Prerequisite: MANA 210

MANA 340
Operations Management
Three Credits
The course covers the analysis, planning and control of production facilities and operations. Also covered is the use of techniques and models for decisions related to: demand forecasts, product mix, plant location, quality control, inventory control, and the human factor in the production process.

Prerequisite: STAT 201

MANA 395
Total Quality Management
Three Credits
The course centers on the analysis and discussion of the elements of total quality management and its effect on organizational behavior. The course also provides a review of its effects on the management of organizations in general, the responsibilities of the manager and the behavior of employees in the organization.

MANA 401
Enterprise Strategy
Three Credits
This course integrates the knowledge acquired in the first three years of business administration. It includes the strategic study organizations at all stages and their social and environmental impact.

Prerequisite: STAT 201

MANA 404 @
Labor Relations
Three Credits
The course presents a multinational approach to labor relations, but places special attention on Puerto Rico. Students will analyze the origins of labor unions in Puerto Rico, as well as labor laws and federal laws related to the island. Arbitration and complaint procedures and the selective analysis of current situations in labor will also be studied.

Prerequisite: MANA 210, MANA 213

MANA 408
International Trade
Three credits
The course centers on the commercialization process of products and services around the world. It includes fundamental themes of international commerce, such as: marketing of exports, organization of the exporting business, financial bases of the exporting process, market selection and research, strategies to promote products in international markets, legal aspects and support instruments in international commerce, international cargo transportation and insurance, regulative and preferential practices in international commerce, importing techniques and operations, dealing with export documents, and an introduction to the new process of globalization.

MANA 422
Compensation Management
Three Credits
The course presents principles and techniques used in the design and the administration of a compensation system. It will include aspects concerning legislation, base pay structure, job evaluation, performance analysis, as well as incentives plans, benefits and services.

Prerequisite: MANA 210

MARK 133
Principles of Marketing
Three Credits
The course covers processes involved in the distribution of goods and services from producer to consumer. Students will study the comprehensive system of marketing, including management-controlled variables, such as product, price, promotion and distribution. External variables such as government, the economy and society will also be considered, as well as consumer behavior, modern marketing trends, market definition, and placement and information systems, among other topics.

MARK 135
Retail Sales
Three Credits
The course centers on an analysis of the theory and practical principles used in organizing and managing retail business. It includes topics such as: the planning and organization of retail business, merchandise purchasing and handling; sales and promotion, and control of business operations.

Prerequisite: MARK 133

MARK 206
Consumer Behavior
Three Credits
Students will study consumer motivation, decision-making in selection of goods or services, as well as market definition and site. The role of anthropology, sociology and social psychology in analyzing and understanding consumer behavior will be considered. The course includes psychological principles that facilitate understanding of individual traits, such as learning experience, perception, attitudes, motivation and personality.

Prerequisite: MARK 133

MARK 251
Advertising and Promotion
Three Credits
The course covers basic principles of advertising. Ethics, as well as social and economic problems related to business advertising are considered. Also included are basic principles applicable to promotional copy writing and the selection of the methods used in transmitting information.

Prerequisite: MARK 133

MARK 301
Marketing Management
Three Credits
The course centers on marketing as a process and analyzes the application of its theories to management. Topics include the role of marketing in organization, development, implementation and control of the marketing plan.

Prerequisite: MARK 133

MARK 305
Personal Selling
Three Credits
The course covers strategic and tactics applicable to personal selling. Topics emphasized include basic principles of sales, selecting and qualifying prospects, research, selling techniques, and closing, which will help students achieve success in personal selling of products and services.

MARK 306
Sales
Three Credits
Study the foundations of professional selling, as creating, communicating and delivering value. Also, initiating, developing and enhancing customer relationships.

Prerequisite: MARK 301

MARK 318
Sales Management
Three Credits
The course centers on a description of the shift in industry from a production-oriented approach to a consumer-oriented approach. Topics include the role of sales management in a production-oriented firm and a customer-oriented firm; changes in the nature of sales management, and managerial challenges in sales management.

Prerequisite: MARK 306

MARK 320
Marketing Research
Three Credits
The course covers the application of the scientific method to the gathering, analysis and use of market data. It includes a review of the literature, as well as experimental exercises in solving marketing problems. Students will study the importance of individual and organizational initiative, and the traditions, methods and objectives of marketing research.

Prerequisites: STAT 202

MARK 350
International Distribution Channels
Three Credits
This course provides students with the skills to design distribution channels both domestically and internationally. The distribution channels of companies often represent the main points of contact with end consumers. Having the right partners and their cooperation is critical to the success of the company to acquire and retain consumers. Specifically, this course discusses the nature of distribution channels, the importance of using marketing intermediaries, the number of levels, behavior and organization, systems of vertical integration, horizontal integration systems, hybrid systems, marketing, physical distribution and management logistics.

Prerequisite MARK 301

MARK 402
Integrated Marketing Communication
Three Credits
The course covers the role of promotion, personal selling, advertisement and public relations in the marketing objectives of an organization. Topics include the nature of communication, marketing resources, as well as how society, attitudes and individual preferences affect communication. Media and the relevance of public relations will also be considered.

Prerequisite: MARK 301

MARK 403
Product Management
Three Credits
The course focuses on the development of new products and on strategies for existing products. The scope and importance of new products will be considered, as well as their objectives and development processes. Emphasis will also be given on the process of change or modification of existing products.

Prerequisite: MARK 402

MARK 404
International Negotiation
Three Credits
This multidisciplinary course explores the negotiation from an individual to an international perspective, including both the public and the private sector. Contains a special emphasis on cross-cultural elements which affect both the perception and the levels of the negotiation process. The course explores the context of negotiation, bargaining structure and dynamics (strategies and tactics) to persuade and negotiate to reach an agreement.

Prerequisite: MARK 301

MARK 405
Public Relations Business
Three Credits
The course focuses on the importance of public relations in contemporary society and on the application of public relations principles in business, society, economy, culture, politics and education in Puerto Rico. Origins of public relations in the United States and Puerto Rico are discussed. Other topics include the role and traits of public relations professionals, as well as their function in society and business. Ecology, environment and public relations ethics will be discussed. The following topics are also included: research, planning, use and evaluation of communications media, importance of public opinion, public relations industry and the public, and the use of promotion and advertising.

Prerequisite: MARK 402

MARK 406
Marketing Strategies
Three Credits
The course focuses on marketing strategies; by describing present marketing problems, the course provides an opportunity for the development of decision-making skills. Emphasis is placed on products and services, integrated marketing communications, marketing channels and pricing strategies.

Prerequisite: MARK 301

MARK 409
Industrial Marketing
Three Credits
The course centers on analyzing methodology and policies in the marketing of industrial products. Topics include distribution channels, pricing and service policy, industrial sales, and purchases.

Prerequisite: MARK 133

MARK 410
International Marketing
Three Credits
The course covers the history and basic principles of marketing as applied to international marketing. Emphasis is placed on the cultural, political and legal framework. Topics include managerial considerations, pricing systems and distribution channels.

Prerequisite: MARK 301

MARK 415
Sales Forecasting
Three Credits
This course studies different quantitative and qualitative methods to predict the uncertain nature of business in sales as moving average, exponential smoothings, time series, simple linear regression, Delphi method, expected value, decision tree diagram and Bayes' theorem.

Prerequisites: MARK 301, STAT 201

MARK 450
Marketing Internship
Six Credits
This course involves students in a work experience related to marketing strategy, in which principles acquired in the classroom will be applied. Strategies in drafting marketing policies at management level will be studied: organization, demand analysis, product planning, pricing system, logistics and sale promotion. The course will also expose the student to actual work situations, which will develop the assurance and self-confidence required in professional life. The experience will also aid the student in deciding on a specific area in the marketing field. Requires one hundred and sixty (160) full-time work hours during the semester.

Prerequisite: 12 credits required plus 2 specialty courses

MARK 455
Marketing Project
Three Credits
In this course the student will apply knowledge acquired in the marketing concentration. The student will be able to apply different aspects, such as the role of marketing in the organization, development, implementation and control of the marketing plan.

Prerequisites: MARK 450

OFAD III
Elementary Spanish Shorthand
Three Credits
The course covers the basics of elementary Spanish shorthand. Students will develop shorthand technique through reading and writing of shorthand symbols, including: vocabulary, brief forms, phrasing, as well as frequent word beginnings and word endings. Exercises are provided to emphasize correct language usage. One semester, 4 hours a week.

OFAD 112
Intermediate Spanish Shorthand
Three Credits
This course continues developing shorthand skills, but at a quicker pace, using reading and writing. Knowledge of shorthand is increased with new vocabulary, brief forms, phrasing, letters, as well as frequent word beginnings and word endings. Language usage is emphasized. One semester, four hours a week.

Prerequisite: OFAD 111

OFAD 113
English Shorthand
Four Credits
This course emphasizes the principles of English shorthand. It introduces pre-transcription skills. Special attention is given to accuracy, spelling and the application of grammatical concepts. Dictation techniques will be developed up to a minimum of 60 words per minute. One semester, five hours a week.

Prerequisite: OFAD 111

OFAD 121
Keyboarding
Three Credits
The course centers on developing keyboard skills and touch-typing, enabling the student to enter data quickly and

precisely in any electronic system. Students are introduced to the ten-key pad. One semester, three hours a week.

OFAD 125
Accounting for Secretaries
Three Credits
This course provides the basics of accounting needed for secretarial work. It includes the following topics: nature and purpose of accounting, basic procedures, internal control, planning, the use and purpose of payroll, and accounting in a service and merchandising enterprise. One semester, three hours a week.

OFAD 141
Keyboarding and Document Formatting I
Three Credits
This course emphasizes basic techniques, proper use of the keyboard, proofreading, application of basic skills to horizontal and vertical centering, proofreader marks, and business correspondence. Students will develop speed and accuracy skills. One semester, four hours weekly.

OFAD 142
Document Formatting II
Three Credits
The course centers on further development of touch-typing skills. Students carry out exercises to develop speed and precision, outlines, manuscripts with footnotes, tabulation, machine direct composition, memoranda, drafts, envelopes and commercial letters with special notes. Basic techniques and attitudes are emphasized. One semester, 4 hours a week.

Prerequisite: OFAD 141

OFAD 205
Office Technology
Three Credits
This course provides basic concepts and the history of word-processing. It includes an analysis of changes in the organizational structure of the office up to the modern electronic office. The course also provides information on the various professions stemming from word-processing and this skill relates to other data systems. One semester, four hours a week.

OFAD 206
Word Information Processing I
Three Credits
This course provides students with instruction and practice in the use of a word processing program. The student will prepare documents applying the basic and intermediate functions of this program. One semester, four hours a week.

Prerequisites: OFAD 142, OFAD 205

OFAD 207
Word Information Processing II
Three Credits
This course offers the student experience in the use of microcomputers through the preparation of documents, as well as through the use of advanced functions of a work-processing program. Emphasis will be placed on adapting software for particular jobs. In addition, this course will allow students to maximize their effectiveness with word processing in the business office. One semester, four hours a week.

Prerequisite: OFAD 206

OFAD 251
English Transcription
Three Credits
This course continues the review of Gregg shorthand principles. Emphasis is placed on transcription skills and the proper use of grammar to produce correspondence in English. One semester, four hours weekly.

Prerequisites: OFAD 113, OFAD 142

OFAD 261
Spanish Transcription
Three Credits
This course integrates typing, shorthand and language skills for a gradual development of transcription ability. One semester, three hours a week.

Prerequisites: OFAD. 112, OFAD 142

OFAD 280
Records Management
Three Credits
This course provides students with the necessary knowledge to organize and maintain document management and filing systems. This knowledge will enable students to work effectively in offices that have centralized or decentralized systems for document management. One semester, three hours a week.

OFAD 281
Office Systems and Procedures
Three Credits
This course provides students the opportunity to enhance knowledge acquired from previous courses. It also develops in students a sense of the responsibilities of working as an office administrator and the ability to solve problems in an office or business environment.

OFAD 282
Office Management
Three Credits
This course provides students of office management with situations to which office personnel are exposed to and teaches them how to face them. It develops in students the competencies required to manage diverse office situations. It presents basic management processes and principles. Topics related to the selection, motivation, and evaluation of office personnel, as well as duties and responsibilities are also discussed. Topics related to office automation, its impact on the personnel and the budget are reviewed.

OFAD 286
Machine Transcription
Three Credits
The students will learn how to work with dictation and transcription systems. Students will also strengthen English language skills through practice in listening, punctuation, grammar, vocabulary and proofreading. One semester, four hours a week.

Prerequisite: OFAD 142

OFAD 307
Computer Software Applications
Three Credits
This course covers different technological phases in the application of microcomputers. It is designed to enable students to apply computerized programs, such as: spreadsheets, record management, databases, telecommunications, and desktop publishing.

Prerequisites: OFAD 206, OFAD 207

OFAD 381
Business Internship (Associate Degree)
Four Credits
The business internship offers students the opportunity to demonstrate the skills acquired throughout their courses in the office administration majors. This course requires a minimum of sixteen (16) hours a week of practice in a private or government office, and one hour a week of seminar. The site supervisor and the internship coordinator will be in charge of the performance evaluation. One semester.

Prerequisites: OFAD 206, OFAD 280, OFAD 281, OFAD 286

OFAD 382
Business Internship (Bachelor's Degree)
Four Credits
This course requires a minimum of sixteen (16) hours a week of practice in a private or government office, and one hour a week of seminar. Integration of classroom training with on-the-job experience will allow the students an opportunity to participate in daily business applications related to their professional careers. The site supervisor and the internship coordinator will be in charge of the performance evaluation. One semester.

Prerequisites: OFAD 206, OFAD 207, OFAD 280, OFAD 281, OFAD 286

OTEM 101
Introduction to Office System Technology
Three Credits
The course introduces the student to basic computer concepts, the Internet as a technological resource, electronic mail and the importance of the different applications. It will familiarize the student with the basic concepts of information retrieval, as well as basic concepts in electronic prosecution of data. Emphasis will be placed on computer handling.

OTEM 201
Information Technology
Three Credits
This course will develop different input technologies: digital image, scanning, speech recognition, electronic communication, and information processing.

Prerequisites: OTEM 101

OTEM 202
END-USER SOLUTIONS
Three Credits
This course introduces three of the most important office applications: Word Processing, Excel, and PowerPoint. By the end of the course the students will know how to use the office applications to create documents, such as reports, spreadsheets, and PowerPoint presentations. The exercises focus on the most common skills that every computer user needs for proficiency.

OTEM 303
Database Management
Three Credits
The course provides the concepts, advanced techniques, and skills necessary in the process of relational databases, analysis and design. It is intended to offer the necessary tools for maintaining and managing information. The student will learn how to analyze information and present it in table reports, forms, and queries. The basics of SQL programming are introduced.

Prerequisites: OTEM 201

OTEM 310 @
Office Information Management
Three Credits
This course develops the competencies needed to administer any type of office. Processes and basic administrative principles and topics are presented, such as: administration of documents using the rules promulgated

by ARMA (Association of Records Managers and Administrators, Inc.), ethical aspects and social responsibility, efficient work and time management, the importance of ergonomics in the office environment, and relevant information for the selection of office personnel. Also included are motivation techniques and employee selection.

OTEM 401
Document Publishing
Three Credits
This is an introductory course that will acquaint students with graphic design technique, principles of page layout and design, and desktop publishing terminology and applications. Students will create a variety of documents such as flyers, brochures, newsletters, and business cards. This course will assist students in producing documents that communicate effectively through good design and application of basic concepts of desktop publishing.

Prerequisites: OTEM 202, OTEM 405

OTEM 402
Web-Based Document Publishing
Three Credits
The course is designed to enhance skills and knowledge of the professional web author by using cross-platform HTML editor for creating and managing Web sites and pages. The student will use a variety of techniques and tool activities designed to develop pages for the commercial/professional web developer standard. The student will design, develop and manage navigation of the Web sites and Web pages.

Prerequisites: OTEM 202, OTEM 401

OTEM 404 @
Training and Development in Office Technology Management
Three Credits
Learning theories and instructional development in education are applied in the training of employees in office systems. The following material will be covered: employee and business needs, selection of instructional strategies, and conducting training, as well as conducting follow-up re-training.

Prerequisites: MANA 131

OTEM 405
Integrated Applications
Three Credits
In this course students will integrate Microsoft Office Applications. The software to be covered is Word, Excel, PowerPoint, Access and Outlook. During the course students will apply knowledge and skills acquired in word processing, spreadsheet, electronic presentations and databases. Students will apply Internet options, including e-mail. Students will also apply critical thinking to solving problems.

Prerequisites: OTEM 202, OTEM 303

OTEM 410
End-User Project
Three Credits
In this course simulations will allow students to apply skills acquired in previous courses and see them come together in developing site projects. The methodology facilitates collaborative learning. Emphasis is placed on projects, simulations and case studies that challenge and sharpen learners' problems-solving skills, providing an opportunity for students to gain practical experience in web design environments.

Prerequisites: OTEM 401, OTEM 402

OTEM 415
Portal Workflow Management
Three Credits
This Web Content Management course provides some principles and practices for designing, developing, and maintaining web-based projects of all sizes and for all audiences. The content management strategy is unique, because it combines three critical components: processes, technology, and people.

Prerequisites: OTEM 405

OTEM 416
Electronic Document Management
Three Credits
The course clearly defines and simplifies the principles of document engineering and management. It sets the proven techniques and methods for planning, building, and maintaining automated systems (EDMS) for fast and efficient storage and retrieval of documents and forms.

Prerequisites: OTEM 405

OTEM 420
Electronic Content Management End-User Project
Three Credits
Students will apply concepts, principles and system design practices, as well as programming techniques for the development of applications in the engineering and administration of documents. The course includes file design and programming for the implementation of the (EDMS) and (CMS) system. Requires laboratory .

Prerequisites: OTEM 415, OTEM 416

OTEM 425
Microsoft Word/Microsoft PowerPoint
Three Credits
In this course students will apply the advanced functions of Word and PowerPoint. Students will prepare different types of letters, tables, columns and forms. They will apply the following functions: merge, track changes, Internet document editing, and different versions of a document. In PowerPoint, students will develop well-formatted electronic presentations. At the end of the course, students will be prepared to take Microsoft Word and PowerPoint Certification exams.

Prerequisites: OTEM 202, OTEM 405

OTEM 426
Microsoft Excel & Microsoft Access
Three Credits
The course provides advanced techniques needed to design, create, edit, print and publish professional-quality electronic spreadsheets and databases on the Internet/Intranet. Students will learn how to analyze information and present it in table format and in charts. Topics include database management, web pages, and macro programming capabilities. Macros will be created using Visual Basic. The course prepares students to take the Microsoft Office User Specialist or Microsoft Access Expert exams.

Prerequisites: OTEM 202; OTEM 303; OTEM 405

OTEM 427
End-User Project (MOUS)
Three Credits
This course prepares students for the Microsoft Office User Specialist (MOUS) exam. Simulations are offered in each of the Microsoft applications to test the knowledge acquired, thus reinforcing skills. Multiple methods for each of the tasks on the examination are provided.

Prerequisites: OTEM 425, OTEM 426

QUME 101
Introduction to Quantitative Methods
Three Credits
This is a basic mathematics course for business administration students. The course includes: fundamental operations with natural and cardinal numbers, fractions, and decimals; ratios and proportions; percentages, algebraic expressions, and linear equations, as well as applications for simple and compound interest.

QUME 202
Quantitative Methods ADMI
Three Credits
The course is an introduction to quantitative methods for business administration students. It includes: fundamental operations with real numbers, linear equations, solutions to systems of equations, and linear inequalities. Students are introduced to concepts of quantitative analysis, mathematical models and tools, linear programming, and applications to aid in problem solving and practical decision-making.

Prerequisite: MATH 199

STAT 201
Business Statistics I
Three Credits
This is an introductory statistics course which covers: frequency distribution, presentation of statistical data, measuring central tendency and dispersion, the concept of probability, and probability distributions used commonly in business analysis.

Prerequisite: MATH 199

STAT 202
Business Statistics II
Three Credits
Students will study sampling distributions, estimating with internal validity, hypothesis testing, analysis of variance, simple regression and correlation, decision analysis, and techniques of quality control. Chi-square and other nonparametric tests are also studied.

Prerequisite: STAT 201

SCHOOL OF EDUCATION

VISION

In collaboration with the broader Universidad del Turabo community and the professional community in school districts, the School of Education seeks to prepare professionals who are able to meet the challenges of education in a global society that is changing, diverse, and technologically oriented.

The School of Education will provide a high quality, student-centered and innovative environment to prepare reflective, collaborative and highly effective educational leaders who can address the needs of students and communities in Puerto Rico and abroad.

The Undergraduate Education Program, conscious of its responsibility in improving the quality of education, provides teacher candidates with a solid preparation in the field of education, as well as with the academic background needed to enhance their general professional competence and their teaching skills.

MISSION

The School of Education is committed to developing reflective, collaborative and highly effective educational leaders. We view teaching both as an art and as a science, learning as a reciprocal process, and service as a responsibility. Thus, we provide a learning environment that promotes individual creativity and fosters the synthesis of theory and practice. We facilitate the development of leaders who are sensitive to individual differences, to moral and equity issues and who, in their work as educators, will actively shape educational organizations.

The School of Education offers Bachelor's Degree programs in Elementary Education, Secondary Education, Special Education and Physical Education. The School of Education serves a diverse student body at the undergraduate and graduate levels on campus, off campus, and at several sites in the United States. We regard the diversity of our many units as a strong point which adds value to our identity.

The School of Education has a tradition of providing an educational environment that is conducive to interaction, innovation, reflection and service. The essence of our School is its people. From faculty and staff, students and alumni to community partners in private and public schools, the intense commitment and great sense of pride and responsibility in our role as educators is indicative of the core values sustained by the School of Education.

In carrying out our mission, we value:

- Excellence and innovation in teaching and learning
- Integration of pedagogical theory and practice
- Professional and personal integrity and responsibility
- Creativity and the development of significant projects that serve as examples in our field
- Active construction and application of knowledge
- A culture that stresses intellectual stimulation, academic excellence and personal dignity
- Teamwork and collaboration with schools, districts, institutions of higher education and organizations in Puerto Rico and abroad
- A sense of community that is fostered by pride in the accomplishments of each of its members and programs

The Program offers bachelor's degrees in elementary education with majors in: preschool education; primary education (K-3); elementary education (fourth to sixth grade), and teaching of English as a second language. The bachelor's degree in secondary education offers majors in biology, chemistry, English as a second language, general science, history, mathematics, social science, Spanish, and vocational industrial education. In addition, there is a bachelor's degree in special education with majors in speech, language, hearing impairments, and mild handicaps.

The objectives of the Division of Undergraduate Education are to enable students to:

1. Understand the importance of the social and personal mission of the teaching profession.
2. Accept changes that will lead to a broadening of their knowledge and experience as teachers and the capacity to use that knowledge effectively in the teaching-learning process.
3. Analyze social, psychological and philosophical foundations of education.
4. Choose and effectively use resources and materials to improve their teaching methods.
5. Understand and use different educational strategies and techniques effectively.
6. Be exposed to a variety of experiences that will help them to develop the skills, attitudes and abilities needed to become agents of change in the field of education.
7. Develop awareness of the responsibility of keeping abreast in their fields of specialization.
8. Understand, revise and enrich the curriculum in their area of specialization.

9. Be able to incorporate technological innovations into their personal lives and their teaching.
10. Develop the skills that will make them lifelong learners.
11. Understand and use the Standards for Excellence in Teaching and the constructivist approach.

PROGRAM IN PHYSICAL EDUCATION, SPORT STUDIES AND MOVEMENT

The Program in Physical Education, Sports Studies and Movement is committed to the development of competent physical education teachers, as well as athletics programs, health-related programs, and student services.

Strong efforts are centered on providing the teacher candidate with the scientific foundations, sports skills and historical perspective of this field, within the general objectives of education.

The intercollegiate, intramural and community services programs are an integral part of the Program, promoting effective management of physical facilities, as well as of economic and human resources. This integration provides an excellent experience in the development of a complete professional in this field.
The objectives of the Physical Education Program are to enable the student to:

1. Develop professional knowledge of the current tendencies and developments in physical education.
2. Analyze the legal framework that regulates the physical education field.
3. Develop techniques, strategies, and procedures in evaluation applied to physical education.
4. Develop policies and educational programs in adapted physical education.
5. Develop techniques, procedures, and administrative practice in the administration of physical education, recreation and interschool competition.
6. Help to improve the quality of life for society.
7. Promote students' use of computers and audio-visual equipment in the process of teaching physical education and in the management of sports events.
8. Develop the theory, conceptual knowledge, technical skills, and attitudes needed to become an effective physical education teacher.
9. Develop knowledge of the scientific foundations of physical education and sports.

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PROGRAMS OF STUDY

BACHELOR'S DEGREE IN ELEMENTARY EDUCATION: PRESCHOOL EDUCATION

Total Credits	**129**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses		**(48 credits)**
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading & Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamental Topics in Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		**(46 credits)**
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning & Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
COMS 104	Community Service	3
PHED 210	Health, Hygiene and Nutrition	3

Major Courses		**(29 credits)**
EDUC 123	Creative Expressions in Children PK-6	3
EDUC 202	Teaching Department g Materials and Learning Devices	3
EDUC 219	Perceptual Motor Development in Preschool and Primary Education	3

EDUC 225	Methods for Teaching from Preschool to Third Grade	3
EDUC 319	Theory, Practice and Assessment of Play Activities in Early and Primary Education Programs	3
EDUC 322	Language Development and Correction of Speech Difficulties in Preschool & Primary Grades	3
EDUC 323	Literature for Children from Preschool to Sixth Grade	3
EDUC 403	Administration of Preschool and Early Childhood Programs	3
EDUC 441	Practicum Teaching in Preschool	5

Elective Courses (6 credits)

BACHELOR'S DEGREE IN ELEMENTARY EDUCATION: PRIMARY EDUCATION (K-3)

Total Credits	**129**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses (48 credits)

EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamental Topics in Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses (46 credits)

EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundation of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundation of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses (29 credits)

EDUC 123	Creative Expressions in Children PK-6	3
EDUC 202	Teaching Materials and Learning Devices	3
EDUC 206	Teaching Reading in Grades K-3	3
EDUC 207	Teaching Writing in Grades K-3	3
EDUC 213	Mathematics and Science: Age of Discovery PK-3 Grade	3
EDUC 215	Critical Thinking Skills and the Teaching of Social Studies in Elementary School	3
EDUC 322	Language Development and Correction of Speech Difficulties in Preschool and Primary Grades	3
EDUC 323	Literature for Children from Kinder to Sixth Grade	3
EDUC 443	Practicum Teaching Elementary School Practicum	5

BACHELOR'S DEGREE IN ELEMENTARY EDUCATION: FOURTH TO SIXTH GRADE

Total Credits	**129**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses (48 credits)

EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamental Topics in Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in Mathematics, Spanish, and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		(46 credits)
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
COMS 104	Community Service	3

Major Courses		(29 credits)
EDUC 123	Creative Expressions in Children PK-6	3
EDUC 202	Teaching Materials and Learning Devices	3
EDUC 211	Curriculum and Teaching Mathematics in Grades 4-6	3
EDUC 212	Curriculum and Teaching Sciences in Grades 4-6	3
EDUC 215	Critical Thinking Skills and Teaching Social Studies in Elementary School	3
EDUC 216	Teaching Reading in Grades 4-6: Diagnosis and Correction of Reading Difficulties	3
EDUC 217	Teaching Writing in Grades 4-6: Diagnosis and Correction of Writing Difficulties	3
EDUC 323	Literature for Children from Preschool to Sixth Grade	3
EDUC 447	Practicum Teaching Fourth to Sixth Grade	5

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN ELEMENTARY EDUCATION: TEACHING ENGLISH AS A SECOND LANGUAGE

Total Credits	**129**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses		(48 credits)
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative Engl.	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamental Topics in Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in Mathematics, Spanish, and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		(46 credits)
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses		(29 credits)
ENGL 205	Literature I	3
ENGL 206	Literature II	3
ENGL 245	Advanced Grammar	3
ENGL 345	Children's Literature	3
ENGL 360	Contrastive Analyses between English and Spanish	3
ENGL 371	Introduction to Linguistics and Phonetics	3
EDUC 222	Teaching English as a Second Language in Elementary School	3
EDUC 350	Theories and Principles of Teaching English as Second Language	3
EDUC 444	Practicum Teaching English in Elementary School	5

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: BIOLOGY

Total Credits	**128**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**28**
Elective Courses	**6**

General Education Courses		(48 credits)
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3

ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
PHSC 103	Fundamentals of Physics	3
CHEM 224	Fundamentals of General Chemistry	3
MATH 155	Pre-Calculus	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		**(46 credits)**
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Educational Sociology	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses		**(28 credits)**
BIOL 203	General Biology I	4
BIOL 204	General Biology II	4
BIOL 325	Botany	4
BIOL 329	Ecology	4
BIOL 340	Genetics	4
EDUC 334	Teaching Science in Secondary School	3
EDUC 452	Practicum Teaching Biology in Secondary School	5

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: CHEMISTRY

Total Credits	**132**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**32**
Elective Courses	**6**

General Education Courses		**(48 credits)**
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
PHSC 103	Fundamentals of Physics	3
BIOL 104	Fundamentals of Biology	3
MATH 155	Pre-Calculus	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by student's major, CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		**(46 credits)**
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Educational Sociology	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses		**(32 credits)**
CHEM 203	General Chemistry I	4
CHEM 204	General Chemistry II	4
CHEM 221	Analytic Chemistry	4
CHEM 351	Organic Chemistry I	4
CHEM 352	Organic Chemistry II	4
EDUC 334	Teaching Science in Secondary School	3
EDUC 453	Practicum Teaching Chemistry in Secondary School	5
MATH 221	Calculus I	4

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: TEACHING ENGLISH AS A SECOND LANGUAGE

Total Credits	**129**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses		**(48 credits)**
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamentals of Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in Mathematics, Spanish, and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		**(46 credits)**
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses		**(29 credits)**
ENGL 205	Literature I	3
ENGL 206	Literature II	3
ENGL 245	Advanced Grammar	3
ENGL 342	Adolescent Literature	3
EDUC 350	Theories and Principles of Teaching English as a Second Language	3
ENGL 360	Contrastive Analysis between English and Spanish	3
ENGL 371	Introduction to Linguistics and Phonetics	3
EDUC 331	Teaching English as a Second Language in Secondary School	3
EDUC 449	Practicum Teaching English in Secondary School	5

Elective Courses	**(6 credits)**

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: GENERAL SCIENCE

Total Credits	**130**
General Education Courses	**50**
Professional Required Courses	**46**
Major Courses	**28**
Elective Courses	**6**

General Education Courses		**(50 credits)**
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
BIOL 203	General Biology I	4
CHEM 203	General Chemistry I	4
MATH 155	Pre-Calculus	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		**(46 credits)**
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3

PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses (28 credits)

BIOL 204	General Biology II	4
CHEM 204	Chemistry II	4
MATH 221	Calculus I	4
PHSC 203	General Physics I	4
PHSC 204	General Physics II	4
EDUC 334	Teaching Science in Secondary School	3
EDUC 451	Practicum Teaching Science in Secondary School	5

Elective Courses (6 credits)

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: HISTORY

Total Credits	**132**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**32**
Elective Courses	**6**

General Education Courses (48 credits)

EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 251	History of Puerto Rico I	3
HIST 271	History of the United States I	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamentals of Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

*Placement in, Spanish and English freshmen courses will be determined by CEEB examination scores and entrance diagnostic tests. Student may be placed in remedial courses if necessary.

Professional Required Courses (46 credits)

EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major: History (32 credits)

GEOG 201	Physical Geography	3
GEOG 225	Geography of Puerto Rico	3
HIST 223	Ancient and Medieval History	3
HIST 230	The Renaissance, Reform Movements and the Rise of the State	3
HIST 232	Problems of the Contemporary World	3
HIST 252	History of Puerto Rico II	3
HIST 263	History of Latin America	3
HIST 272	History of the United States (Second Part)	3
EDUC 332	Teaching Social Sciences or History in Secondary School	3
EDUC 455	Practicum Teaching History in Secondary School	5

Elective Courses (6 credits)

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: MATHEMATICS

Total Credits	**128**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**28**
Elective Courses	**6**

General Education Courses (48 credits)

EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 155	Pre-Calculus	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis Introduction to Reading	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students who do not meet eligibility requirements for advanced mathematic courses may have to take additional prerequisite courses.

Professional Required Courses		(46 credits)
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses		(28 credits)
MATH 175	Geometry	3
MATH 221	Calculus I	4
MATH 222	Calculus II	4
MATH 305	Probabilities & Statistics	3
MATH 345	Abstract Algebra	3
MATH 350	Lineal Algebra	3
EDUC 333	Teaching Mathematics in Secondary School	3
EDUC 450	Practicum Teaching Mathematics in Secondary School	5

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN SECONDARY EDUCATION MAJOR: VOCATIONAL INDUSTRIAL EDUCATION

Total Credits	**129**
General Education Courses	**48**
Professional Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses		(48 credits)
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamentals of Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		(46 credits)
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major: Vocational Industrial Education		(29 credits)
EDVI 465	Foundations of Vocational Industrial Education	3
EDVI 466	Methods and Curriculum in Vocational Industrial Education	3
EDVI 467	Evaluation of Vocational Industrial Education	3
EDVI 468	Development of Educational Resources Applied to Vocational Industrial Education	3
EDVI 469	Health, Hygiene and Safety in Vocational Industrial Education	3
EDVI 470	Student Organizations	3
EDVI 472	Organization, Supervision and Administration of the Vocational Industrial Workshop	3
EDVI 473	Labor Relations: Implications for Vocational Industrial Educators	3
EDUC 449	Practicum Teaching in Vocational Industrial Education	5

Elective Courses **(6 credits)**

Notes:

1. Candidates for this degree must have completed a major in one of the skills taught in vocational schools such as plumbing, electrician, food preparation, cosmetology, etc.
2. Besides the completion of the Bachelor's Degree in Arts in Secondary Education with a major in Vocational Industrial Education, to obtain a Teaching certificate in Vocational Industrial Education, candidates must be licensed by the corresponding Examining Board for those occupations that are regulated by law and be a member of the corresponding guild for those

occupations that have such a representative association.

BACHELOR'S DEGREE IN SPECIAL EDUCATION

Total Credits	**129**
General Studies	**48**
Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses		**(48 credits)**
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamentals of Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Professional Required Courses		**(48 credits)**
EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociological Foundations of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophical Foundations of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major: Mild Impairments		**(29 credits)**
SPED 214	Assistive Technology in Special Education	3
SPED 216	Teaching Reading and Writing to Handicapped Children I	3
SPED 217	Teaching Reading and Writing to Handicapped Children II	3
SPED 218	Methodology for Teaching Mathematics in Special Education	3
SPED 312	Education of Children with Specific Learning Disabilities	3
SPED 317	Education of Mildly Retarded Children	3
SPED 322	Language Development and Speech Correction for Exceptional Children	3
SPED 360	Methodology for Teaching Exceptional Children	3
SPED 446	Special Education Practicum: Mild Impairments	5

Elective Courses **(6 credits)**

Major: Speech, Language and Hearing Impairments		**(29 credits)**
SPED 214	Assistive Technology in Special Education	3
SPED 216	Teaching Reading and Writing to Handicapped Children I	3
SPED 217	Teaching Reading and Writing to Handicapped Children II	3
SPED 218	Methodology for Teaching Mathematics in Special Education	3
SPED 322	Language Development and Speech Correction for Exceptional Children	3
SPED 324	Behavior Modification of the Handicapped Child	3
SPED 327	Teaching Communication to the Deaf Child	3
SPED 349	Methods and Techniques for the Education of Students with Hearings Impairments	3
SPED 445	Special Education Practicum: Speech, Language and Hearing Impairments	5

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN PHYSICAL EDUCATION MAJOR: SECONDARY EDUCATION

Total Credits	**129**
General Studies Courses	**48**
Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses		**(48 credits)**
EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamentals of Math	3
SOSC 103	Integrated Social Sciences I	3

SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Required Courses (46 credits)

EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development I	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociology of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophy of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses (29 credits)

PHED 201	Principles and History of Physical Education	3
PHED 205	Organization and Administration of Physical Education	3
PHED 220	Anatomy and Physiology	3
PHED 222	Swimming and First Aid	3
PHED 223	Group Sports	3
PHED 224	Individual Sports	3
PHED 300	Methodology and Teaching Physical Education at the Secondary Level	3
PHED 355	Evaluation and Research in Secondary Level Physical Education	3
PHED 449	Secondary School Practicum in Physical Education	5

Elective Courses (6 credits)

BACHELOR'S DEGREE IN PHYSICAL EDUCATION MAJOR: ELEMENTARY EDUCATION

Total Credits	**129**
General Studies Courses	**48**
Required Courses	**46**
Major Courses	**29**
Elective Courses	**6**

General Education Courses (48 credits)

EDUC 105	Freshman Seminar	3
ENGL 154	Basic Communicative English	3
ENGL 155	Advanced Communicative English	3
ENGL 223	Reading and Writing Compendium	3
HUMA 115	Western Civilization I	3
HUMA 116	Western Civilization II	3
HIST 253	History of Puerto Rico (Compendium)	3
HIST 273	History of the United States of America	3
INSC 101	Integrated Sciences I	3
INSC 102	Integrated Sciences II	3
MATH 126	Fundamentals of Math	3
SOSC 103	Integrated Social Sciences I	3
SOSC 104	Integrated Social Sciences II	3
SPAN 155	Introduction to Writing/ Introduction to Reading	3
SPAN 250	Advanced Composition	3
SPAN 255	Reading, Writing and Analysis	3

Placement in, Spanish and English freshman courses will be determined by CEEB examination scores and entrance diagnostic tests. Students may be placed in remedial courses if necessary.

Required Courses (48 credits)

EDUC 106	Introduction to Education	3
EDUC 171	Human Growth and Development I	3
EDUC 172	Educational Psychology	3
EDUC 205	Sociology of Education	3
EDUC 214	Computers in Education	3
EDUC 276	Classroom Management	3
EDUC 355	Evaluation and Measurement of the Educational Process	3
EDUC 356	Practicum Seminar	1
EDUC 363	Curriculum Planning and Design	3
EDUC 401	Clinical Experiences Seminar	3
EDUC 420	Philosophy of Education	3
EDUC 435	Interdisciplinary Seminar	3
EDUC 436	Pedagogical Integration Seminar	3
SPED 315	Teaching Exceptional Children	3
PHED 210	Health, Hygiene and Nutrition	3
COMS 104	Community Service	3

Major Courses (29 credits)

PHED 201	Principles and History of Physical Education	3
PHED 207	Physical Education of the Handicapped Child	3
PHED 220	Anatomy and Physiology	3
PHED 221	Motor Skills Development: Games and Light Sports	3
PHED 222	Swimming and First Aid	3
PHED 302	Organization and Administration of Physical Education in the Elementary School	3
PHED 305	Methodology and Curriculum in Primary Level Physical Education	3
PHED 355	Evaluation and Research in Physical Education	3
PHED 447	Primary School Practicum in Physical Education	5

Elective Courses (6 credits)

COURSE DESCRIPTIONS

EDUC 105
Freshman Seminar
Three Credits
Course designed as a tool to assist college freshmen in achieving the adjustment needed to survive in higher education. It consists of a series of activities and educational experiences aimed at providing the first year students with study skills needed for academic development. It also provides the students with the personal skills needed in making decisions that will result in improving self esteem, self recognition and the wish to be successful.

EDUC 106
Introduction to Education
Three Credits
This is the first professional course in the curriculum of the teacher preparation program. It introduces concepts related to education while students explore their individual commitment to teaching as a career, and their strengths and weaknesses. Special emphasis will be placed on observation and analysis of school scenarios, especially the teaching-learning process. The different roles a teacher must take, as part of his/her school functions will be discussed. The student will complete 15 hours of clinical experiences.

Prerequisite: EDUC 105

EDUC 123
Creative Expression in Young Children
Three Credits
Students will study the methods, materials and techniques used in developing basic skills in music, art, and drama in young children. Students will practice processes used to initiate singing, basic rhythms, use of simple instruments, arts and crafts materials, use of puppets, improvisation and dramatization according to child's age development and maturity from pre-school to sixth grade. The course includes discussions of ways to motivate free expression and creativity in infants and young children, as well as the development of awareness and appreciation of the fine arts in young children.

EDUC 171
Human Growth and Development
Three Credits
The course centers on the study of psychological thought related to growth and development from birth through adolescence, and its implications for the teacher and the school. Changes that occur in human beings from the moment of conception and throughout the different stages of life, such as prenatal, infancy, childhood, adolescence and adulthood, are studied from the physical, psychomotor, social, psychological, and moral viewpoints. Ten hours of classroom observations are part of the requirements.

Prerequisites: EDUC 106

EDUC 172
Educational Psychology
Three Credits
This course offers a wide overview of concepts related to learning and intelligence and their relationship with human development. Topics discussed are psychometric techniques, styles and theories of learning, emotional development, moral development and ethical conduct, as well as the development of personality, mental and physical health The course examines the relationship of these theories to educational practice and the role of the teacher.

Prerequisites: EDUC 106, EDUC 171

EDUC 202
Teaching Materials and Learning Devices
Three Credits
This laboratory course combines graphic and instructional media processes for education and training purposes. Techniques for integrating media into instruction are practiced. Students will develop instructional materials, taking into consideration the principles of good communication, appropriate and effective design, and the use and evaluation of these materials.

Prerequisite: EDUC 106

EDUC 205
Sociological Foundations of Education
Three Credits
The course is a study of culture and its relationship to the educational process. It covers phenomena of change and their educational implications. School is analyzed as a social and political system. The role of economics, history and the social sciences in education and educational thought is examined. Different socio-cultural principles are analyzed as they relate to the development of the educational system of Puerto Rico.

Prerequisites: EDUC 106, EDUC 171, EDUC 172

EDUC 206
Teaching Reading in Grades K-3
Three Credits
A study of the theory and practice of essential aspects in the teaching of reading in grades kindergarten to third. Emphasis on different methods employed to teach reading. Includes development of teaching techniques, strategies, diagnosis and correction of reading difficulties.

Prerequisites: SPAN 155, SPAN 250

EDUC 207
Teaching Writing in Grades K-3
Three Credits
Study and analysis of the theory and practice used in the teaching of writing in grades kindergarten to third. Development of teaching techniques and strategies used to teach writing to young children are emphasized. Includes the diagnosis and correction of writing difficulties.

Prerequisites: EDUC 206, SPAN 155, SPAN 250

EDUC 211
Curriculum and Teaching of Mathematics in Fourth to Sixth Grades
Three Credits
This course prepares future teachers by exposing them to techniques, processes, strategies and means to teach mathematics in grades four through six. The development of mathematical skills will be emphasized, as well as practice of the inductive method. The Standards for the Mathematics Program published by the local Department of Education will be examined. The use of the computer as a learning tool is explored and emphasized.

Prerequisites: MATH 125-126

EDUC 212
Curriculum and Teaching of Science in Fourth to Sixth Grades
Three Credits
This course studies and analyzes the foundations, theories, principles, skills, concepts, planning, research, implementation and curriculum for the teaching of science in the fourth to the sixth grades. Considerable emphasis is placed on hands-on science activities and on those teaching strategies which help children learn processes and concepts of science. The Standards of the Science Program published by the local Department of Education are examined. The use and integration of technology is emphasized.

Prerequisite: INSC 101-102

EDUC 213
Math and Science: Age of Discovery: Pre Kindergarten to Third Grade
Three Credits
Students will study and analyze the science and mathematics curriculum and its application from preschool and kindergarten to the third grade. Curriculum design for science and mathematics and its relationship to the growth and development of children from ages three to eight will be examined. The use of the computer as a learning tool is explored and emphasized, as well as the examination of the Standards for the Science and Mathematics Programs produced by the local Department of Education. Clinical experience of at least ten hours throughout the semester will be required.

Prerequisites: INSC 101-102, MATH 125-126

EDUC 214
Computers in Education
Three Credits
This course introduces general concepts about the structure of computers, their impact on modern society and their integration into the educational process. The course provides laboratory experiences in which the student will practice acquired knowledge in diverse situations related to teaching. Students will learn the use of computers as teaching and learning tools and will integrate the use of other emerging technology into their learning experience.

Prerequisite: EDUC 106

EDUC 215
Critical Thinking Skills and the Teaching of Social Studies in Elementary School
Three Credits
This course is designed to prepare the future teacher in the content and skills of the social studies program for grades Pre-K through Sixth of the elementary school. It examines in-depth themes related to the development of mental processes, intellectual skills, processes used for conflict resolution, and the development of ideal attitudes and values expected of a future teacher. Standards of the Social Studies Program of the local Department of Education are used as a point of reference.

Prerequisites: EDUC 205, EDUC 172

EDUC 216
Teaching of Reading in Fourth to Sixth Grade: Diagnosis and Correction of Reading Difficulties
Three Credits
The course centers on the theoretical and practical study of essential aspects needed to teach reading in elementary grades four through six. Conceptual models and official documents of the local Department of Education are studied and analyzed. Students will also examine and discuss selected literature appropriate for the grades included in this course.

Prerequisite: EDUC 205, EDUC 172, SPAN 155, SPAN 250

EDUC 217
Teaching of Writing in Fourth To Sixth Grade: Diagnosis and Correction of Writing Difficulties
Three Credits
This course will prepare future teachers in grades four to six in basic techniques needed to develop writing skills, calligraphy, spelling and creativity. Standards of Excellence

of the Spanish Program of the Department of Education will be examined. Available commercial materials for the teaching of writing will be examined. Future teachers will practice the production of materials to provide for the needs of each child. This course will combine theory and practice and will develop in the future teacher the skills needed to teach writing as a process of communication.

Prerequisites: EDUC 216, SPAN 155, SPAN 250

EDUC 219
Perceptual Motor Development in Preschool and Primary Education
Three Credits

Students will study the physical, social, emotional and cognitive development of children and its impact on perceptual motor development. Different development theories are analyzed and their practical use is discussed. The course includes the study and analysis of childhood development theories of contemporary teaching and learning. Instructional strategies will include observation, analysis, research, simulations, small group discussion, and teamwork.

Prerequisite: EDUC 225

EDUC 222
Teaching of English as a Second Language
Three Credits

The course centers on the study of the principles, methods and techniques used in the teaching of English as a second language in elementary school. Emphasis is placed on the curriculum, textbooks, lesson planning and observation, and the Standards for the Teaching of English as proposed by the Department of Public Education. Participatory experiences equivalent to ten hours of clinical experiences will be required.

Prerequisite: 15 major credits in English

EDUC 225
Methods for Teaching from Preschool to Third Grade
Three Credits

The course is a study of all aspects related to the integrated development of preschool and primary education. The physical, emotional and cognitive development of the young child will be discussed. The history of preschool and primary education will be examined, as well as innovative methods, the curriculum, and the physical environment necessary to facilitate a good preschool program. Also studied are new approaches, as well as educational resources needed to develop an effective and successful preschool and primary grades program.

Prerequisites: 15 major credits in K-3 Education

EDUC 276
Classroom Management
Three Credits

This course will discuss, analyze and observe the daily occurrences of an elementary or secondary school classroom with the intention of studying techniques and strategies of classroom management, group control and behavior modification. The subject of violence in the schools and how to deal with it or prevent it will be widely discussed. This course is strongly recommended as an elective for all secondary school majors. Classroom observations and participatory experiences equivalent to ten hours of clinical experiences will be required.

Prerequisites: EDUC 106, EDUC 171, EDUC 172

EDUC 308
Participation of the Family and the Community in the Development of Children in Preschool and Primary Grades
Three Credits

The course covers the foundations and components of human diversity in the educational context. Emphasis is placed on the development and application of processes and collaboration skills needed to work together with students, families and diverse groups to promote the development of learning communities.

EDUC 319
Theory, Practice and Assessment of Play Activities in Early and Primary Education Programs
Three Credits

The course centers on the study, practice and assessment of theories related to play activities and the use of games in education, from preschool and kindergarten, up to third grade. Themes to be discussed include the role of play and game activities in child development, play as representation of reality, the purpose of play, types of games suitable for four to eight-year-olds, the purpose of evaluation in game activities, the need to follow rules while playing, and the use of play and game activities in assessment strategies.

Prerequisite: EDUC 106, EDUC 171, EDUC 172

EDUC 322
Language Development and Correction of Speech Difficulties in Preschool and Primary Grades
Three Credits

The course covers language development of preschool and elementary school children. Different stages in linguistic development and theories related to early signs of language and speech difficulties in preschool and elementary school are studied and analyzed. Emphasis is placed on the identification and referral of children with language and speech difficulties, so that they may receive the special services they need to improve their oral communication.

Prerequisite: EDUC 106, EDUC 171, EDUC 172, SPAN 155, SPAN 250

EDUC 323
Literature for Children from Preschool to Sixth Grade
Three Credits
In theoretical and practical form, this course offers the future teacher the most essential material related to children's literature within the elementary school program. Future teachers must be knowledgeable about a select and ample amount of children's literature, as well as about the methodology that will enable them to instill the enjoyment of good literature in children, and also inspire them to create their own. In this course books, works of art, fiction, folklore, poetry and games will be studied. Creativity will be stimulated.

Prerequisite: EDUC 106, EDUC 171, EDUC 172, SPAN 155, SPAN 250

EDUC 324
Preschool Education: Past, Present and Future
Three Credits
The course centers on the discussion of the historical and legal roots of preschool education. Innovative methods, techniques, strategies and best practices for the education of three-and four-year olds will be examined and discussed. Evaluation, selection and design of educational materials for this age group are also included.

Prerequisites: EDUC 106, EDUC 171, EDUC 172

EDUC 330
Teaching Spanish in Secondary School
Three Credits
Students will study and analyze various aspects involved in the teaching of Spanish in secondary school. The course includes both theoretical content and practical experience related to the teaching of Spanish, the Standards of Excellence promoted by the Department of Education, and the strategies and methodologies employed for teaching language skills in oral and written form.

Prerequisite: 21 credits in Spanish major courses

EDUC 331
Teaching of English in Secondary School
Three Credits
This course is a requirement for all majors in the Teaching of English as a Second Language in secondary schools. It is based on the study and analysis of the objectives, materials, approaches and techniques suggested for teaching English. The Standards of Excellence determined by the Department of Public education are examined and used as a point of reference.

Prerequisite: 21 credits in English major courses

EDUC 332
Teaching of Social Sciences and History in Secondary School
Three Credits
This course provides future teachers an overview of the history and social studies curriculum, and examines skills needed to teach one of these two areas of the secondary school curriculum. Principles of integration, processes, methods, techniques and styles of learning are studied, along with the Standards of Excellence proposed by the Department of Education for these two areas.

Prerequisite: 21 major credits in either History or Social Studies

EDUC 333
Teaching Mathematics in Secondary Schools
Three Credits
The course is an analysis of different aspects related to the teaching of mathematics in secondary school. Methods, materials, curriculum, textbooks, teacher guides and the Standards of Excellence proposed for the teaching of mathematics are examined and analyzed.

Prerequisite: 21 major credits in Mathematics

EDUC 334
Teaching of Science in Secondary School
Three Credits
The purpose of this course is to offer prospective secondary school science teachers the practical and theoretical experience needed to teach science. The course is divided into three parts: theory, the teaching of science in secondary school, and science curriculum. Specific knowledge that must be acquired by the students is emphasized in the last part of the course. Standards of Excellence for the Teaching of Science are discussed.

Prerequisite: 21 major credits in General Sciences, Biology or Chemistry

EDUC 339
Inclusion Vision and Process: Management of at Risk Children
Three Credits
The course centers on the study of the nature and needs of handicapped infants and primary school children. Concepts and factors that determine which children are potentially at risk and will need special services are examined. Emphasis is placed on diagnosis and evaluation, teaching techniques, adaptation of the curriculum, and strategies for early intervention of children with developmental difficulties.

Prerequisites: SPED 315

EDUC 350
Theories and Principles of Teaching English as a Second Language
Three Credits
The course centers on the study of the theories, methodologies and techniques for teaching English as a second language. Students will reflect upon the principles, foundations, studies and supporting research in order to compare their effectiveness or lack thereof in teaching a second language. Students will conduct active demonstrations of techniques based on school visits and observations. They will also reflect on the diversity of their personal teaching styles and how they meet the needs of Puerto Rican students. Future teachers will receive guidance in comparing and analyzing relevant results from research and from their school visits. In this way they will be able to make practical suggestions and recommend effective practices for teaching English as a Second Language in Puerto Rico.

Prerequisites: 15 credits in English major courses

EDUC 355
Evaluation and Measurement of the Educational Process
Three Credits
The course covers the theory and practice in evaluating the educational process. Emphasis is placed on the taxonomy of objectives and to the skills required for promoting student achievement. Topics include current concepts in evaluation criteria, performance, and mastery testing, among others. Traditional concepts of preparation, administration, correction and interpretation of achievement tests; basic concepts of statistics, and recent evaluation criteria, such as assessment strategies and the use of portfolios, will be discussed and analyzed. The course includes discussions of other evaluation procedures that prospective teachers should be aware of.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 363, EDUC 420

EDUC 363
Curriculum Planning and Design
Three Credits
This course prepares the future teacher in the development of curricular theories. Types of curricula, as well as organization, models and concepts, curriculum development and implementation are examined and analyzed. Lesson planning and classroom organization are also discussed.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 420

EDUC 367
Care of Children in Preschool Education
Three Credits
The course covers strategies for the physical and emotional care of three- and four-year-olds, including behavior modification techniques and conflict resolution. Health, nutrition, and security aspects related to preschool programs are also discussed.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, SPED 315

EDUC 400
Correction of Reading and Writing Difficulties in Secondary School Students
Three Credits
The course is designed for secondary education majors. It provides future teachers with the necessary skills to identify and correct language difficulties of secondary school students. The application of Spanish language skills in reading and writing across the curriculum will be emphasized, as well as the need to manage reading skills to comprehend and interpret materials in each discipline.

Prerequisites: 15 major credits

EDUC 401
Clinical Experiences Seminar
Three Credits
This course is the second clinical experience requirement in the School of Education's Teacher Preparation Programs. It includes fifteen hours of a campus-based seminar and 30 clinical experiences hour of direct observation and active participation in at least two different school scenarios, as well as 15 lecture hours.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 214, EDUC 355, EDUC 363, EDUC 420, SPED 315

EDUC 403
Administration of Preschool and Early Childhood Programs
Three Credits
The course centers on the study and analysis of knowledge, content and skills required in planning, managing and coordinating educational programs for infants, toddlers and preschool children. Topics discussed are: types of programs, planning and evaluation of goals, selecting and supervising human resources, use and maintenance of physical resources, the role of parents in the education of young children, government agencies that regulate programs and facilities, and current legislation pertaining to preschool and early childhood education. The requirements for opening a preschool or infant day care center will be examined. Clinical experiences are required amounting to at least 15 hours per semester.

Prerequisite: 15 major credits in Preschool Education.

EDUC 420
Philosophical Foundation of Education
Three Credits
Students will examine, analyze, and critique the historical, philosophical and cultural roots of our educational system and its changes over time. The basis for an educational philosophy will be studied, along with social, cultural, religious and political changes that have influenced education in Puerto Rico. Some philosophical concepts will be examined, such as, idealism, realism, pragmatism, existentialism, and constructivism.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205

EDUC 435
Interdisciplinary Seminar
Three credits
Professional seminar that integrates the academic, social-humanistic and scientific knowledge that has been developed by the student teacher during his\her formation. Analysis and discussion of tendencies, methods and innovations related to fundamental knowledge and communicative competence of future teachers in their global and local context. Emphasis is given on case studies, problem solving, thematic discussions and technology application.

Prerequisites: 45 general education credits

EDUC 436
Pedagogical Integration Seminar
Three Credits
This course integrates academic and professional knowledge obtained by future teachers throughout their course of study. Innovations in education, methods, techniques and strategies are discussed and analyzed. A review of sociological, philosophical and psychological foundations of education will be included, as a preparation for the teacher's certification examination.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 214, EDUC 355, EDUC 363, EDUC 401, EDUC 420, SPED 315

EDUC 441
Practicum Teaching in Preschool
This is a laboratory experience for students whose major is preschool education. Student teachers will participate in a real educational setting to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 443
Practicum Teaching in Pre-Kinder to Third Grade
Five Credits
This is a laboratory experience for students whose major is primary education (K-3). Student teachers will participate in a real educational setting to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, 436 and 21 major credits

EDUC 444
Practicum Teaching English in Elementary School
Five Credits
This is a practicum course for students whose major is the teaching of English at the elementary level. Student teachers will participate in real educational settings to practice knowledge acquired in education courses. They will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 447
Practicum Teaching Forth to Sixth Grade
Five Credits
This is a laboratory experience for students whose major is Fourth to Sixth Grade Education. The student teacher will participate in a real educational setting to practice knowledge acquired in education courses. The student teacher will gradually assume the responsibility of teaching in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 448
Practicum Teaching Spanish in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of Spanish at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 449
Practicum Teaching English in Secondary School
Five Credits
The course is a laboratory experience for students whose major is one of the content areas in secondary school education. The student teacher will participate in a real educational setting to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 450
Practicum Teaching Mathematics in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of mathematics at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 451
Practicum Teaching Science in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of general science at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 452
Practicum Teaching Biology in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of biology at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 453
Practicum Teaching Chemistry in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of chemistry at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 454
Practicum Teaching Social Science in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of social sciences at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDUC 455
Practicum Teaching History in Secondary School
Five Credits
This is a practicum course for students whose major is the teaching of history at the secondary level. The student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume teaching responsibilities in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDVI 449
Practicum Teaching in Vocational Industrial Education
Three Credits
Practicum course for students whose major is the teaching of vocational industrial at the secondary level in which the student teacher will participate in real educational settings to practice knowledge acquired in education courses. The student teacher will gradually assume the responsibility of teaching in a real classroom.

Prerequisite: EDUC 435, EDUC 436 and 21 major credits

EDVI 465
Foundations of Vocational Industrial Education
Three Credits
This course examines vocational education, the different laws that regulate the development of vocational and technical education, progress indicators, professional development opportunities, as well as goals and objectives of occupational education. The course includes the development of an action plan to improve teachers' leadership potential, based on current legislation.

EDVI 466
Methods and Curriculum in Vocational Industrial Education
Three Credits
The course covers basic processes needed to analyze competencies and skills that should be developed by students taking vocational and technical courses. Emphasis is placed on the use of official documents that vocational and technical teachers should be familiar with. Alternatives for the integration and adaptation of the curriculum to the work place are studied. Different alternatives to develop measurable objectives based on the standard technological curriculum and skills required in the occupational field are examined.

EDVI 467
Evaluation in Vocational Industrial Education
Three Credits
The course covers techniques and skills used to implement the processes of assessment and evaluation based on competence, standards of excellence, and a log of skills required of vocational students in an occupational setting. Models of scientific instruments to measure the results of the teaching and learning processes will be developed. Students will be able to try out tests and other evaluation instruments they have developed with selected student populations, in order to measure the reliability of these instruments.

Prerequisite: EDVI 465

EDVI 468
Development of Educational Resources Applied to Vocational Industrial Education
Three Credits
This course has been structured to provide the student with the competencies and skills needed to develop, select, evaluate, and utilize the appropriate educational resources to conduct a vocational course based on industrial and technical education. It includes techniques to ascertain quality control of products and services used to evidence a high sense of responsibility, to demonstrate knowledge of roles, as well as pride in working as an occupational educator. It provides alternatives for the development and production of educational resources that will allow students to perform with excellence.

Prerequisite: EDVI 465

EDVI 469
Health, Hygiene and Safety in Occupational Education
Three Credits
This course will present students with concepts that promote safety, health, and hygiene in the vocational workshop. It is structured so that students will be able to recognize the principal safety and accident prevention measures required when developing curriculum in the manipulative component of their field of specialization. Students will establish the difference between an accident and an incident and will demonstrate that safety is a personal commitment implying no unnecessary exposure to risks in their workplace. Students will define methods and techniques for accident prevention in industry and will select some of them to use in a research project.

Prerequisite: EDVI 465

EDVI 470
Student Organizations
Three Credits
The course centers on the development of goals, objectives, functions and purposes of student organizations. Educational strategies in the interpretation of the role of the counselor of student organizations, professional development and the process for the organization of boards of directors for local chapters will be presented. A leadership activities plan will be incorporated to educational competencies to be developed in the vocational workshop.

Prerequisite: EDVI 465

EDVI 471
Integration of the Adult Student to Vocational Industrial Education
Three Credits
The course centers on the role of adult students in their integration to vocational and technical education, based students' training expectations for entry into the occupational world. It includes industrial practice and skills required in different educational settings. Also included are alternatives for curriculum integration that facilitate the development of instructional units and preparation for the vocational world.

Prerequisite: EDVI 465

EDVI 472
Organization, Supervision and Administration of the Vocational Workshop
Three Credits
The course is a discussion and demonstration of functional styles for the organization, supervision and administration of equipment, tools and other educational materials used in the development of vocational and technical courses. The application of competencies developed in the course will be evaluated by means of the organization and presentation of a scale model of a workshop in each student's area of concentration.

Prerequisite: EDVI 467

EDVI 473
Labor Relations: Implications for Vocational Industrial Educators
Three Credits
This course is based on existing legislation that promotes unionization of workers in Puerto Rico. The student must examine different examples of the organization of trade unions in the public sector. Through critical analysis the student will recognize and understand current legislation and the rights of employers and employees. Positive and procedural aspects of Law No. 45 (1998) and its implications

for the unionization of public employees will be discussed. The recently created law for the teaching profession (Law No. 158, enacted July 18, 1999) and the unionization of teachers is discussed.

Prerequisite: EDVI 465

EDVI 474
Occupational Internship
Six Credits
This course is aimed at strengthening the commitment of the vocational educator by keeping abreast with industrial and economic developments within the geographic area of the school where s/he works. The demands of the labor force and the regulations of the Labor Department, the needs and interests of the community, statistical data on employment opportunities, and training needs of the area of specialization will be discussed. The course includes site visits, occupational internships and practice in industry, commerce or banking institutions related to vocational and technical area of expertise.

Prerequisite: 21 credits in Vocational Industrial Education (EDVI)

NOTE: Students who have at least three years of full time work experience in their field of specialization do not take this course.

EDVI 475
The Exceptional Child in the Vocational Industrial Workshop
Three Credits
The course is a study of provisions, security measures, assessment, alternative evaluation, and technological assistive equipment needed to provide educational opportunities to exceptional students in the vocational industrial workshop. The current categories of special education students, rights and responsibilities of the student, and the vocational teacher and adjustments needed to accommodate handicapped students in the vocational workshop are discussed.

Prerequisite: SPED 315, EDVI 465

PHED 103
Track and Field
Three Credits
The course covers the history, scoring and basic skills for the different events, and offers basic skills practice.

PHED 105
Physical Fitness and Gymnastics
Three Credits
The course emphasizes the importance of gymnastic and physical exercise in the development of the human body. It involves practice of the different gymnastic skills and tests of physical fitness.

PHED 106
Basic Rhythms
Two Credits
The course covers the theory and practice of the basic rhythms used in the physical education program. It emphasizes the creation of movement patterns by students.

PHED 107
Games and Sports for Elementary School Teachers
Three Credits
The course is a study of the history and evaluation of games as a teaching vehicle. It also covers the methodology used for teaching games at the elementary level. Special attention is given to teaching techniques. It also equips the elementary school teacher with the ability to handle and control a group in an outdoor game area.

PHED 108
Tennis
Two Credits
The course covers the history, rules, scoring and elementary tactics of single and doubles games. Basic skills are practiced.

PHED 109
Swimming
Two Credits
This is a practical course in which the student learns the skills and basic styles of swimming. Water safety measures are emphasized.

PHED 112
Volleyball and Basketball
Three Credits
The course covers the history, rules, scoring procedures and elementary techniques of the games, as well as practice of the different skills in volleyball and basketball.

PHED 113
Softball and Soccer
Three Credits
The course covers the history, rules, scoring, basic techniques, and strategies of the games. It offers basic skills practice and develops the ability to coordinate motion in different aspects of the game.

PHED 201
Principles and History of Physical Education
Two Credits
The course covers the history, objectives, and principles of physical education. Contemporary issues of physical education in different societies and cultures are also studied.

PHED 202
Development of Motor Skills in Elementary School
Three Credits
The course enables future teachers to develop and refine students' movement patterns. It emphasizes practice of fundamental skills to optimize their motor development, including manipulative movements, rotational, static, and dynamic stability.

PHED 203
Organization of Simple Games
Two Credits
The course centers on the study, analysis, and practical application of simple games, especially designed for teaching physical education in the elementary school.

PHED 204
First Aid
Two Credits
The course covers the application of first aid in physical education activities in school and community.

PHED 205
Organization and Administration of Physical Education
Three Credits
The course centers on the principles of administration and supervision of physical education programs, techniques of group dynamics, and organization of different school activities.

PHED 206
Physiology of Exercise
Three Credits
Fundamental aspects of physiology and its relationship to physical education are emphasized. Students will study basic concepts of muscular concentration, muscular strength, nervous control of muscular contraction, calcium dissipation in the human body, cardiovascular aptitude, resting electrocardiograms, as well as the effects of isometric exercise on heartbeat, blood pressure, and other vital functions.

Prerequisite: PHED 208

PHED 207
Physical Education of the Handicapped Child
Three Credits
Students will study a variety of educational opportunities that allow maximum development of the individual's capacity. Special attention is given to techniques which enable children with physical and mental disabilities to participate in physical activities within the limitations of their capacities.

Prerequisite: SPED 315

PHED 208
Anatomy and Kinetics
Three Credits
The course centers on the study of gross anatomy. It emphasizes systemic anatomy, with special attention to the muscles, bones, nerves, and articulations related to physical activity.

PHED 209
Physical Education and Health Laws
Three Credits
Students will study and analyze the laws and regulations regarding physical education, health and sports in Puerto Rico. Emphasis is given to case studies related to negligence, constitutional issues, and risk management. Judicial procedures and the legal foundations of administration are discussed.

PHED 210
Health, Hygiene and Nutrition
Three Credits
The course covers the theory and practice of the components of wellness and physical fitness lifestyles, once medical records and health risk profiles are developed, and physical fitness levels are established. Students are exposed to information, activities, techniques and strategies to obtain and maintain acceptable levels of physical fitness that allow an effective life. Lifelong sports, weight control, stress management, and nutritional theories will be discussed.

PHED 211
Sports and Games for the Elementary Level
Three Credits
Theory and practice of strategies and foundations for the integral development of the elementary level student through physical activities and motor development. It emphasizes physical fitness, neuromuscular development, motor perception and socio-emotional development. Games and specific activities for the development of these areas are conducted.

PHED 220
Anatomy and Physiology
Three Credits
The course centers on the study of gross human anatomy and the physiological changes in the different body systems during physical activity. Joint movement and muscular action are studied, together with basic principles of mechanics applied to body movements in different sports.

PHED 221
Motor Skills Development, Simple Games and Sports at the Elementary Level
Three Credits
The course covers the theory and practice of strategies and foundations for the integral development of the elementary level student through physical activities and motor development. It emphasizes physical fitness, neuromuscular development, social-emotional development, perception, manipulative movement, and rotational stability. Games and specific activities for developing these areas are conducted.

PHED 222
First Aid and Swimming
Three Credits
The course covers the theory, methodology and practice of swimming and first aid. Swimming styles, such as freestyle, backstroke, and breaststroke, are emphasized. Survival modalities such as back and side sliding are practiced as well. Basic techniques of first aid, in accordance with American Red Cross guidelines, are discussed and practiced.

PHED 223
Team Sports
Three Credits
The course centers on the theory and practice of team sports such as volleyball, basketball, softball, baseball, and soccer. Historical evaluations of the sports are emphasized, as are its foundations, rules, techniques, tactics, and physical conditioning. Roles of the referees and officials are discussed.

PHED 224
Individual Sports
Three Credits
Students will study the history, rules, techniques, and teaching methodology of tennis, as well as track and field. Rules for scoring track and field events and tennis are discussed.

PHED 300
Methodology and Teaching of Physical Education at the Secondary Level
Three Credits
The course centers on analysis, interpretation and implementation of the curriculum and methodology of physical education.

Prerequisite: 15 major credits

PHED 301
Methodology for Teaching Physical Education in the Elementary School
Three Credits
The course covers theory, methodology and practice of the learning process in physical education at the elementary level. It emphasizes the development of skills to integrate various pedagogical techniques in a comprehensive planned individual system. Classroom management, performance analysis, assessment and evaluation are discussed.

Prerequisite: 15 major credits

PHED 302
Administration and Organization of Physical Education at the Elementary Level
Three Credits
The course centers on principles related to the administration, organization and supervision of physical education programs at the elementary level. It emphasizes the ability to optimize teaching environments that promote learning and applying theories of administration.

PHED 305
The Methodology and Curriculum of Physical Education in the Elementary School
Three Credits
The course covers theory, methodology, practice, and curricular models of the learning process in Physical Education at the elementary level. Theories, curriculum types, models, designs, and concepts are analyzed and evaluated. The course emphasizes the development of skills to integrate essential pedagogical knowledge, such as a comprehensive planned individual system, classroom management, performance analysis, assessment and evaluation. The constructivist paradigm is applied during the course. Computers and their applications are used as tools in the course.

PHED 354
Measurement and Evaluation of Physical Education
Three Credits
The course centers on administration and evaluation of tests of strength, general motor ability, motor fitness, endurance, and skills. The course also covers testing in social development, body mechanics, and nutritional measurements, as well as somatotyping. Basic statistical techniques and design of testing methods are included.

Prerequisite: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 363, EDUC 420

PHED 355
Evaluation and Investigation in Physical Education
Three Credits
Throughout the course students gain knowledge about different techniques and methods in measurement, assessment, evaluation and investigation processes, in relation to relevant objectives in Physical Education. Data from tests are statistically evaluated by students, who are also initiated in basic research methodology.

PHED 363
Planning and Curricular Design of Physical Education
Three Credits
The course is based on the evaluation and analysis of theories and curriculum models of physical education. It qualifies the student to implement, modify, and to design curricula that deal with various educational needs, fiscal situations and physical facilities. The course is based on the constructivist paradigm in which the teacher becomes a facilitator within the teaching-learning process. The students are encouraged to use the computer as a valuable tool.

Prerequisite: EDUC 106, EDUC. 171, EDUC 172, EDUC 205, EDUC 420

PHED 447
Elementary School Practicum Physical Education
Five Credits
The course offers students practical experience in an educational setting which represents a broad diversity of social aspects. Practice is offered over an extended period, wherein the student assumes the responsibility of teaching in a school setting under supervision of qualified personnel.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 214, EDUC 276, EUDC 401, EDUC 420, PHED 354, PHED 363, SPED 315

PHED 449
Secondary School Practicum
Five Credits
This practical and functional course for prospective teachers involves clinical practice in teaching physical education at the secondary school level.

Prerequisites: EDUC 106, EDUC 171, EDUC 172, EDUC 205, EDUC 214, EDUC 276, EUDC 401, EDUC 420, PHED 354, PHED 363, SPED 315,

SPED 214
Assistive Technology in Special Education
Three Credits
Students will study methodologies, techniques and innovative strategies needed to teach special education students effectively. Emphasis is placed on current research, identification of needs of exceptional children that can be met through use of computers, evaluation and prescription of software, hardware, and assistive devices.

Prerequisites: SPED 315

SPED 216-217
Teaching Reading and Writing to Students with Disabilities I and II
Three Credits
The course is an analysis of strategies, techniques and methods used to teach reading and writing to students with disabilities. It includes the study of instruments to diagnose, assess and prepare individualized educational programs. Materials preparation, using the computer to teach writing, as well as diagnostic and remedial teaching of writing skills are also included.

Prerequisites: SPAN 155, SPAN 250, SPAN 255, SPED 214, SPED 315

SPED 218
Methodology for Teaching Mathematics in Special Education
Three Credits
The course is an analysis of the curriculum content in mathematics from K-11 with special emphasis on adaptations, methodology and assessment strategies for students with disabilities.

Prerequisites: MATH 125-126, SPED 315

SPED 301
Nature and Needs of the Mildly Handicapped
Three Credits
The course centers on research, observation, analysis and discussion of the needs of the mildly handicapped. It emphasizes the establishment of levels of comparison with the “normal” child. The course includes demonstrations and practice. Participatory experience equivalent to ten hours of clinical experience will be required.

Prerequisite: SPED 315

SPED 304
Nature and Needs of the Severely Handicapped
Three Credits
A comprehensive study of the natural development (physical and psychological) and technical needs of the severely handicapped, as well as corrective and/or rehabilitation methods for them. The course emphasizes teaching methodology and curriculum.

Prerequisite: SPED 315

SPED 305
The Family and the Education and Counseling of Children with Special Needs
Three Credits
The course covers principles and processes in individual and group programs for parents of children with special needs in school, day care, and residential settings. It includes

topics such as family therapy, parent education, and the parent-school relationship.

Prerequisite: SPED 315

SPED 307
Pre-Vocational and Vocational Education
Three Credits
The course covers pre-vocational competences to be developed by the severely handicapped. Emphasis is placed on the development of skills needed in the work environment, such as oral expression, following instructions, using the telephone, money and exchange, survival vocabulary, simple systems of weights and measures, and simple rules for the world of work. Personal grooming, appearance, punctuality and responsibility are also emphasized. The course includes visits and clinical experience in pre-vocational and rehabilitation centers.

Prerequisite: SPED 315

SPED 310
The Emotionally Disturbed Child in the Classroom
Three Credits
The course centers on the nature of children who have emotional problems, as well as their social, psychological and educational needs

Prerequisite: SPED 301 or SPED 304

SPED 311
Services and Education for the Handicapped Child
Three Credits
The course is an analysis of current civil rights legislation regarding the disabled in Puerto Rico and the United States. It emphasizes application of legislation and repercussions in the courts. It includes clinical experiences, including research, planning, and educational work with parents.

Prerequisite: SPED 315

SPED 312
Education of Children with Specific Learning Disabilities
Three Credits
The course centers on basic learning disabilities due to minimal brain damage such as: aphasia, dyslexia, dystrophia, and dyscalculia. It also covers psychosocial, motor, perceptual and linguistic development, as well as special educational experiences of the child with these conditions. Emphasis is placed on diagnostic skills. Participatory experiences equivalent to ten hours of clinical experiences will be required.

Prerequisite: SPED 315

SPED 315
Teaching Exceptional Children
Three Credits
This introductory course in special education centers on the analysis of social, emotional and educational needs of children with different exceptional qualities. It includes diagnosis; educational and rehabilitation services; family and community attitudes, and civil rights. Emphasis is placed on the educational needs and learning styles of exceptional children, teaching methods, techniques and curricular content.

Prerequisite: EDUC 106, EDUC 171

SPED 316
Education of the Deaf Child
Three Credits
The course centers on basic principles of teaching the deaf child, as well as the psychology of children with hearing impairment. Participatory activities equivalent to ten hours of clinical experience will be required.

Prerequisite: SPED 315

SPED 317
Education of Mildly Retarded Children
Three Credits
The course covers causes, manifestations, problems, and identification of mental retardation. It includes characteristics and education of educable retarded children and adolescents. Topics include teaching techniques, educational approaches, curriculum, and physical facilities. Participatory experiences equivalent to ten hours of clinical experience will be required.

Prerequisite: SPED 301

SPED 318
Education of Children with Severe Mental Retardation
Three Credits
The course centers on causes, manifestations, problems, and identification of children at a trainable level of mental retardation. Topics include characteristics and education of trainable mentally retarded children and adolescents. Teaching techniques, educational approaches, curriculum, and physical facilities are also covered.

Prerequisite SPED 304

SPED 319
Psychology of the Deaf Child
Three Credits
The course is a comprehensive study of the history, psychology, educational and vocational opportunities, attitudes and social organizations pertaining to deaf children.

Prerequisite: SPED 315

SPED 324
Behavior Modification of the Handicapped Child
Three Credits
The course offers basic knowledge of the nature, psychosocial, and educational needs of the child with severe emotional disturbances. Topics emphasized include mutes, infantile schizophrenia, phobic neuroses, and educational handling of children with these conditions in a special classroom. The course includes clinical experience.

Prerequisite: SPED 301, SPED 304 or SPED 319

SPED 327
Teaching Communication to the Deaf Child
Three Credits
The course is a comprehensive study of different approaches to teaching communication to deaf children, as well as the advantages and disadvantages of these approaches. It includes practice of the methodology of each approach.

SPED 337
Curricular and Methodological Adaptation for Children with Cerebral Palsy and other Muscular-Skeletal Problems
Three Credits
The purpose of this course is to equip the prospective special education teacher with basic knowledge relevant to the nature and educational needs of the children with cerebral palsy and other muscular-skeletal conditions. Topics include the children's learning disabilities, strategies used in their education, and necessary curricular adaptations.

Prerequisite: SPED 319

SPED 338
Diagnosis and Prevention of Hearing Disabilities
Three Credits
The course aims to equip the prospective teacher of exceptional children, specifically deaf children, with technical knowledge regarding this complex condition. Classification, anatomy and physiology of the hearing mechanism, diagnostic and rehabilitation tools and preventive methods are studied. Deafness and the hearing process are analyzed.

Prerequisite: SPED 319

SPED 339
Management of At-Risk Children or Children with Developmental Deficiencies
Three Credits
The course centers on the nature and needs of handicapped infants, toddlers and preschool children. Concepts and factors in determining which children are potentially at risk of needing special education services are examined. Emphasis is placed on diagnosis, evaluation, teaching techniques, adaptation of the curricula, and strategies for early intervention of children with developmental deficiencies.

Prerequisite: EDUC 225 and SPED 315

SPED 340
Language Disorders due to Neurological Damage
Three Credits
The course provides the prospective teacher of exceptional children with basic knowledge of neurolopedic and psycholinguistic functions that enable identification, handling and stimulation of the child with language disorders due to brain damage. Topics include theories of language formation and the study of encephalic development, as well as its logopedic functions.

Prerequisite: EDUC 322

SPED 341
Psychology and Education of the Legally Blind
Three Credits
The course provides the prospective special education teacher with the knowledge necessary to teach the blind child. Emphasis is placed on Braille, reading and writing, longhand, as well as the use of traditional methods and recent innovations in the field of education of the blind.

Prerequisite: EDUC 322

SPED 342
Education of the Child with Superior Intelligence
Three Credits
The course provides the prospective special and regular education teacher with the knowledge needed to deal with the social, psychological and educational needs of the gifted child. Emphasis is placed on the child's problems in adjusting to the regular curriculum and strategies for the child's education.

Prerequisite: SPED 315

SPED 349
Methods and Techniques for the Education of Students with Hearing Impairments
Three Credits
This course includes the study of skills and knowledge needed to evaluate students with hearing impairments, as well as an examination of emerging technology for sound amplification. Different programs for auditory training are also discussed, and methods and techniques for aural rehabilitation are analyzed. Topics include educational approaches used to help children with hearing impairments succeed in school and to improve their social skills.

SPED 360
Methodology for the Teaching of Exceptional Children
Three Credits
The course centers on characteristics and learning styles of the exceptional child; evaluation and educational prescription; special equipment and teaching materials; educational technology and its adaptation to the exceptional child; curriculum adaptation; preparation of objectives, and daily, individualized teaching plans. Emphasis is placed on demonstrations and practice.

Prerequisite: 18 credits in special education

SPED 445
Special Education Practicum: Speech, Language and the Hearing Impaired
Five Credits
The course emphasizes laboratory experiences in which the student teacher practices knowledge acquired in special education courses. Student teachers assume responsibility for teaching a group of students at the level, grade, and exceptionality for which they have prepared.

Prerequisite: 21 major credits

SPED 446
Special Education Practicum: The Mildly Impaired
Five Credits
This is a practicum course for students whose major is the teaching of special education of the mildly impaired at the secondary level. Student teachers will participate in real educational settings to practice knowledge acquired in education courses, and will gradually assume the responsibility of teaching in a real classroom.

COMS104
Community Service
Three Credit Hours
This course is designed with two specific goals: to provide the student practical experiences in scenarios similar to the ones s/he will encounter after graduation; and to develop a sense of civic responsibility and involvement in the student. A minimum of 30 hours of volunteer service in a non-profit agency, organization or institution is required.

JOSÉ DOMINGO PÉREZ SCHOOL OF ENGINEERING

SCHOOL OF ENGINEERING DISTINGUISHED PROFESSOR
William R. Dawes, Jr., Ph.D.

DOE SAMUEL P. MASSIE CHAIR OF EXCELLENCE
Roberto Lorán, Ph.D.

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Katia Placeres / Secretary

Dyanissie Medina Rodríguez / Secretary

OVERVIEW OF THE SCHOOL OF ENGINEERING

Recognizing the need for engineering professionals in Puerto Rico's accelerating economic environment, the Ana G. Méndez University System (AGMUS) Board of Trustees approved the establishment of a School of Engineering at the University of Turabo in August of 1990. The School of Engineering started with an initial enrollment of 75 students in the 1990-91 academic year. At present, the school offers associate degrees in engineering technology, bachelor of science degrees in Mechanical Engineering, Electrical Engineering, Computer Engineering, Industrial and Management Engineering, and a Master of Science degree in Administration of Telecommunications and Network Systems, in day and evening sessions. The School is committed to the success of every student and pursues this goal by offering small classes taught by highly qualified faculty, a wide range of student services, modern facilities and equipment, and opportunities for undergraduates to participate in faculty-directed research, special design projects and internships.

The School of Engineering is housed in the modern Sandia National Laboratories Engineering Building, named in recognition of the support provided by the U.S. Department of Energy. This facility, which was occupied in August of 1992, includes classrooms, computer centers, instructional and research laboratories, offices for faculty and staff, meeting and conference rooms, offices for student organizations, and student study rooms. An additional 13,000 square feet were added in 2009 for a total of 63,000 square feet. The expansion houses offices, laboratories and classrooms for the Department of Electrical and Computer Engineering.

The School of Engineering has three academic departments in addition to two institutes focused on associate and advanced technology degrees. The three academic departments are:

- Department of Mechanical Engineering
- Department of Electrical and Computer Engineering
- Department of Industrial and Management Engineering

Engineering Programs Accredited by the EAC Commission of ABET:

The following three programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700:

B.S. in Mechanical Engineering
B.S. in Electrical Engineering
B.S. in Industrial and Management Engineering

VISION

The vision of the School of Engineering is to become the school of choice for all students interested in a technology or engineering degree, and to be recognized for its excellence in teaching and research.

MISSION

To provide our students at all degree levels, associate, bachelor and graduate, with an excellent education that allows them to become competitive at a national level in their chosen field of expertise, and responsive to the needs of their communities.
To serve the community through scholarly activities at the pre-college and college levels, through research and

development, and through programs that serve the needs of industry.

ACADEMIC ENGINEERING PROGRAMS

In a joint effort with its constituencies, each academic department has developed specific vision and mission statements, and educational objectives.

ENGINEERING CURRICULUM

The School of Engineering offers academic programs leading to Bachelor of Science degrees in Mechanical Engineering, Electrical Engineering, Computer Engineering, and Industrial and Management Engineering. Within these programs, students may select electives that will provide a concentration in a major area of their chosen field.

The curriculum in each of the School of Engineering's academic programs has been developed to achieve the School's mission and the objectives of the individual programs. These curricula provide the student with the necessary skills in mathematics, science, engineering analysis and design, professional practice, and communication to successfully pursue a career in engineering.

The program curricula have many aspects in common. The first four semesters, known as the Engineering Basic Course Module, are identical except for a second-level programming course exclusive to the Electrical Engineering curriculum. This approach permits all students to make a well-informed choice of major at the end of their second year. Engineering design skills, crucial for the professional practice of engineering, are integrated throughout all program curricula, beginning in the first semester and culminating in capstone design experiences. Students will also gain considerable experience in engineering computer applications as they progress through the curricula. They will find that communication skills, both written and oral, are emphasized in all programs.

All program curricula also share a common general studies (humanities, social sciences, and languages) component. The aim of these courses is to provide the student with a liberal arts preparation necessary to integrate their technical knowledge with their social and cultural environment. Particular emphasis is placed on communication skills.

Full-time students who follow the recommended course schedules can complete the engineering curriculum in 9 semesters (4.5 years). Program duration for part-time and transfer students will vary, based upon course load and previous course work.

Upon the completion of any of the engineering programs, students will be prepared to take the national Fundamentals of Engineering examination, one of the requirements for qualification for the Professional Engineer's license and for membership in the Association of Licensed Engineers and Surveyors of Puerto Rico (Colegio de Ingenieros y Agrimensores de Puerto Rico). The School of Engineering strongly encourages its students to take the Fundamentals of Engineering examination, and assists them in this endeavor.

In August 2007 the School of Engineering started the Hispanic Entrepreneurial Program for Innovation (HEPI) in partnership with Michigan Technological University, and assisted by a grant from the National Science Foundation (NSF). The main goal of the HEPI program is to transform engineering education by incorporating active learning into the curriculum, while addressing industry's need for engineers. In essence, a multi-disciplinary learning environment is created from which students launch their own enterprises to create new products or services. The students assume many different leadership roles with the authority and accountability to conduct engineering projects. They also develop their technical, communication, interpersonal, and business skills which facilitates the transition to the professional workforce. Any engineering student, from sophomore- to senior-level, may elect to participate in this program by either joining an existing enterprise or by proposing a new enterprise team to the Technical Advisory Board that oversees the program. The entrepreneurial option impacts 12 credits, equivalent to four courses in the curriculum – two engineering electives and the two senior design courses.

The School of Engineering reserves the right to make changes in course offerings, curricula, and other policies affecting its programs. In the specific case of a curriculum revision, current students will be moved horizontally to the new curriculum. Students will be required to take new courses at a level higher than that at which the student is currently enrolled but never courses at a level below. All current and former students enrolled in the School of Engineering are subject to these conditions.

ENGINEERING DESIGN

Each engineering program emphasizes the development of engineering design skills, crucial for engineering practice, especially in the local industrial environment. Beginning in their first semester, students will learn to devise individual components, systems, and processes while taking into account some "real-world" constraints, specifications, and requirements. Students will demonstrate their design abilities through a series of projects and open-ended

problems of increasing sophistication and complexity, culminating in capstone design projects in their final semester. They will receive ample experience in communicating their designs graphically, in writing and through oral presentations, to other students, faculty, and practicing engineers.

The School of Engineering maintains modern computer-aided design software applications on its network of computers, rapid prototyping equipment, and a machine shop in support of these design activities.

RESEARCH

To enhance the students' educational experience and to ensure the continued professional development of the faculty, the School of Engineering encourages and supports faculty research activities in a variety of fields. Opportunities exist for students to participate in Undergraduate Research elective courses on a number of on-going projects. In addition to gaining valuable experience and developing crucial lifelong learning skills, students receive course credit for their efforts. Some of these research programs are funded by a number of federal, commonwealth, and private industrial sources.

Students and faculty may also participate in summer internship programs at any of several national laboratories. Students gain valuable experience in a research and development environment and begin to develop the professional contacts that will assist them in their career development. These internships include a stipend with travel and housing allowances.

In addition, Universidad del Turabo is a member of the Latin American and Caribbean Consortium of Engineering Institutions (LACCEI) which fosters partnerships among academia, industry, government and private organizations.

GRADUATING STUDENT PROFILE

Students that complete any of the engineering programs at the Universidad del Turabo develop, as a minimum, the following profile:

- An ability to apply knowledge of mathematics, science and engineering
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to design a system, component, or process to meet desired needs
- An ability to function on multidisciplinary teams
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility
- An ability to communicate effectively
- The broad education necessary to understand the impact of engineering solutions in a global and societal context
- A recognition of the need for, and an ability to engage in life-long learning
- A knowledge of contemporary issues
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

APPLICATION PROCESS

The School of Engineering uses the same application procedure as the Universidad del Turabo

ADMISSIONS POLICY

Freshmen

While the actual procedure for admitting students to the Academic Engineering Programs depends on whether the applicant is a first-time freshman, a transfer student from another institution, or a UT student reclassified from another program, the fundamental criterion is the same: the applicant must demonstrate a sufficiently strong background in mathematics and English so as to have a reasonable chance of successfully completing an academic engineering program leading to a B.S. degree. The intention of this criterion is to be inclusive. The goal of the SOE admissions policy is to ultimately admit every student with a motivation to study engineering, if not immediately, then after successful completion of a set of basic mathematics and English courses. This criterion derives directly from the stated UT goals and mandates the SOE to provide opportunities for professional engineering education to all interested students in Puerto Rico.

Applicants to academic engineering programs leading to B.S. degrees in Computer Engineering, Electrical Engineering, Industrial and Management Engineering, or Mechanical Engineering have to satisfy the following admission requirements:

A High School Grade Point Average (GPA) of not lower than 2.0/4.0.

Take the College Entrance Examination Board (CEEB) and, using the following formula with the Achievement scores of the CEEB, obtain an index of at least 75:

$$Index = \frac{[(Mathematics + English + Spanish) \times 0.75] + [GPA \times (25)]}{16}$$

$$Admit\ to\ B.S.program\ if\ Index\ \geq 75$$

For example, suppose a student has the following qualifications:

- GPA: 3.0
- CEEB Achievement Test Scores:
  - Mathematics: 600
  - English: 550
  - Spanish: 450

$$Index = \frac{[(600+550+450)\times 0.75]+[3.0\times(25)]}{16}$$

$$Index = \frac{[1200]+[75]}{16}$$

$$Index = 79.7,\ \therefore Admit\ to\ B.S.program\ since\ Index\ \geq 75$$

Example:
How to calculate the Index

450

Engineering students are placed in the appropriate mathematics, English, and Spanish courses according to their CEEB scores. Cut scores have been identified in each area; for example, students with a CEEB score of 700 or higher in mathematics may enroll directly in MATH 155 Pre-Calculus (an accelerated-pace compendium of MATH 151 Algebra and Trigonometry I and MATH 152 Algebra and Trigonometry II). Similar cut scores exist for English and Spanish courses with several levels that determine the degree of development required by a student. However, students may opt to challenge the cut score by taking placement exams offered by Universidad del Turabo. If the challenge is successful, the student will be enrolled in the appropriate higher level course. Scores from Advanced Placement CEEB exam results are respected by Universidad del Turabo although in some cases the required cut score is 4.0 (of a maximum of 5.0), instead of the typical cut score of 3.0.

Students not satisfying above requirements are encouraged to enroll in the Associate Degree Programs. Once they have achieved the necessary verbal, mathematics, or English language skills as required by the Academic Engineering Programs, the student may submit a request to the Engineering Advising Office for reclassification into the Engineering Academic Programs.

The following reclassification requirements must be satisfied:

Requirements for Reclassification of Students from the UTSOE Associate Degree Programs

Have a grade point average (GPA) no lower than 2.5/4.0 in the associate degree program.

Pass MATH 121 Intermediate Algebra with a minimum grade of B.

Or pass MATH 151 Algebra and Trigonometry I and MATH 152 Algebra and Trigonometry II with a minimum grade of C in each course. These two courses are covalidated for MATH 155 Pre-Calculus.

Requirements for Reclassification of Students from Other Academic Programs at Universidad del Turabo

- Have a cumulative grade point average no lower than 2.5/4.0 at Universidad del Turabo

- Pass MATH 121 Intermediate Algebra with a minimum grade of B.

- Or pass MATH 151 Algebra and Trigonometry I and MATH 152 Algebra and Trigonometry II with a minimum grade of C in each course. These two courses are covalidated for MATH 155 Precalculus.

- Or, in the case of students reclassifying from the Business Administration school, pass MATH 199 Quantitative Methods I and MATH 200 Quantitative Methods II with a minimum grade of C in each course. These two courses are covalidated for MATH 155 Precalculus.

Transfer Students

The Director of the Engineering Advising Office (EAO) in coordination with the Associate Dean oversees the admission process of transfer students into the academic engineering programs. Only these two persons evaluate candidates which guarantees consistency in the vital task of evaluating course equivalencies for transfer credits. No other faculty member of the Department, School or University can officially grant transfer credits under any circumstances; however, faculty members can recommend course equivalencies. The Associate Dean's approval is required in all evaluations.

General Admission Requirements for Transfer Students

For transfer students from ABET accredited engineering programs:

- Have a Grade Point Average (GPA) no lower than 2.0/4.0.
- Be eligible for starting in at least MATH 151 Algebra and Trigonometry I, i.e., pass a course leading to MATH 151with a minimum grade of B, or be able to place in MATH 151 by placement exam.

- For transfer students from other programs:
- Have a Grade Point Average (GPA) of not less than 2.5/4.0.
- Be eligible for starting in at least MATH 151 Algebra and Trigonometry I, i.e., pass a course leading to MATH 151with a minimum grade of B, or be able to place in MATH 151 by placement exam.

General Education, Math and Science Courses

Most transfer students enter at the freshman or sophomore level. For this reason, the EAO is especially concerned with general education, math, and science courses. Course equivalencies for these will be granted as long as the School/College/University is recognized and accredited by the appropriate governing bodies and the course descriptions, including prerequisites, agree with those in the Universidad del Turabo undergraduate catalog. Of particular importance are the Physics courses, which must have Calculus as a prerequisite. The student must bring a catalog (or photocopies) with the course descriptions to the EAO. Life experience credits are not accepted under any circumstances.

Engineering Science Courses

The EAO is also especially concerned with the first few engineering science courses which are common to all engineering curricula. These include Introduction to Engineering, Engineering Graphics, Computer Programming, Statics, Dynamics and Electrical Networks. Courses from ABET accredited programs are easily transferable. Still, course descriptions are necessary to assure equivalency. Courses from non-ABET accredited programs (including foreign institutions) are accepted as long as the School/College/University is recognized and accredited by the appropriate governing bodies and the course descriptions, including prerequisites, agree with those in the Universidad del Turabo undergraduate catalog. The student must bring a catalog (or photocopies) with the course descriptions to the EAO. Life experience credits are not accepted under any circumstances.

Engineering science courses of a level higher than those listed above follow the same procedure; however, it may become necessary for the EAO to consult with an appropriate faculty member to determine equivalency. The student may also be required to present a copy of the syllabus and the textbook if the course description is insufficient to determine equivalency.

Engineering electives are not transferable.

Students must also satisfy the graduation requirements which stipulate that transfer students must complete at least the last thirty (30) credit hours of a bachelor's degree and the last twelve (12) credit hours of its major at the School of Engineering.

Engineering Design Courses

For the purpose of this section, an engineering design course is defined as a high-level design course typical of the last two or three semesters that culminate the curriculum.

These courses are not transferable. Students must also follow the graduation requirements which stipulate that transfer students must complete at least the last thirty (30) credit hours of a bachelor's degree and the last twelve (12) credit hours of its major at the School of Engineering.

General procedure

The student supplies a copy of their transcript and course descriptions to the EAO for an initial advising session. The EAO will direct the student to the Associate Dean who checks the student's records to ensure that the student is in the proper major and eligible for the program. Students on academic probation at other institutions will not be considered. During the session, the Associate Dean fills and discusses an advising sheet with the student (please refer to the end of the catalog for a copy). The Associate Dean explains which courses may be transferred, which courses could not be accepted and why, and identifies which courses are needed to fulfill the degree requirements. An extra copy of the advising sheet is given to the student. To complete the transfer process, the student must still request official transcripts from the institution and fill in the application for admission form. This advising session is a service provided free of cost to the student. A candidate may opt to skip this advising session and apply to the program by completing the application for admission and submitting it by mail. After evaluation and approval by the Associate Dean of Engineering, the transfer process culminates with the approval of the Admissions Director.

GRADUATION REQUIREMENTS

Students at the School of Engineering will be eligible to receive a Bachelor's degree after meeting the following requirements:

Completion of all the required course work.

Completion of the number credit hours required for the degree with a minimum Grade Point Average of 2.00

Transfer students must complete at least the last thirty (30) credit hours of a bachelor's degree and the last twelve (12) credit hours of its major at the School of Engineering.

The minimum Grade Point Average in their major is 2.30

Prerequisites

The School of Engineering enforces the prerequisites in its engineering curriculum. Students who register for a course for which they do not have the necessary prerequisites will be dropped from the course before the end of the term, and receive a grade of WA.

Repeating Courses

Students may repeat a course in order to improve their Grade Point Average. Credit will be given for the higher grade, which will be used to compute the Grade Point Average. If the grade of the second attempt is the same as the first, they will both be used for the cumulative average, but only once for the graduation average.

Students must repeat courses required for graduation if they receive a grade of D or F. A student in the School of Engineering must complete all courses used to fulfill graduation requirements (both engineering and non-engineering) with a grade of C or better.

Students may be eligible for financial aid when repeating a course. Repeated courses will be considered in determining a student's satisfactory progress.

WITHDRAWALS

See the established university policy.

ACADEMIC ADVISING

All engineering students are referred to the Engineering Advising Office to assure proper course sequencing with respect to prerequisites. The Engineering Advising Sheet (please refer to the end of the catalog for a copy) is used for this purpose. As a supplemental activity, all engineering students are encouraged to visit faculty members during office hours (or ask for an appointment) to discuss progress, academic goals, career goals, and professional aspects of the engineering profession.

PROFESSIONAL SOCIETIES

Engineering students are strongly encouraged to become student-members of professional societies and to continue membership after graduation to facilitate the process of life-long learning. The following societies have student chapters at the Universidad del Turabo.

American Society of Mechanical Engineers (ASME) www.asme.org

ASME is a 125,000 member worldwide society whose vision is to be the premier organization for promoting the art, science and practice of mechanical engineering throughout the world. Membership provides students with a subscription to the society magazine 'Mechanical Engineering', access to technical papers, continuing education seminars and workshops, employment resources, and the opportunity to participate in ASME-sponsored national competitions. In past years, Universidad del Turabo students have won first place prizes in the design competition and the technical poster presentation competition.

Society of Automotive Engineers (SAE) www.sae.org

SAE is a 75,000 member world-wide society that provides technical information and expertise used in designing, building, maintaining, and operating self-propelled vehicles for use on land or sea, in air or space. Membership

provides students with a subscription to one society-sponsored magazine, either 'Automotive Engineering' or 'Aerospace Engineering', access to technical papers, continuing education seminars and workshops, employment resources, and the opportunity to participate in SAE-sponsored national competitions. Universidad del Turabo students have competed in the off-road vehicle Mini-Baja and the SAE Aero Design remote controlled airplane projects.

Association of Licensed Engineers and Land Surveyors of Puerto Rico (CIAPR) www.ciapr.org

CIAPR is a 12,000 member association that represents all practicing engineers and land surveyors in Puerto Rico. Membership provides students with a subscription to the monthly newspaper "Tecnomundo' which features contemporary engineering issues in Puerto Rico. In addition, membership provides the opportunity to meet practicing engineers in monthly technical sessions. All students that belong to any of the above worldwide societies automatically become members of the CIAPR chapter.

Society of Hispanic Professional Engineers (SHPE) www.shpe.org

SHPE is an organization that promotes Hispanics in engineering, math and science. Membership provides students with a subscription to the monthly SHPE magazine and SHPE Newsletter, continuing education seminars, employment resources and scholarships.

Institute of Electrical and Electronics Engineers (IEEE) www.ieee.org

The IEEE is a non-profit, technical professional association of more than 380,000 individual members in 150 countries. Through its members, the IEEE is a leading authority in technical areas ranging from computer engineering, biomedical technology and telecommunications, to electric power, aerospace and consumer electronics, among others. Membership provides students with a subscription to the monthly IEEE Spectrum and IEEE Potentials magazines, continuing education seminars to gain a better understanding of the electrical engineering field, employment resources and scholarships.

The Engineering Honor Society – Tau Alpha Omega www.tbp.org

In the spring semester or 2002-03, the School of Engineering started an Engineering Honor Society and admitted its first 12 undergraduate members – five of which were fourth year students and seven of which were fifth year students. Tau Alpha Omega is modeled after the National Engineering Honor Society - Tau Beta Pi, and the goal of Tau Alpha Omega is to become an official student chapter of Tau Beta Pi in the near future. Tau Beta Pi is the only engineering honor society representing the entire engineering profession. It is the nation's second-oldest honor society. It was founded at Lehigh University in 1885 to mark in a fitting manner those who have conferred honor upon their alma mater by distinguished scholarship and exemplary character as undergraduates in engineering, or by their attainments as alumni in the field of engineering, and to foster the spirit of liberal culture in engineering colleges. At the time of the founding of Alpha Tau Omega, Tau Beta Pi had 221 collegiate chapters and a total initiated membership of 429,000.

Society of Women Engineers – SWE www.swe.org

The Society of Women Engineers (SWE) was founded with the goal of meeting and advancing the unique career needs of women in engineering. The Society has grown to a vital national/international organization with over 16,000 members across more than 300 sections and student sections. By understanding the special effort required to attract and develop women as engineering professionals, the Society has created many effective programs for recruiting and preparing engineering students, and enhancing the skills of its practicing engineering members. The Society of Women Engineers provides its members with the opportunity to grow and to develop in many areas through professional and technical meetings, joint meetings with other societies, technical tours, and social activities. SWE members provide services to women in school by acting as role models and by demonstrating the technical contributions that women have made, and continue to make, in society. SWE also offers the opportunity for its members to learn and to practice management, organizational and leadership skills. In addition, SWE: Magazine of the Society of Women Engineers provides a means of sharing technical and professional information. Finally, SWE sponsors various leadership conferences and an annual conference at which a variety of technical, managerial, and SWE-specific topics are presented. These forums are a means of focusing resources, and providing training in career guidance, continuing development, management and leadership. Student-oriented conference activities, offer student-specific forums such as resume writing and interviewing.

Institute of Industrial Engineers – IIE www.iienet.org

The Institute of Industrial Engineers was founded to foster the dissemination of the leading edge practices and knowledge in the design and implementation of systems consisting of people, materials, facilities, information, money, technology to produce either a product or service that satisfies a given market. Outputs from such production systems must satisfy quality, timeliness and price requirements demanded by the market. Thus the industrial engineering profession must look forward to the large scope of applications where they will work to achieve the mission and vision of the profession. Founded in 1948, IIE is the premier society dedicated to serving the professional needs of all people involved in improving quality and productivity. IIE has more than 15,000 members worldwide and more than 280 chapters. *Contact an expert* on manufacturing, lean manufacturing, ergonomics, quality, Six Sigma, Supply chain management, and other industrial engineering specialties through IIE is a program where students can get expert advice. IIE also provides the IE monthly magazine, case studies, discussion forums, links, terminology search, and web casts as part of dissemination efforts. IIE's mission is dedicated solely to the support of the industrial engineering profession and individuals involved with improving quality and productivity.

American Society for Quality – ASQ www.asq.org **and** www.asq1500.org **(Puerto Rico Chapter)**

ASQ's vision is "By making quality a global priority, an organizational imperative and a personal ethic, the American Society for Quality becomes the community for everyone who seeks quality technology, concepts or tools to improve themselves and their world." Is the dissemination forum for quality related research, best practices in technologies and management of quality improvement and elimination of wastes. ASQ has joined the Baldrige National Quality Program and the Alliance for Performance Excellence to form the Malcolm Baldrige Project. The project will promote the Baldrige performance excellence criteria to business executives. Part of this effort is the creation of case studies of organizations that have applied for the Baldrige award to disseminate best practices in performance excellence. When ASQ says "quality" we mean best practices, continuous improvement, and tapping the full power of knowledge. Quality means making ourselves and our world better. Quality defines and drives successful individuals, organizations and communities. And it never stops evolving.

ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT

Dr. José L. Colón, Department Head

The Electrical and Computer Engineering department offers two programs at the bachelor's level, one in electrical engineering and the other in computer engineering. Each program is described separately. The two programs share the same faculty and same technical staff, as follows:

ELECTRICAL AND COMPUTER ENGINEERING FACULTY

Alcides Alvear / Assistant Professor
M.S. Computer Engineering
University of Puerto Rico at Mayagüez

Dr. Mark A. Lau / Associate Professor
Ph.D. Electrical Engineering
University of Colorado at Boulder

Dr. Roberto Callarotti / Professor
Director for Research, PREC
Ph.D. Electrical Engineering
Massachusetts Institute of Technology

Dr. Yahya M. Masalmah / Assistant Professor
Ph.D. Computing & Information Science and Engineering
University of Puerto Rico at Mayagüez

Gustavo Chaparro / Instructor
M.S. Computer Engineering
University of Puerto Rico at Mayagüez

Wilma Pabón / Instructor
M.S. Electrical Engineering
University of Puerto Rico at Mayagüez

Dr. José L. Colón / Professor
Electrical and Computer Eng. Department Head
D. Eng. Electrical Engineering
Rensselaer Polytechnic Institute

Dr. Jorge M. Vargas / Associate Professor
Ph.D. Electrical Engineering
Florida International University

Dr. Jeffrey L. Duffany / Professor
Ph.D. Computer and Information Engineering
Stevens Institute of Technology

Idalides J. Vergara-Laurens / Assistant Professor
M.S. Computer Engineering
University of Puerto Rico at Mayagüez

Dr. Yazan Hijazi / Associate Professor
Ph.D. Electrical Engineering
Florida International University

Dr. Jintao Xiong / Assistant Professor
Ph.D. Electrical and Computer Engineering
University of Massachusetts Amherst

Dr. Sastry Kuruganty / Professor
Ph.D. Electrical Engineering
University of Saskatchewan, Canada

ELECTRICAL AND COMPUTER ENGINEERING TECHNICAL STAFF

Noemí Camacho / Computer Center Coordinator
B.B.A. Computerized Information Systems Universidad del Turabo

Nelson Martínez, E.I.T. / Electrical Engineering Laboratories Coordinator
B.S. Electrical Engineering
Polytechnic University of Puerto Rico

COMPUTER ENGINEERING PROGRAM

In an increasingly complex world computers are at the forefront of the most amazing technological developments. With such a vast spectrum of applications ranging from the Internet to electronic portable devices to robotics to video games, the Computer Engineering Program provides the student with a rigorous academic preparation for a rich and rewarding career. Students will learn the principles of hardware and software design and their interface to build complex computer systems for industrial applications.

VISION

To become the first choice for all motivated students who wish to pursue a computer engineering education in Puerto Rico.

MISSION

To professionally prepare computer engineering graduates who are capable of fulfilling the technological needs of society and excel in the design and creation of computer systems.

EDUCATIONAL OBJECTIVES OF THE COMPUTER ENGINEERING DEPARTMENT

(broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve)

1. To be successfully employed or gain entrance to a graduate program in computer engineering or related disciplines.
2. To become leaders in their profession or demonstrate entrepreneurial initiative.
3. To demonstrate attainment of technical and professional maturity.

The Faculty of the School of Engineering, through a set of measurable outcomes, and with the input of students and an Industry Curriculum Advisory Board, systematically measures the effectiveness of the program in satisfying its educational objectives and continuously strives to improve the program.

OUTCOMES FOR COMPUTER ENGINEERING PROGRAM

(What students should know and should be able to do by the time of graduation)

a. an ability to apply knowledge of mathematics, science, and engineering.

b. an ability to design and conduct experiments as well as to analyze and interpret data.

c. an ability to design a system, component, or process to meet desired needs.

d. an ability to function on multi-disciplinary teams.

e. an ability to identify, formulate, and solve engineering problems.

f. an understanding of professional and ethical responsibility.

g. an ability to communicate effectively.

h. the broad education necessary to understand the impact of engineering solutions in a global and societal context.

i. a recognition of the need for, and an ability to engage in life-long learning.

j. a knowledge of contemporary issues.

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

l. knowledge of probability and statistics, including appropriate computer engineering applications.

m. knowledge of advanced mathematics, including differential equations, linear algebra, complex variables, and discrete mathematics.

n. an ability to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

RELATIONSHIP OF OUTCOMES TO COMPUTER ENGINEERING PROGRAM OBJECTIVES:

PROGRAM OUTCOMES	Program Objectives		
	1	2	3
a. Ability to apply knowledge of mathematics, science and engineering.	X		
b. Ability to design and conduct experiments as well as to analyze and interpret data.	X		
c. Ability to design a system, component, or process to meet desired needs.	X		
d. Ability to function on multidisciplinary teams.		X	
e. Ability to identify, formulate, and solve engineering problems.	X		X
f. Understanding of professional and ethical responsibility.		X	
g. Ability to communicate effectively.		X	
h. Broad education necessary to understand the impact of engineering solutions in a global and societal context.		X	
i. Recognition of the need for, and an ability to engage in life-long learning.			X
j. Knowledge of contemporary issues.		X	
k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	X		
l. Knowledge of probability and statistics, including appropriate computer engineering applications.	X		
m. Knowledge of advanced mathematics, including differential equations, linear algebra, complex variables, and discrete mathematics.	X		
n. An ability to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.	X		

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING (155 CRS)

(Please refer to the end of the catalog for the sequence of courses by semester)

A. Component of general studies (50 credits)

Languages

Code	Title	Credits	Prerequisites
SPAN 152	Fundamentals of Reading and Writing	3	See note 1
SPAN 250	Writing Techniques	3	SPAN 152
ENGL 152	Communicative English II	3	See note 1
ENGL 153	Advanced Communicative English	3	ENGL 152
ENGL 231	Research and Writing	3	ENGL 153
ENGL 331	Oral Communication	3	ENGL 153
		18	

Natural sciences and mathematics

MATH 155	Pre-Calculus (or MATH 151 & 152)	3	See note 1
PHSC 205	Physics for Engineering I	4	MATH 221
CHEM 203	General Chemistry I	4	MATH 151
		11	

Humanistic and social sciences

HUMA 111	Universal Culture and Civilization I	3	
(List G)	Humanistic Elective I	3	HUMA 111
SOSC 111	Individual, Community, Government, and Social Responsibility I	3	
(List H)	Social Sciences Elective I	3	SOSC 111
(Lists G, H)	Social Sciences or Humanistic Elective II	3	
ECON 121	Economic Principles I	3	
		18	

Freshman seminar

ENGI 100	Introduction to Engineering	3	

B. Complementary general courses (21 credits)

MATH 221	Calculus I	4	MATH 155
MATH 222	Calculus II	4	MATH 221
MATH 223	Calculus III	4	MATH 222
MATH 395	Differential Equations	3	MATH 222
PHSC 207	Physics for Engineering I Laboratory	1	MATH 221, [PHSC 205] Co-Req.
PHSC 206	Physics for Engineering II	4	PHSC 205, PHSC 207
PHSC 208	Physics for Engineering II Laboratory	1	PHSC 205, PHSC 207 [PHSC 206] Co-Req.

C. Core courses (29 credits)

ENGI 122	Introduction to Computer Programming	3	MATH 155
ENGI 223	Intermediate Programming	3	ENGI 122, MATH 221
ENGI 277	General Statics and Dynamics	3	PHSC 205, PHSC 207
ENGI 310	General Thermodynamics	3	CHEM 203, ENGI 277, PHSC 206
ENGI 410	Engineering Economy	3	MATH 221
ENGI 478	Fundamentals of Engineering	3	ENGI 122 , ENGI 310

			ENGI 410, ELEN 302
ELEN 301	Electrical Networks I	3	PHSC 206, PHSC 208
ELEN 302	Electrical Networks I Laboratory	1	PHSC 206 / PHSC 208 [ELEN 301] Co-Req.
ELEN 330	Electronics I	3	ELEN 301, ELEN 302
ELEN 332	Electronics I Laboratory	1	ELEN 302 / [ELEN330] Co-Req.
ELEN 360	Random Signals and Systems	3	MATH 223 / ELEN 301

D. Specialty courses (52 credits)

COMP 311	Discrete Mathematics for Engineers	3	ENGI 223
COMP 315	Analysis and Design of Data Structures and Algorithms	3	CPEN 358 / MATH 222
COMP 411	Numerical Methods with Programming	3	COMP 311
CPEN 358	Object Oriented Programming	3	ENGI 223
CPEN 425	Software Engineering	3	CPEN 358
CPEN 444	Computer Architecture and Organization	3	ELEN 312
CPEN 446	Computer Networks	3	ENGI 223
CPEN 452	Operating Systems	3	ENGI 223
CPEN 455	Introduction to Databases	3	COMP 315
CPEN 457	Programming Languages	3	COMP 315
CPEN 491	Senior Design Project I	3	CPEN 425 / CPEN 455 [CPEN 444 / CPEN 452] Co-Req.
CPEN 492	Senior Design Project II	3	CPEN491 or Last Semester Status
ELEN 312	Digital Logic Design I	3	ENGI 122 / ELEN 301
ELEN 313	Digital Logic Design I Laboratory	1	ELEN 302 / [ELEN 312] Co-Req.
ELEN 442	Microprocessors I	3	ENGI 223 / ELEN 312 / ELEN 313
ELEN 443	Microprocessors II	3	ELEN 442
(List F)	Computer Engineering Elective I	3	Depends on Selected Elective
(List F)	Computer Engineering Elective II	3	Depends on Selected Elective

E. Free Elective (3 credits)

	Choose any course offered at Universidad del Turabo	3	Depends on Selected Elective

F. Professional electives

CPEN 456	Database Management Systems	3	CPEN 455
CPEN 458	Introduction to Compilers	3	CPEN 452
CPEN 459	Artificial Intelligence	3	ENGI 223
CPEN 477	Computer Network Security	3	CPEN 446
CPEN 478	Distributed Systems	3	CPEN 444, CPEN 452
CPEN 488	Advanced Computer Architectures	3	CPEN 444
CPEN 497	Special Topics	3	Chairperson's permission
ELEN 430	Digital Electronics	3	ELEN 330
ELEN 431	Electronics II	3	ELEN 330
ELEN 436	Power Electronics	3	ELEN 431
ELEN 441	Digital Logic Design II	3	ELEN 312 / ELEN 330
ELEN 498	Undergraduate Research I	3	Chairperson’s permission
ELEN 499	Undergraduate Research II	3	ELEN 498 and Chairperson’s permission

G. Humanistic electives

ART 101	Art Appreciation	3	HUMA 111
FRCH 101	Basic Course in French	3	HUMA 111
FRCH 102	Basic Course in French	3	HUMA 111
HIST 232	Contemporary World Problems	3	HUMA 111
HIST 251	History of Puerto Rico I	3	HUMA 111
HIST 252	History of Puerto Rico II	3	HUMA 111
HIST 253	History of Puerto Rico (Compendium)	3	HUMA 111
HIST 272	History of the United States of America II	3	HUMA 111
HIST 273	History of the United States of America (Compendium)	3	HUMA 111
HUMA 112	Universal Culture and Civilization II	3	HUMA 111
HUMA 115	Western Civilization: A Puertorrican Perspective	3	HUMA 111
HUMA 116	Western Civilization: A Puertorrican Perspective	3	HUMA 111
MUSI 101	Music Appreciation	3	HUMA 111
PHIL 201	Introduction to Philosophy I	3	HUMA 111
PHIL 202	introduction to Philosophy II	3	HUMA 111
PHIL 300	Introduction to Ethics	3	HUMA 111

H. Social sciences electives

GEOG 202	Human Geography	3	SOSC 111
GEOG 205	Global Economy and Resources	3	SOSC 111
POSC 380	Constitutional Law	3	SOSC 111
PSYC 123	Survey Course in Psychology	3	SOSC 111
PSYC 405	Physiological Psychology	3	SOSC 111
SOSC 101	Introduction to Social Sciences I	3	SOSC 111
SOSC 102	Introduction to Social Sciences II	3	SOSC 111
SOCI 203	Social Principals (Compendium)	3	SOSC 111
SOCI 325	Sociology of Deviance	3	SOSC 111

I. Development courses

MATH 100	Basic Mathematics	3	Placement Exam
MATH 107	Basic Fundamentals of Mathematics	3	Placement Exam
MATH 120	Elementary Algebra	3	Placement Exam
MATH 121	Intermediate Algebra	3	Placement Exam
ENGL 151	Basic Communicative English	3	Placement Exam

Important notes:

1. Freshmen will be placed in the English (ENGL) and Spanish (SPAN) courses according to their scores in the placement test offered at Universidad del Turabo. Freshmen with 490 points, or less, in the mathematics-achievement part of the College Entrance Examination Board (CEEB), must take MATH 100.
2. Some of the required or elective specialty courses are not offered every semester.
3. Universidad del Turabo reserves the right to make changes to this curriculum.

ELECTRICAL ENGINEERING PROGRAM

The **Electrical Engineering** program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700:

The conveniences that we enjoy today are made possible by the effective utilization of electrical energy. This form of energy has enabled a wide spectrum of technologies ranging from computers to robotics to industrial automation to medical imaging to wireless communication. The standard of living of any country is judged by the consumption of electrical energy per capita. The Electrical Engineering Program offers the student an exciting curriculum covering diverse areas including power, electronics, computers, controls, communications, and signal processing. Students will be well prepared to tackle problems in these areas and become agents of innovation in an increasingly complex world. In circuits and electronics, students are introduced to energy sources, circuit elements, and devices that are encountered in practical electrical networks. In power systems, students are given the background to understand the generation, transmission, and distribution of electric power. In computers, students learn the principles under which computers are built and communicate among themselves; students also learn how to design software for applications such as the Internet. In control systems, students are introduced to the design techniques for the automatic monitoring of industrial processes. In communications and signal processing, students learn the modulation techniques used in analog and digital communication systems, and filter design.

VISION

To become the first choice for all motivated students who wish to pursue an electrical engineering education.

MISSION

To professionally prepare electrical engineering students who, as graduates, are capable of fulfilling the technological needs of society.

EDUCATIONAL OBJECTIVES

(broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve)

1. To be successfully employed or gain entrance to a graduate program in electrical engineering or related disciplines.

2. To become leaders in their profession or demonstrate entrepreneurial initiative.

3. To demonstrate attainment of technical and professional maturity.

The Faculty of the Electrical and Computer Engineering Department, through the following set of measurable outcomes, and with the input of its constituents, systematically measures the effectiveness of the program in satisfying its educational objectives and continuously strives to improve the program.

OUTCOMES

(What students should know and should be able to do by the time of graduation)

a. An ability to apply knowledge of mathematics, science, and engineering.

b. An ability to design and conduct experiments as well as to analyze and interpret data.

c. An ability to design a system, component, or process to meet desired needs.

d. An ability to function on multi-disciplinary teams.

e. An ability to identify, formulate, and solve engineering problems.

f. An understanding of professional and ethical responsibility.

g. An ability to communicate effectively.

h. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

i. A recognition of the need for, and an ability to engage in life-long learning.

j. A knowledge of contemporary issues.

k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

l. Knowledge of probability and statistics, including appropriate electrical engineering applications.

m. Knowledge of advanced mathematics, including differential equations, linear algebra, complex variables, and discrete mathematics.

n. An ability to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

RELATIONSHIP OF OUTCOMES TO ELECTRICAL ENGINEERING AND COMPUTER ENGINEERING PROGRAM OBJECTIVES:

PROGRAM OUTCOMES	Program Objectives		
	1	2	3
a. Ability to apply knowledge of mathematics, science and engineering.	X		
b. Ability to design and conduct experiments as well as to analyze and interpret data.	X		
c. Ability to design a system, component, or process to meet desired needs.	X		
d. Ability to function on multidisciplinary teams.		X	
e. Ability to identify, formulate, and solve engineering problems.	X		X
f. Understanding of professional and ethical responsibility.		X	
g. Ability to communicate effectively.		X	
h. Broad education necessary to understand the impact of engineering solutions in a global and societal context.		X	
i. Recognition of the need for, and an ability to engage in life-long learning.			X
j. Knowledge of contemporary issues.		X	
k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	X		
l. Knowledge of probability and statistics, including appropriate electrical engineering applications.	X		
m. Knowledge of advanced mathematics, including differential equations, linear algebra, complex variables, and discrete mathematics.	X		
n. An ability to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.	X		

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (155 CRS)

(Please refer to the end of the catalog for the sequence of courses by semester)

A. Component of general studies (50 credits)

Languages

Code	Title	Credits	Prerequisites
SPAN 152	Fundamentals of Reading and Writing	3	See note 1
SPAN 250	Writing Techniques	3	SPAN 152
ENGL 152	Communicative English II	3	See note 1
ENGL 153	Advanced Communicative English	3	ENGL 152
ENGL 231	Research and Writing	3	ENGL 153
ENGL 331	Oral Communication	3	ENGL 153
		18	

Natural sciences and mathematics

MATH 155	Pre-Calculus (or MATH 151 & 152)	3	See note 1
PHSC 205	Physics for Engineering I	4	MATH 221
CHEM 203	General Chemistry I	4	MATH 151
		11	

Humanistic and social sciences

HUMA 111	Universal Culture and Civilization I	3	
(List G)	Humanistic Elective I	3	HUMA 111
SOSC 111	Individual, Community, Government, and Social Responsibility I	3	
(List H)	Social Sciences Elective I	3	SOSC 111
(Lists G, H)	Social Sciences or Humanistic Elective II	3	
ECON 121	Economic Principles I	3	
		18	

Freshman seminar

ENGI 100	Introduction to Engineering	3	

B. Complementary general courses (21 credits)

MATH 221	Calculus I	4	MATH 155
MATH 222	Calculus II	4	MATH 221
MATH 223	Calculus III	4	MATH 222
MATH 395	Differential Equations	3	MATH 222
PHSC 207	Physics for Engineering I Laboratory	1	MATH 221 / [PHSC 205] Co-Req.
PHSC 206	Physics for Engineering II	4	PHSC 205 / PHSC 207
PHSC 208	Physics for Engineering II Laboratory	1	PHSC 205 / PHSC 207 [PHSC 206] Co-Req.

C. Core courses (24 credits)

ENGI 122	Introduction to Computer Programming	3	MATH 155
ENGI 223	Intermediate Programming	3	ENGI 122 / MATH 221
ENGI 244	Engineering Materials	3	CHEM 203 / PHSC 205
ENGI 277	General Statics and Dynamics	3	PHSC 205 / PHSC 207
ENGI 310	General Thermodynamics	3	CHEM 203 / ENGI 277 / PHSC 206
ENGI 398	Engineering Mathematics	3	MATH 222/ENGI 122 [MATH 395 / ELEN 301] Co-Req.
ENGI 410	Engineering Economy	3	MATH 221
ENGI 478	Fundamentals of Engineering	3	ENGI 122 / ENGI 244 / ENGI 310 ENGI 410 / ELEN 302

D. Specialty courses (57 credits)

ELEN 301	Electrical Networks I	3	PHSC 206 / PHSC 208
ELEN 302	Electrical Networks I Laboratory	1	PHSC 206 / PHSC 208 [ELEN 301] Co-Req.
ELEN 311	Electrical Networks II	3	ELEN 301 / ELEN 302 / MATH 395
ELEN 312	Digital Logic Design I	3	ENGI 122 / ELEN 301
ELEN 313	Digital Logic Design I Laboratory	1	ELEN 302 / [ELEN 312] Co-Req.
ELEN 330	Electronics I	3	ELEN 301 / ELEN 302
ELEN 332	Electronics I Laboratory	1	ELEN 302 / [ELEN 330] Co-Req.
ELEN 360	Random Signals & Systems	3	MATH 223 / ELEN 301
ELEN 370	Electromagnetics	3	ELEN 301 / ENGI 398
ELEN 414	Linear Systems	3	ELEN 301 / MATH 395 / ENGI 398
ELEN 416	Control Systems	3	ELEN 414
ELEN 417	Systems Laboratory	1	[ELEN 416] Co-Req
ELEN 421	Electromechanical Energy Conversion Lab	1	ELEN 302 / [ELEN 422] Co-Req.
ELEN 422	Electrical Machines	3	ELEN 311
ELEN 431	Electronics II	3	ELEN 330
ELEN 433	Electronics II Laboratory	1	ELEN 332 / [ELEN 431] Co-Req.
ELEN 442	Microprocessors I	3	ENGI 223 / ELEN 312 / ELEN 313
ELEN 474	Communication Systems I	3	ELEN 360 / ELEN 414
ELEN 480	Power System Analysis I	3	ELEN 422
ELEN 491	Electrical Engineering Design Concepts	3	[ELEN 370 / ELEN 422 ELEN 431] Co-Req.
ELEN 492	Major Design Experience	3	ELEN 491 or Last Semester Status
(List F)	Electrical Engineering Elective I	3	Depends on Selected Elective
(List F)	Electrical Engineering Elective II	3	Depends on Selected Elective

E. Free Elective (3 credits)

	Choose any course offered at Universidad del Turabo	3	Depends on Selected Elective

F. Professional electives

ELEN 430	Digital Electronics	3	ELEN 330
ELEN 434	Instrumentation	3	ELEN 431 / ELEN 433
ELEN 436	Power Electronics	3	ELEN 431
ELEN 441	Digital Logic Design II	3	ELEN 312 / ELEN 330
ELEN 443	Microprocessors II	3	ELEN 442
ELEN 460	Digital Signal Processing	3	ELEN 414
ELEN 472	Antennas and Transmission Lines	3	ELEN 370
ELEN 475	Communication Systems II	3	ELEN 474
ELEN 478	RF Design	3	ELEN 431 / ELEN 474
ELEN 481	Power System Analysis II	3	ELEN 480
ELEN 484	Power Transmission and Distribution	3	ELEN 480
ELEN 488	Power System Reliability	3	ELEN 480
ELEN 497	Special Topics	3	Chairperson's Permission
ELEN 498	Undergraduate Research I	3	Chairperson's Permission
ELEN 499	Undergraduate Research II		ELEN 498 and Chairperson's Permission
COMP 311	Discrete Mathematics for Engineers	3	ENGI 223
COMP 315	Analysis and Design of Data Structures & Algorithms	3	CPEN 358 / MATH 222
COMP 411	Numerical Methods with Programming	3	COMP 311

CPEN 358	Object Oriented Programming	3	ENGI 223
CPEN 444	Computer Architecture and Organization	3	ELEN 312
CPEN 446	Computer Networks	3	ENGI 223
CPEN 452	Operating Systems	3	ENGI 223
CPEN 455	Introduction to Databases	3	COMP 315
CPEN 457	Programming Languages	3	COMP 315
CPEN 458	Introduction to Compilers	3	CPEN 452
CPEN 459	Artificial Intelligence	3	ENGI 223

G. Humanistic electives

ART 101	Art Appreciation	3	HUMA 111
FRCH 101	Basic Course in French	3	HUMA 111
FRCH 102	Basic Course in French	3	HUMA 111
HIST 232	Contemporary World Problems	3	HUMA 111
HIST 251	History of Puerto Rico I	3	HUMA 111
HIST 252	History of Puerto Rico II	3	HUMA 111
HIST 253	History of Puerto Rico (Compendium)	3	HUMA 111
HIST 272	History of the United States of America II	3	HUMA 111
HIST 273	History of the United States of America (Compendium)	3	HUMA 111
HUMA 112	Universal Culture and Civilization II	3	HUMA 111
HUMA 115	Western Civilization: A Puertorrican Perspective	3	HUMA 111
HUMA 116	Western Civilization: A Puertorrican Perspective	3	HUMA 111
MUSI 101	Music Appreciation	3	HUMA 111
PHIL 201	Introduction to Philosophy I	3	HUMA 111
PHIL 202	introduction to Philosophy II	3	HUMA 111
PHIL 300	Introduction to Ethics	3	HUMA 111

H. Social sciences electives

GEOG 202	Human Geography	3	SOSC 111
GEOG 205	Global Economy and Resources	3	SOSC 111
POSC 380	Constitutional Law	3	SOSC 111
PSYC 123	Survey Course in Psychology	3	SOSC 111
PSYC 405	Physiological Psychology	3	SOSC 111
SOSC 101	Introduction to Social Sciences I	3	SOSC 111
SOSC 102	Introduction to Social Sciences II	3	SOSC 111
SOCI 203	Social Principals (Compendium)	3	SOSC 111
SOCI 325	Sociology of Deviance	3	SOSC 111

I. Development courses

MATH 100	Basic Mathematics	3	Placement Exam
MATH 107	Basic Fundamentals of Mathematics	3	Placement Exam
MATH 120	Elementary Algebra	3	Placement Exam
MATH 121	Intermediate Algebra	3	Placement Exam
ENGL 151	Basic Communicative English	3	Placement Exam

Important notes:

1. Freshmen will be placed in the English (ENGL) and Spanish (SPAN) courses according to their scores in the placement test offered at Universidad del Turabo. Freshmen with 490 points, or less, in the mathematics-achievement part of the College Entrance Examination Board (CEEB), must take MATH 100.
2. Some of the required or elective specialty courses are not offered every semester.
3. Universidad del Turabo reserves the right to make changes to this curriculum.

INDUSTRIAL AND MANAGEMENT ENGINEERING PROGRAM

Dr. Oscar A. Sáenz, Department Head

The **Industrial and Management Engineering** program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700:

Industrial Engineering encompasses activities in quality, production, operations research, simulation, facilities layout, work system design, work measurement, safety and ergonomics, economic and cost analyses. An industrial engineer acquires the capacity to design, develop, implement, and improve integrated systems that include people, materials, information, equipment, technology and energy through mathematical or heuristic models. It applies knowledge in mathematics, computers, algorithms and graphics to solve problems involving efficiency, effectiveness or productivity. In terms of Management, a graduate of this program develops an understanding of the engineering relationships between the management tasks of planning, organization, leadership, control, and the human element in production, research, and service organizations. Essential professional skills, such as communication, teamwork and interpersonal relations are practiced throughout this program.

VISION

To become the first choice for all motivated students who wish to pursue an Industrial and Management Engineering education.

MISSION

To professionally prepare Industrial and Management Engineering students who, as graduates, are capable of fulfilling the technological needs of society.

EDUCATIONAL OBJECTIVES

(broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve)

The IME program is committed to provide our graduates with the technical and professional skills necessary to solve contemporary challenges in industrial and management engineering. The first goal of the IME program is that, within the first years after graduation, our graduates will successfully engage technical problems in areas such as Quality, Design of Experiments, simulation, work systems design, facilities layout, and production planning, as well as working in teams, manage or participate in projects, and contribute to decision-making towards enterprise improvement and greater efficiency. The second goal of the IME program is that, progressively over time, our graduates will be able to assume greater technical and administrative responsibilities, manage projects, and assume more complex leadership roles in their enterprises.

Building upon the above-mentioned two general goals, the IME Program has three educational objectives, which the IME Department assesses periodically to measure the degree to which alumni achieve them.

Within four years following graduation**:**

Objective 1: graduates will gain technical and professional experience in IME, or allied disciplines, via successful employment, self-employment, or pursue graduate studies.

Objective 2: graduates will perform IME related functions, improve, design, redesign, or manage enterprises (i.e., products, activities, business processes in industrial or service settings) with a systems perspective.

Five years after graduation and beyond, and by further developing their engineering and management skills, IME graduates

Objective 3: graduates will advance in their professional careers and progressively assume greater leadership, technical, or managerial roles in their organizations.

The Faculty of the Industrial and Management Engineering Department, through the following set of measurable outcomes, and with the input of its constituents, systematically measures the effectiveness of the program in satisfying its educational objectives and continuously strives to improve the program.

OUTCOMES

(What students should know and should be able to do by the time of graduation)

Engineering programs must demonstrate that their graduates have:

a. An ability to apply knowledge of mathematics, science and engineering.

b. An ability to design and conduct experiments, as well as to analyze and interpret data.

c. An ability to design a system, component, or process to meet desired needs.

d. An ability to function on multi-disciplinary teams.

e. An ability to identify, formulate, and solve engineering problems.

f. An understanding of professional and ethical responsibility.

g. An ability to communicate effectively.

h. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

i. A recognition of the need for, and an ability to engage in life-long learning.

j. A knowledge of contemporary issues.

k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

l. The ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy.

m. Accomplish integration of systems using appropriate analytical, computational, and experimental practices.

n. An understanding of the engineering relationships between the management tasks of planning, organization, leadership, control, and the human element in production, research, and service organizations.

o. An understanding of and dealing with the stochastic nature of management systems.

p. The capability of demonstrating the integration of management systems into a series of different technological environments.

RELATIONSHIP OF IME PROGRAM OUTCOMES TO PROGRAM EDUCATIONAL OBJECTIVES:

PROGRAM OUTCOMES	Program Objectives		
	1	2	3
a. Ability to apply knowledge of mathematics, science and engineering.	X		
b. Ability to design and conduct experiments as well as to analyze and interpret data.	X		
c. Ability to design a system, component, or process to meet desired needs.	X		
d. Ability to function on multidisciplinary teams.		X	X
e. Ability to identify, formulate and solve engineering problems.	X		
f. Understanding of professional and ethical responsibility.	X		X
g. Ability to communicate effectively.	X		X
h. Broad education necessary to understand the impact of engineering solutions in a global and societal context.		X	
i. Recognition of the need for, and an ability to engage in life-long learning.	X		
j. Knowledge of contemporary issues.	X		X
k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	X		
l. Ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy.		X	
m. Accomplish integration of systems using appropriate analytical, computational, and experimental practices.		X	
n. An understanding of the engineering relationships between the management tasks of planning, organization, leadership, control, and the human element in production, research, and service organizations.	X		X
o. An understanding of and dealing with the stochastic nature of management systems.		X	X
p. Capability of demonstrating the integration of management systems into a series of different technological environments.		X	X

INDUSTRIAL AND MANAGEMENT ENGINEERING FACULTY

Dr. Jack T. Allison / Professor and
Dean of the School of Engineering
Ph.D. Industrial Engineering,
Texas A & M

Mariceli Rivera / Lecturer
MS Industrial Engineering
Penn State University

Carmen Collazo / Lecturer
ME Management Systems
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M.S. Industrial Engineering
University of Michigan

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MBA, Universidad del Turabo

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Ph. D. Computer Science
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Dr. José Santiváñez / Associate Professor
Ph.D. Industrial Engineering
Northeastern University

Janette Pérez, P.E. / Instructor
M.S. Industrial Engineering
University of Puerto Rico at Mayagüez

BACHELOR OF SCIENCE IN INDUSTRIAL & MANAGEMENT ENGINEERING (154 CRS)

(Please refer to the end of the catalog for the sequence of courses by semester)

A. Component of general studies (50 credits)

Languages

Code	Title	Credits	Prerequisites
SPAN 152	Fundamentals of Reading and Writing	3	See note 1
SPAN 250	Writing Techniques	3	SPAN 152
ENGL 152	Communicative English II	3	See note 1
ENGL 153	Advanced Communicative English	3	ENGL 152
ENGL 231	Research and Writing	3	ENGL 153
ENGL 331	Oral Communication	3	ENGL 153
		18	

Natural sciences and mathematics

Code	Title	Credits	Prerequisites
MATH 155	Pre-Calculus (or MATH 151 & 152)	3	See note 1
PHSC 205	Physics for Engineering I	4	MATH 221
CHEM 203	General Chemistry I	4	MATH 151
		11	

Humanistic and social sciences

HUMA 111	Universal Culture and Civilization I	3	
(See list G)	Humanistic Elective I	3	HUMA 111
SOSC 111	Individual, Community, Government and Social Responsibility I	3	
(See list H)	Social Sciences Elective I	3	SOSC 111
(See lists G, H)	Social Sciences or Humanistic Electives II	3	
ECON 121	Economic Principles I	3	SOSC 111
		18	

Freshman seminar

ENGI 100	Introduction to Engineering	3	

B. Complementary general courses (21 credits)

MATH 221	Calculus I	4	MATH 155
MATH 222	Calculus II	4	MATH 221
MATH 223	Calculus III	4	MATH 222
MATH 395	Differential Equations	3	MATH 222
PHSC 207	Physics for Engineering I Laboratory	1	MATH 221 / [PHSC 205] Co-Req
PHSC 206	Physics for Engineering II	4	PHSC 205 / PHSC 207
PHSC 208	Physics for Engineering II Laboratory	1	PHSC 205 / PHSC 207 [PHSC 206] Co-Req

C. Core courses (22 credits)

ENGI 122	Introduction to Computer Programming	3	MATH 155
ENGI 160	Engineering Graphics	3	MATH 155
ENGI 277	General Statics and Dynamics	3	PHSC 205 / PHSC 207
ENGI 310	General Thermodynamics	3	CHEM 203 / ENGI 277 / PHSC 206
ENGI 410	Engineering Economy	3	MATH 221
ENGI 478	Fundamentals of Engineering	3	ENGI 122 / ENGI 277 / ENGI 310 / ENGI 410 / ELEN 301/ ELEN 302 or next-to-last semester status
ELEN 301	Electrical Networks I	3	PHSC 206 / PHSC 208

ELEN 302	Electrical Networks I Laboratory	1	PHSC 206 / PHSC 208 [ELEN 301] Co-Req.

D. Specialty courses (58 credits)

IMEN 205	Introduction to Engineering Management	3	MATH 221
IMEN 341	Finance for Engineers	3	ENGI 410 / IMEN 390
IMEN 390	Engineering Statistics and Data Analysis	4	MATH 222
IMEN 402	Work Measurement	4	IMEN 390
IMEN 403	Work Systems Design	3	ENGI 277 / IMEN 402
IMEN 405	Statistical Quality Control	4	IMEN 390
IMEN 406	Operations Research	3	MATH 223 / IMEN 390
IMEN 407	Production Planning and Control	3	IMEN 406
IMEN 408	Facility Layout	3	ENGI 160 / IMEN 402 / IMEN 407
IMEN 409	Design Project	3	IMEN 403 / IMEN 405 / IMEN 408 IMEN 421 / Chairperson's Permission
IMEN 411	Systems Analysis and Design	3	ENGI 122 / IMEN 205 / IMEN 402
IMEN 413	Probabilistic Models in Operations Research	3	MATH 395 / IMEN 390
IMEN 414	Systems Simulation	3	ENGI 122 / IMEN 406
IMEN 416	Design of Industrial Experiments	3	IMEN 390
IMEN 421	Engineering Project Management	3	ENGI 410 / IMEN 407
	Industrial Engineering Elective I	3	Depends on Selected Elective
	Industrial Engineering Elective II	3	Depends on Selected Elective
ACCO 303	Cost Accounting	4	IMEN 341

E. Free Elective (3 credits)

	Choose any course offered at Universidad del Turabo	3	Depends on Selected Elective

F. Professional electives

IMEN 404	Industrial Safety and Health Management	3	CHEM 203, IMEN 205, IMEN 390
IMEN 410	Activity Based Costing	3	ACCO 303
IMEN 412	Product Reliability	3	IMEN 405
IMEN 415	Systems Design Project with Simulation	3	IMEN 414
IMEN 420	Models in Facility Planning and Material Handling	3	IMEN 408
IMEN 422	Models for Production Control and Service Logistics	3	IMEN 407
IMEN 423	Information Management in Manufacturing Systems	3	IMEN 411
IMEN 425	Enterprise Continuous Improvement	3	IMEN 402
IMEN 430	Supply Chain Manufacturing	3	IMEN 407
IMEN 431	Sequence and Scheduling	3	IMEN 407
IMEN 497	Special Topics	3	Chairperson's Permission
IMEN 498	Undergraduate Research I	3	Chairperson's Permission
IMEN 499	Undergraduate Research II	3	IMEN 498 and Chairperson's Permission
MEEN 401	Manufacturing Processes	3	ENGI 277

G. Humanistic electives

ART 101	Art Appreciation	3	HUMA 111
FRCH 101	Basic Course in French	3	HUMA 111
FRCH 102	Basic Course in French	3	HUMA 111
HIST 232	Contemporary World Problems	3	HUMA 111
HIST 251	History of Puerto Rico I	3	HUMA 111
HIST 252	History of Puerto Rico II	3	HUMA 111
HIST 253	History of Puerto Rico (Compendium)	3	HUMA 111

HIST 272	History of the United States of America II	3	HUMA 111
HIST 273	History of the United States of America (Compendium)	3	HUMA 111
HUMA 112	Universal Culture and Civilization II	3	HUMA 111
HUMA 115	Western Civilization: A Puertorrican Perspective	3	HUMA 111
HUMA 116	Western Civilization: A Puertorrican Perspective	3	HUMA 111
MUSI 101	Music Appreciation	3	HUMA 111
PHIL 201	Introduction to Philosophy I	3	HUMA 111
PHIL 202	introduction to Philosophy II	3	HUMA 111
PHIL 300	Introduction to Ethics	3	HUMA 111

H. Social sciences electives

GEOG 202	Human Geography	3	SOSC 111
GEOG 205	Global Economy and Resources	3	SOSC 111
POSC 380	Constitutional Law	3	SOSC 111
PSYC 123	Survey Course in Psychology	3	SOSC 111
PSYC 405	Physiological Psychology	3	SOSC 111
SOSC 101	Introduction to Social Sciences I	3	SOSC 111
SOSC 102	Introduction to Social Sciences II	3	SOSC 111
SOCI 203	Social Principals (Compendium)	3	SOSC 111
SOCI 325	Sociology of Deviance	3	SOSC 111

I. Development courses

MATH 100	Basic Mathematics	3	Placement Exam
MATH 107	Basic Fundamentals of Mathematics	3	Placement Exam
MATH 120	Elementary Algebra	3	Placement Exam
MATH 121	Intermediate Algebra	3	Placement Exam
ENGL 151	Basic Communicative English	3	Placement Exam

Important notes:

1. Freshmen will be placed in the English (ENGL) and Spanish (SPAN) courses according to their scores in the placement test offered at Universidad del Turabo. Freshmen with 490 points, or less, in the mathematics-achievement part of the College Entrance Examination Board (CEEB), must take MATH 100.
2. Some of the required or elective specialty courses are not offered every semester.
3. Universidad del Turabo reserves the right to make changes to this curriculum.

MECHANICAL ENGINEERING PROGRAM

Dr. Juan C. Morales, P.E., Department Head

The **Mechanical Engineering** program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone:

WHAT IS A MECHANICAL ENGINEER?

Mechanical engineers apply physical principles in the creation of useful devices, objects and machines. They design and develop everything that you may think of as a machine: from supersonic jets, to automobiles, to bicycles to toasters. The designs are analyzed using mathematics and physical principles of motion, energy, and force to ensure that the product functions reliably. In many cases the analyses are performed using impressive and exciting state of the art computer aided design (CAD) software. Mechanical engineers also strive to create designs that can be manufactured at a competitive cost. Maintenance of the product after design and fabrication is also of concern to mechanical engineers. Practically every product or service in modern life has been touched in some way by a mechanical engineer. This makes mechanical engineering one of the oldest, one of the broadest, and one of the most exciting engineering disciplines.

The two main subdivisions within mechanical engineering are ***mechanical systems*** and ***thermal/fluid systems***.

- In the area of ***mechanical systems***, mechanical engineers design the solid components of a system. Knowledge of materials and manufacturing processes is required. Typical applications include:
  - ✓ The suspension and steering systems of a car.
  - ✓ The pistons, the rods, the crankshaft, and other solid components of an engine.
  - ✓ The landing gear of aircraft and other complex aerospace components.
  - ✓ All kinds of machinery such as cranes, lathes, and ski lifts, to name a few.
  - ✓ All the mechanisms and other solid components of household items such as washing machines, dryers, refrigerators, and automatic gate openers.
- In the area of ***thermal/fluid systems***, mechanical engineers utilize heat and fluid energy to convert it into useful work to satisfy a particular need. Typical applications include:
  - ✓ The design of water distribution systems inside buildings including the fluid mechanics calculations to determine the required capacity of the pumps, and the required pipe diameters.
  - ✓ The design of heating, ventilation and air conditioning systems (HVAC) that maintain a comfortable state inside enclosed areas and, in some cases, such as hospitals and pharmaceutical facilities, maintain strict parameters of cleanliness.
  - ✓ The design of steam turbines and boilers used in the power industry to generate electricity including the calculations based on the Rankine cycle, one of the most used thermodynamic power cycles.
  - ✓ The design of gas turbines used for jet propulsion as well as in the power industry (coupled to an electric generator) to generate electricity. These require an understanding of the thermodynamic combustion process, the aerodynamics of turbine blades, and basic concepts of electrical networks.
  - ✓ The design of heat exchangers that extract heat energy from nuclear reactors.

Most mechanical engineering systems require the integration of *mechanical systems* and *thermal/fluid systems*; however, in most cases, mechanical engineers specialize in only one area. For this reason, a group is usually required to incorporate all areas. In the PE Exam, an eight-hour exam required for licensure, the exam taker must choose one of the three different modules in the afternoon (depth) portion of the exam: HVAC, Thermal and Fluid Systems, and Machine Design. However, the exam taker must demonstrate competency in all areas in the morning (breadth) portion of the PE Exam.

WHAT ARE YOUR CAREER OPTIONS AFTER GRADUATION?

There are many career options that you may explore after graduation. Some professionals elect to stay in the same place their entire lives. Others like to change periodically. As you will see, the Mechanical Engineering degree gives you a very high degree of mobility. Some of your options after graduation are:

Private Industry

Apply your knowledge in the emerging aerospace sector in Puerto Rico, or in the biotechnology, pharmaceutical, and service sectors. There are ample employment opportunities that range from using sophisticated computer aided design software to design jet engine components, to validation of fabrication procedures of medical devices, to

the maintenance of equipment. Choose from several companies located in Puerto Rico, the United States, or even worldwide, where your degree from an ABET-accredited program, will be welcome. Most graduates follow the private industry option.

Entrepreneurship – Business Ownership

If you participated in the Entrepreneurial Program option (MEPI) you will be better prepared to start your own company. However, ost of the successful businesses that Turabo graduates have originated started after acquiring a few years of experience in private industry in their particular area of expertise. The experience, plus the contacts with clients, give you a better probability of sustaining your own business.

US Government and the Military

With the baby boomer generation retiring, there are literally thousands of engineering jobs that have to be filled in the US Government and the Military. Many of our graduates have elected this option and are happily settled in the mainland USA working as engineers.

Graduate School

Are you still thirsty for more knowledge? Do you enjoy research? If that is the case then graduate school may be your best option. Many ME graduates from Turabo have continued studies in universities in Puerto Rico and the mainland USA, including UPR, Cornell, Stanford, Georgia Tech, Purdue, RPI, and Michigan Tech, among others. If you earn a Teaching Assistantship while pursuing a Master's degree and you discover that you like teaching, then a good decision may be for you to continue studying towards a PhD degree and enter academia as an engineering professor.

Research Labs

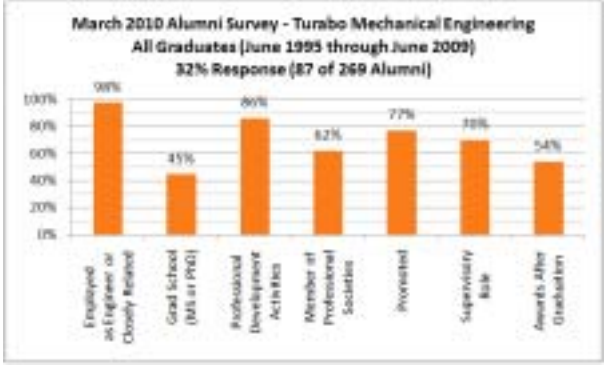
There are several Research Laboratories in the mainland USA. Some are government owned while others are private research centers searching for profitable future innovations. The Sandia National Laboratory, a government laboratory after which the main building of this School is named, employs several of our graduates, all of which have continued their graduate studies and earned MS degrees.

Preparation for other Professions such as Law, Medicine, Business

The expertise in problem-solving that you achieve in the Mechanical Engineering curriculum will serve you well for exploring any other profession. Many patent lawyers have a mechanical engineering degree that serves them well to better understand inventions. Many dentists involved in research have mechanical engineering degrees which assist them in designing and fabricating specialized machines and mechanisms for their research. Many high-level managers with MBA's start with an engineering degree.

Alumni Survey Results (March 2010)

The following figure shows the results of the most recent alumni survey, carried out in March 2010.



VISION

To become the number one choice for all motivated students who wish to pursue a mechanical engineering education in Puerto Rico.

MISSION

To professionally prepare mechanical engineering graduates who are capable of fulfilling the technological needs of society and excel in the design and realization of mechanical and thermal systems.

GOALS

Goal 1 represents broad statements that describe the desired career and professional accomplishments that the program is preparing its graduates to achieve; these are Program Educational Objectives as defined by ABET. They are assessed regularly by the department to measure the degree to which alumni achieve these objectives. Goals 2 through 6 are not considered within the ABET definition of Program Educational Objectives; these are general goals that convey the program endeavors.

1. To provide a thorough education in the fundamentals of mechanical engineering, including thermal, fluid, and mechanical systems, in order to sustain an excellent and accredited undergraduate program with the following expectations for our graduates:

   Within the first one-to-four years after graduation our graduates should be:
   - gainfully employed in mechanical engineering (or allied disciplines) or in good academic standing in a program of graduate studies in a variety of fields, including mechanical engineering;
   - engaged in activities that promote their professional development;
   - participating in organizations that serve their profession.

Building upon these, five-to-ten years beyond graduation, our graduates should show:

- evidence of career advancement into roles of greater responsibility to their employer/employees;
- evidence of continued learning.

2. To search for, develop, and use the most effective teaching/learning methodologies that deliver graduates with the attitude and ability to apply practical knowledge in the workplace.

3. To promote scholarly research activities between students and faculty, and to gradually transition from a teaching, to a teaching-and-research program.

4. To promote participation of students in the innovative Entrepreneurial option (MEPI) as a particularly effective medium through which communication and team skills, leadership qualities, and business sense, can be effectively developed.

5. To encourage enrichment of the educational experience through participation in student chapters of professional societies, special student projects, and industry internships.

6. To review, assess and improve the program on a continuous basis.

OUTCOMES

(What students should know and should be able to do by the time of graduation. The program outcomes are covered through coursework. Each course in the curriculum addresses at least one of the outcomes listed below.)

a. An ability to apply knowledge of mathematics, science and engineering.

b. An ability to design and conduct experiments, as well as to analyze and interpret data.

c. An ability to design a system, components or processes to meet desired needs.

d. An ability to function on a multidisciplinary team.

e. An ability to identify, formulate, and solve engineering problems.

f. An understanding of professional and ethical responsibility.

g. An ability to communicate effectively.

h. A broad education necessary to understand the impact of engineering solutions in a global and societal context.

i. A recognition of the need for, and an ability to engage in life-long learning.

j. A knowledge of contemporary issues.

k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

l. An ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.

MECHANICAL ENGINEERING FACULTY

Dr. Gerardo Carbajal / Associate Professor
Ph.D. Mechanical Engineering
Rensselaer Polytechnic Institute

Sandra Pedraza / Instructor
M.S. Mechanical Engineering
University of Puerto Rico

Eduardo Castillo / Instructor
Ph.D. Candidate Mechanical Engineering
Rensselaer Polytechnic Institute

Dr. Edwar Romero / Assistant Professor
Ph.D. Candidate Mechanical Engineering
Michigan Technological University

Dr. Luciano Castillo / Visiting-Adjunct Professor
Ph.D. Mechanical Engineering
State University of New York, Buffalo

Dr. Ferdinand Rosa, P.E. / Lecturer
Ph.D. Mechanical Engineering
University of Arizona

Jiman Han / Instructor
Ph.D. Candidate Mechanical Engineering
Oakland University

Dr. Mary C. Ruales / Assistant Professor
Ph.D. Mechanical Engineering
Florida International University

Arturo Llavona, P.E. / Lecturer
M.S. Civil Engineering
University of Puerto Rico

Dr. Visvanatha Sundararajan / Professor
Ph.D. Engineering Mechanics
University of Kansas

Dr. Amaury Malavé / Assistant Professor
Director of Puerto Rico Energy Center (PREC)
Ph.D. Mechanical Engineering
University of Wisconsin, Madison

Carlos Trigueros / Lecturer
M.S. Chemical Engineering
University of Rhode Island

Erick Méndez, P.E. / Lecturer
M.S. Nuclear Engineering
University of Puerto Rico

Diego Villegas / Assistant Professor
Ph.D. Mechanical Engineering
Michigan Technological University

Dr. Omar Meza / Substitute Assistant Professor
Ph.D. Mechanical Engineering
West Virginia University

Pedro Zayas / Instructor & Lab Director
M.S. Electrical Engineering
University of Michigan
B.S. Mechanical Engineering
University of Puerto Rico

Dr. Juan C. Morales, P.E. / Associate Professor
Mechanical Engineering Department Head
Ph.D. Structural Engineering
University of Puerto Rico
M.S. Mechanical Engineering
Northeastern University

MECHANICAL ENGINEERING TECHNICAL STAFF

José Santana / Machine Shop Coordinator
Associate Degree in Tool and Die Making
Technological Institute of Puerto Rico

Pedro Zayas / Mechanical Engineering Laboratories Director
M.S. Electrical Engineering
University of Michigan
B.S. Mechanical Engineering
University of Puerto Rico

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING (154 CRS)

(Please refer to the end of the catalog for the sequence of courses by semester)

A. Component of general studies (50 credits)

Languages

Code	Title	Credits	Prerequisites
SPAN 152	Fundamentals of Reading and Writing	3	See note 1
SPAN 250	Writing Techniques	3	SPAN 152
ENGL 152	Communicative English II	3	See note 1
ENGL 153	Advanced Communicative English	3	ENGL 152
ENGL 231	Research and Writing	3	ENGL 153
ENGL 331	Oral Communication	3	ENGL 153
		18	

Natural sciences and mathematics

MATH 155	Pre-Calculus (or MATH 151 & 152)	3	See note 1
PHSC 205	Physics for Engineering I	4	MATH 221
CHEM 203	General Chemistry I	4	MATH 151
		11	

Humanistic and social sciences

HUMA 111	Universal Culture and Civilization I	3	
(See list G)	Humanistic Elective I	3	HUMA 111
SOSC 111	Individual, Community, Government & Social Responsibility I	3	
(See list H)	Social Sciences Elective I	3	SOSC 111
(See lists G, H)	Social Sciences or Humanistic Elective II	3	
ECON 207	Economics of the New World Order	3	SOSC 111
		18	

Freshman seminar

ENGI 100	Introduction to Engineering	3	

B. Complementary general courses (24 credits)

MATH 221	Calculus I	4	MATH 155
MATH 222	Calculus II	4	MATH 221
MATH 223	Calculus III	4	MATH 222
MATH 350	Linear Algebra	3	MATH 222
MATH 395	Differential Equations	3	MATH 222
PHSC 207	Physics for Engineering I Laboratory	1	MATH 221 / [PHSC 205] Co-Req
PHSC 206	Physics for Engineering II	4	PHSC 205 / PHSC 207
PHSC 208	Physics for Engineering II Laboratory	1	PHSC 205 / PHSC 207 [PHSC 206] Co-Req

C. Core courses (22 credits)

ENGI 122	Introduction to Computer Programming	3	MATH 155
ENGI 160	Engineering Graphics	3	MATH 155
ENGI 233	Statics	3	PHSC 205 / PHSC 207
ENGI 410	Engineering Economy	3	MATH 221
ENGI 478	Fundamentals of Engineering	3	ENGI 122/ENGI 244/ENGI 305/ ENGI 318/ENGI 410/MEEN 312/ MEEN 320/ELEN 301/ELEN 302

ELEN 301	Electrical Networks I	3	PHSC 206 / PHSC 208
ELEN 302	Electrical Networks I Laboratory	1	PHSC 206 / PHSC 208 [ELEN 301] Co-Req.
ELEN 420	Electromechanical Energy Conversion	3	ELEN 301/ELEN 302

D. Specialty courses (55 credits)

ENGI 244	Engineering Materials	3	CHEM 203 / PHSC 205
ENGI 305	Fluid Mechanics	3	ENGI 334 / MATH 395
ENGI 318	Strength of Materials	3	ENGI 233
ENGI 319	Materials Testing Laboratory	1	ENGI 244 / ENGI 318 / MEEN 418
ENGI 333	Machine Shop Lab.	1	ENGI 160 / ENGI 244/ ENGI 318
ENGI 334	Dynamics	3	ENGI 233
MEEN 312	Kinematics of Mechanisms	3	ENGI 334
MEEN 320	Thermodynamics I	3	ENGI 233/ CHEM 203 PHSC 206 / PHSC 208
MEEN 340	Computer Aided Design	3	ENGI 160 / ENGI 318 / MATH 350
MEEN 401	Manufacturing Processes	3	ENGI 244 / ENGI 318
ENGI 406	Fluid Mechanics Laboratory	1	ENGI 305 / MEEN 418
MEEN 418	Experimental Methods	2	ELEN 301/ELEN 302
MEEN 420	Heat Transfer	3	ENGI 305 / MEEN 320
MEEN 421	Thermodynamics II	3	ENGI 305 / MEEN 320
MEEN 425	Design of Machine Elements	3	ENGI 318 / MEEN 312
MEEN 427	Mechanical Engineering Sys. Lab.	1	ENGI 319/ENGI 406/MEEN 420 MEEN 421/MEEN 425/ELEN 420
MEEN 475	Multidisciplinary Experience in Industry	4	ENGI 319/ENGI 406/MEEN 420 MEEN 421/MEEN 425/ELEN 420
MEEN 481	Mechanical Systems Design	3	MEEN 425 / MEEN 340
MEEN 485	Thermal Systems Design	3	MEEN 420 / MEEN 421
(See list F)	Mechanical Engineering Elective I	3	Depends on Selected Elective
(See list F)	Mechanical Engineering Elective II	3	Depends on Selected Elective

E. Free Elective (3 credits)

	Choose any course offered at Universidad del Turabo	3	Depends on Selected Elective

F. Professional electives

MEEN 451	Process and Product Design	3	ENGI160 / MEEN 401
MEEN 464	Mechanical Vibrations	3	MEEN 425
MEEN 465	Vehicle Dynamics Fundamentals	3	MEEN 425
MEEN 474	Finite Element Analysis with Applications	3	MEEN 425
MEEN 477	Solar Technologies	3	MEEN 420/[MEEN 421] Co-Req
MEEN 480	Automatic Controls	3	ELEN 301 / ENGI 334 MATH 350 / MATH 395
MEEN 482	Failure of Materials in Mechanical Design	3	MEEN 425
MEEN 483	Computer Aided Manufacturing	3	ENGI 122 / MEEN 401 / MEEN 425
MEEN 484	Corrosion in Metals	3	ENGI 244 / MEEN 425
MEEN 489	Air Conditioning	3	MEEN 420 / MEEN 421
MEEN 490	Robotics	3	ELEN 301 / MEEN 312
MEEN 497	Special Problems	3	Chairperson's Permission
MEEN 498	Undergraduate Research I	3	Chairperson's Permission
MEEN 499	Undergraduate Research II	3	MEEN 498 / Chairperson’s Permission
IMEN 402	Work Measurement	4	MEEN 401 / MEEN 418
IMEN 405	Statistical Quality Control	4	MEEN 401 / MEEN 418

G. Humanistic electives

ART 101	Art Appreciation	3	HUMA 111
FRCH 101	Basic Course in French	3	HUMA 111
FRCH 102	Basic Course in French	3	HUMA 111
HIST 232	Contemporary World Problems	3	HUMA 111
HIST 251	History of Puerto Rico I	3	HUMA 111
HIST 252	History of Puerto Rico II	3	HUMA 111
HIST 253	History of Puerto Rico (Compendium)	3	HUMA 111
HIST 272	History of the United States of America II	3	HUMA 111
HIST 273	History of the United States of America (Compendium)	3	HUMA 111
HUMA 112	Universal Culture and Civilization II	3	HUMA 111
HUMA 115	Western Civilization: A Puertorrican Perspective	3	HUMA 111
HUMA 116	Western Civilization: A Puertorrican Perspective	3	HUMA 111
MUSI 101	Music Appreciation	3	HUMA 111
PHIL 201	Introduction to Philosophy I	3	HUMA 111
PHIL 202	introduction to Philosophy II	3	HUMA 111
PHIL 300	Introduction to Ethics	3	HUMA 111

H. Social sciences electives

GEOG 202	Human Geography	3	SOSC 111
GEOG 205	Global Economy and Resources	3	SOSC 111
POSC 380	Constitutional Law	3	SOSC 111
PSYC 123	Survey Course in Psychology	3	SOSC 111
PSYC 405	Physiological Psychology	3	SOSC 111
SOSC 101	Introduction to Social Sciences I	3	SOSC 111
SOSC 102	Introduction to Social Sciences II	3	SOSC 111
SOCI 203	Social Principals (Compendium)	3	SOSC 111
SOCI 325	Sociology of Deviance	3	SOSC 111

I. Development courses

MATH 100	Basic Mathematics	3	Placement Exam
MATH 107	Basic Fundamentals of Mathematics	3	Placement Exam
MATH 120	Elementary Algebra	3	Placement Exam
MATH 121	Intermediate Algebra	3	Placement Exam
ENGL 151	Basic Communicative English	3	Placement Exam

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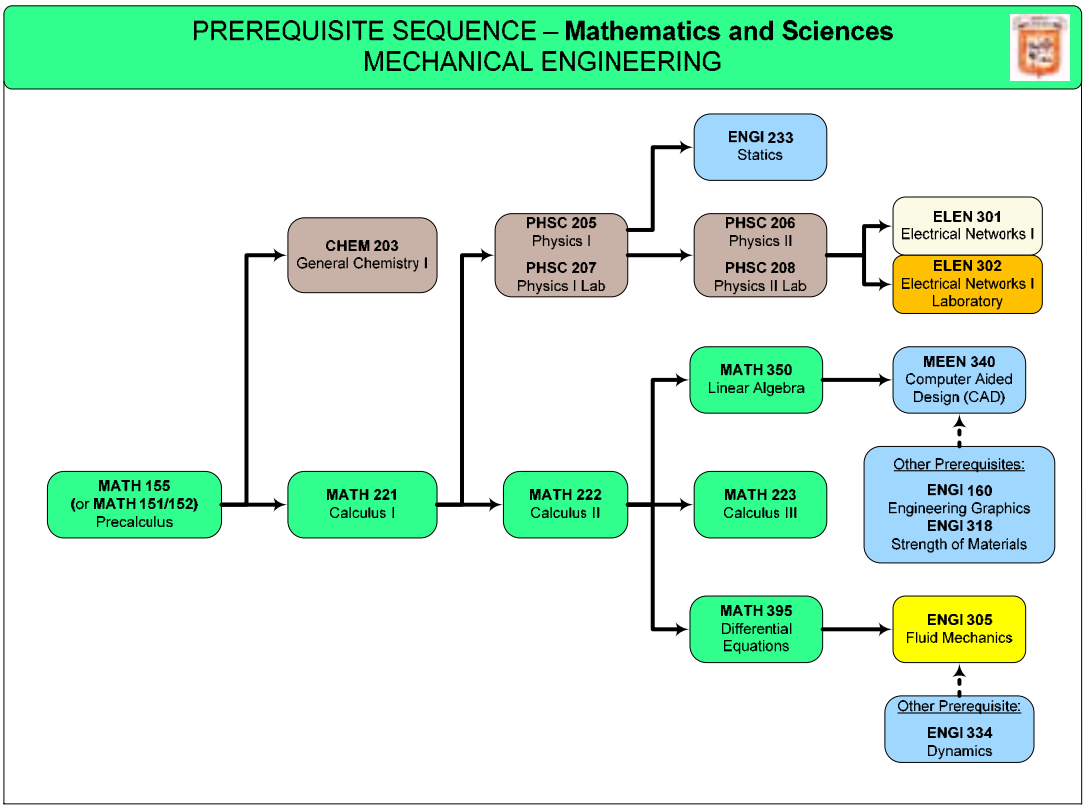
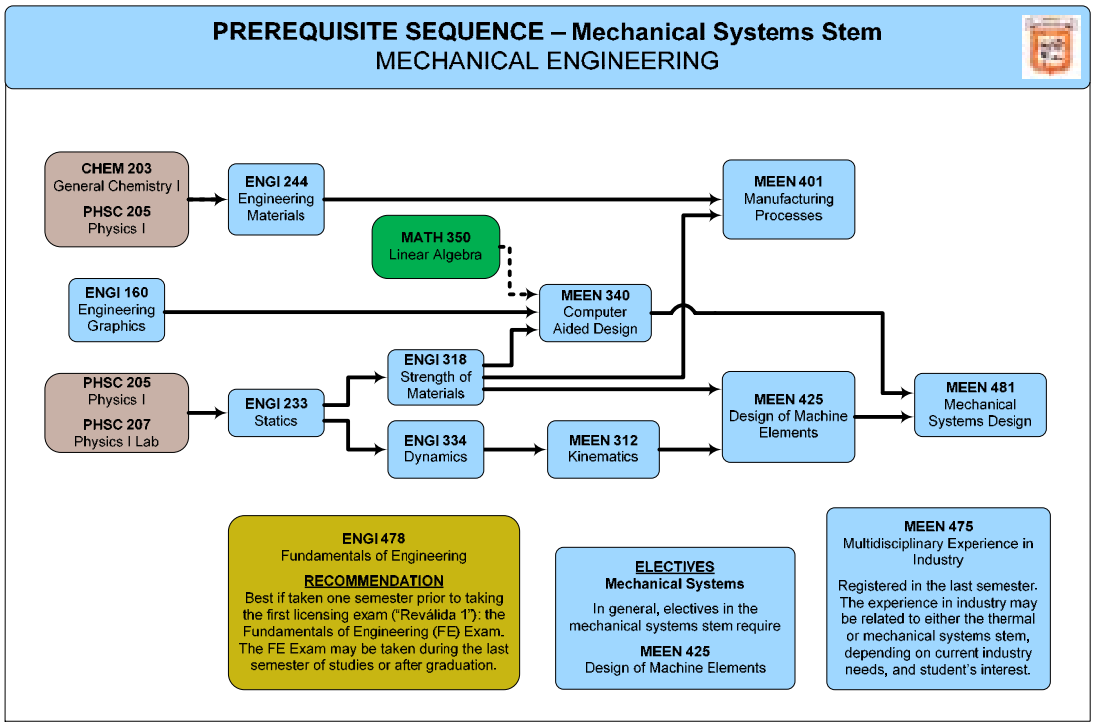
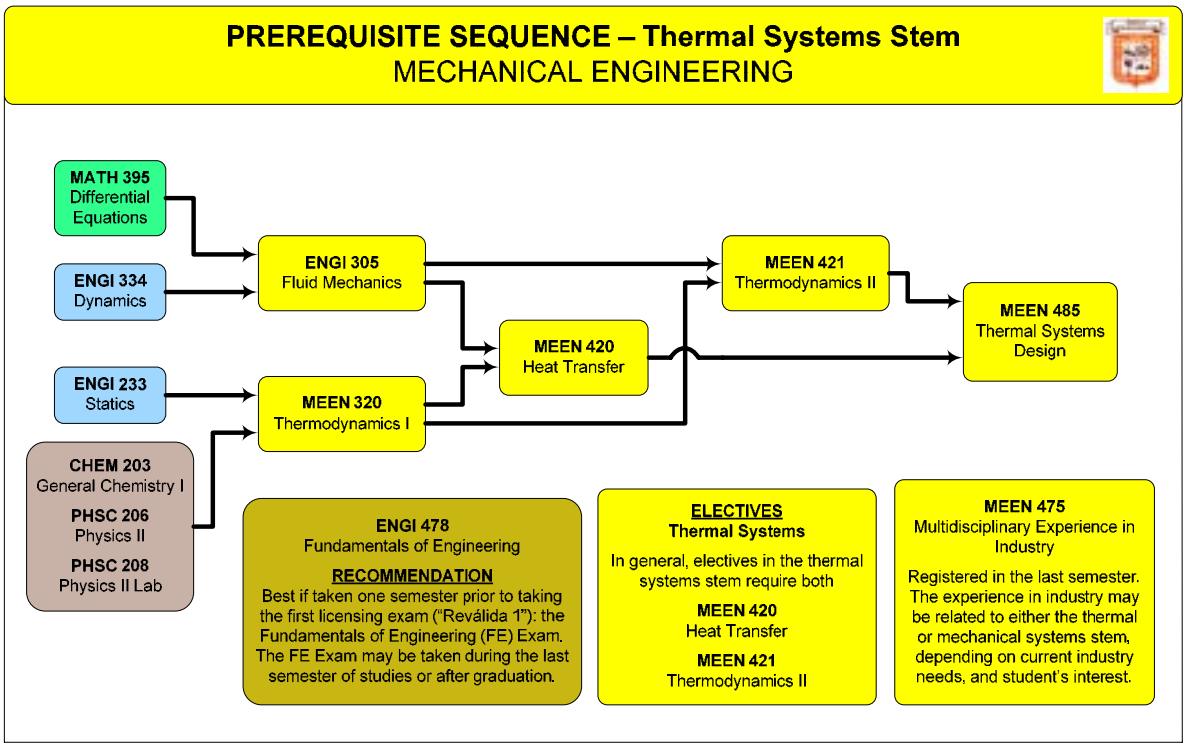
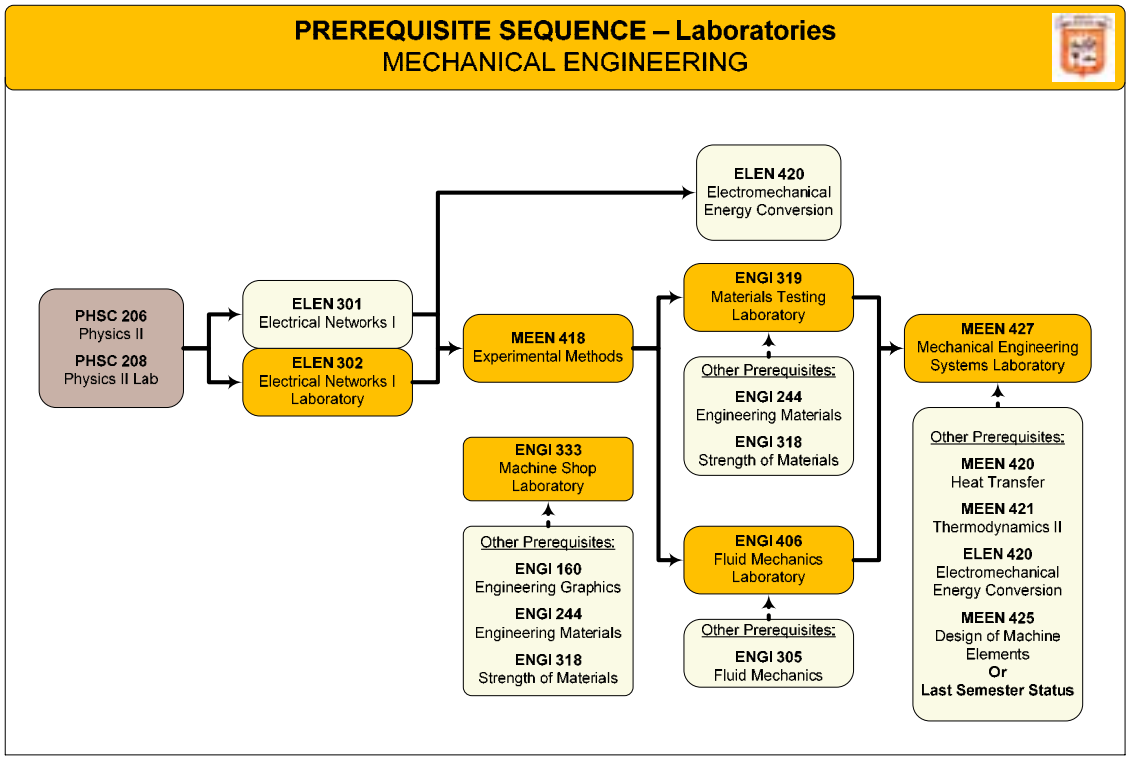

PREREQUISITE SEQUENCE – Mathematics and Sciences
MECHANICAL ENGINEERING
ENGI 233 Statics
CHEM 203 General Chemistry I
PHSC 205 Physics I
PHSC 207 Physics I Lab
PHSC 206 Physics II
PHSC 208 Physics II Lab
ELEN 301 Electrical Networks I
ELEN 302 Electrical Networks I Laboratory
MATH 350 Linear Algebra
MEEN 340 Computer Aided Design (CAD)
MATH 155 (or MATH 151/152) Precalculus
MATH 221 Calculus I
MATH 222 Calculus II
MATH 223 Calculus III
Other Prerequisites:
ENGI 160 Engineering Graphics
ENGI 318 Strength of Materials
MATH 395 Differential Equations
ENGI 305 Fluid Mechanics
Other Prerequisite:
ENGI 334 Dynamics


PREREQUISITE SEQUENCE – Mechanical Systems Stem
MECHANICAL ENGINEERING
CHEM 203 General Chemistry I
PHSC 205 Physics I
ENGI 244 Engineering Materials
MEEN 401 Manufacturing Processes
MATH 350 Linear Algebra
ENGI 160 Engineering Graphics
MEEN 340 Computer Aided Design
ENGI 318 Strength of Materials
PHSC 205 Physics I
PHSC 207 Physics I Lab
ENGI 233 Statics
MEEN 425 Design of Machine Elements
MEEN 481 Mechanical Systems Design
ENGI 334 Dynamics
MEEN 312 Kinematics
ENGI 478 Fundamentals of Engineering
RECOMMENDATION
Best if taken one semester prior to taking the first licensing exam ("Reválida 1"): the Fundamentals of Engineering (FE) Exam. The FE Exam may be taken during the last semester of studies or after graduation.
ELECTIVES
Mechanical Systems
In general, electives in the mechanical systems stem require
MEEN 425 Design of Machine Elements
MEEN 475 Multidisciplinary Experience in Industry
Registered in the last semester. The experience in industry may be related to either the thermal or mechanical systems stem, depending on current industry needs, and student's interest.


PREREQUISITE SEQUENCE – Thermal Systems Stem
MECHANICAL ENGINEERING
MATH 395 Differential Equations
ENGI 334 Dynamics
ENGI 233 Statics
CHEM 203 General Chemistry I
PHSC 206 Physics II
PHSC 208 Physics II Lab
ENGI 305 Fluid Mechanics
MEEN 320 Thermodynamics I
MEEN 420 Heat Transfer
MEEN 421 Thermodynamics II
MEEN 485 Thermal Systems Design
ENGI 478 Fundamentals of Engineering
RECOMMENDATION
Best if taken one semester prior to taking the first licensing exam ("Reválida 1"): the Fundamentals of Engineering (FE) Exam. The FE Exam may be taken during the last semester of studies or after graduation.
ELECTIVES
Thermal Systems
In general, electives in the thermal systems stem require both
MEEN 420 Heat Transfer
MEEN 421 Thermodynamics II
MEEN 475 Multidisciplinary Experience in Industry
Registered in the last semester. The experience in industry may be related to either the thermal or mechanical systems stem, depending on current industry needs, and student's interest.


PREREQUISITE SEQUENCE – Laboratories
MECHANICAL ENGINEERING
PHSC 206 Physics II
PHSC 208 Physics II Lab
ELEN 301 Electrical Networks I
ELEN 302 Electrical Networks I Laboratory
ELEN 420 Electromechanical Energy Conversion
MEEN 418 Experimental Methods
ENGI 333 Machine Shop Laboratory
Other Prerequisites:
ENGI 160 Engineering Graphics
ENGI 244 Engineering Materials
ENGI 318 Strength of Materials
ENGI 319 Materials Testing Laboratory
Other Prerequisites:
ENGI 244 Engineering Materials
ENGI 318 Strength of Materials
ENGI 406 Fluid Mechanics Laboratory
Other Prerequisites:
ENGI 305 Fluid Mechanics
MEEN 427 Mechanical Engineering Systems Laboratory
Other Prerequisites:
MEEN 420 Heat Transfer
MEEN 421 Thermodynamics II
ELEN 420 Electromechanical Energy Conversion
MEEN 425 Design of Machine Elements
Or
Last Semester Status

COURSE DESCRIPTIONS

COMP 311
Discrete Mathematics for Engineers
Three Credits
Three hours of lecture per week. This is an introductory course in discrete mathematics. It covers fundamentals of logic, proofs, set theory, number theory, finite state machines, computational complexity, recurrence relations, discrete probability, and graph theory with an emphasis on engineering applications.

Prerequisite: ENGI 223 Intermediate Programming

COMP 315
Analysis and Design of Data Structures and Algorithms
Three Credits
Three hours of lecture/laboratory per week. This course is an introduction to two fundamental topics in computer engineering: data structures and algorithm design. Topics include design of efficient algorithms, abstract data types such as linked list, queues, stacks, binary trees, complex analysis, sorting, searching, and recursive algorithms.

Prerequisites: CPEN 358 Object-Oriented Programming, MATH 222 Calculus II

COMP 411
Numerical Methods with Programming
Three Credits
Three hours of lecture per week. This course targets students who have working knowledge in one or more programming languages such as C, C++, and Java, or computational tools such as Matlab. This course introduces algorithm development to solve mathematical problems such as root finding, interpolation and approximation, integration, solution to initial value problems (IVP) arising from first- and second-order ordinary differential equations (ODE), and direct and iterative methods for solving systems of linear equations.

Prerequisite: COMP 311 Discrete Mathematics for Engineers

CPEN 358
Object-Oriented Programming
Three Credits
Three hours of lecture/laboratory per week. Introduction to object-oriented programming and design using JAVA. Techniques for object-oriented programming including Java classes, inheritance, composition, virtual functions and polymorphism, stream input/output templates, and exception and handling are presented.

Prerequisite: ENGI 223 Intermediate Programming

CPEN 425
Software Engineering
Three Credits
Three hours of lecture per week. This course covers the techniques used during the software development cycle: specification, design, testing, documentation, and maintenance. Software and hardware integration is also discussed. The course requires the design, implementation, and management of a software engineering project.

Prerequisite: CPEN 358 Object-Oriented Programming

CPEN 444
Computer Architecture and Organization
Three Credits
Three hours of lecture per week. Survey of the basic concepts of computer design. Information representation, instruction sets, addressing modes, arithmetic/logic units, floating point units, control units, microprogramming, hardwired control, memory hierarchy, caches, associative memory, memory management, input-output, DMA, interrupts, system organization, CISC, RISC, super scalar machines, special purpose machines, and multiprocessing.

Prerequisite: ELEN 312 Digital Logic Design I

CPEN 446
Computer Networks
Three Credits
Three hours of lecture per week. This course provides an introduction to computer networks. Techniques and protocols of the physical layer, data link layer, medium access control sublayer, network layer, transport layer, and application layer are introduced.

Prerequisite: ENGI 223 Intermediate Programming

CPEN 452
Operating Systems
Three Credits
Three hours of lecture/laboratory per week. Introduction to basic operating systems concepts, UNIX operating system, process management, communication and scheduling; I/O devices, drivers, interrupts handlers, and deadlock; memory management, swapping and virtual memory; file systems, security, and protection mechanisms. FRANKLIN GOTHIC

Prerequisite: ENGI 223 Intermediate Programming

CPEN 455
Introduction to Databases
Three Credits
Three hours of lecture/laboratory per week. This is an introductory course in database management systems with emphasis on relational database design and applications development. Topics include entity-relationship model, relational model, object-oriented model and object-relational model; database design techniques such as E-R modeling, E-R to relational mappings, functional, and normalization; structured query language (SQL); applications servers and DBMS; transaction processing and database recovery; DBMS implementation techniques such as storage management, indexing, and access methods, query evaluation, and optimization.

Prerequisite: COMP 315 Analysis and Design of Data Structures and Algorithms

CPEN 456
Databases Management Systems (Elective)
Three Credits
Three hours of lecture per week. This course introduces some techniques for traditional building of relational database management systems (DBMS). The course focuses on design, implementation, performance, and reliability considerations for DBMS. It emphasizes database engine architecture, disk storage organization, buffer management, B+-trees indexing, hash-based indexing, traditional joint algorithms, two-phase locking and concurrency, write-ahead logging, query optimization, database benchmarking, object-oriented databases, data warehousing, and data mining.

Prerequisite: CPEN 455 Introduction to Databases

CPEN 457
Programming Languages
Three Credits
Three hours of lecture per week. Comparative study of programming paradigms including imperative, object-oriented, functional, logic, and concurrent programming with focus on main features produced by different languages for specific applications. Topics include formal specification of the syntactic structure of a language, context-free grammars, parsing, and principles of language design.

Prerequisite: COMP 315 Analysis and Design of Data Structures and Algorithms

CPEN 458
Introduction to Compilers (Elective)
Three Credits
Three hours of lecture per week. This course is an introduction to specifications and implementation of modern compilers. It addresses the techniques involved in source languages analysis and object codes efficient generation with an emphasis on the components of a compiler. Topics include lexical analysis, parsing, type checking, code generation and translation, optimization, and implementation of modern programming languages.

Prerequisite: CPEN 452 Operating Systems

CPEN 459
Artificial Intelligence (Elective)
Three Credits
Three hours of lecture per week. This course will introduce the basic principles in artificial intelligence research. Topics include simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. Application areas such as knowledge representation, natural language processing, expert systems, robotic vision and machine learning will be explored.

Prerequisite: ENGI 223 Intermediate Programming

CPEN 477
Computer and Network Security (Elective)
Three Credits
Three hours of lecture per week. This course covers the basics of computer and network security. Topics in computer security include elementary cryptography, computer program security, database security, operating system security, trusted operating systems, Bell-Lapadula, multi-level security, access control, malicious code and computer viruses. Topics in network security include confidentiality, authentication, availability, secure email, secure electronic transactions, IP security, security attacks, access control, intrusion detection, firewalls, security planning, computer crimes, digital forensics, legal, privacy and ethical issues.

Prerequisite: CPEN 446 Computer Networks

CPEN 478
Distributed Systems (Elective)
Three Credits
Three hours of lecture per week. This course covers several topics in distributed systems. Topics include operating system architectures, network, distributed, and autonomous systems; design, concurrent programming, client/server models, synchronization, distributed process

communication, time and resource scheduling, distributed/shared files and memory.

Prerequisites: CPEN 444 Computer Architecture and Organization, CPEN 452 Operating Systems

CPEN 488
Advanced Computer Architectures (Elective)
Three Credits
Three hours of lecture per week. This course provides an in-depth overview of the current state of the art in high-performance computing. Topics to be covered include the history of computational science, processor architectures, multi-core systems, memory systems for high performance, input/output devices, ultra-scsi, fiber channel, and storage area networks. Introduction to parallel computing, supercomputing, grid computing, cluster computing, Beowulf systems, and performance benchmarks. Survey of supercomputer applications such as scientific visualization, ocean and atmospheric models, fluid flow, wave propagation, and np-complete problems.

Prerequisite: CPEN 444 Computer Architecture and Organization

CPEN 491
Senior Design Project I
Three Credits
Three hours of lecture/discussion per week. Capstone Part I: The development, analysis, and simulation of a major design project. Discussion of alternative designs. Discussion of appropriate IEEE standards, and realistic design constraints such as cost, environmentally friendly manufacturing, aesthetics, safety, possible social and political impact, and ethical considerations. Discussion of intellectual property issues.

Prerequisites: CPEN 425 Software Engineering, CPEN 455 Introduction to Databases

Corequisites: [CPEN 444 Computer Architecture and Organization, CPEN 452 Operating Systems]

CPEN 492
Senior Design Project II
Three Credits
Three hours of lecture/discussion per week. Capstone Part II: Implementation of the proposed design. Integration of hardware and software systems where appropriate. Prototyping. Testing the complete design for proper performance. Trouble shooting the designed hardware and/or software. Make iterative changes to the design to meet or exceed the specifications of the design. Fully document the design.

Prerequisite: CPEN 491 Senior Design Project I or last semester status

CPEN 495, 496, 497
Special Topics
One, Two, and Three Credits respectively
Special topics in computer engineering. Format will depend on course topic.

Prerequisites: Chairperson's permission

ELEN 301
Electrical Networks I
Three Credits
Three hours of lecture per week. Introduction to the analysis of linear circuits. Electrical quantities, Ohm's law, Kirchhoff's current and voltage laws, node voltage analysis, loop analysis, theorems of Thevenin and Norton, maximum power transfer, energy storage, introduction to AC circuits and computer-aided analysis.

Prerequisites: PHSC 206 Physics for Engineering II, PHSC 208 Physics for Engineering II Laboratory

ELEN 302
Electrical Networks I Laboratory
One Credit
One three-hour laboratory session per week. Application of the theory learned in ELEN 301 Electrical Networks I. Characteristics of electrical components and circuits; use of electronic test equipment.

Prerequisites: PHSC 206 Physics for Engineering II, PHSC 208 Physics for Engineering II Laboratory

Corequisites: [ELEN 301 Electrical Networks I]

ELEN 311
Electrical Networks II
Three Credits
Three hours of lecture per week. This course introduces the fundamentals of transient state analysis for second order circuits using differential equations, linear circuit analysis in the frequency domain, sinusoidal steady-state analysis and power calculations. Laplace transform techniques, frequency response analysis of balanced three-phase circuits, and two-port circuit analysis.

Prerequisites: ELEN 301 Electrical Networks I, ELEN 302 Electrical Networks I Laboratory, MATH 395 Differential Equations

ELEN 312
Digital Logic Design I
Three Credits
Three hours of lecture per week. This course is an introduction to the fundamentals of digital design concepts.

The topics covered include positional number systems, switching algebra, logic function minimization, Karnaugh maps, combinational logic design using SSI, MSI, and LSI, and sequential logic analysis and design.

Prerequisites: ENGI 122 Introduction to Computer Programming, ELEN 301 Electrical Networks I

ELEN 313
Digital Logic Design I Laboratory
One Credit

One three-hour laboratory session per week. This laboratory explores the characterization and application of typical digital logic circuits and covers the topics required for analyzing the behavior of logical networks. It reinforces the material covered in Digital Logic Design I (ELEN 312) and introduces material relevant to the use of electronic test equipment.

Prerequisites: ELEN 302 Electrical Networks I Laboratory

Corequisites: [ELEN 312 Digital Logic Design I]

ELEN 330
Electronics I
Three Credits

Three hours of lecture per week. An introductory course in electronics and microelectronics that covers semiconductor fundamentals, operational amplifiers, diodes, BJTs, MOSFETs, and basic digital switching. The course aims to build a solid understanding of these basic electronic devices by providing a clear understanding of device operation on a physical level, and then complements this with applications, analysis, and design of electronic circuits.

Prerequisites: ELEN 301 Electrical Networks I, ELEN 302 Electrical Networks I Laboratory

ELEN 332
Electronics I Laboratory
One Credits

One three-hour laboratory session per week. Laboratory experiments. Design, building, and testing of electronic circuits containing op-amps, diodes, BJTs, and MOSFETs.

Prerequisites: ELEN 302 Electrical Networks I Laboratory

Corequisites: [ELEN 330 Electronics I]

ELEN 360
Random Signals and Systems
Three Credits

Three hours of lecture per week. This course introduces the physical origins of noise and modeling uncertainty for the analysis of electronic devices, analog and digital systems, and communications. Coverage of basic discrete and continuous probability theory, random variables, and stochastic processes. Applications to the analysis of linear systems in the presence of noise and random signal processing are also presented.

Prerequisites: MATH 223 Calculus III, ELEN 301 Electrical Networks I.

ELEN 370
Electromagnetics
Three Credits

Three hours of lecture per week. Introduction to electromagnetic systems. Transmission lines, electrostatics, boundary value problems. Maxwell's equations and its applications. Plane waves. Reflection and refraction of plane waves. Fundamentals of electromagnetic wave propagation and antennas.

Prerequisites: ELEN 301 Electrical Networks I, ENGI 398 Engineering Mathematics

ELEN 414
Linear Systems
Three Credits

Three hours of lecture per week. This course introduces continuous-time signals and systems. It provides the mathematical foundation for the interpretation and analysis of signals and systems. Coverage of time and frequency domain representations of signals and systems, convolution, Fourier transforms and Fourier series for continuous-time signals, Laplace transforms.

Prerequisites: ELEN 301 Electrical Networks I, MATH 395 Differential Equations, ENGI 398 Engineering Mathematics

ELEN 416
Control Systems
Three Credits

Three hours of lecture per week. This course introduces fundamentals of classical control. Coverage of analysis of linear time-invariant feedback control systems, system modeling, time and frequency-domain responses, stability, analysis by use of root-locus, Bode plots, and Nyquist stability criterion.

Prerequisites: ELEN 414 Linear Systems

ELEN 417
Systems Laboratory
One Credit
One three-hour laboratory session per week. This lab course provides practical experiences in control systems. This course encourages students to explore concepts in feedback control systems through lab experiments and open-ended projects. Feedback control experiments include modeling, identification, servomechanism control, and programmable logic controllers (PLCs).

Prerequisites: [ELEN 416 Control Systems] Co-requisite

ELEN 420
Electromechanical Energy Conversion (for mechanical engineering majors)
Three Credits
Three hours of lecture per week. This course provides an introduction to electromechanical energy conversion for mechanical engineering majors. Topics include principles of electromechanical energy conversion, three-phase systems, magnetic circuits, transformers, direct current machines, alternating current machines, steady-state analysis and dynamic characteristics.

Prerequisite: ELEN 301 Electrical Networks I

ELEN 421
Electromechanical Energy Conversion Laboratory
One Credit
One three-hour laboratory session per week. This laboratory explores the characterization and application of typical electrical energy conversion components. The laboratory experiments include testing and parameter identification for modeling of DC machines, transformers, poly-phase as well as single-phase phase systems, magnetic circuits, synchronous machines, and induction machines.

Prerequisites for Electrical Engineering: ELEN 302 Electrical Networks I Laboratory;

Corequisites: [ELEN 422 Electrical Machines]

Prerequisites for Mechanical Engineering: ELEN 420 Electromechanical Energy Conversion

ELEN 422
Electrical Machines
Three Credits
Three hours of lecture per week. This course deals with the analysis of electrical machines and transformers. Topics include the theory and operation of direct current motors, direct current generators, alternating current motors, alternating current generators and transformers. In alternating current motors and transformers both single-phase and three-phase systems are included.

Prerequisite: ELEN 311 Electrical Networks II

ELEN 430
Digital Electronics (Elective)
Three credit-hours
Three hours of lecture/laboratory-practice per week. Theory of operation of transistor-transistor logic (TTL), emitter coupled logic (ECL), metal-oxide-semiconductor (MOS), and complementary MOSFETs (CMOS) gates; time delay, operation of semiconductor memories; programmable logic arrays (PLA); multivibrators; analog gates; analog to digital (A/D) and digital to analog (D/A) converters. Laboratory experiments to reinforce concepts.

Prerequisites: ELEN 330 Electronics I

ELEN 431
Electronics II
Three Credits
Three hours of lecture per week. Introduction to the concepts and techniques of practical electronic design. Topics include single-stage amplifier configurations, multi-stage amplifiers, frequency response, feedback and stability, power amplifiers, active filters, oscillators, and advanced semiconductor properties.

Prerequisite: ELEN 330 Electronics I

ELEN 433
Electronics II Laboratory
One Credit
One three-hour laboratory session per week. Experiments include design, testing, and measurements with advanced electronic circuits, frequency response, power amplification, sinusoidal oscillators, waveform generators, active filters.

Prerequisites: ELEN 332 Electronics I Laboratory

Corequisites: [ELEN 431Electronics II]

ELEN 434
Instrumentation (Elective)
Three Credits
Three hours of lecture per week. Introduction to the design of electronic systems for the measurement of physical variables. Sensors and transducers, signal conditioning, noise, noise reduction techniques, grounding, shielding, signal recovery techniques, sampling, digital-to-analog conversion, analog-to-digital conversion, precision electronics, automated test equipment. Design, construction, and evaluation of instrumentation systems.

Prerequisites: ELEN 431 Electronics II, ELEN 433 Electronics II Laboratory

ELEN 436
Power Electronics (Elective)
Three Credits
Three hours of lecture per week. Application of electronic devices to the conversion of electrical power. Device fundamentals, controlled rectifiers, AC voltage controllers, AC-DC converters, DC to DC converters, DC to AC inverters, motor controllers, snubbers, thermal design considerations. Design, simulation, construction, and testing of power electronic components and systems.

Prerequisites: ELEN 431 Electronics II

ELEN 441
Digital Logic Design II (Elective)
Three Credits
Three hours of lecture per week. This course covers additional theoretical and practical aspects in digital systems and sequential logic design. Topics include additional minimization techniques, synthesis techniques, asynchronous sequential logic, interfacing, programmable logic devices, design considerations for practical systems, high speed logic design, design for testability, implementation of logic circuits using MSI, LSI, CPLDs, FPGAs, VHDL, CAD tools, and digital test equipment.

Prerequisites: ELEN 312 Digital Logic Design I, ELEN 330 Electronics I

ELEN 442
Microprocessors I
Three Credits
Three hours of lecture per week. This is an introductory course in computers and microprocessors. It focuses primarily on software aspects. Topics include CPU architecture, microprocessors, microcontrollers, assembly language programming, interrupts, I/O peripherals, memory, system architecture, and simple interfacing.

Prerequisites: ENGI 223 Intermediate Programming, ELEN 312 Digital Logic Design I, ELEN 313 Digital Logic Design I Laboratory

ELEN 443
Microprocessors II (Elective)
Three Credits
Three hours of lecture per week. Advanced topics in microprocessor systems design. System timing, memory architecture, interrupts, interfacing peripherals, design for testability, system buses, embedded and real-time systems, hardware and software aspects of interfacing, hardware-software tradeoffs, high level languages, in-circuit emulators, disassembling logic analyzers, simulators.

Prerequisite: ELEN 442 Microprocessors I

ELEN 460
Digital Signal Processing (Elective)
Three Credits
Two hours of lecture and a one-hour lab per week. This course provides a practical introduction to digital signal processing concepts. Topics include discrete-time signals and systems, sampling, convolution, *z*-transforms, frequency response, discrete-time Fourier transform, fast Fourier transform (FFT), and digital filtering (IIR and FIR).

Prerequisites: ELEN 414 Linear Systems

ELEN 472
Antennas and Transmission Lines (Elective)
Three Credits
Three hours of lecture per week. Introduction to analysis, characterization, and design of transmission lines, wave guides, and antennas. Telegraphy equations, lossless lines, characteristic impedance matching, bounded wave propagation modes, cavity resonators, planar and dielectric wave guides, vector potential, antenna types, impedance, radiation patterns, and antenna feeds.

Prerequisite: ELEN 370 Electromagnetics

ELEN 474
Communications Systems I
Three Credits
Three hours of lecture per week. This course provides an introduction to communication systems. Basic modulation and demodulation techniques and performance of digital communication systems in the presence of noise are introduced: linear modulation, angle modulation, sampling and pulse code modulation, detection-error probability, behavior of digital communication systems in the presence of noise.

Prerequisites: ELEN 360 Random Signals and Systems, ELEN 414 Linear Systems

ELEN 475
Communications Systems II (Elective)
Three Credits
Three hours of lecture per week. Introduction to the analysis of analog communication systems in the presence of noise. Optimum signal detection. Introduction to information theory. Introduction to error correcting codes.

Prerequisite: ELEN 474 Communications Systems I

ELEN 478 RF
Design (Elective)
Three Credits
Three hours of lecture per week. This course introduces the fundamentals of radio frequency (RF) circuits and design. It covers the behavior of circuit components at radio frequencies, transmission line theory, the use of Smith charts in impedance matching, and the design of various RF circuits such as amplifiers, oscillators, mixers, and super-heterodyne receivers.

Prerequisites: ELEN 431 Electronics II, ELEN 474 Communication Systems I

ELEN 480
Power System Analysis I
Three Credits
Three hours of lecture per week. This is an introductory course in electrical power systems. The course emphasizes the modeling of power system components, determination of transmission system parameters, generalized network analysis to characterize a power system in steady-state including load-flows. It also incorporates the use of computer software packages to aid in the analysis and design of power systems.

Prerequisite: ELEN 422 Electrical Machines

ELEN 481
Power System Analysis II (Elective)
Three Credits
Three hours of lecture per week. This is a second course in power system analysis and forms a continuation of the topics introduced in ELEN 480.This course presents the concepts and system analysis and design techniques necessary to evaluate the performance of power systems. In this course, fault analysis of power systems using matrix formulation of bus admittance and impedance matrices is studied. Balanced three-phase faults as well as unbalance faults are included. Unbalanced systems are analyzed using symmetrical components technique. Power system protection methods and equipment are also studied. The course incorporates the use of computer software packages to aid the analysis and design of power systems.

Prerequisite: ELEN 480 Power System Analysis I

ELEN 484
Power Transmission and Distribution (Elective)
Three Credits
Three hours of lecture per week. This course deals with power transmission and distribution systems analysis and design. Topics include transmission line characteristics, inductance, and capacitance calculations of overhead lines, steady-state analysis, transmission losses, and transmission system design. In the distribution system area, the topics covered include distribution system analysis, voltage regulation, and distribution system design. The course provides a practical insight into the analysis of transmission and distribution systems.

Prerequisite: ELEN 480 Power System Analysis I

ELEN 488
Power Systems Reliability (Elective)
Three Credits
Three hours of lecture per week. This is an introductory course in power system reliability evaluation with emphasis on probabilistic techniques. The course introduces the basic reliability concepts using probability and statistics. The significance of outage data collection and classification in realistic system planning will be examined. The course concludes with a final design project.

Prerequisites: ELEN 480 Power System Analysis I

ELEN 491
Electrical Engineering Design Concepts
Three Credits
One two-hour lecture/discussion session and one two-hour seminar/workshop per week. Analysis, simulation, and development of a design project. Discussion of alternative designs. Discussion of appropriate standards and realistic design constraints such as cost, environmentally friendly manufacturing, aesthetics, safety, possible social and political impact, and ethical considerations. Integration of hardware and software where appropriate. Seminars on contemporary issues. Workshops on ethics. Teamwork required.

Corequisites: [ELEN 370 Electromagnetics, ELEN 422 Electrical Machines, ELEN 431 Electronics II]

ELEN 492
Major Design Experience
Three Credits
One two-hour hands-on workshop and one two-hour session of experimental practice per week. Development, analysis, simulation, and implementation of a major design project to solve a specific problem in an industry or enterprise. Ethics workshops. Integration of hardware and software where appropriate. Teamwork required.

Prerequisites: ELEN 491 Electrical Engineering Design Concepts or last semester status.

ELEN 495, 496, 497
Special Topics (Elective)
One, Two and Three Credits respectively
Special topics in electrical engineering. Format will depend on course topic.

Prerequisite: Chairperson's permission

ELEN 498
Undergraduate Research I (Elective)
Three Credits
Three hours of seminar per week. This course introduces basic undergraduate research on specific electrical/computer engineering topics.

Prerequisites: Chairperson's permission

ELEN 499
Undergraduate Research II (Elective)
Three Credits
Three hours of seminar per week. This course expands the undergraduate research experience on specific electrical/computer engineering topics.

Prerequisites: ELEN 498 Undergraduate Research I, and Chairperson's permission

ENGI 100
Introduction to Engineering
Three Credits
Three hours of lecture/workshop per week. Required introductory course for all first year engineering students. Introduction to the various specialties within the engineering profession. Basic concepts of engineering design and technical communication. Laws and ethics of the engineering profession.

Prerequisite: Admission to the School of Engineering.

ENGI 122
Introduction to Computer Programming
Three Credits
Three hours of lecture-discussion per week. This course is an introduction to computer programming and the C++ programming language. The course covers basic computer architecture and computer functions; problem analysis; design and implementation of algorithms; structured programming concepts; C++ language syntax; and programming tools.

Prerequisites: MATH 155 Pre-Calculus (or MATH 151 Algebra & Trigonometry I and MATH 152 Algebra & Trigonometry II)

ENGI 160
Engineering Graphics
Three Credits
Three hours of lecture/studio per week. Principles of engineering graphics including free sketching and computer graphics (SolidWorks). Fundamentals of 3D projections and multiview projections; sheet layout and scaling; dimensioning; tolerance; solid modeling; assembly of parts; engineering working drawings.

Prerequisites: MATH 155 Pre-Calculus or (MATH 151 Algebra & Trigonometry I and MATH 152 Algebra & Trigonometry II)

ENGI 223
Intermediate Programming
Three Credits
Three hours of lecture/laboratory per week. This is an intermediate-level course in computer programming. It provides a wealth of current, real-world applications, and examples drawn from the scientific and engineering fields. It allows students to fully exploit the potential uses of C and C++ programming languages. This course includes problem analysis and design of algorithms, sorting, searching, pointers, multidimensional arrays, string processing, structures, and file processing.

Prerequisites: ENGI 122 Introduction to Computer Programming, MATH 221 Calculus I

ENGI 233
Statics
Three Credits
Three hours of lecture per week. Introduction to the vector concepts of force and moment; analytical and graphical techniques for analysis of point forces, distributed forces and moments, centroid, center of mass; static equilibrium of a rigid body and systems of rigid bodies such as frames, trusses, and machines; shear and moment diagrams; static friction forces.

Prerequisites: PHSC 205 Physics for Engineering I, PHSC 207 Physics for Engineering I Laboratory

ENGI 244
Engineering Materials
Three Credits
Three hours of lecture per week. Governing principles of material properties and behavior. Atomic structures and bonding; crystalline structures, defects and dislocations. Diffusion, deformation, and material strengthening. Phase transformations and diagrams. Polymers, ceramics, and composites. Corrosion.

Prerequisites: CHEM 203 General Chemistry I, PHSC 205 Physics for Engineering I

ENGI 277
General Statics and Dynamics
Three Credits
Three hours of lecture per week. Compendium for non-mechanical engineering majors. STATICS: Planar (2D) force/moment vectors and resultants. Static equilibrium and free body diagrams. Applications to particles, beams, trusses, and frames. Friction. Centroid and moment of inertia of composite areas. Vectors, resultants, and equilibrium of a particle in 3D. DYNAMICS: planar kinematics/kinetics of particles using rectangular and normal-and-tangential coordinate systems. Projectile motion. Free body diagrams and kinetic diagrams. Kinematics of a rigid body rotating about a fixed axis. Velocity analysis of rigid bodies in general plane motion using relative motion analysis. Mass moment of inertia. Kinetics of a rigid body in translation and in rotation.

Prerequisites: PHSC 205 Physics for Engineering I, PHSC 207 Physics for Engineering I Laboratory

ENGI 305
Fluid Mechanics
Three Credits
Three hours of lecture per week. Fundamental concepts of fluid mechanics and applications to engineering problems. Fluid statics; integral form for control volumes (conservation of mass, momentum equation, Bernoulli equation); differential form (conservation of mass and an introduction to the Navier-Stokes equation), dimensional analysis. Calculation of head loss in pipes; introduction to boundary layers, and lift and drag forces.

Prerequisites: ENGI 334 Dynamics, MATH 395 Differential Equations

ENGI 310
General Thermodynamics
Three Credits
Three hours of lecture per week. This course is designed for engineering students in programs other than mechanical engineering; it covers introduction to first and second laws of thermodynamics with applications; introduction to heat transfer with general applications.

Prerequisites: CHEM 203 General Chemistry 1, ENGI 277 General Statics and Dynamics, PHSC 206 Physics for Engineering II

ENGI 318
Strength of Materials
Three Credits
Three hours of lectures per week. Analysis of stress and strain. Stress-strain relations. Torsional and flexural loading. Bending moment and shear force diagrams. Bending stresses. Combined loading. Stress and strain transformation. Beam deflection and the application of superposition. Elastic stability.

Prerequisites: ENGI 233 Statics

ENGI 319
Materials Testing Lab
One Credit
One three-hour laboratory per week. Standard physical tests of engineering materials including tension, bending, micro-hardness and macro-hardness. Basic metallurgy including grinding, polishing, etching and micro-structure identification. Heat treatment of steel including quenching and Jominy test.

Prerequisites: ENGI 244 Engineering Materials, ENGI 318 Strength of Materials, MEEN 418 Experimental Methods

ENGI 333
Machine Shop Laboratory
Three Credits
Three hours of laboratory per week. Operation of drills, milling machines, lathes, power saws, and surface grinders. Introduction to precision measuring techniques. Introduction to welding.

Prerequisites: ENGI 160 Engineering Graphics, ENGI 244 Engineering Materials, ENGI 318 Strength of Materials

ENGI 334
Dynamics
Three Credits
Three hours of lecture per week. Introduction to the kinematics and kinetics of particles and rigid bodies in plane motion; translation, rotation and complex motion of rigid bodies; mass moments of inertia; concepts underlying the work-energy principle and impact-momentum principle as applied to particle and rigid body plane motion.

Prerequisites: ENGI 233 Statics

ENGI 398
Engineering Mathematics
Three Credits
Three hours of lecture per week. This course provides advanced engineering mathematics necessary to analyze and design complex electrical and electronic devices, circuits, and systems. Selected topics from linear algebra,

complex variables, and partial differential equations are presented. Topics include matrix algebra, determinants, inverses, eigenvalues and eigenvectors; complex numbers, functions of complex variables, complex integration, complex power series, residue integration; partial differential equations, diffusion equation, wave equation, and Laplace equation. Applications to analysis of linear circuits, control and communication systems, and electromagnetic waves are discussed.

Prerequisites: MATH 222 Calculus II, ENGI 122 Introduction to Computer Programming

Corequisites: [MATH 395 Differential Equations, ELEN 301 Electrical Networks I]

ENGI 406
Fluid Mechanics Lab
One Credit

One three-hour laboratory per week. Laboratory work that supplements classroom instruction in fluid mechanics phenomena; measuring devices and techniques; testing of fluid machinery.

Prerequisites: ENGI 305 Fluid Mechanics, MEEN 418 Experimental Methods

ENGI 410
Engineering Economy
Three Credits

Three hours of lecture per week. An introduction to the basic concepts, techniques, and methodologies of engineering economy, useful in evaluating the economic feasibility of engineering systems, projects, and services for effective decision making.

Prerequisite: MATH 221 Calculus I

ENGI 478
Fundamentals of Engineering
Three Credits

Three hours of lecture per week. A review for the Fundamentals of Engineering (FE) exam to aid student preparation and exam performance.

Prerequisites for Electrical Engineering: ENGI 122 Introduction to Computer Programming, ENGI 244 Engineering Materials, ENGI 310 General Thermodynamics, ENGI 410 Engineering Economy, ELEN 302 Electrical Networks I Laboratory

Prerequisites for Computer Engineering, and for Industrial and Management Engineering: ENGI 122 Introduction to Computer Programming, ENGI 310 General Thermodynamics, ENGI 410 Engineering Economy, ELEN 301 Electrical Networks I, ELEN 302 Electrical Networks I Laboratory

Prerequisites for Mechanical Engineering: ENGI 122 Introduction to Computer Programming, ENGI 244 Engineering Materials, ENGI 305 Fluid Mechanics, ENGI 318 Strength of Materials, ENGI 410 Engineering Economics, MEEN 312 Kinematics, MEEN 320 Thermodynamics I, ELEN 301 Electrical Networks I, ELEN 302 Electrical Networks I Laboratory

(Some prerequisites may be waived if a student, from any of the programs, is in next-to-last semester status. Ideally, this course should be taken one semester prior to taking the FE Exam.)

IMEN 205
Introduction to Engineering Management
Three Credits

Three hours of lecture per week. An introduction to the principles of administration of engineering, including the management functions of planning, decision making, organizing, human aspects, leading, and controlling.

Prerequisites: MATH 221 Calculus I

IMEN 341
Finance for Engineers
Three Credits

Three hours of lecture per week. Interrelationships between engineering design and business assessment of capital projects. Study of the central role of engineering design in determining a project's implementation and its financial requirements. Theory and practical aspects of accounting principles, financial and risk analysis from an engineering perspective. Understanding and analysis of the three main financial statements: balance sheet, income statement, and cash flow. Cost of capital, sensitivity and risk analysis in engineering projects.

Prerequisites: IMEN 390 Engineering Statistics and Data Analysis, ENGI 410 Engineering Economy

IMEN 390
Engineering Statistics and Data Analysis
Four Credits

Five hours of lecture/laboratory per week. Fundamental concepts of variation and approaches to deal with this phenomenon in practice. Data analysis and synthesis. Axioms of probability, discrete and continuous random variables with their industrial applications. Random samples, central limit theorem and sampling distributions and their applications. Estimation and hypothesis testing on one or two populations. Simple regression. Introduction to multiple regression. Use of computer software.

Prerequisite: MATH 222 Calculus II

IMEN 402
Work Measurement
Four Credits
Three hours of lecture and one two-hour laboratory per week. Introduction to motion and time study, including work design, job analysis, and the techniques of setting time standards.

Prerequisites for Industrial and Management Engineering: IMEN 390 Engineering Statistics and Data Analysis

Prerequisites for Mechanical Engineering: MEEN 401 Manufacturing Processes, MEEN 418 Experimental Methods

IMEN 403
Work System Design
Three Credits
Three hours of lecture per week. Introduction to ergonomics principles and work environments applied to workplace design.

Prerequisites: ENGI 277 Statics and Dynamics, IMEN 402 Work Measurement

IMEN 404
Industrial Safety and Health Management (Elective)
Three Credits
Three hours of lecture per week. An introduction to concepts and techniques of safety and health management, a modern perspective on compliance with mandatory standards for workplace safety and health.

Prerequisites: CHEM 203 Chemistry I, IMEN 205 Introduction to Engineering Management, IMEN 390 Engineering Statistics and Data Analysis

IMEN 405
Statistical Quality Control
Four Credits
Five hours of lecture/laboratory per week. Application of engineering statistics to the control and improvement of manufacturing and service processes with an emphasis on quality.

Prerequisite for Industrial and Management Engineering: IMEN 390 Engineering Statistics and Data Analysis

Prerequisites for Mechanical Engineering: MEEN 401 Manufacturing Processes, MEEN 418 Experimental Methods

IMEN 406
Operations Research
Three Credits
Three hours of lecture per week. Introduction to the operations research modeling approach with emphasis on linear programming and extensions, the simplex method and its applications.

Prerequisites: MATH223 Calculus III, IMEN 390 Engineering Statistics and Data Analysis

IMEN 407
Production Planning and Control
Three Credits
Three hours of lecture per week. Theory and practical aspects of production systems, problem solving, forecasting, aggregate planning, inventory, materials requirements planning, scheduling, integrated production planning and control and show how they can be applied in practice.

Prerequisite: IMEN 406 Operations Research

IMEN 408
Facility Layout
Three Credits
Three hours of lecture per week. This course provides the students analytical methods for designing production and service facilities.

Prerequisites: ENGI 160 Engineering Graphics, IMEN 402 Work Measurement, IMEN 407 Production Planning & Control

IMEN 409
Design Project
Three Credits
Three hours of lecture per week. Analysis, development of alternatives, and presentation of a design project of a company.

Prerequisites: IMEN 403 Work Systems Design, IMEN 405 Statistical Quality Control, IMEN 408 Facility Layout, IMEN 421 Engineering Project Management, and Chairperson's Permission

IMEN 410
Activity Based Costing (Elective)
Three Credits
Three hours of lecture per week. Methods used to assign costs to a product or activity. Financial statement analysis, standard cost, profit planning, budgeting, and design and operation of a cost system.

Prerequisite: ACCO 303 Cost Accounting

IMEN 411
Systems Analysis and Design
Three Credits
Three hours of lecture per week. Basic course on the analysis and design of computer based information systems, including system requirements analysis and documentation, logical and physical modeling, system architecture, and interface design. The course follows a model-driven approach to system analysis and design, and

covers various methodologies for data, process, and object-oriented modeling and design.

Prerequisites: ENGI 122 Introduction to Computer Programming, IMEN 205 Introduction to Engineering Management IMEN 402 Work Measurement

IMEN 412
Product Reliability (Elective)
Three Credits
Three hours of lecture per week. Analysis of product reliability data; statistical methods for analysis of experimental data of various type.

Prerequisite: IMEN 405 Statistical Quality Control

IMEN 413
Probabilistic Models in Operations Research
Three Credits
Three hours of lecture per week. Introduction to theory and use of stochastic models to represent and improve industrial and service systems. It includes Markov Chains, Queuing Models and Decision Analysis.

Prerequisites: MATH 395 Differential Equations, IMEN 390 Engineering Statistics and Data Analysis

IMEN 414
Systems Simulation
Three Credits
Three hours of lecture/laboratory per week. This is a basic course on the application of discrete event-based simulation to the design, analysis, and improvement of production, logistics, and service systems. The course includes techniques and methodologies for the generation of random numbers and variates, data collection and analysis, model building using Pro-Model, model verification and analysis, and output analysis.

Prerequisites: ENGI 122 Introduction to Computer Programming, IMEN 406 Operations Research

IMEN 415
Systems Design Project with Simulation (Elective)
Three Credits
Three hours of lecture per week. In depth study into the design, modeling and subsequent analysis of contemporary production/service systems. Emphasis is placed in advanced methodologies involve in a simulation study.

Prerequisites: IMEN 414 Systems Simulation

IMEN 416
Design and Analysis of Industrial Experiments (Required)
Three Credits
Three hours of lecture per week. Fundamental concepts of experimentation-factors, responses, levels, randomization, replication, random error, blocking. Use of statistical software.

Prerequisite: IMEN 405 Statistical Quality Control

IMEN 420
Models in Facility Planning and Material Handling (Elective)
Three Credits
Three hours of lecture per week. Computer based course using models such as forecasting, project control, master schedule, production planning, and inventory control.

Prerequisite: IMEN 408 Facility Layout

IMEN 421
Engineering Project Management
Three Credits
Three hours of lecture-discussion per week. Theory and practical aspects of project planning, organizing, scheduling and resources management, identifying the main components and life cycle of project management and showing how they may be applied in practice, e.g., capacity increase, new production lines, software development, and enterprise start-ups. Application of project management software.

Prerequisites: ENGI 410 Engineering Economy, IMEN 407 Production Planning and Control

IMEN 422
Models for Production Control and Service Logistics (Elective)
Three Credits
Three hours of lecture per week. Design and evaluation of computerized production planning and control system. Includes capacity planning, bill of materials, shop floor control, cycle count, master scheduling, and data base integration systems.

Prerequisites: IMEN 407 Production Planning and Control

IMEN 423
Information Management in Manufacturing Systems (Elective)
Three Credits
Three hours of lecture per week. Management aspects of a computer based system in a manufacturing environment.

Prerequisites: IMEN 411 Computer Based System

IMEN 425
Enterprise Continuous Improvement (Elective)
Three Credits
Three hours of lecture per week. Fundamental concepts of Lean Manufacturing, Six Sigma and other contemporary performance improvement methodologies or quality management systems.

Prerequisite: IMEN 402 Work Measurement

IMEN 430
Supply Chain Manufacturing (Elective)
Three Credits
Three hours of lecture per week. Strategic and operational aspects of logistics and on reducing waste and cycle time of a business supply chain.

Prerequisite: IMEN 407 Production Planning and Control

IMEN 431
Sequence and Scheduling (Elective)
Three Credits
Three hours of lecture per week. Practical aspects of scheduling resources in areas such as transportation, distribution, and warehouses.

Prerequisite: IMEN 407 Production Planning and Control

IMEN 495, 496, 497
Special Topics (Elective)
One, Two and Three Credits respectively
Special topics in industrial and management engineering. Format will depend on course topic.

Prerequisite: Chairperson's permission

IMEN 498
Undergraduate Research I (Elective)
Three Credits
Three hours of seminar per week. This course introduces basic undergraduate research on specific industrial and management engineering topics.

Prerequisites: Chairperson's permission

IMEN 499
Undergraduate Research II (Elective)
Three Credits
Three hours of seminar per week. This course expands the undergraduate research experience on specific industrial and management engineering topics.

Prerequisites: IMEN 498 Undergraduate Research I, and Chairperson's permission

MEEN 312
Kinematics of Mechanisms
Three Credits
Three hours of lecture per week. Introduction to the kinematics principles of inversion, transmission of motion, and mobility; analysis of mechanism components such as four-bar linkages, cams, spur gears, and gear trains; synthesis of plane kinematics mechanisms. One or more design projects require the application of course topics.

Prerequisite: ENGI 334 Dynamics

MEEN 320
Thermodynamics I
Three Credits
Three hours of lecture per week. First and second laws of thermodynamics; properties, equations of state and thermodynamic relations.

Prerequisites: ENGI 233 Statics, CHEM 203 General Chemistry I, PHSC 206 Physics for Engineering II, PHSC 208 Physics for Engineering II Laboratory

MEEN 340
Computer Aided Design
Three Credits
Three hours of lecture/studio per week. Introduction to Computer Aided Design. Introduction to Finite Element Analysis. Finite element modeling using Cosmos Works software. Introduction to dynamic analysis using the Working Model software.

Prerequisites: ENGI 160 Engineering Graphics, ENGI 318 Strength of Materials, MATH 350 Linear Algebra

MEEN 401
Manufacturing Processes
Three Credits
Three hours of lecture per week. Introduction to manufacturing. Materials in manufacturing. Overview of casting, bulk deformation, and metal removal processes. Manufacturing process of plastics and composites.

Prerequisites: ENGI 244 Engineering Materials, ENGI 318 Strength of Materials

MEEN 418
Experimental Methods
Two Credits
One hour of lecture and one three-hour laboratory per week. Principles of measurement. Operational characteristics and limitations of various transducers. Error analysis. Introduction to Labview and computer data acquisition.

Prerequisites: ELEN 301 Electrical Networks I, ELEN 302 Electrical Networks I Laboratory

MEEN 420
Heat Transfer
Three Credits
Three hours of lecture per week. Basic principles and applications of the three heat transfer modes: conduction, convection, and radiation, in steady and unsteady states.

Prerequisites: ENGI 305 Fluid Mechanics, MEEN 320 Thermodynamics I

MEEN 421
Thermodynamics II
Three Credits
Three hours of lecture per week. Extensions and applications of the first and second laws of thermodynamics including: real gases, psychrometrics, power and refrigeration cycles, and combustion processes.

Prerequisites: ENGI 305 Fluid Mechanics, MEEN 320 Thermodynamics I

MEEN 425
Design of Machine Elements
Three Credits
Three hours of lecture per week. Static and fatigue failure theories. Design of mechanical elements such as springs, threaded fasteners, bearings, gears, shafts, clutches, and brakes.

Prerequisites: ENGI 318 Strength of Materials, MEEN 312 Kinematics

MEEN 427
Mechanical Engineering Systems Laboratory
One Credit
One three-hour laboratory per week. Design of experiments in mechanical engineering including both thermal and mechanical systems.

Prerequisites: ENGI 319 Materials Testing Lab, ENGI 406 Fluid Mechanics Testing Lab, MEEN 420 Heat Transfer, MEEN 421 Thermodynamics II, MEEN 425 Design of Machine Elements, ELEN 420 Electromech. Energy Conversion.

MEEN 451
Process and Product Design (Elective)
Three Credits
Three hours of lecture per week. Dynamics of converting ideas to marketable products; role of visual and written communications in market definition and product promotion; impact of new product decisions on the factory; cross-cultural problems in introducing new products overseas; facility layout, material flow, handling systems, design and analysis of work systems.

Prerequisites: ENGI 160 Engineering Graphics, MEEN 401 Manufacturing Processes

MEEN 464
Mechanical Vibrations (Elective)
Three Credits
Three hours of lecture per week. Introduction to vibration of mechanical systems. Free vibration of undamped and damped systems. Response to harmonic excitation of undamped and damped systems. Vibration instrumentation. Design for vibration suppression. Free and forced vibration of two degree of freedom system.

Prerequisite: MEEN 425 Design of Machine Elements

MEEN 465
Vehicle Dynamics Fundamentals (Elective)
Three Credits
Three hours of lecture per week. Fundamentals of vehicle dynamics. Acceleration and braking performance. Road loads and ride. Suspension, steering, rollover and tires.

Prerequisite: MEEN 425 Design of Machine Elements

MEEN 474
Finite Element Analysis with Applications (Elective)
Three Credits
Three hours of lecture/studio per week. Immersion into the use of finite element analysis to solve complex, real-world heat transfer and structural analysis problems. Theoretical knowledge of fundamental finite element concepts. Emphasis on applications using commercial finite element software.

Prerequisite: MEEN 425 Design of Machine Elements

MEEN 475
Multidisciplinary Experience in Industry
Four Credits
Four hours of lectures/workshops per week. Multidisciplinary experience in industry for senior students through projects with local manufacturing industries. Design content highly dependent on current availability of projects in industry. Seminars on project planning, ethics, communication, value engineering, and job-hunting skills.

Prerequisites: ENGI 319 Materials Testing Lab, ENGI 406 Fluid Mechanics Testing Lab, MEEN 420 Heat Transfer, MEEN 421 Thermodynamics II, MEEN 425 Design of Machine Elements, ELEN 420 Electromech. Energy Conversion.

MEEN 477
Solar Technologies (Elective)
Three Credits
Three hours of lecture per week. Fundamentals of solar energy; spectral distribution, availability of solar energy, thermal energy storage, concentrators, receivers. Solar-only and solar-hybrid systems; solar subsystems.

Prerequisites: MEEN 420 Heat Transfer, Co-requisite [MEEN 421 Thermodynamics II]

MEEN 480
Automatic Controls (Elective)
Three Credits
Three hours of lecture per week. Control system design with emphasis on mechanical, thermal, and electrical systems. Classical and modern analyses involving the root locus method, the Routh-Hurwitz and Nyquist stability criteria, Bode plots, and state-space methods. Computer simulation of complex systems.

Prerequisites: ELEN 301 Electrical Networks I, ENGI 334 Dynamics, MATH 350 Linear Algebra, MATH 395 Differential Equations

MEEN 481
Mechanical Systems Design
Three Credits
Three hours of lecture per week. Major design experience of an engineering system, including completion of a semester-length design project, engineering design techniques and methodology.

Prerequisites: MEEN 425 Design of Machine Elements, MEEN 340 Computer Aided Design

MEEN 482
Failure of Materials in Mechanical Design (Elective)
Three Credits
Three hours of lecture per week. Design of structures to prevent mechanical failure. Modes and theories of failure. Stress, strain, deformation, and their relationships. Fracture and fatigue analysis and prevention. Design against creep, fretting, wear, and corrosion failures.

Prerequisites: MEEN 425 Designs of Machine Elements

MEEN 483
Computer Aided Manufacturing (Elective)
Three Credits
Two hours of lecture and one three-hour laboratory per week. Introduction to CAD/CAM. Applicability of basic components of industrial automation in computer aided manufacturing.

Prerequisites: ENGI 122 Introduction to Computer Programming, MEEN 401 Manufacturing Processes, MEEN 425 Design of Machine Elements.

MEEN 484
Corrosion in Metals (Elective)
Three Credits
Three hours of lecture per week. Introduction to fundamental principles of corrosion; eight forms of corrosion; electromechanical test methods; corrosion environments; corrosion control methods; failure analysis and economics.

Prerequisites: ENGI 244 Engineering Materials, MEEN 425 Design of Machine Elements

MEEN 485
Thermal Systems Design
Three Credits
Three hours of lecture per week. Analysis and design of energy systems. Design content emphasizes sizing of components. Piping networks, Heat Exchangers, Prime movers. Numerical methods solutions.

Prerequisites: MEEN 420 Heat Transfer, MEEN 421 Thermodynamics II

MEEN 489
Air Conditioning (Elective)
Three Credits
Three hours of lecture per week. Analysis and design of air conditioning and refrigeration systems.

Prerequisites: MEEN 420 Heat Transfer, MEEN 421 Thermodynamics II

MEEN 490
Robotics (Elective)
Three Credits
Two hours of lecture and one three-hour laboratory per week. Introduction to robotics, robot anatomy, motion analysis, control, and industrial applications.

Prerequisites: ELEN 301 Electrical Networks I, MEEN 312 Kinematics

MEEN 495, 496, 497
Special Problems (Elective)
One, Two and Three Credits respectively

Course credit and format will depend on the specific problem. Special design problems to be offered by the engineering faculty.

Prerequisites: Chairperson's Permission

MEEN 498
Undergraduate Research I (Elective)
Three Credits

Three hours of seminar per week. This course introduces basic undergraduate research on specific mechanical engineering topics. The proposed subjects covered in class are related with experimental and numerical or analytical analysis or both.

Prerequisites: Chairperson's permission

MEEN 499
Undergraduate Research II (Elective)
Three Credits

Three hours of seminar per week. This course expands the undergraduate research experience on specific mechanical engineering topics. The proposed subjects covered in class are related to experimental and numerical methods.

Prerequisites: MEEN 498 Undergraduate Research I, and Chairperson's permission

MEPI 351
New Venture Creation (Elective)
One Credit

The course is designed to develop capabilities required to formulate, execute and support entrepreneurial intentions. The main objective of this course is to introduce students to the steps and key elements of the venture creation process. The students will acquire knowledge of entrepreneurial behaviors and tasks required to successfully create and manage a technology intensive business. More specifically, students will explore the concepts related to identifying and exploiting opportunities, including: evaluating entrepreneurial opportunities, formulating strategies, business planning and implementation.

Prerequisites: Authorization of the School Dean and by recommendation of the MEPI Director.

MEPI 352
Legal Issues of Entrepreneurship (Elective)
One Credit

New venture creation is a dynamic process immersed within an institutional and regulatory context. This course will provide students understanding of the regulatory framework surrounding new technology ventures. The modules will be organized to provide students knowledge about the different requirements of new businesses, including choice of legal entity, permits, insurances and HR requirements. The course will also develop awareness of different support programs designed to assist entrepreneurs during this process. Furthermore, the students will receive information about specific issues in technology ventures, including: intellectual property, trade secrets, patents, trademarks, copyrights and licensing. After completing this course, students will be familiarized with the regulatory process required to formalize a new business.

Prerequisites: MEPI 351 New Venture Creation, and authorization of the School Dean by recommendation of the MEPI Director.

MEPI 353
The Business Plan (Elective)
One Credit

Planning in emerging ventures has many purposes and uses. Firstly, planning serves as a mechanism to guide the entrepreneurial intentions and behavior, while monitoring the expected versus actual results. Secondly, access to finance requires the preparation of formal written plans that allow investors to see a glimpse of the yet inexistent venture. Throughout this module, planning in nascent firms will be discussed from the perspective of nascent entrepreneurs and potential investors. At completion of this module, the students are expected to have prepared a formal business plan ready for soliciting finance or venture capital. Therefore the course dynamic will take an active learning approach in which the students will be writing their business plan as they are being introduced to different concepts. The development of the formal business plan will be aided by the use of business planning software.

Prerequisites: MEPI 351 New Venture Creation, MEPI 352 Legal Issues of Entrepreneurship, and authorization of the School Dean by recommendation of the MEPI Director.

MEPI 455
Enterprise Project I (Elective)
Three Credits

Interdisciplinary teams work as part of an enterprise to address real-world design projects or problems. Discussion of realistic design constraints such as cost, environmental

friendly manufacturing, aesthetics, safety, possible social and political impact, and ethical considerations. Discussion of intellectual property. Students gain experience in defining project objectives, planning strategies to achieve these objectives, and leading technical teams to accomplish project goals.

Prerequisites: Authorization of the corresponding School Dean by recommendation of the Entrepreneurial Program for Innovation Option Director.

MEPI 456
Enterprise Project II (Elective)
Three Credits

Interdisciplinary teams work as part of an enterprise to address real-world design projects or problems. Discussion of realistic design constraints such as cost, environmental friendly manufacturing, aesthetics, safety, possible social and political impact, and ethical considerations. Discussion of intellectual property. Students gain experience in defining project objectives, planning strategies to achieve these objectives, and leading technical teams to accomplish project goals.

Prerequisites: Authorization of the corresponding School Dean by recommendation of the Entrepreneurial Program for Innovation Option Director.

SCHOOL OF HEALTH SCIENCES

VISION

To be the first choice as a School of Health Sciences in Puerto Rico offering innovative opportunities for a formation of excellence.

MISSION

To prepare excellent human resources in the Health Sciences with innovative academic offerings across the currículum which can respond properly and rapidly to the needs of local and global communities.

OBJECTIVES

Our main objectives are:

1. To respond to the needs of health professionals in our catchment area.
2. To establish a continuous improvement system in our programs to ensure their relevance and applicability to our society.
3. To develop health professionals capable of working in Puerto Rico, as well as in other Spanish-speaking and English-speaking communities.
4. To contribute significantly to the development of students with high humanistic values.
5. To establish academic offerings with the participation of customers, students, health services providers, and accreditation agencies to ensure an effective professional practice that responds to the needs of the community.
6. To effectively implement technology integration in all of our programs.
7. To maximize the relevance of our academic offerings utilizing innovative strategies that will facilitate the transfer of knowledge to the practice of health professions and promote the acquisition of an integrated body of knowledge to be used in solving problems.
8. To establish local and international strategic alliances with health care institutions that can provide practice settings for faculty development and for exchange of resources in the areas of teaching and research.
9. To establish local and international alliances with other universities to increase our students' opportunities to participate in exchange programs that will broaden their vision of the health professional role.
10. To develop basic and applied research projects in the area of health, geared to the improvement of the quality of life in Puerto Rico and other communities.

GOALS

1. Respond to the health needs of our communities within a global perspective.
2. Provide an educational setting with balanced efforts among academic offerings, clinical services, and research endeavors.
3. Establish a system of continuous improvement in our programs to ensure their relevance and applicability.
4. Develop highly trained health professionals prepared to serve individuals and groups from diverse cultural, social and economical backgrounds.
5. Develop health professionals with high humanistic values.
6. Integrate technology in all of our administrative, academic, research and clinical activities.
7. Facilitate transference of scientific knowledge to the practice of the health professions.
8. Establish national and international alliances for faculty development, exchange of resources, and student exchange programs.
9. Foster a high degree of professionalism as health care providers within an interdisciplinary perspective.
10. Establish innovative programs prepared with the collaboration of community stakeholders, students, patients and accreditation agencies.
11. Promote an evidence-based practice setting.
12. Utilize service learning as the primary educational methodology for all academic programs.

STAFF

Ángel L. Rivera / Dean

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Nilda I. Boria / Associate Dean for Administrative Affairs

María E. Rosa / Director, Nursing Department

Nydia V. Bou / Director, Health Professions Department

Milva Vega / Director, Naturopathic Medicine Doctoral Program

Carmen Santiago / Nursing Clinical Coordinator

Nelly González / Student Services Officer

Joannie Ortiz / Administrative Affairs Director

Ana D. Serrano /Administrative Affairs Coordinator

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MPH, University of Puerto Rico

TECHNICAL STAFF

Maribel Lebrón Bonilla / Nursing Laboratory Technician
BSN Metropolitan University, Puerto Rico

PROGRAMS OF STUDY

BACHELOR´S DEGREE IN NURSING SCIENCES

Description of the Program:

This innovative nursing program with emphasis on community health promotion and interventions is the first offered by the School of Health Sciences. It was specially designed for qualified students and registered nurses who aim to possess a bachelor's degree in nursing. The curriculum of 130 credits should be completed in four years. Our graduates will be able to perform their professional nurse generalist role as providers of health care services in primary, secondary and tertiary settings.

Our students have the opportunity to practice in hospital and community settings within an interdisciplinary environment. Innovations and new technological advances are integrated into the training of future nurses according to the new skills and roles for holistic care. Our nursing program expects to provide the leadership and vision required as nursing makes the transition into the 21st Century.

Objectives:

The students in the bachelor´s degree program in nursing sciences will:

Develop critical thinking and problem-solving skills.

1. Integrate basic concepts of the behavioral, biological and natural sciences to better understand themselves and others.
2. Interpret and use scientific data in nursing interventions through collaborative research work.
3. Apply knowledge related to social-politics, culture, economics and history in the analysis of society and social problems.
4. Communicate effectively in verbal and written forms in English and Spanish.
5. Develop healthy working relationships.
6. Understand, appreciate and respect cultural differences.
7. Understand the variables that affect the health of hispanic populations.
8. Understand the nature of health professions.
9. Acquire and apply the technical skills necessary to offer excellent nursing care.
10. Integrate strategies for the promotion and maintenance of health, risk reduction and disease prevention across the lifespan.
11. Discuss the evolution and treatment of the disease process.
12. Integrate informatics in healthcare into professional practice.
13. Develop ethical values that influence the decision-making process in nursing practice and inter-personal relationships.
14. Understand the environment and the organizations in which health services are provided.
15. Recognize the importance of continuing education and identify the values of the profession.
16. Recognize the importance of professional nursing associations in the establishment of public policy in healthcare and in professional improvement.

CURRICULUM

Total Credits	**128**
General Studies Courses	**49**
Professional Courses	**15**
Health Sciences Core Courses	**6**
Specialty Courses	**52**
Elective Courses	**6**

General Studies Courses		**(49 credits)**
ART 101	Art Appreciation	3
BIOL 103	Biology for the Health Sciences	3
CHEM 223	Chemistry for Nursing	4
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HESC105	Freshman Seminar	3
HUMA 111	Civilizations & Universal Culture I	3
HUMA 112	Civilizations & Universal Culture II	3
MATH 120	Introduction to Algebra	3
PSYC 123	Survey Course in Psychology	3
SOSC 111	Individual, Community, Government And Social Responsibility I	3
SOSC 112	Individual, Community, Government and Social Responsibility II	3
SPAN 152	Fundamentals of Reading & Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Courses		**(15 credits)**
BIOL 300	Microbiology	4
BIOL 303-304	Human Biology	8
GESC 107	Introduction to Computers for Science Students	3

Core Courses		**(6 credits)**
HESC 340	Health Sciences Research	3
HESC 360	Statistics Applied to the Health Sciences	3

Specialty Courses		**(52 credits)**
NURS 201	Fundamentals of Nursing	5
NURS 202	Health and Physical Assessment	4
NURS 203	Pharmacology	3
NURS 204	Technical Skills Laboratory	2
NURS 205	Pathophysiology	3
NURS 303	Medical Surgical Nursing	5
NURS 304	Maternal & Child Nursing	5
NURS 305	Nursing Care of Children and Adolescents	5
NURS 403	Community Health Nursing	5
NURS 404	Mental Health Nursing	3
NURS 405	Nursing Leadership	3
NURS 406	Practicum	4
NURS 407	Knowledge Integration in Nursing	3

Elective Courses **(6 credits)**

BACHELOR'S DEGREE IN NUTRITION AND DIETETICS

Description of the Program

Responding to the great need in Puerto Rico for professionals in the area of Nutrition and Dietetics, the School of Health Sciences at Universidad del Turabo provides an integrated education through an undergraduate academic offering of a bachelor of science degree in nutrition and dietetics.

This is a coordinated program, which means that students have the opportunity to complete an internship as part of their program and qualify to apply for the license to practice as a professional dietitian.

The purpose of this program is to prepare professionals who are committed to impacting the community, influencing improvement in nutritional habits, and promoting healthy lifestyles.

Objectives

1. Prepare competent entry-level dietitians who can work in a variety of settings.
2. Develop professional dietitians committed to community service and interdisciplinary work.
3. Develop professionals capable of participating in nutrition and dietetic research-related activities.

CURRICULUM

Total Credits	**134**
General Studies Courses	**49**
Essential Courses	**28**
Specialty Courses	**51**
Elective Courses	**6**
Supervised Practice Experiences	**900 hours**

General Studies Courses		**(49 credits)**
BIOL 103	Biology for the Health Sciences	3
CHEM 224	Fundamentals of General Chemistry	4
ENGL 152	Intermediate Communicative English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HESC105	Freshman Seminar	3
HIST 253	History of Puerto Rico (Comp)	3
HUMA 111	Civilizations & Universal Culture I	3
HUMA 112	Civilizations & Universal Culture II	3
MATH 120	Introduction to Algebra	3
PSYC 123	Survey Course in Psychology	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SOSC 112	Individual, Community, Government and Social Responsibility II	3
SPAN 152	Fundamentals of Reading and Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Essential Courses		**(28 credits)**
BIOL 303	Human Biology I	4
BIOL 304	Human Biology II	4
BIOL 321	Food Microbiology	3
BIOL 350	Biochemistry	4
CHEM 225	Fundamentals of Organic Chemistry	4
GESC 107	Introduction to Computers for Science Students	3
HESC 340	Health Sciences Research	3
HESC 360	Statistics Applied to Health Sciences	3

Specialty Courses		**(51 credits)**
NUTR 201	Introductory Nutrition	3
NUTR 202	Food Science	3
NUTR 204	Vegetarian Nutrition	3
NUTR 205	Nutrition for Sport and Exercise	2
NUTR 206	Nutrition in Alternative and Complementary Medicine	2
NUTR 305	Sociocultural Aspects in Nutrition	2
NUTR 310	Food Service System Management	3
NUTR 320	Foodservice Facility Design and Equipment	3
NUTR 321	Institutional Menu-Planning	3
NUTR 403	Advanced Nutrition and Metabolism	3
NUTR 405	Nutrition Throughout the Life Cycle	3
NUTR 420	Nutritional Assessment	2
NUTR 425	Community Nutrition	3
NUTR 435	Educational Strategies in Nutrition	2
NUTR 436	Food Service Practice Experience	0
NUTR 440	Medical Nutrition Therapy I	3
NUTR 441	Medical Nutrition Therapy II	3
NUTR 442	Medical Nutrition Therapy Practice Experience	0
NUTR 450	Community Practice Experience	0
NUTR 451	Nutritional Research Methods	2
NUTR 455	Integration Seminar and Fundamentals of Nutrition-Dietetics Profession	3
NUTR 460	Purchasing and Preparation of Quantity Food Service	3

Electives Course **(6 credits)**

BACHELOR'S DEGREE IN SPEECH LANGUAGE THERAPY

Description of the Program

Our goal is to prepare speech-language therapy professionals with the knowledge, skills, and attitudes that are necessary to serve as therapists in the areas of counseling, prevention, and intervention of persons with communication impairments. The teaching/training process will be characterized by ample participation in the clinical processes, freedom to question and express ideas, and the principle of liberty of individuals' rights.

Objectives

The Program will accommodate for students' necessities, interests, and abilities to accomplish the following objectives:

1. Contribute to the expansion of health services programs to respond the needs of Puerto Rican society.
2. Prepare students in the area of speech-language therapy to serve the necessities of children and youth with speech, language, and hearing impairments.
3. Prepare a graduate to work effectively with other health team professionals for the well being of handicapped children and youth.

4. Promote a humanistic view in the provision of speech-language therapy services.
5. Promote among students the search for truth through the intense and scientific analysis of facts or of circumstances which they will encounter in their professional life.
6. Prepare a graduate skilled in the use of technology as a therapeutic tool through a practice-clinic learning experience.

PROGRAM OF STUDY

Total Credits	**123**
General Studies Courses	**48**
Professional Courses	**9**
Core Courses	**6**
Specialty Courses	**54**
Elective Courses	**6**

General Studies Courses		**(48 credits)**
BIOL 103	Biology for the Health Sciences	3
BIOL 200	Principles of Human Anatomy	3
ENGL 152	Intermediate Comm. English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HESC105	Freshman Seminar	3
HIST 253	History of Puerto Rico (Comp)	3
HUMA 111	Civilizations & Universal Culture I	3
HUMA 112	Civilizations & Universal Culture II	3
MATH 120	Introduction to Algebra	3
PSYC 123	Survey Course in Psychology	3
SOSC 111	Individual, Community, Government & Social Responsibility I	3
SOSC 112	Individual, Community, Government & Social Responsibility II	3
SPAN 152	Fundamentals of Reading & Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Professional Courses		**(9 credits)**
SIGN 102	Sign Language I	3
SIGN 201	Sign Language Linguistic	3
EDUC 171	Human Growth Development and Learning	3

Core Courses		**(6 credits)**
HESC 340	Health Sciences Research	3
HESC 360	Statistics Applied to the Health Sciences	3

Specialty Courses		**(54 credits)**
SPTH 200	Introduction to Communication Disorders	2
SPTH 205	Anatomy and Physiology of Speech and Language	3
SPTH 225	Seminar: Legal & Ethical Aspects of Communication Professionals 1	
SPTH 254	Microcomputer Application in Speech Language Pathology	3
SPTH 255	Language Development: Normal and Pathologic Processes	3
SPTH 257	Intervention with Infants and Children with Auditory Dysfunction	3
SPTH 300	Speech and Hearing Sciences	3
SPTH 305	Assistive Technology in Communication Disorder	3
SPTH 350	Articulatory Phonetics	2
SPTH 355	Speech Development: Normal and Pathologic Processes	3
SPTH 357	Early Intervention	3
SPTH 377	Fluency Disorders in Children and Adolescents	2
SPTH 397	Voice Disorders in Children and Adolescents	2
SPTH 401	Screening Speech and Language Disorders in Infants, Children and Adolescents	3
SPTH 403	Treatment I: Basic Concepts	2
SPTH 405	Treatment II: Related Conditions with Emphasis on ADD, Learning Disabilities, Autism	2
SPTH 407	Treatment III: Severe Conditions	2
SPTH 409	Treatment IV: Speech and Language Disorders Adolescents and Prevocationals	2
SPTH 415	Reading and Writing Difficulties	2
SPTH 440	Knowledge Integration in Speech-Language Therapy	3
SPTH 450	Clinical Practice I	2
SPTH 451	Clinical Practice II	3

Elective Courses **(3 credits)**

BACHELOR'S DEGREE IN SIGN LANGUAGE INTERPRETATION

Description of the Program

The program will provide theoretical, academic and technical training to those students who pursue a degree in interpreting for the deaf. The Bachelor of Science degree in Sign Language Interpretation will consist of 48 credits of general education, 3 credits of health science, 62 credits in the specialty, and 9 credits of elective courses, for a total of 122 credits and a research project.

General Requirements for Admission

Students interested in admission to the Bachelor of Science in Sign Language Interpretation must complete all the institutional requirements.

Institution's General Requirements

- Have graduated from high school or its equivalent.

- Have previously taken the test given by College Board or SAT (if younger than 25). Applicants who are 25 years of age or older will only take the institution's placement test.
- Institutional application package – needed documents
- Complete application and pay the $15.00 admission fee
- Official transcript
- CEEB or SAT Results (or placement test by Universidad del Turabo)
- Immunization test results (if 21 years old or younger)
- Copy of the Social Security card.
- For immigrant students, residency or student visa is required.

Program Requirements

- Minimum GPA of 2.50
- Interview package
- The student must send a short essay (200 words) expressing the reasons for choosing this program.
- Skills Evaluation Video: Prospective students must be recorded on video (for 3 to 5 minutes) in order to demonstrate facial and visual-gestural ability
- Prospective students who already have basic Sign Language Experience:

These individuals will be able to take a Sign Language Proficiency Placement Test (currently under construction) to identify which level of Sign Language would be an appropriate entrance level for them. Students will be permitted to approve up to three levels of Sign Language courses. This test is administered in interview format and consists of a 30-minute video-recorded conversation with a deaf individual. A trained rater will observe the video and score it. Individuals with a score of 90 and above will be able to obtain credit for levels III, II, and I. Individuals who obtain scores between 80-89 will be able to obtain credit for levels II & I. Finally, students who score between 70-79 will be able to receive credit for level I. Individuals whose score is lower than 70 will be required to take all levels of the basic Sign Language courses.

OBJECTIVES OF THE PROGRAM

General Objectives:

1. To contribute to the accessibility of high quality services in sign language interpreting for the Puerto Rican deaf and hearing communities.
2. To develop and conduct linguistic and socio-linguistic sign language research in order to describe the grammatical structure of this language and develop academic materials based on the linguistic reality of Sign Language.
3. To encourage research in the area of sign language interpreting within the linguistic complexities of Puerto Rico.
4. To prepare professional sign language interpreters able to serve the particular communication needs of Puerto Rican deaf and hearing persons.
5. To prepare professional sign language interpreters able to work efficiently with other members of health/educational work teams.
6. To promote and encourage sign language interpreting certification in Puerto Rico.
7. To establish an agreement of global collaboration and exchange with other universities and professionals in the field of sign language interpreting and sign language linguistics.
8. To promote a humanistic attitude in the provision of sign language interpreting services.
9. To encourage students in the search for truth through the analysis of scientific facts or circumstances, which will be part of their professional experience.
10. To prepare the students to become knowledgeable of new sign and oral communication technology in the area of dear and hearing persons.
11. To prepare sign language interpreters able to work in different social and professional contexts.

Student's Specific Objectives:

The students in the Sign Language Interpretation Program will develop the following skills and competencies needed for the provision of high quality sign language interpreting services.

Interpersonal Skills

1. To effectively intervene in the attitudes and behaviors of deaf persons who receive sign language interpretation services.
2. To establish appropriate interpersonal relations with the deaf client/student based on the sign language interpreter code of ethics.
3. To be sensitive to the cultural values and particular needs of the Puerto Rican deaf community.
4. To follow the code of ethics developed for the sign language interpreter in all situations during the interpreting service performance.

Sign language skills:

1. To adequately use signs, Spanish, and English languages appropriate to the age and educational level of the deaf person.
2. To use the correct professional terminology when communicating in Spanish and English, about sign language and sign language interpreting.
3. To communicate in an organized manner following the grammatical structure of Spanish, English and Puerto Rican/American Sign Language.

4. To mediate professionally between the languages and cultures of both the deaf and hearing clients.
5. To adequately use the interpreter's professional register to accommodate the needs of both hearing and deaf clients.

Personal Skills:

1. To demonstrate responsibility in delivering interpreting services.
2. To demonstrate commitment on attending professional meetings.
3. To demonstrate responsibility in completing are documents required by her/his superior.
4. To respect the confidentiality of the deaf/hearing persons regarding the information that is interpreted.
5. To perform the professional obligations inherent to interpreting services.

Clinical/Practical Skills

1. To consider the theoretical frame in selecting the strategies needed to prepare activities and materials adapted to the particular needs of deaf persons.
2. To use technology as a tool for communication when needed.
3. To demonstrate knowledge of the protocols needed for effective interpretation.
4. To contribute to the development of ethical standards in the interpreting profession.

PROGRAM OF STUDY

Total Credits	**122**
General Studies Courses	**48**
Research Courses	**3**
Specialty Courses	**62**
Elective Courses	**9**

General Studies Courses		**(48 credits)**
BIOL 103	Biology for the Health Sciences	3
BIOL 200	Principles of Human Anatomy	3
ENGL 152	Intermediate Comm. English	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
HESC105	Freshman Seminar	3
HIST 253	History of Puerto Rico (Comp)	3
HUMA 111	Civilizations & Universal Culture I	3
HUMA 112	Civilizations & Universal Culture II	3
MATH 120	Introduction to Algebra	3
PSYC 205	Personal Growth & Development	3
SOSC 111	Individual, Community, Government And Social Responsibility I	3
SOSC 112	Individual, Community, Government and Social Responsibility II	3
SPAN 152	Fundamentals of Reading and Writing	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Core Courses		**(3 credits)**
HESC 340	Health Sciences Research	3

Specialty Courses		**(62 credits)**
SIGN 101	Visual-gestural & Body Language Communication Techniques	3
SIGN 102	Sign Language I: Foundations	3
SIGN 103	Sign Language II: Conversations	3
SIGN 104	Sign Language III: Narratives	3
SIGN 105	Sign Language IV: Advanced	3
SIGN 106	Use of Classifiers, Fingerspelling and Numberings	3
SIGN 121	History & Socio-Cultural Aspects of Deaf Culture	3
SIGN 122	Sign Language Discourse & Lab	3
SIGN 201	Sign Language Linguistics	3
SIGN 203	Introduction to Sign Language Interpreting: Skills Development and Translation	3
SIGN 204	Fundamental Skills in the Interpreting Process	3
SIGN 302	Ethical and Professional Principles in Interpreting	3
SIGN 303	Practicum & Theory of Consecutive Interpreting	3
SIGN 304	Introduction to Basic Audiology	3
SIGN 316	Communication Disorders and Assistive Technology	3
SIGN 401	Practicum and Theory of Simultaneous Interpretation I and Internship	4
SIGN 402	Practicum and Theory of Simultaneous Interpretation II and Internship	4
SIGN 405	Interpreting Idioms and Culture	3
SIGN 416	Psychosocial Aspects of Deafness	3
SIGN 502	Sign Language Research Project	3

Elective Courses **(9 credits)**

COURSE DESCRIPTIONS

(Courses marked with @ could be offered in both modalities, traditional or on-line.)

HESC 105
Freshman Seminar in Health Sciences
Three Credits

The focus of this course is to strengthen basic knowledge and skills at the personal, intellectual and technological level necessary to succeed in academic activities, performance, and adjustment to university life. Each

student will participate in mentorship activities that will continually build upon skills and knowledge base in the advancement of student development. Important emphasis is given to the integral development of humanistic fulfillment and academic success. Students are guided through a series of activities on the university campus exposing them to services offered by the institution and the School of Health Sciences. The goal is to instill in students feelings of security and confidence in managing and solving personal and academic situations.

HESC 340
Health Sciences Research
Three Credits
This is a required core course for undergraduate students at the School of Health Sciences. Specific attention is given to the relationship between research outcomes and clinical practice. This course prepares students to analyze research literature in the health sciences critically. Students also have the opportunity to apply the scientific method to clinical research. Funding opportunities available to develop research studies in health sciences are presented and discussed.

Prerequisite: MATH 120

HESC 360
Statistic Applied to Health Sciences
Three Credits
This is the third required core course for all students completing BS studies at the School of Health Sciences, except for students of Speech Language Therapy and Dietetics and Nutrition, who are encouraged to take it as an elective. The course provides a discussion of statistical methods applied to the health professions. In this course students expand on the knowledge introduced in HESC 340-Health Sciences Research. Emphasis is placed on qualitative and quantitative statistical analyses applied to clinical research, according to different research designs.

Prerequisite: MATH 120

NURS 201
Fundamentals of Nursing
Five Credits
This theoretical and clinical course provides an introduction to the historical, sociopolitical, and legal concepts of the nursing profession in the U.S., Puerto Rico, and in other Hispanic communities. Emphasis is placed on the development of basic nursing skills, which are needed for promotion of health and maintenance of individuals, families and communities. The student is guided to consider the individual's motivation in seeking health care and how these problems interfere with the person's daily activities. Clinical practice provides opportunities for development of the skills needed in hospital and community settings to carry out the nursing role. Emphasis is placed on the client as a holistic being and the use of critical thinking when intervening in health and illness with a variety of individuals from different cultural/social backgrounds and age groups.

Prerequisites: SOSC 101-102, ENGL 151-152, 221, CHEM 223, PSYC 123, PADE 105, MATH 120, SPAN 151-152, HUMA 115, BIOL 303-304, 300

NURS 202
Health and Physical Assessment
Four Credits
This course focuses on concepts of health promotion and disease prevention in conducting physical examinations and health assessments. Multidisciplinary and interdisciplinary collaboration, cultural competence, and professional interpersonal skills are modeled in order to achieve the goals of Healthy People 2010. Practice in the skills laboratory provides an opportunity for the students to examine and implement the nursing process with individuals, families and communities throughout the life span as consumers and resources of health care. The nursing diagnosis process, health screening, referrals process, and physical examination techniques are discussed, applied, and practiced in laboratory experiences.

NURS 203
Pharmacology
Three Credits
This course presents students with the opportunity to develop critical thinking related to pharmacology concepts applied to the nursing process. The content focuses on principles of pharmacology, drug classifications, administration routes, dosage calculations, therapeutic use, disinfection procedures, basic concepts of nontraditional medicine and drug interactions. Advantages and disadvantages of pharmacotherapy and the patient's well-being are discussed. In addition, the course includes content on bioterrorism agents, drugs for HIV/AIDS, medication errors and gene therapy.

Prerequisites: NURS 201, NURS 202

NURS 204
Technical Skills Laboratory
Two Credits
This course provides students with the development of basic technical nursing skills required at the baccalaureate level. Students are expected to assess the client, formulate nursing diagnoses, perform different nursing procedures, evaluate patient outcomes, and document pertinent data following NANDA, NIC and NOC.

NURS 205
Pathophysiology
Three Credits
This course presents the basic concepts of human pathophysiology and explains the processes of specific diseases. The course is divided in two parts: the microsystem and the macrosystem. Part one reviews cellular responses to infection, environmental factors, genetics, diet, cancer, and stress. Part two is organized by body systems. Students are expected to have a basic knowledge of microbiology, chemistry, anatomy and physiology. Relevant case studies are discussed in class, and aspects such as risk factors pertinent to pediatric, aging and women's health are presented.

Prerequisites: NURS 201, NURS 202

NURS 301
Community Health I
Three Credits
In this course the student examines concepts related to the community, such as characteristics and development of resources available to the group. The community's physical and social environment is analyzed, including industries, organizations, schools, and health services. Emphasis is placed on leadership rights of members through active participation in the decision-making activities for the wellness of the population. Political issues and their influence on health policies are examined.

Prerequisite: NURS 205

NURS 302
Community Health II
Three Credits
This is a second course examining aspects of community interventions. In this course students are exposed to specific knowledge needed for appropriate interventions as nurse generalists in community settings. Students also have the opportunity to gain skills for interventions with individuals, families and other community groups.

Prerequisite: NURS 301

NURS 303
Medical Surgical Nursing
Five Credits
This theoretical and clinical course prepares students to intervene with individuals in adult and elderly stages who present physiological alterations affecting their homeostasis. The focus is on the development of knowledge based on application of the nursing process, communication skills, critical thinking and therapeutic interventions, as essential to ensuring optimal care. The course includes theory, nursing skills laboratory, clinical experiences (hospitals and communities), and seminars. The hospitals used for clinical practice are at secondary and tertiary levels of care.

Prerequisites: NURS 201, NURS 202

NURS 304
Maternal and Child Nursing
Five Credits
This theoretical and clinical course focuses on concepts of the childbearing patient, her infant and the impact on her family. The nursing process is presented as a guide for intervention with families during the normal human development process including: pregnancy, delivery, post partum, and care of the newborn. Health promotion is emphasized. Epidemiology, infectious, acute, and chronic diseases are discussed, taking into consideration maternal and newborn needs in community and hospital care settings, from a biopsychosocial perspective. At the beginning of the course, specific maternal and childcare skills are practiced in a nursing skills laboratory. After this practice, students participate in different experiences within the clinical setting.

Prerequisite: NURS 303

NURS 305
Nursing Care of Children and Adolescents
Five Credits
This theoretical and clinical course focuses on the care of children and adolescents. The student is introduced to the concepts of nursing care from the first year of life through adolescence. Basic nursing skills are developed for the prevention of illness, health promotion, and health maintenance in this age group. Emphasis is placed on the client as a holistic being, on applying critical thinking, and on promoting the use of nursing diagnosis according to the North American Nursing Diagnosis Association (NANDA), with nursing interventions (NIC) and outcomes (NOC) adequate to this age group.

NURS 321
Primary Health I
Six Credits
The course centers on the assessment of predictive factors of illness, analyzing the lifestyles, and nutritional factors that influence the levels of care in diverse community groups. Genetic and biosocial risks are considered. Proactive strategies for health promotion and illness reduction are discussed. The individual's health history and

assessment are considered as essential to set achievable goals for intervention.

Prerequisite: NURS 302

NURS 322
Primary Health II
Six Credits
The course centers on the implementation of risk reduction strategies applicable to individuals and groups. The course also incorporates knowledge and skills for the promotion, maintenance and prevention of illness throughout the developmental stages and the evolution of the life cycle. Emphasis is given to the importance of establishing community coalitions to identify and implement goals for quality of life, taking into consideration the difference in cultures, the concepts of health, and the political effects, within the provisions of health services systems.

Prerequisite: NURS 321

NURS 401
Management of Normal, Acute & Chronic Crises Throughout the Life Span I
Five Credits
The nursing process constitutes a basic guide for intervention with families during the normal human development process, which includes pregnancy, delivery, postpartum and care of the child until adolescence. Health promotion is emphasized. Epidemiology, infections, acute and chronic disease are emphasized, as are maternal and child needs in community and hospital care settings, from a biopsychosocial perspective. This course offers clinical experiences and theoretical content. At the beginning of the course, specific maternal and childcare skills are practiced in a nursing skills laboratory.

Prerequisite: NURS 322

NURS 402
Management of Normal, Acute & Chronic Crisis Throughout the Life Span II
Five Credits
This course prepares the student to manage adult and elderly populations with physiological alterations. Emphasis is placed on development of knowledge based on application of the nursing process, communication skills, critical thinking, and therapeutic interventions essential to ensure optimal care. This course includes theory, nursing skills laboratory practice, clinical experiences (hospital and community), and seminars.

Prerequisite: NURS 401

NURS 403
Community Health Nursing
Five Credits
This theoretical and clinical course focuses on the study of principles and practices involved in community health nursing and the development of skills for health education in community settings. Students are familiarized with models, theories, concepts and skills related to community interventions. Public Health concepts are discussed and applied to the health improvement of different communities. Community physical and social environments are analyzed, including the role of the different organizations. Emphasis is given to priorities for health promotion and maintenance according to Healthy People 2010, including health disparities and the essential role of the nursing professional.

Prerequisites: NURS 304, NURS 305

NURS 404
Mental Health Nursing
Five Credits
The focus of this theoretical and clinical course is the promotion of health and provision of opportunities for clients to maximize their ability to live, work, socialize, and learn in the communities of their choice. The practice of mental health nursing is presented from the perspective of helping people manage difficulties, solve problems, decrease emotional pain, and promote growth, while respecting their rights to their own values, beliefs and decisions. Nursing students are encouraged to engage in self-analysis in order to increase their understanding and self-acceptance. This is important because nurses who are able to clarify their own beliefs and values are less likely to be judgmental or to impose their own values and beliefs on clients. Neurobiological, psychosocial, sociological, and spiritual theories are discussed, to help students understand clients and their experiences and to help them engage in the healing process. Emphasis is given to development of effective communications skills, application of the nursing process, community mental health, critical thinking and cultural diversity.

NURS 405
Nursing Leadership
Three Credits
The focus of this course is on the basic concepts of effective nursing leadership and management within today's dynamic health care system where nursing roles are evolving. The impact of economics, information, technology, and politics on the health care system is discussed and analyzed. Problems and challenges are viewed as opportunities for growth and improvement for the health care team where nursing plays a key role. The student has the opportunity to critically analyze case

studies in various health care settings. A variety of concepts and theories from research and literature are analyzed and applied to practice. Participation in local, national, and international nursing and non-nursing organizations is encouraged.

Prerequisite: NURS 403, NURS 404

NURS 406
Practicum
Four Credits
In this course the student has the opportunity to integrate knowledge from previous courses with the purpose of promoting professional attitudes, internal motivation, development of responsibility, and accountability for practice. Emphasis is placed on the development of skills in the clinical area selected by the student in agreement with the professor. The goal is to increase clinical skills and apply critical thinking, using nursing diagnoses according to the North American Nursing Diagnosis Association (NANDA, NIC and NOC). In addition, students have the opportunity to practice the employer-employee relationship and leadership skills. In addition to the clinical experiences, the group meets once a week for two hours to discuss issues relevant to this stage of their professional development.

NURS 407
Knowledge Integration in Nursing
Three Credits
The focus of this course is integration of knowledge in preparation for local and/or national professional examination tests. Students have the opportunity to become familiar with the requirements for practicing the nursing profession in Puerto Rico and the National Council Licensure Examination (NCLEX). In addition, students will review and practice the basic components included in the examination test required by the Department of Health to practice the profession of Nursing and the NCLEX.

NURS 421
Interdisciplinary Seminar I
Six Credits
The course centers on experience in diverse health settings. Training is provided within the interdisciplinary health team that provides healthcare in a hospital setting. Emphasis is placed on managed care and advanced nursing practice, as well as on evaluation of the services being offered to meet health needs. The student applies the nursing process to individuals in acute care, those with chronic illnesses, and patients with terminal illnesses. The course includes technology of updated information related to clinical nursing.

Prerequisites: All NURS courses

NURS 422
Interdisciplinary Seminar II
Six Credits
The course allows the students to apply critical thinking in the process of problem-solving and to offer alternatives for health problems in the community, within an interdisciplinary healthcare team. Concepts of environmental health, epidemiology, empowerment, and nursing process are emphasized. The community setting is utilized, with intensive practice in the application of the nursing process.

Prerequisite: NURS 421

NUTR 201
Introductory Nutrition
Three Credits
The course covers fundamentals of nutrition, such as the study of food nutriments, digestion, absorption, metabolism, and excretion. Problems associated with deficiency and excess are discussed. Students will have the opportunity to evaluate their food intake in terms of caloric content, and nutrients, and compare it with the established recommendations for individual needs.

Prerequisites: BIOL 103, BIOL 303, CHEM 224, CHEM 225

NUTR 202
Food Science
Three Credits
The course centers on evaluation of chemical, physical, functional and nutritional changes in food. Topics include evaluation of changes which take place during selection, preparation, processing, and storage of food, with attention given to the quality and retention of nutrients. The course includes an experimental laboratory with techniques to examine the chemical and physical properties in food. The necessary characteristics of food preparation and conservation of nutrients are determined, including adequate food appearance.

Prerequisites: NUTR 201, BIOL 321

NUTR 204
Vegetarian Nutrition
Two Credits
The course covers the theory and basic concepts of vegetarian nutrition. Topics include the need for essential nutrients and the health consequences in humans of a vegetarian diet. Emphasis is given to trends in the use of vegetarian diets, fallacies, and risk factors. Topics include

composition, planning, and selection of vegetarian nutrition and how to satisfy body needs at different stages of life.

Prerequisite: NUTR 201

NUTR 205
Nutrition in Sports and Exercise
Two Credits
The course covers basic concepts of the interaction of nutrition, sports and exercise. Emphasis is given to the athlete, his/her physical condition, nutritional needs, and other specific needs.

Prerequisite: NUTR 201

NUTR 206
Nutrition in Alternative-Complementary Medicine
Two Credits
The course covers theory, culture, and application of alternative-complementary medicine in nutrition. Experiences are directed towards obtaining knowledge about the use of herbs. A scientific base is provided, utilizing and analyzing available literature and identifying the most commonly used herbs with their generic and common names.

Prerequisite: NUTR 201

NUTR 305
Socio-Cultural Aspects in Nutrition
Two Credits
The course explores and analyzes socio-cultural factors associated with the decision-making process related to food intake and its effects on individual nutrition and health. Students will have the opportunity to evaluate controversies related to food and its effects on nutrition. The purpose is the formation of professionals who can participate in public policy related to food and nutrition in Puerto Rico.

Prerequisite: NUTR 425

NUTR 310
Food Service System Management
Three Credits
The course covers principles of marketing, financial management, and human resources applied to food service facilities. Topics include discussion of hypothetic situations for analysis and recommendations. Food services laws and regulations at national and international levels are also discussed. Emphasis is given to leadership skills and the necessary skills to influence change and quality improvement.

Prerequisite: NUTR 201

NUTR 320
Food Service Facility Design and Equipment
Three Credits
This course centers on the importance of appropriate planning in food service facility settings. Topics include discussion of elements in the design, maintenance and operation of institutional equipment, safety. and sanitation to ensure quality of services. Students will have the opportunity to visit food service facilities and view the institutional equipment used.

Prerequisite: NUTR 310

NUTR 321
Institutional Menu-Planning
Three Credits
The course centers on theory, techniques, and practice in the design, preparation, analysis and servicing of an institutional menu. The course also provides experience in basic administration of food servicing which provide nutritional meals adequate to the served population. These experiences are focused on the following: knowledge and skills of time and money management, costs per recipe, recipe standardization, portion control, food preparation, and meal management. Recent studies, trends in the food industry, consumer patterns, and general population patterns are discussed. Computer programs are included as part of the experiences in menu design and analysis.

Prerequisites: NUTR 320, NUTR 460

NUTR 403
Advanced Nutrition and Metabolism
Three Credits
The course centers on evaluation of the biochemical and physiological aspects that interact in the utilization of nutriments by the human body. Health problems associated with nutritional excess or deficiencies, such as obesity, anemia, osteoporosis, and other nutritional disorders are examined.

Prerequisites: NUTR 201, BIOL 304, BIOL 350

NUTR 405
Nutrition Throughout The Life Cycle
Three Credits
This course studies the physiological and developmental changes throughout the stages of the life cycle of humans and the nutritional needs related to those stages. Psychosocial and environmental conditions that impact nutrition status at each stage of life are also examined.

Prerequisite: NUTR 420

NUTR 420
Nutritional Assessment
Two Credits
This course includes in-depth study of nutritional analysis methods, including dietary intake, as well as anthropometric, biochemical, and clinical measures. Students have the opportunity to practice nutritional analysis methods at individual and family levels. Students are also exposed to nutritional evaluation studies.

Prerequisites: NUTR 201, BIOL 304

NUTR 425
Community Nutrition
Three Credits
The course analyzes the predominant health problems in Puerto Rico and other cultures, such as the USA. The students will become familiarized with important epidemiologic studies and government initiatives in response to the current nutritional situation and related services at public and private levels. Special attention will be given to the development and impact of government public policy in the field of nutrition. Students have at least one community field experience; the course includes a special project.

Prerequisite: NUTR 420

NUTR 435
Educational Strategies in Nutrition
Two Credits
The course covers social aspects that interact with the acquisition of alimentary patterns, analyzing the human behavior theories most utilized in the nutrition field and their application to nutritional counseling. The course also explores different educational strategies in nutrition, including communication techniques through mass media, group teaching, and individual teaching. The student will plan, practice and apply this knowledge during educational activities related with nutrition.

Prerequisites: NUTR 201, NUTR 420, NUTR 425

NUTR 436
Food Service Supervised Practice Experience
N/A Credits
The course covers the application of theory, functions and principles of management through supervised practice in healthcare facilities. Emphasis is placed on personnel and financial management, problem analysis, and quality assurance.

Prerequisites: Coordinated Program Exclusive.

NUTR 440
Medical Nutrition Therapy I
Three Credits
This course covers the use of nutrition as a component of treating disease. Relevant biochemistry and physiology are integrated into a medical nutrition therapy plan. The course is organized by body organ system and disease. Topics covered from a medical nutritional perspective include acid base, fluid and electrolyte balance; renal, cardiovascular, gastrointestinal, hepatic, and pancreatic diseases. Special nutrition therapies are discussed. The course also introduces students to nutritional genomics, food-drug interactions, enteral and parenteral support, and medical terminology. Material is illustrated by case studies.

Prerequisite: NUTR 403

NUTR 441
Medical Nutrition Therapy II
Three Credits
This course continues covering the use of nutrition as a component of treating disease. Relevant biochemistry and physiology are integrated into a medical nutrition therapy plan. The course is organized by body organ system and disease. Topics covered from a medical nutritional perspective include acid base, fluid and electrolyte balance; renal, cardiovascular, gastrointestinal hepatic, pancreatic diseases. Special nutrition therapies are discussed. Material is illustrated by case studies.

Prerequisite: NUTR 440

NUTR 442
Medical Nutrition Therapy Supervised Practice Experience
N/A Credits
The course covers the application of principles of clinical nutrition in specific disease conditions during supervised practice in healthcare facilities.

Prerequisites: Coordinated Program Exclusive.

NUTR 450
Community Practice Supervised Experience
N/A Credits
This course provides experiences that include nutrition assessment, counseling, and delivery of nutrition services to the community.

Prerequisites: Coordinated Program Exclusive.

NUTR 451
Nutritional Research Methods
Two Credits
This course presents the principal methods of human nutrition research, and focuses on the role of the nutritionist as part of a research team. Qualitative and quantitative research, research ethics, quality control, selection of dietary assessment methodology, and sources of funding are discussed. A research study is conducted as part of this course and results are shared with other students and faculty members. The students will have the opportunity to analyze research articles from well-recognized journals in the area of nutrition.

Prerequisites: HESC 340, HESC 360, NUTR 420

NUTR 455
Integration Seminar and Fundamental Aspects in the Nutrition-Dietetics Profession
Three Credits
The course covers the requirements to practice the profession of dietetics in Puerto Rico. It includes review and practice of the basic components included in the examination test required by the Department of Health and Commission on Dietetic Registration to practice the profession of Nutritionist and Dietitian. The course also includes an introduction to careers in nutrition, dietetics, and food service administration, job responsibilities; interests, abilities, skills, education and experience required for the job; and job market for similar positions.

Prerequisites: Coordinated Program Exclusive.

NUTR 460
Purchasing and Preparation of Quantity Food Service
Three Credits
The course centers on manager/supervisor responsibilities for food purchasing and preparation in large quantity food service systems. The course includes planning, purchasing, preparation, and service of nutritionally balanced, safe meals, in accordance with established budgets. Time to practice the concepts learned in class will be provided.

Prerequisites: NUTR 202, NUTR 310

PHAR 100
Pharmacology
Two Credits
The course presents introductory concepts related to pharmacology, including administration routes, therapeutic use, aseptic procedures, basic concepts of non-traditional medicine, and drug interactions. The course also provides the student with the opportunity to increase knowledge related to advantages and disadvantages of pharmacotherapy treatment in overall human wellbeing.

Prerequisite: NURS 202

SIGN 101
Visual-Gestural and Body Language Communication Techniques V
Three Credits
This course focuses on nonverbal aspects of communications, which are an integral part of communication in all sign languages. Emphasis is given to the use and understanding of facial expressions, gestures, pantomime, and body language. The students will develop their visual readiness and ability to think in pictures instead of words. The focus is on using the body, the face, and the hands to communicate meaning.

SIGN 102
Sign Language I: Foundations
Three Credits
The course is designed for students who do not have previous Sign Language experience. The purpose of the course is to develop primarily receptive skills, as well as expressive skills guided to the development of basic dialogue instruction in a functional scenario. The dialogues will be geared to conversations related to daily interactions, such as introducing oneself, exchanging personal information, talking about one's surroundings, and indicating where one lives. Students will also learn about the Deaf community and its culture.

SIGN 103
Sign Language II: Conversations
Three Credits
The course is designed for students who have previous Sign Language experience. The purpose of the course is to develop abstract concepts and self-expression about issues outside the classroom setting. In this course students will also develop narratives and learn how to locate objects and persons. They will have the opportunity to learn about cultural aspects of the Deaf community. They will also learn conversational strategies and how to maintain the attention of sign language users.

Prerequisite: SIGN 102

SIGN 104
Sign Language III: Narratives
Three Credits
The course is designed for the student who already has Sign Language skills. The purpose is to develop the linguistic abilities necessary to explain ideas or concepts; describe things and illustrate how and why they work.. The course will help develop the ability to translate from written text to

Sign Language. Students will use Sign Language to express experiences, tell stories, and express other narrative aspects. Information of linguistic aspects, vocabulary, and cultural information is presented in Sign Language as the primary language; Spanish will be the secondary language.

Prerequisites: SIGN 103

SIGN 105
Sign Language IV: Advanced
Three Credits
This course is designed for the student that already has Sign Language experience. The purpose is to instruct students in receptive and expressive skills of more complex aspects of Sign Language, such as poetry and literature, as well as artistic and abstract messages. The course focuses on going from informal to formal usage of language. The student will also explore how to translate written text into ASL.

Prerequisite: SIGN 104

SIGN 106
Use of Classifiers, Fingerspelling, and Numbering
Three Credits
This course will develop Sign Language skills through the use of descriptive classifiers and non-manual signals. It will assist the student in acquiring fluent fingerspelling and the use of visual receptive and expressive skills. It will also provide concentrated instruction and practice in cardinal and ordinal numbers as well as number incorporation. A brief history of the different manual alphabets in different countries will be included.

SIGN 121
Historic and Sociocultural Aspects of the Puerto Rican Deaf Culture
Three Credits
This course explores the history of American Sign Language, different Artificial Sign Systems and their linguistic relation to Puerto Rican Sign Language. It also considers the sociolinguistics aspects by which the deaf people identify themselves as a linguistic minority group. This course includes an analysis of the development of Puerto Rican Sign Language and its historical sociopolitical status. The analysis of this history is based on research of both American and Puerto Rican Sign Language. In this course we discuss the reasons why Deaf people have been considered a linguistic minority.

SIGN 122
Sign Language Discourse and Lab
Three Credits
This course will assist students in gaining an understanding of discourse, as well as in recognizing features of discourse used in American and Puerto Rican Sign Language such as register, spatial mapping, prosody, discourse structures, rhetorical analysis, involvement and interaction strategies, coherence, cohesion, and framing. The course will enhance students' own use of American and Puerto Rican Sign Language through incorporation of those features. The laboratory will provide an interactive experience in environments in which the students will have the opportunity to observe features of American and Puerto Rican Sign Language discourse explored in class.

Prerequisite: SIGN 102

SIGN 201
Sign Language Linguistics
Three Credits
This course will include fundamental linguistic concepts founded in oral languages that have been used as a linguistic theoretical framework and have been applied for the analysis of sign languages. It considers the work developed by sign language linguists, their contributions, as well as issues raised by these professionals, and how their linguistic and sociolinguistic research have changed views regarding deafness, deaf people, sign languages, and interpreting.

SIGN 203 @
Introduction to Sign Language Interpreting: Skills Development and Translation
Three Credits
This course will provide students with practice of skills and process tasks needed for consecutive and simultaneous interpretation. Focus will be primarily on intra and inter-lingual language exercises including: shadowing, prediction and anticipation, memory enhancement, text analysis for goal and main points, and paraphrasing. Exercises will be conducted in Sign Language.

Prerequisite: SIGN 105

SIGN 204
Fundamental Skills in the Interpreting Process
Three Credits
This course is an introduction to the field of Sign Language Interpretation. In addition to topics concerning the role, function and skills required of an interpreter, the student will be exposed to cross-cultural issues affecting interpreters. Students will also examine current trends in

research, advances in the field, and explore the various arenas in which interpreters work.

Prerequisite: SIGN 203

SIGN 302 @
Ethical and Professional Principles in Interpreting
Three Credits
Interpreters often find themselves in situations that may conflict with their own value system. This course will provide an exploration of the personal ethics and values that influence the decision-making process. Students will identify the source of conflicts; analyze the situation from the perspectives of the deaf clients, agency and interpreter, and make recommendations for action. Students will examine moral considerations and ethical systems, address power relationships between the non-deaf interpreter and the Deaf Community, and incorporate their impact in functioning as facilitators of communication. Students will use case studies to explore issues, make recommendations, and discuss the consequences of each decision.

Prerequisite: SIGN 203

SIGN 303
Practicum and Theory of Consecutive Interpreting
Three Credits
This hands-on course will provide in-depth study and practice of interpretation through the understanding and use of the consecutive mode of interpreting. Students will further develop requisite skills such as text analysis, mind mapping/visualization, multi-tasking strategies, prediction and anticipation. They will acquire an understanding of three models of interpreting (Cokely, Colonomos, Gish). They will be exposed to process management skills, and will enhance their use of tools for self-analysis and peer feedback.

Prerequisite: SIGN 203

SIGN 304 @
Introduction to Basic Audiology
Three Credits
This course will study the basic physical properties of sound, as well as the anatomy and physiology of the auditory system. Other topics include disorders related to deafness, and how audiological tests are administered and interpreted. Discussions of how these processes affect the interpreting profession and its considerations towards the clientele will also be included.

Prerequisite: BIOL 103

SIGN 316 @
Communication Disorders & Assistive Technology
Three Credits
This course provides an overview of speech, language and hearing disorders in children and adults. The course is designed to provide the students with the opportunity to learn about diagnosis and remediation of spoken and written language problems found in the deaf and hard of hearing population. This course will also offer an introduction to basic assistive technology used by the deaf and hard of hearing community. Students will have the opportunity to explore the use of the equipment.

SIGN 401
Practicum and Theory of Simultaneous Interpreting I and Internship
Four Credits
This hands-on course will provide in depth study and practice of Puerto Rican Sign Language interpretation through the understanding and use of the consecutive mode of interpreting and transitioning to the simultaneous mode. Students will build skills and knowledge through continued study and practice of text analysis, visualization, process management skills and tools for self-analysis and peer feedback.

Prerequisite: SIGN 203

SIGN 402
Practicum and Theory of Simultaneous Interpreting II and Internship
Four Credits
This course will provide further in-depth study and practice of Sign Language interpretation through the understanding and use of the simultaneous mode of interpreting. Students will focus on both individual and team interpreting and will work with selected teammates in two separate rotations. They will compare transliteration and interpretation and will practice both methods. They will review the business of interpretation and the settings in which interpreters work, as they prepare to begin interpreting to work in the field. Deaf individuals will be invited to class to participate as the "audience" for interpreting practice.

Prerequisite: SIGN 401

SIGN 405
Interpreting Idioms and Culture
Three Credits
This course is designed for the interpreting student to be able to list and study many of the different cultural idioms in Puerto Rico. Through the use of comparison and analysis of traditional and typical phrases, the student will be able to look for meaning in various contexts. This course will help

the student with the development of analytic thinking to be used in any interpreting situation of idiomatic phrases.

Prerequisite: SIGN 203

SIGN 416 @
Psychosocial Aspects of Deafness
Three Credits
This course will study the psychological, emotional and social impact of audition loss through the life cycle. Students will consider the interpreter's role as a non-professional advocate in the rehabilitation process of people with hearing loss and their families.

Prerequisite: SIGN 121

SIGN 502
Sign Language Research Project
Three Credits
The accomplishment of this requirement will become an important academic contribution to the knowledge and understanding of the Puerto Rican Deaf Community and Interpreters' linguistic situation. The course provides an opportunity for results of research carried out by students to be applied in the linguistic planning of deaf education, interpreting curriculum, and in understanding important aspects of the history of the Deaf in Puerto Rico.

SPTH 200
Introduction to Communication Disorders
Two Credits
This course provides an introduction to students who are considering a career in speech language therapy, speech language pathology, or audiology. It presents a broad overview of different issues related to human communication disorders across the lifespan and the various etiologies that causes these disorders. It discusses diverse disorders with emphasis on the individual and the family.

Prerequisite: HESC 105

SPTH 205
Anatomy and Physiology of Speech and Language
Three Credits
The course centers on the study of primary and secondary functions of human body structures involved in the reception and production of language and speech. Normal and abnormal anatomy and physiology will be studied. The impact on speech, language, and communication of abnormal body structures and their functioning will be analyzed.

Prerequisite: BIOL 200

SPTH 225
Seminar: Legal and Ethical Aspects of the Communication Profession
One Credit
Students will be exposed to current issues in the professions of speech pathology, audiology, speech therapy, and other related fields. Public Law 77, which is the Law that regulates the profession of speech therapy in Puerto Rico, and other related laws will be discussed. The vision of professional organizations in Puerto Rico and the United States will be presented.

Prerequisites: None

SPTH 254
Microcomputer Applications in the Practice of Speech-Language Pathology
Three Credits
The course centers on a discussion of common computer applications that speech language pathology professionals can use to perform clinical and administrative tasks. Hands-on computer applications and software will be offered. Students will evaluate commercial software and will adapt those programs to the client's particular needs.

Prerequisite: SPTH 403

SPTH 255
Language Development: Normal and Pathological Processes
Three Credits
Through the course the student will participate in interactive experiences with infants, children and adolescents with and without language disorders. Language development from the first words through adolescence will be covered and simultaneously contrasted with pathological indicators. Controlled laboratory experiences will be offered including the management of didactic materials.

Prerequisite: EDUC 171

SPTH 257
Intervention with Infants and Children with Auditory Dysfunction
Three Credits
The course centers on the study of key clinical aspects for the delivery of aural habilitative and rehabilitative services to infants and children with hearing loss. The different types of hearing loss diagnosed in infants and in regular and special education students will be discussed. Strategies and

methods for aural habilitation and auditory training will be discussed.

Prerequisites: SPTH 205, SPTH 355, SPTH 255

SPTH 300
Speech and Hearing Sciences
Three Credits
The course is an introduction to the acoustical nature of speech and an orientation to basic instrumentation used in measurement and analysis. Information and theories regarding normal processes of speech and hearing and how to relate those processes to various communication disorders are discussed. Students will be introduced to the science of speech-language pathology and audiology as precursors to evidence-based practice.

Prerequisites: MATH 120, BIOL 103, SPTH 200

SPTH 305
Assistive Technology in Communication Disorders
Three Credits
The course presents a general view of handicaps and the potential benefit of assistive technology, specifically of alternative and augmentative communication devices, to facilitate independent communication in individuals. Students will learn how alternative and augmentative communication devices help individuals 0 through 21 years with handicaps to participate and interact in their homes, school and community. Students will have the opportunity to observe the impact of technology in the Clinical Experiences in Speech-Language Pathology Lab, and will also be exposed to the use of different technologies. At the end of the course students will be able to match consumer capabilities with assistive technology equipment, adaptations, or strategies to increase communication independence.

Prerequisites: SPTH 255, SPTH 355

SPTH 350
Articulatory Phonetics
Two Credits
The course is a study of manner, place, and voice in the articulation of Spanish sounds in normal and disordered speech. Emphasis will be given to the Caribbean dialect. The course will present the International Phonetic Alphabet (IPA) and will apply IPA symbols for the transcription of normal and disordered speech samples. Change in word meaning resulting from the faulty positioning of articulators will be analyzed. Distinctive Feature Geometry will be discussed as they apply to possible changes in phoneme selection. Basic acoustic phonetics terms will be presented as they apply to the speech discrimination process. Intensive speech samples transcription using IPA symbols will be exercised.

Prerequisite: SIGN 201

SPTH 355
Speech Development: Normal and Pathological Processes
Three Credits
The course centers on the study of normal, delayed, and deviant phonological and articulatory systems in Spanish speaking children. The course will discuss the most relevant theories of phonological development. Intervention methods for treatment of articulation and phonological disorders will be studied and analyzed. Articulation and phonology screening processes will be presented and applied.

Prerequisites: SPTH 205 SPTH 350 SPTH 300

SPTH 357
Early Intervention
Three Credits
The course is an in-depth study of early communication development that occurs during the first years of life, starting with normal and pathological sensory development and developing all the way through pre-intentional conducts. Clinical observations at day care centers, Pediatric Centers of the Puerto Rico Department of Health, laboratory exercises, and small group discussions will be provided. Exposure to the service delivery system of Puerto Rico Early Intervention Program, Avanzando Juntos, will be provided.

Prerequisite: SPTH 255

SPTH 377
Stuttering Disorders in Children and Adolescents
Two Credits
The course centers on the study of fluency disorders and their characteristics in children and adolescents. Different theories about the etiology of fluency disorders will be compared. Intervention techniques for the correction of fluency disorders will also be presented.

Prerequisites: SPTH 205

SPTH 397
Voice Disorders in Children and Adolescents
Two Credits
The course centers on the study of voice normal aspects and disorders in children and adolescents. Topics include detailed analysis of phonation problems and their characteristics, causes, and maintenance factors, including organic, functional, and emotional aspects. Intervention

strategies for voice disorders will be studied and applied in controlled clinical experiences.

Prerequisites: SPTH 205, SPTH 300

SPTH 401
Screening of Speech and Language Disorders in Infants, Children and Adolescents
Three Credits
Students will study techniques and specific procedures for the design of screening activities for different environments, in order to perform communication screenings that will effectively predict and reduce the prevalence of speech and language problems in infants, children and adolescents.

Prerequisites: SPTH 205, SPTH 355, SPTH 255

SPTH 403
Treatment I: Basic Concepts in the Treatment of Communication Disorders
Two Credits
The course centers on studying the peripheral aspects that frame the therapy situation. It includes examination of the most basic and important aspects that should be considered when planning therapies.

Prerequisites: SPTH 205, SPTH 355, SPTH 255

SPTH 405
Treatment II: Related Conditions with Emphasis on ADD, Learning Disabilities, Autism and Other Pervasive Developmental Disorders
Two Credits
The course centers on the study of theories and practical knowledge needed to offer therapy services to children who present conditions associated with speech and language problems that are usually diagnosed during infancy, childhood or adolescence (DSM IV). These conditions include Attention Deficit Disorders with or without hyperactivity, learning disabilities, autism, and Pervasive Developmental Disorders.

Prerequisite: SPTH 255

SPTH 407
Treatment III: Severe Conditions
Two Credits
The course is an analysis of the required skills for the management of clients with severe conditions. It includes the study of clinical strategies that will allow development of functional communication skills in their clients. Students will also develop the necessary attitudes and skills for professional teamwork in service delivery to clients with severe handicaps.

Prerequisites: SPTH 255

SPTH 409
Treatment IV: Speech and Language Disorders Adolescents and Prevocationals
Two Credits
The course centers on the study and analysis of cognitive and linguistic development in adolescents, as well as the specific characteristics that are observed in adolescents with language and communication disorders. Emphasis is placed on strategies to help adolescents with language disorders in acquiring the communication skills needed to be effective in academic, social, and vocational environments.

Prerequisites: SPTH 255

SPTH 415
Reading and Writing Difficulties
Two Credits
This course is designed to provide the background and training that prepare SLPA's to support the development of (a) spoken language as a foundation for learning to read and write; (b) sound and word level awareness for grasping the alphabetic principle; (c) comprehension and formulation skills for using higher-order semantic and syntactic forms; and (d) knowledge of literate discourse structures for comprehending and producing coherent spoken and written texts.

Prerequisites: SPTH 255, SPTH 355, SPTH 405, SPTH 409

SPTH 440
Knowledge Integration in Speech-Language Therapy (3 credits)
The course presents a compendium of all relevant material presented in the specialty courses in order to better qualify students for the successful completion of the speech-language therapists board exam.

Prerequisites: All SPTH code courses except SPTH 415-401-305-254

Co Requisite: SPTH 450

SPTH 450
Clinical Practice I
Two Credits
Students will practice clinical skills previously learned in the pathology courses. During the course students will practice

in at least two clinical settings and will deliver speech and language therapy services to clients from 0 through 21 years of age.

Prerequisites: All SPTH code courses except SPTH 415-401-305-254

Co Requisite: SPTH 440

SPTH 451
Clinical Practice II
Three Credits

Students will refine the clinical skills acquired in Clinical Practice I, Treatment II, III and IV. During the course students will practice in at least two different clinical settings that serve populations with attention deficit, learning disabilities, severe language delays, and pervasive disorders. Screening techniques and procedures will be applied in clinical settings.

Prerequisite: SPTH 450

INTERNATIONAL SCHOOL OF INTERIOR DESIGN

The International School of Design (ISD) at UT initiated its operation as an administrative unit in 2006. Its first two degrees will be a Bachelor's Degree in Design with concentration in Industrial Design (BDes) and an Associate Degree in Fashion Design (AFD). The Dean will be the Chief Officer of the School, which has become the seventh academic unit of the institution. Initially the School will have an administrative director; later, it will hire a secretary and a student affairs coordinator. The ISD Faculty will report to the Dean who reports to the Vice-chancellor.

MISSION

Prepare leaders and professionals in the design field who are competitive and focused toward an international academic perception, critical, multidisciplinary, committed to debate, investigation, cultural content and to the technological merits of the designed object and its production technology.

VISION

To be known in Puerto Rico and internationally as leaders in the development of professionals in design with international and multidisciplinary perspectives, oriented toward the needs of the contemporary human being.

GOALS

The proposed program relates to the Institutional mission. The Programs goals are:

- Promote ethical and cultural values to enable students to make better use of their judgment, rights, and obligations.
- Establish international collaborations.
- Graduate well prepared students in the area of design
- Promote the uses of technology for design and production
- Establish collaborative relationships between the University and the external community by promoting research, and industrial relationships
- Fulfill the institutional mission through these goals.

FACULTY

Members of the faculty will be carefully chosen educators and practitioners with academic preparation and practical experience in the discipline. These faculty members will be chosen from design professionals with preparation and practice in the area.

Mercedita Andrew
Industrial Design Summer Studies, RISD, RI
BFA, Cum Laude, University of Puerto Rico, Mayagüez Campus
Ceramic and Industrial Design Studies, Rochester, NY
Summer Workshop at Boisbuchet, Vitra Design Museum, Lessac, France
MID, Master of Industrial Design, Pratt Institute, Brooklyn, NY

Sonia Bazán
BED, Environmental Design, UPR, Río Piedras
MArch, Architecture, University of Philadelphia
MA, Industrial Design
Elisava, Escola Superior de Disseny, Barcelona, Spain

Ufuk Ersoy
BArch, Architecture, Dokuz Eylul University, Izmir Turkey
MArch, Architecture, University of Pennsylvania, Philadelphia
Candidate PhD, Architectural Theory, University of Pennsylvania, Philadelphia

Maruja Fuentes / Instructor
BED, UPR, Río Piedras
MArch, Georgia Institute of Technology, Atlanta, GA

Ramón Gómez Aponte
BArch, Cornell University, Ithaca, NY

James Lynn Díaz
BA, Telecommunications, USC, Puerto Rico
MGA, Master in Graphics Arts, Atlantic College, Guaynabo, PR

Enrique Martínez
MArch, Escuela Técnica Superior de Arquitectura, Universidad Politécnica de Madrid
MID, Master of Industrial Design, RISD, RI

Aurorisa Mateo
BED, UPR, Río Piedras
MArch, Architectural Association, London, UK

María de los Ángeles Matos
BSc, Natural Sciences, UPR, Río Piedras
BA, UPR, Río Piedras
MFA, Sculpture, Universidad Autónoma de México, México

Clarissa Méndez
ED, Environmental Design, UPR, Río Piedras
MArch, Architecture, Virginia Polytechnic Institute, Virginia

Ileana Muñoz / Instructor
BFA, Image and Design, Escuela de Artes Plásticas de Puerto Rico
MGA, Master in Graphics Arts, Atlantic Collage, Guaynabo, PR

Alfredo Nieves Moreno
BA, Literature, UPR, Río Piedras
MA, Public Communication Major Contemporary Culture, USC, Puerto Rico

Celina Nogueras Cuevas
BA, Major Philosophy and History of Art, UPR, Río Piedras
MA, Theory of Art, University of Essex, UK

Lida Orta Anés
BS, General Science, UPR, Río Piedras
MP, Planning, UPR, Río Piedras
MA, Organizational Psychology, University of Michigan, Michigan
PhD, Environmental Health

Jorge Paricio
AAS, Fashion Design, The Altos de Chavón, Dominican Republic
BFA, Fine Arts Minor in Design, Universidad Complutense de Madrid, Spain
MA. Industrial Design, Pratt Institute, NY
PhD. Fine Arts, Universidad Complutense de Madrid, Spain

Maricelis Ramos
BED, Environmental Design, UPR, Río Piedras
MArch, Architecture, UPR, Río Piedras

Marxz Rosado
BFA, Sculpture, Escuela de Artes Plásticas de Puerto Rico
Master of Design, Domus Academy, Milan, Italy

José Fernando Vázquez Pérez
Cornell Slo-Mo Summer Program, Holland, Belgium and France
Cornell Rome Program
BArch, Cornell University, Ithaca, NY
MID, Master of Industrial Design, RISD, RI

Marcos Sousa Santos
BA Product Design, Fine Arts of Lisbon, Portugal

Anthony Whitfield
BA Fine Arts, Sarah Lawrence College, NY
MA, Fine Arts, CUNY, NY
MA, Urban Policy, New School for Social Research, NY

BACHELOR'S DEGREE IN DESIGN WITH CONCENTRATION IN INDUSTRIAL DESIGN (BDES)

The Bachelor's program in Industrial Design will focus on the design of objects that are used to assist us in daily activities, improve the quality of our lives, and bring pleasure, creativity and meaning to the world we see and the things we do. Students will be focused on multiple productions, from limited editions to mass market. Each student, based upon his or her general interests, will focus on the design of a range of products from furniture, appliances, wearable technology, electronics, lighting, table top items, and hardware tools to toys, human powered vehicles, devices for the elderly or disabled, to name a few areas. Particular attention will be placed on the issues of affordability, social justice, sustainability and environmental impact, and the relationship of those factors to export trade, tourism, and emerging markets.

The academic and professional orientation of the program enables students to learn different techniques in order to apply them to a diversity of clients. It also offers practical experience and business courses in order to prepare students to work in different industries or develop their own project.

The program has several distinct areas:

- General education component
- Core curriculum in design
- Business courses
- Environmental courses
- Practical experiences in different settings
- Concentration courses
- A close student-faculty interaction and academic counseling
- A distinguished faculty with experience as practitioners in the field

Program General Objectives of Bachelor's Degree in Design with Concentration in Industrial Design

The goals of the Bachelor's Degree in Design with Concentration in Industrial Design are:

- To provide students the knowledge to develop the skills to contribute to our society.
- To capacitate designers for a variety of settings.

Program Specific Objectives of Bachelor's Degree in Design with Concentration in Industrial Design

- To capacitate designers capable of developing their own industry.

- To develop designers capable of designing innovative products.
- To fulfill the needs of local industry.
- To provide designers capable of developing their own businesses and sensitive to ethical and integrity issues.
- To create design appropriate to clients' needs.

PROGRAM REQUIREMENTS

Students interested in applying for admission to the Bachelor's Degree in Design with Concentration in Industrial Design will be considered if they fulfill the following criteria:

- High school transcripts of credits, with a grade point average of at least 2.50 on a 4.0 scale. (25%)
- Results of the College Entrance Examination Board with 450 points or more on an 800 scale on each part (25%).
- An interview and drawing homework with the Admissions Committee (25%).
- Portfolio (15%).
- A personal statement of professional and educational goals (10%).
- Student must submit a $15.00 nonrefundable application fee.
- Students must comply with any other requirements established in the catalog by the U.T. Academic School.

ADMISSION REQUIREMENTS FOR TRANSFER STUDENTS

Students who have begun studies at other institutions need to complete the following requirements:

- Be in good academic standing at the previous institution where studies were initiated and must not have been subjected to any academic or disciplinary sanctions.
- Official credit transcript with admission application.
- Have at least twelve transferable semester credits with a minimum grade of C from another accredited institution.
- Fulfill all general admission criteria as stated above.

GRADUATION REQUIREMENTS

Students in the Bachelor's Degree in Design with Concentration in Industrial Design at Universidad del Turabo will be eligible to receive their degree after meeting the following requirements:

1. Completion of all courses required for the degree.
2. Completion of the number of credit hours required for the degree with a minimum Grade Point Average of 2.50. Students should obtain a grade of C or more in core and major courses. Students must comply with the retention standards established at the institution.
3. Completion and approval of a Portfolio.
4. All students who enter Universidad del Turabo will be subject to the graduation requirements in force during the year they are admitted. Nevertheless, if the curriculum is modified, the student must graduate from the new curriculum as was applied to its study program by the School.
5. Students must apply for graduation at the Registrar's office during the period established in the Academic Calendar. Students must also settle any debts to the Institution. No document certifying graduation will be given until documentation has been presented that there are no outstanding debts.

Commencement exercises will be held once a year, at the end of the second academic semester. Students who meet graduation requirements at the end of any term or a summer session may apply to the Registrar's office for certification to that effect.

ALUMNI PROFILE

Graduates from the Bachelor's Degree in Design with Concentration in Industrial Design will:

- Have the competence skills and knowledge in the industrial design.
- Be capable of working in a diversity of industries.
- Apply the ethical principles that rule the profession.
- Apply the environmental principles that rule the profession.
- Have the competence to select and create the appropriate design for the clients' needs.
- Be able to conduct research in the field.
- Have the knowledge to develop their own industry
- Be sensible to ethnological diversities and needs.

CURRICULUM

BACHELOR'S DEGREE IN DESIGN WITH CONCENTRATION IN INDUSTRIAL DESIGN (BDES)

Total Credits	**129**
General Education Courses	**48**
Core Courses	**15**
Major Courses	**60**
Electives Courses	**6**
General Education	**(48 credits)**

DESI 105	Freshman Seminar	3
ENGL 152	Oral Communication: Speaking	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
GEDE 300	Globalism and cultural integrity	3
HIDE 100	History of Art	3
HIDE 110	Representing Culture: Art and Artifact 1500-1850	3

HUMA 111	Civilization and Universal Culture I	3
INDI 316	Business Practice	3
MATH 170	Basic Geometry	3
PHSC 101	Introduction to Physical Science I	3
PHSC 102	Introduction to Physical Science II	3
SOSC 111	Community, Government and Social Responsibility I	3
SPAN 152	Writing Fundamentals	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Core Courses **(15 credits)**

DESI 121	Drawing I	3
DESI 130	Image Studio - B&W	3
DESI 131	Image Studio - Color	3
DESI 145	Communication Studio	2
HIDE 200	History of Design 1800-Today	4

Major Courses **(60 credits)**

DESI 140	Industrial Design 1 Form Studio	3
DESI 150	Industrial Design 2 - 3D Studio: Body, Space and Context	3
DESI 250	Industrial Design 3 Core Studio: concepts and realization I	4
DESI 251	Industrial Design 4 Core Studio: concepts and realization II	4
DESI 260	Technical Rendering; Measurement and Doc. Methods	2
DESI 270	Models I	2
DESI 271	Models II	2
DESI 280	Introduction to CAD and CAID I	2
DESI 281	Introduction to CAD and CAID II	2
DESI 300	Industrial Design 5 - Core Studio I	4
DESI 301	Industrial Design 6 - Core Studio II	4
INDI 280	Product Illustration	2
INDI 310	Rapid Prototyping I	4
INDI 315	Sustainable Practice	3
INDI 400	Thesis Studio I	5
INDI 401	Thesis Studio II	5
INDI 410	Portfolio Studio	2
INDI 480	Internship	3
SEDE 200	Material Survey and Properties I	2
SEDE 300	Material Survey and Properties II	2

Electives **(6 credits)**

BACHELOR'S DEGREE IN DESIGN WITH CONCENTRATION IN GRAPHIC DESIGN (BDES)

Total Credits	**124**
General Education Courses	**48**
Core Courses	**17**
Major Courses	**53**
Electives Courses	**6**

General Education **(48 credits)**

DESI 105	Freshman Seminar	3
ENGL 152	Oral Communication: Speaking	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
GEDE 300	Globalism and cultural integrity	3
HIDE 100	History of Art	3
HIDE 110	Representing Culture: Art and Artifact 1500-1850	3
HUMA 111	Civilization and Universal Culture	3
INDI 316	Business Practice	3
MATH 170	Basic Geometry	3
PHSC 101	Introduction to Physical Science I	3
PHSC 102	Introduction to Physical Science II	3
SOSC 111	Individuals, Community, Government and Social Responsibility	3
SPAN 152	Writing Fundamentals	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Core Courses **(15 credits)**

DESI 121	Drawing I	3
DESI 130	Image Studio - B&W	3
DESI 131	Image Studio - Color	3
DESI 145	Communication Studio	2
DESI 285	Digital Photography	2
HIDE 200	History of Design 1800-Today	4

Major Courses **(57 credits)**

GRAD 105	Typography I	3
GRAD 215	Typography II	3
GRAD 201	Graphic Communication Media	3
GRAD 202	Graphic Design Studio I	4
GRAD 210	Graphic Design Studio II	4
GRAD 310	Graphic Design Studio III	4
GRAD 315	Ethics and Legislation in Design	3
GRAD 320	Packaging Design	3
GRAD 325	Video Editing	3
GRAD 410	Senior Design Project I	5
GRAD 420	Senior Design Project II	5
GRAD 430	Portfolio Studio	2
GRAD 440	Internship	3
WEDE 100	Web Design and Graphics	4
WEDE 200	Web Artistic Graphical Design	4

Electives **(6 credits)**

BACHELOR'S DEGREE IN DESIGN WITH CONCENTRATION IN INTERIOR DESIGN (BDES)

Total Credits	**127**
General Education Courses	**48**
Core Courses	**15**
Major Courses	**58**
Electives Courses	**6**

General Education **(48 credits)**

DESI 105	Freshman Seminar	3
ENGL 152	Oral Communication: Speaking	3
ENGL 153	Advanced Communicative English	3

ENGL 231	Research and Writing	3
GEDE 300	Globalism and Cultural Integrity	3
HIDE 100	History of Art	3
HIDE 110	Representing Culture: Art and Artifact 1500-1850	3
HUMA 111	Civilization & Universal Culture	3
INDI 316	Business Practice	3
MATH 170	Basic Geometry	3
PHSC 101	Introduction to Physical Science I	3
PHSC 102	Introduction to Physical Science II	3
SOSC 111	Individuals, Community, Government and Social Responsibility I	3
SPAN 152	Writing Fundamentals	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Core Courses **(15 credits)**

DESI 121	Drawing I	3
HIDE 106	Dwellings: The Const. Environment, Pre Hist. to 1500	3
HIDE 200	History of Design 1800-Today	4
INTE 110	Principles and Fundaments of Design	3
INTE 115	Color Theory Application	2

Major Courses **(58 credits)**

INTE 210	Introduction to CAD and Computer Presentation	3
INTE 220	Interior Materials, Finishes and Specifications	3
INTE 225	Textiles Components and Applications	2
INTE 240	Plastic and Decorative Arts for Interior Design	2
INTE 310	Building Codes and Standards	2
INTE 320	Furniture Design	3
INTE 330	Lighting Design Studio	3
INTE 340	Building Systems and Construction Methods	3
INTE 150	Interior Design Studio 1	3
INTE 151	Interior Design Studio 2	3
INTE 250	Interior Design Studio 3	4
INTE 251	Interior Design Studio 4	4
INTE 350	Interior Design Studio 5	4
INTE 351	Interior Design Studio 6	4
INTE 400	Senior Design Project I	5
INTE 401	Senior Design Project II	5
INTE 410	Portfolio Studio	2
INTE 420	Internship	3

Electives **(6)**

DESCRIPTION OF COURSES

(Courses marked with @ could be offered in both modalities, traditional or on-line.)

DESI 105
Freshman Seminar
Three Credits

This course introduces students to the personal and academic development provided to them, in terms of activities, techniques and experience focused on the best way to help them manage, identify and develop personal and study skills which will promote personal and academic success. It is conceived as an introductory course in the various specialties in design programs and design careers. Ethics of the design process and profession will be discussed.

DESI 121
Drawing I
Three Credits

This studio course provides students with instruction in fundamental freehand drawing skills. Students will be working with models and other live subjects. The importance of sketching as a means of recording and demonstrating concepts and processes will be emphasized. The development of fundamental drawing skills will be stressed, and standard manual product illustration skills will be introduced. Pencil, charcoal, ink, pastels and watercolors will be used to render figures and objects. Developing an ability to convey volume, texture and form through line and gesture will be stressed.

DESI 130
Image Studio Black and White
Three Credits

The objectives of this course include the introduction of digital image making and graphic design software; the development of image research skills; the development of narrative presentation skills; and a cross-cultural introduction to information organization systems. These skills will be applied in various forms required of industrial designers, including simple instruction manuals, research documents, user scenarios, and various forms of presentation boards. Particular attention will be placed on typography and photographic imagery.

DESI 131
Image Studio Color
Three Credits

This course builds upon the curriculum of Image Studio - Black & White and introduces color into rendering and representation skills. Digital color imaging and printing skills are introduced and students will be taught basic digital

and film photographic documentation skills. In addition, they will learn traditional product illustration techniques, including marker and colored pencil techniques.

Prerequisite: DESI 130

DESI 140
Industrial Design 1 - Form Studio
Three Credits
This course focuses on the development of 3-dimensional forms. Issues of materiality, ergonomics, and user interface will be introduced through exercises that result in multiple iterations of a series of familiar typologies. Masses, volumes, containers, shells, and skins will be explored in various materials, alone and in combination. Particular attention will be placed upon the history of form as a manifestation of culture, environment, and technology.

DESI 145
Communication Studio
Two Credits
This course introduces industrial designers to information design and live presentation skills. Emphasis is given to desktop publishing and graphic design skills employed in the development of documents and presentation materials ranging from business cards and announcements to booklets, research documents, concept presentations, and exhibition materials. In addition, significant attention will be paid to students' live presentation skills. These presentations will be coached, scripted, videotaped, and critiqued.

Prerequisite: DESI 130

DESI 150
Industrial Design 2 - 3D Studio: Body, Space and Context with On-Line Module
Three Credits
In this design studio, students will be introduced to design methodologies that will form the basis of their training as industrial designers. Through a series of design projects and exercises, students will be introduced to issues of accessibility in relation to ability, physical and psychological development, gender, culture and environment. Ergonomics will be reintroduced. An on-line component will tie studio work to related literature, historical precedents, and research methodology.

Prerequisite: DESI 140

DESI 250
Industrial Design 3 - Core Studio: Concept and Realization I
Two Credits
Through lectures, design exercises, as well as individual and group projects, students will be introduced to the processes involved in the practice of industrial design. Students will also be taught professional methodologies through pin-ups and desk critiques. In the first semester this course will be focused particularly on the development of user scenarios, ideation, and concept presentation through the design of hand tools and other simple objects. Students will also be introduced to user interfaces and ergonomics. Design, art, and social history will be referenced throughout the course and students will be expected to complete a significant research project that address these factors in the development of their own work.

Prerequisite: DESI 150

DESI 251
Industrial Design 4 - Core Studio: Concept and Realization II
Two Credits
This course builds on the work done in DESI 250 - Industrial Design 3: Core Studio: Concept and Realization I, and further explores user-centered design, ergonomics, and legible interfaces, within the context of inclusive design. In addition, students will undertake projects that involve the inclusion of engineered mechanisms and external power sources.

Prerequisite: DESI 250

DESI 260
Technical Rendering: Measurement and documentation methods
Two Credits
This course will focus on the mastery of manual technical rendering skills as the basis for an understanding of the physical specificity of a designed object. The topic is approached as a decision-making and communication process. Students will be taught not only the tradition of manual drafting but the meaning of the language it embodies and the way that language translates in computerized terms. Students will develop portfolios of renderings that express a range of design decisions and construction specifications involved in the evolution of objects.

Prerequisite: DESI 150

DESI 270
Models I
Two Credits
This course introduces model making as a vehicle for the development and realization of design concepts. The uses of various forms of representation will be taught and contextualized, from sketch models to scaled representation and full scale appearance models. Professional standards will be stressed. Students will be

instructed in choice of materials, assembly, milling, sanding, priming, and the use of the lathe, vacuum former, bending machines, and the hot belt.

Prerequisite: DESI 150

DESI 271
Models II
Two Credits
This course builds upon the knowledge and skills learned in Models1. Students will incorporate those skills in the production of both appearance models and working prototypes. Complex, contextualized models will also be built. These projects will be executed by students, working individually and in teams.

Prerequisite: DESI 270

DESI 280
Introduction to CAD and CAID I
Two Credits
Students will be introduced to industry standard computer-aided design and computer-aided industrial design software that will provide students with the ability to produce detailed two-dimensional renderings of objects for industrial production. Studio Tools, Alias, Rhinoceros, Solidworks, and Ashlar Graphite will be taught. Particular attention will be paid to the integration of skills taught in this class with manual drafting skills.

Prerequisite: DESI 150

DESI 281
CAD and CAID II
Two Credits
In CAD and CAID II, students will be taught either Alias, a 3-D modeling and rendering program using Silicon graphic workstation (SGI), the IRIX operating system and the Alias studio package, or Solidworks, a 3-D parametric modeling and surfacing program. Through sequences of tutorials, students will develop familiarity with these programs. Through the use of these programs in the execution of a studio project, they will have direct experience in their application within a design process.

Prerequisite: DESI 280

DESI 285
Digital Photography
Two Credits
This course develops students' creative vision of the photographic composition which is necessary for application in the design world, beginning with analog photography and ending with digital photography. Students will work with different digital images formats. They will learn how to work with the most useful software in the digital images industry, as a tool for managing and manipulating digital images.

Prerequisite: GRAD 201

DESI 300
Industrial Design 5 - Core Studio I
Four Credits
This studio course draws upon all the skills and knowledge that students have amassed to date. Employing a design process taught in their sophomore year, students will develop mass-produced products for use by individuals in private life. Projects will include furniture, lifestyle accessories and electronics, as well as industry-sponsored collaborations. In this class students will research new materials and technologies and apply them in designs that address issues of utility, market niches, trends, inclusive design, sustainability and functionality.

Prerequisites: DESI 140, DESI 150

DESI 301
Industrial Design 6 - Core Studio II
Four Credits
This studio course draws upon all of the skills and knowledge that students have amassed to date. Employing a design process taught in their sophomore year, students will develop mass-produced products for use in the public realm. Projects will include a wide range of products, from street lighting to lavatory facilities, from human-powered transport to recycling receptacles, as well as industry-sponsored collaborations. In this class students will research new materials and technologies and apply them in the designs that address issues of public safety, codes and regulations, durability, utility, market niches, trends, inclusive design, sustainability and functionality.

Prerequisite: DESI 140, DESI 150, DESI 250, DESI 251, DESI 300

GEDE 300
Globalism and Cultural Integrity
Three Credits
This course focuses on the role of a global economy, ecology, and political circumstances on the designers' ability to effect change in various cultural context. Beginning with discussion of artesian traditions and designing to cultural specificity, this course proceeds through investigations of notions universal design, inclusive design, social entrepreneurship, cultural supremacy, technology and the impact of outsourcing and other shifts

in global economies on the physical culture of the 21st century.

Prerequisite: HIDE 100

GRAD 105
Typography I
Three Credits
Students will learn about the history of typography. Topics include classification, anatomy, and different types of typography. Students will study the different typographical expressions. They will analyze optical effects of typography, as well as the typographical measuring system. They will also learn to work with typographic composition and start to design their own typographies. Student will study the development of digital typography, from analog to digital processes and they will learn to convert these into vector images, using Bézier curves to create each character. Then using a conversion program, students will pass to True Type (TT), changing to a digital font. Students will learn about different international organizations that work in the development and study of typography.

Prerequisite: GRAD 201

GRAD 201
Graphic Communication Media
Three Credits
This is an introductory course on the fundamentals and concepts of the media of graphic communication. Students study different graphic communication media, such as digital video for multimedia works, graphic design, typography, effective communication for printing, design and composition of pages, illustrations, as well as the foundations of designs. Students stay current and study aspects and new developments in the publications. They will also analyze technological developments and how they are put in the context of traditional operations and within the emerging demands for methods and creations of design, management, programming and distribution.

GRAD 202
Graphic Design Studio I
Four Credits
The objective of the course is to provide students with basic knowledge about the history and evolution of graphic design up to the digital era. Students will learn how to work with design elements: image and typography. They will begin to differentiate between vector image and raster image. Students will use software to manage both types of images. They will also design simple publications, such as stationery, brochures, posters, shoppers, creative resumés, and newspaper advertisements. They will learn to select the suitable image format for the importation and exportation images among software in use.

Prerequisite: GRAD 201

GRAD 210
Graphic Design Studio II
Four Credits
Students will learn to diagram a publication of multiple pages. They will study the entire component of a publication in books, magazines, newspapers, shoppers, and brochures. Importation and management of digital images to all types of publications will he taught. Topics include the design of master pages, layers, typographic styles, columns and other elements of a digital publication. Students will also study and create grids.

Prerequisite: GRAD 202

GRAD 215
Typography II
Three Credits
In this course students will learn how to manage fonts in different platforms. Students will begin to recognize the various digital fonts in existence and how they are developed. They will learn how to manage these fonts in the different media available media, and to integrate typography as a design element and as an image. They will transport the text to the different software and learn all the specifications considered necessary to complete the task. Students will begin to create their own fonts library and use the internet as a searching tool to select fonts which are suitable for their design.

Prerequisite: GRAD 201

GRAD 310
Graphic Design Studio III
Four Credits
In this course students will obtain knowledge in the area of interface design, beginning with the creation of a nonlinear conceptualization in the graphic design area. They will work with dynamic design principles. Students' previous courses had a static basis; this course has a dynamic basis. Students will begin to work with the design of button, menus, bars, links and graphics in movement, while applying basic knowledge of design to a multimedia protect.

Prerequisite: GRAD 210

GRAD 315
Ethics and Legislation in Design
Three Credits
This course introduces students to legal and ethical issues that affect design. Topics examined include intellectual property, freedom of expression and contract law. Students will learn how to protect their rights, and equally importantly, how to lead the legal debate with the

identification of legal concepts and terms which apply to the practice of design. Basic legal issues of contract and property law within the creative context will be examined. Among the topics explored will be the work for hire agreement, the consignment agreement and the agency agreement. Copyright law, trademarks, and patents will also be explored. Issues such as registering a copyright, copyright infringement, registering a trademark and patents will be examined from the perspective of the designer in analog and digital design.

Prerequisite: HUMA 111

GRAD 320
Packaging Design
Three Credits
In this course students learn components and principles of packaging design. Topics include the history of the package and the importance of design elements (image and typography) on the packaging design. Students will recognize the importance of art as a design element, as are color, space, shape, texture, and lines. They will obtain knowledge of managing the different materials available for the creation of a package that can be designed and created by students. They will also study some of the rules and regulations established for package design, and will learn the different classifications that condition transportation and storage of packages.

Prerequisite: GRAD 210

GRAD 325
Video Editing
Three Credits
Students will begin to study the bases for linear and nonlinear video edition. The student will learn about the RGB color mode used in computer monitors and commercial television. They will learn logistics and techniques for video recording and the appropriate techniques for video editing. The student will know how to integrate text on the video screen and how to work with programs for digital video editing. Finally, the student will learn how to select from different system memories, storage systems, as well as the appropriate format for the project.

Prerequisite: WEDE 200

GRAD 410
Senior Design Project I
Five Credits
In this course, students begin a process based on professional practices that will result in the development and completion of a graphic design proposal. Design processes employed in earlier courses will be applied in the ideation, research, design documentation, and prototyping of the new product. Investigation of design trends and market research will be undertaken as students work toward innovation in their designs.

Prerequisites: GRAD 201, GRAD 202, GRAD 210, GRAD 310

GRAD 420
Senior Design Project II
Five Credits
This course is a continuation of work begun in the first semester. Students continue a process based upon professional practices that will result in the development and completion of a graphic design proposal. Design processes employed in earlier courses will be applied in the ideation, research, design documentation, and completion of a graphic design proposal. Investigation of design trends and market research will be undertaken as students work toward innovation in their designs.

Prerequisite: GRAD 410

GRAD 430
Portfolio Studio
Two Credits
This studio will focus on the preparation and refinement of a portfolio that encompasses the student's work within the program and in any other distinguishing activity. The goal will be the production of a refined, multifaceted presentation of the student's goals and creative vision, as manifestation of his or her ability to engage in professional practice.

Prerequisite: Completion of the third year Graphic Design BD

GRAD 440
Internship
Three Credits
All students will be required to take part in a professional internship that employs a wide range of skills and knowledge developed in this degree program. Each student will work with a department advisor to realize the potential of this experience fully, either in a graphic design company or by giving professional services to a graphic artist in a product realization.

Prerequisite: Completion of the third year Graphic Design BD

HIDE 100 @
History of Art
Three Credits
This course surveys the history of the representation of the human body as a record of the social, technological, environmental, and political circumstances of a period. The goal of this course is to establish among young designers an understanding of art as an expression of the desires, aspirations, needs, esthetics, and available resources of subjects/users throughout history. Human beings and their representations of the environment will be examined, from the earliest representations of humans, through current film and digital media that envision the future,.

HIDE 105 @
Fashion History
Three Credits
This seminar course is traces the development of fashion and body adornment in Asia, Africa, Europe, Greece and Roman Empire through the establishment of Paris, Milan, New York and Latin America as distinct fashion capitols, as well as the establishment of independent fashion centers across the globe. Economic, political, technological, environmental and cultural history will be discussed in relation to fashion's evolution.

HIDE 106 @
Dwellings: The constructed environments, Prehistory to 1500
Three Credits
This course examines the evolution of architecture and design as a production of human imagination. Through lectures, tutorials and research projects the students will understand the way in which architecture and design is always dominated by the exigencies of time and location and developed as a consequence of forces of economy, trade, war, political situations, religion, or the exchange of knowledge.

Prerequisite: HIDE 100

HIDE 110 @
Representing Culture: Art and Artifact 1500-1850
Three Credits
This course will study the history of art and objects in the contexts of one another, economics, industry and technology, culture, politics and sociology. Beginning in 1500, the migration of ideas around the globe will be explored in relationship to the evolution of design and art. Particular attention will be paid to moments when cultures intersect and the impact of those moments on the course of ideas and material culture.

Prerequisite: HIDE 100

HIDE 115
Western Culture I
Three Credits
In this course students will trace the development of Western civilization from its roots in ancient Near Eastern civilizations to the end of the Middle Ages. It is conceived as a course in the development of Western culture that will instill in the students an appreciation of the origins and importance of their culture.

HIDE 116
Western Culture II
Three Credits
This course traces the development of Western Civilizations from the Modern Age (the Renaissance) up to the present day. It is conceived as a course in the development of Western culture that will instill in the students an appreciation of the origins and importance of their culture.

HIDE 200 @
History of Design 1800-1945
Three Credits
Through lectures, tutorials and research projects students will be introduced to the history of design, from the industrial revolution through the innovations of WWII. Relationships between design, art, industry, environment, and culture will discussed as factors in the development of design. The rise of urbanism, history, politics and technological advances will be examined as pivotal influence in design.

Prerequisite: HIDE 100

HIDE 300
Design since 1945
Three Credits
This course surveys the history of design from 1945 up to today. Students will discuss design in both the industrialized Western world and the Far East. Topics introduced include the global who's who of designers, architects, cultural and national design organizations, and corporate icons. Design components, such as modernism, consumerism, reconstruction after World War II; nostalgia and heritage; social responsibility, and their influence on design will be researched. Industrial design as a powerful marketing tool that has captured the international consumer through culture, socioeconomics, politics, and technology will be examined.

INDI 280
Product Illustration
Two Credits
While digital presentation has assumed an undeniably central role in industrial design practice, the immediacy and

conceptual qualities of the hand drawn image contribute to the maintenance of its importance as a communication skill. This course stresses industry standards for industrial design representation and the integration of manual and digital skills. Pencil, marker, watercolor, and ink wash renderings will be taught. Students will be taught techniques that employ and manipulate these images in Photoshop and other digital programs. Students will develop a portfolio reflecting their competency.

Prerequisite: DESI 150

INDI 310
Rapid Prototyping I
Three Credits
Using either Alias or Solidworks, students will develop their rendering and specification skills for application in the use of 3-D prototyping technologies. Student will apply these skills to a series of projects, including the prototyping of products designed in their Core Studio.

Prerequisite: DESI 271

INDI 311
Rapid Prototyping II
Three Credits
This course builds upon the curriculum of Rapid Prototyping and is an individualized studio-based course in which students will combine traditional construction and rapid prototyping. Each student will produce short runs of a product designed for mass production in the Core Studio.

INDI 315
Sustainable Practice
Three Credits
This studio focuses on the goals and principles that frame a sustainable approach to design practice. From discussions, lectures and studio exercises, students will be introduced to the environmental issues raised in materials, production methods, distribution, use, and disposal involved in the products they design. In addition, human, business, institutional, political and cultural factors that pertain to the impact of design will be discussed.

Prerequisite: SEDE 200

INDI 316
Business Practices
Two Credits
This course will focus on business practices that impact Industrial design industries. Topics to be covered will include: team practices, organizational structures, market size, penetration and shares, competitive analysis, product line up, licensing, copyrights, patents, intellectual property, pricing and branding. Students will also be introduced to the development process and the uses and implementation of business plans.

INDI 400
Thesis Studio I
Five Credits
Students will engage in a two-semester long process, based upon professional practices, that will result in the development and prototyping of a complex, mass-produced product. Design processes employed in earlier courses will be applied in the ideation, research, design documentation, and prototyping of the new product. Investigation of design trends and market research will be undertaken as students work toward an innovation in their designs.

INDI 401
Thesis Studio II
Five Credits
This course is a continuation of work begun in the first semester. Students continue a process, based upon professional practices that will result in the development and prototyping of a complex, mass-produced product. Design processes employed in earlier courses will be applied in the ideation, research, design documentation, and prototyping of the new product. Investigation of design trends and market research will be undertaken as student work toward an innovation in their designs.

Prerequisite: INDI 400

INDI 410
Portfolio Studio
Three Credits
This studio will focus on the preparation and refinement of a portfolio that encompasses the student's work within the program and any other distinguishing activity. The goal will be the production of a refined, multifaceted presentation of the student's goals and creative vision and his or her ability to engage in professional practice.

Prerequisite: Completion of the third year.

INDI 480
Internship
Three Credits
All students will be required to take part in a professional internship that employs a wide range of skills and knowledge developed in this degree program. Each student will work with a department advisor to fully realize the potential of this experience.

Prerequisite: Completion of the third year.

INTE 110
Principles and Fundamentals of Design
Three Credits
This is an introductory course that presents the basic elements and principles of design. Focusing on the study of human perception, dimension, and spatial activity requirements, students will work on problem identification, research methods and sources, and the parameter of appropriate design solutions.

Prerequisite: Admission to School

INTE 115
Color Application Theory
Two Credits
This course introduces the student to color theory and its relationship to graphic and tridimensional composition. A systematic approach to selecting interior color is offered. In addition, students will develop coloring techniques for visual representation, rendering, and illustration.

Prerequisite: Admission to School

INTE 150
Interior Design Studio 1
Three Credits
This studio course introduces students to the design process, problem solving, small-scale one-space spatial organization, anthropometrics, and presentation techniques. Through lectures and design exercises, students will develop concepts to achieve interior design goals and apply theoretical knowledge and technical skills to their interior design solutions as they work on a variety of professionally relevant interior design projects.

Prerequisite: Admission to School

INTE 151
Interior Design Studio 2
Three Credits
This studio course builds up the skills developed in Interior Design Studio I. To continue to develop these skills, students will be given a series of projects of increasingly complexity, but at an elementary level. This course will also focus on the study of historical precedents and research methodology as fundamental parts of the design process.

Prerequisite: INTE 150

INTE 210
Introduction to Computer-Aided-Design
Three Credits
This course will introduce the use of computer-aided design and other industry related software, as standard tools for interior design illustration, drafting, and design development. Students will develop the skills and technical knowledge for the development of two-dimensional drawing and three-dimensional modeling of building interiors.

Prerequisite: INTE 151

INTE 220
Interior Materials, Finishes and Specifications
Two Credits
This course examines the functional and aesthetic properties of specific finishes for a given interior. It will also present materials in terms of history, uses and characteristics, ranging from wood, concrete, ceramics, metals, plastics, textiles and composites. Through lectures, demonstration, specific exercises and hands-on examination, students will be introduced to manufacturing techniques involved in the design and construction specifications of interior details and finishes.

Prerequisite: INTE 151

INTE 225
Textiles Components and Standards
Two Credits
The objective of this course is to introduce students to the types of textiles, fabrics, their components, the nature of synthetic and natural fabrics and their characteristics. Content includes discussion of yarns, fabrics, finishes, design methods, aesthetic applications, specifications, and their compliance to building codes and regulations.

Prerequisite: INTE 150

INTE 240 @
Plastics and Decorative Arts for Interior Design
Two Credits
This course introduces students to the examination of current use of plastic and decorative arts in the interior environment. Students will be introduced not only to current trends in style, art objects, contemporary artists and expressions, but also to the relationships and interconnections between current trends and the development of “taste” over the last years.

Prerequisite: INTE 151

INTE 250
Interior Design Studio 3
Four Credits
Through lectures, design exercises, pin-ups, and desk critiques, students will continue to develop skills in the design process. Topics include programmatic concerns involved in residential, commercial, and institutional

interior design projects. Students will develop projects at an intermediate level of complexity, emphasizing professional applications and the role of the interior designer as an environmental problem solver.

Prerequisite: INTE 151

INTE 251
Interior Design Studio 4
Four Credits
This studio course builds upon knowledge and skills learned in Interior Design Studio III. Students will incorporate the skills learned and will continue to develop them through design projects of increasing complexity. These projects will be carried out by students working individually and in teams.

Prerequisite: INTE 250

INTE 310
Building Codes and Standards
Two Credits
This course focuses on the study of physical requirements and code restrictions and how they form an integral part of the design criteria of every building project. Students will be introduced to the history of building regulations and learn how codes were developed, organized, and designed to secure uniformity and protect the public's interest, health, safety, and welfare.

Prerequisite: INTE 251

INTE 320
Furniture Design Studio
Three Credits
This course introduces students to the design process as it applies to furniture, focusing on furniture ergonomics, materials, construction and manufacturing techniques, and design. Students will research selected topics and design seating, work-service pieces, and cabinetry. Emphasis will be placed on the design process, detailing, documentation, and presentation techniques.

Prerequisite: INTE 251

INTE 330
Lighting Design Studio
Three Credits
This course offers a comprehensive study of the possibilities of lighting as one of the primary elements of the interior environment. Students will be introduced to various topics that influence lighting design decisions, such as properties of materials as they relate to light, codes and laws, lighting technologies, electricity and electrical distribution systems, and their application in the execution of a studio project.

Prerequisite: INTE 251

INTE 340
Building Systems and Construction Methods
Three Credits
This course introduces students to structural principles and construction methods of buildings. Ranging from concrete construction, prefabricated modules, wood and metal structures, students will familiarize themselves with these systems in order to make design decisions for the creation of an interior environment. In addition, they will study mechanical systems, such as ventilation, air conditioning, plumbing, and electricity, and the integration of these systems as design elements.

Prerequisite: INTE 350

INTE 350
Interior Design Studio 5
Four Credits
This studio course draws upon all the skills and knowledge that students have amassed to date. Students will deal with advanced problems in interior design, developing designs to the highest level of detail, integrating building systems, lighting, interior finishes, and colors. Energy conservation, sustainable materials, the psychological impact of spaces, and the meaning of place are important issues in this course.

Prerequisite: INTE 251

INTE 351
Interior Design Studio 6
Four Credits
Built upon knowledge and skills acquired in Interior Design Studio 5, this course emphasizes individual competence in the total design process. Students will be encouraged to make knowledgeable decisions to produce solutions reflecting a high level of achievement.

Prerequisite: INTE 350

INTE 400
Senior Design Project I
Five Credits
Students will engage in a two-semester long process, based upon professional practices. The goal is the development of an interior design project. Students are required to develop and submit a programmatic project proposal, with the approval and guidance of the Senior Design Project

Committee and faculty. Emphasis is placed on a high degree of complexity and challenge within the design project.

Prerequisite: INTE 350

INTE 401
Senior Design Project II
Five Credits
This studio serves as the second part of a two-studio sequence dedicated to the development and production of a major interior design project. Students continue the design project through the conventional phases of design development, documentation, and presentation. A written research component must accompany the drawings, as well as models and other presentation techniques.

Prerequisite: INTE 400

INTE 410
Portfolio Studio
Two Credits
This studio will focus on the preparation and refinement of a portfolio that encompasses the student's work within the program and any other distinguishing activity. The goal will be the production of a refined, multifaceted presentation of the student's goals and creative vision and his or her ability to engage in professional practice.

Prerequisite: Completion of the third year.

INTE 420
Internship
Three Credits
All students will be required to take part in a professional internship that employs a wide range of skills and knowledge developed in this degree program. Each student will work with a department advisor to realize the potential of this experience fully.

Prerequisite: Completion of the third year.

SEDE 200
Material Survey and Properties I
Two Credits
This seminar course will introduce students to the history, uses, and characteristics of materials ranging form woods, metals, and ceramics, to plastics, industrial textiles and composites. Through research assignments, selection exercises, lecture demonstrations, and hands-on examination, students will be introduced to the world's material culture, its history, application, and impact.

Prerequisite: DESI 250

SEDE 300
Material Survey and Properties II
Two Credits
This course builds on the curriculum of Material Survey and provides more in-depth analysis of material properties and their uses. Through lectures and research projects student will deepen their knowledge of material, paying particular attention to the way they behave when utilized with various material processes.

Prerequisite: SEDE 200

WEDE 100
Introduction to the Internet and XHTML
Four Credits
In this course, a number of topics are discussed in detail: computers versus software, performance issues, types of Internet connections, safety, security troubleshooting, composing effective mail, net etiquette, organizing information, introduction to e-comerce, customazing tools, chat and online syncronous communications, forums, and blogs. Also covered are: basic design publishing languages, such HTML and XHTML. Web design and publishing concepts will be introduced.

Prerequisite: GRAD 202

WEDE 200
Web Design and Graphics
Four Credits
This course focuses on the principles of Web usability, client purpose and needs as key elements in successful Web Design. Simplicity of design is introduced as a practical Web Design principle. Some of the topics covered are age loading time, graphics design for the Internet, writing for the web, document size and readability, fonts for the web, color schemes and visual impact, and site architecture vs. content. Students will be introduced to some software tools and effective web site navigation strategies.
Prerequisite: WEDE 100

SCHOOL OF SCIENCE AND TECHNOLOGY

The School of Science and Technology at Universidad del Turabo responds to the educational needs of a society undergoing rapid economic growth and technological development. The School provides a rich learning environment in which students may pursue programs of higher education that will advance their career objectives, while at the same time instilling the motivation to continue to learn and grow intellectually throughout life

It is the mission of the School to foster liberal education, to encourage the generation of knowledge and to contribute to the well-being of the community. The School promotes lifelong learning, research, social and professional responsibility, and growth. To these ends the School challenges students to think critically and intuitively, recognize and value diverse perspectives, and to solve problems creatively and with perseverance.

Three majors in natural sciences are offered: general science, biology (with tracks in microbiology, medical sciences and biotechnology), and chemistry. Each major offers basic courses as well as specialized and advanced courses in biology, chemistry, physics, and mathematics. A variety of electives are offered to ensure a well-rounded and complete education.

The objectives of the School are to:

1. Develop within graduates a broad proficiency in scientific knowledge and professional competence.
2. Provide high quality academic and practical training that will enhance the learning experience.
3. Develop in graduates the ability to think and analyze solutions for contemporary scientific problems using the scientific method.
4. Promote and develop research at all levels.
5. Prepare students to use modern technology and instruments in their careers.
6. Establish joint research projects with other institutions, national laboratories and industries, promoting diversity among students and faculty.
7. Foster lifelong learning and intellectual growth.
8. Instill in graduates a sense of values, which will foster responsible participation in civil and public affairs.

STAFF

Teresa Lipsett-Ruiz / Dean

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José Ducongé / Chair, Chemistry-Physics Department

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LABORATORY TECHNICIANS

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Angel Ojeda / Mathematics

Lilliam Ruiz / Mathematics

Francisco Rivera / Biology

Zulma P. Ortiz / Biology

Maritza Rodríguez / Biology

Carlos Neira / Physics

Francisco Díaz / Physics

Carmen Bonilla / Chemistry

Verónica Castro-Simmons / Chemistry

Ramón Polanco / Instrumentation

FACULTY

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MEd, University of Phoenix

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PROGRAMS OF STUDY

BACHELOR DEGREE IN NATURAL SCIENCE: GENERAL SCIENCE

Total Credits	**121-122**
General Studies Courses	**48**
Major Courses	**43-44**
Major Elective Courses	**18**
Free Elective Courses	**12**

General Studies Courses		**(48 credits)**
ENGL 152	Intermediate Comm. Skills	3
ENGL 153	Advanced Comm. Skills	3
ENGL 231	Research and Writing	3
HIST 232	Contemporary World Problems	3
HUMA 111-112	Universal Civilization and Culture	6
MATH 155	Pre-Calculus (Compendium)	8
GESC 105	Freshman Seminar	3
GESC107	Introduction to Computers for Science Students	3
GESC 264	Introduction to Scientific Research	3
PSYC 123	General Psychology	3
SOSC 111-112	Individual, Community, Government and Social Responsibility I and II	6
SPAN 152	Writing Fundamentals	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Major Courses(43-44 credits)

BIOL 203-204	General Biology I and II	8
BIOL ___	Any 300 level	3 or 4
CHEM 203-204	General Chemistry I and II	8
CHEM 351-352	Organic Chemistry I and II	8
MATH 221	Analytic Geometry and Calculus I	4
PHSC 203-204	General Physics I and II	8
PHSC 359	Modern Physics	4

Major Elective Courses (18 credits)

Major electives may be selected from the Science and Math courses offered in the School.

CHEM 311	Inorganic Chemistry	4
CHEM 385	Biochemistry	3
CHEM 386	Modern Techniques in Biochemistry	3
CHEM 365-366	Undergraduate Research in Chemistry I and II	3 or 6
CHEM 355-356	Practical Internship in Chemistry I and II	3 or 6
CHEM 451	Organic Synthesis	3
CHEM 475	Preparation for Chemistry Licensing	3
CHEM 485	Electrochemistry	3
CHEM 481	Introduction to Computational Chemistry	3
PHSC 359	Modern Physics	3
MATH 305-306	Probability and Statistics I and II	6
MATH 350	Linear Algebra	3
MATH 395	Differential Equations	3
ENCH 358	Environmental chemistry I	3
ENCH 359	Environmental Chemistry II	3
ENCH 362	Environmental Geochemistry	3
ENCH 370	Environmental Toxicology	3
BIOL 410	Introduction to Biotechnology	4
BIOL 450	Bioprocess Engineering	4
BIOL 460	Techniques in Biotechnology	4
BIOL 303	Human Biology I	4
BIOL 331	Developmental Biology	4
BIOL 332	Human Embryology	3
BIOL 333	Introduction to Marine Biology	4
BIOL 335	Biodiversity and Conservation	3
BIOL 345	Evolution	3
BIOL 347	Diagnosis & Control of Food Plant Diseases	4
BIOL 350	Biochemistry	4
BIOL 351-352	Practical Internship in Biology I and II	3 or 6
BIOL 357	Special Topics in Biology	3
BIOL 360	Ornithology	4
BIOL 366	Undergraduate Research in Biology II	3
BIOL 340	Genetics	4
BIOL 355	Cellular and Molecular Biology	4
BIOL 312	General Zoology	4
BIOL 318	Parasitology	4
BIOL 325	General Botany	4
BIOL 329	General Ecology	4
BIOL 367	Basic Biostatistics	3
BIOL 365	Undergraduate Research in Biology I	3
BIOL 304	Human Biology II	4
BIOL 322	Immunology	4
BIOL 320	Microbiology	3
BIOL 321	Food Microbiology	3
BIOl 323	Industrial Microbiology	3
BIOL 230	Fungi and Mankind	3
BIOL 310	Introduction to Animal Behavior	3

Elective Courses (12 credits)

*Prerequisites for BIOL 203-204 are the same as for MATH 151-152.

**Prerequisite for MATH 151-152 is: MATH 121 or a minimum of 70% on the departmental placement test or a minimum of 3 on the CEEB Advanced Test (Level 1) or a minimum of 700 on the CEEB Mathematics Achievement Test.

****The following courses are not accepted as major electives nor free electives: BIOL 101-102, MATH 100, 120, 121, 126, 155, 199, 200, PHSC 101-102 or their equivalents.

BACHELOR'S DEGREE IN NATURAL SCIENCE: BIOLOGY

Total Credits	**127**
General Studies Courses	**48**
Required Courses in Science & Math	**36**
Major Courses	**26**
Major Elective Courses	**11**
Free Elective Courses	**6**

General Studies Courses (48 credits)

ENGL 152	Intermediate Communication Skills	3
ENGL 153	Advanced Communication Skills	3
ENGL 231	Research and Writing	3
HIST 232	Contemporary World Problems	3
HUMA 111-112	Universal Civilization and Culture	6
MATH 155	Pre-Calculus (Compendium)	8
GESC 105	Freshman Seminar	3
GESC107	Introduction to Computers for Science Students	3
GESC 264	Introduction to Scientific Research	3
PSYC 123	General Psychology	3
SOSC 111-112	Individual, Community, Government and Social Responsibility I and II	6
SPAN 152	Writing Fundamentals	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Required Courses in Science and Math (36 credits)

BIOL 203-204	General Biology I and II	8
CHEM 203-204	General Chemistry I and II	8
CHEM 351-352	Organic Chemistry I and II	8
MATH 221	Analytic Geometry and Calculus I	4
PHSC 203-204	General Physics I and II	8

Major Courses		(26 credits)
BIOL 340	General Genetics	4
BIOL 355	Cellular and Molecular Biology	4
BIOL 312	General Zoology	4
BIOL 325	General Botany	4
BIOL 329	General Ecology	4
BIOL 365	Research in Biology	3
BIOL 367	Basic Biostatistics	3

Major Elective Courses (11-12 credits)

Option in Biotechnology

BIOL 410	Introduction to Biotechnology	4
BIOL 450	Bioprocess Engineering	4
BIOL 460	Techniques in Biotechnology	4

Option in Pre-Medical Sciences

BIOL 303	Human Biology I	4
BIOL 304	Human Biology II	4
BIOL 322	Immunology	4

Option in Microbiology

BIOL 320	General Microbiology	4
BIOL 321	Food Microbiology	3
BIOL 323	Industrial Microbiology	4

Other Electives

BIOL 230	Fungi and Humanity	3
BIOL 310	Introduction to Animal Behavior	3
BIOL 318	Parasitology	4
BIOL 331	Developmental Biology	4
BIOL 332	Human Embryology	3
BIOL 333	Introduction to Marine Biology	4
BIOL 335	Biodiversity and Conservation	3
BIOL 345	Evolution	3
BIOL 347	Diagnosis & Control of Food Plant Diseases	4
BIOL 350	Biochemistry	4
BIOL 351-352	Practical Internship in Biology I and II	3 or 6
BIOL 357	Special Topics in Biotechnology	3
BIOL 360	Ornithology	4
BIOL 366	Undergraduate Research in Biology II	3

Free Elective Courses (6 credits)

*Prerequisites for BIOL 203-204 are the same as for MATH 151-152.

**Prerequisite for MATH 151-152 is: MATH 121 or a minimum of 70% on the departmental placement test or a minimum of 3 on the CEEB Advanced Test (Level 1) or a minimum of 700 on the CEEB Mathematics Achievement Test.

****The following courses are not accepted as major electives nor free electives: BIOL 101-102, MATH 100, 120, 121, 126, 155, 199, 200, PHSC 101-102 or their equivalents.

BACHELOR'S DEGREE IN NATURAL SCIENCES: CHEMISTRY

Total Credits	**135**
General Studies Courses	**48**
Required Courses in Science and Math	**32**
Major Courses	**43**
Science and/or Math Elective Courses	**6**
Free Elective Courses	**6**

General Studies Courses		(48 credits)
ENGL 153	Advanced Comm. Skills	3
ENGL 231	Research and Writing	3
ENGL 331	Public Comm. Skills and Oral Pres.	3
HIST 232	Contemporary World Problems	3
HUMA 115-116	Western Civilization: Puerto Rico	6
MATH 155*	Pre-Calculus (Compendium)	8
GESC 105	Freshman Seminar	3
GESC107	Introduction to Computers for Science Students	3
GESC 264	Introduction to Scientific Research	3
PSYC 123	General Psychology	3
SOSC 111-112	Individual, Community, Government and Social Responsibility I and II	6
SPAN 152	Writing Fundamentals	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3

Required Courses in Science & Math		(32 credits)
BIOL 203-204	General Biology I and II	8
PHSC 203-204	General Physics I and II	8
PHSC 359	Modern Physics	4
MATH 221	Calculus and Analytical Geometry I	4
MATH 222	Calculus and Analytical Geometry II	4
MATH 223	Calculus and Analytical Geometry III	4

Major Courses		(43 credits)
CHEM 203-204	General Chemistry I and II	8
CHEM 221	Analytical Chemistry	4
CHEM 351-352	Organic Chemistry I and II	8
CHEM 311	Descriptive Inorganic Chemistry	4
CHEM 430	Instrumental Analysis	4
CHEM 463-464	Physical Chemistry I and II	8
CHEM 390	Spectroscopy	3
CHEM 385	Biochemistry	4

Elective Courses in Science		(6 credits)
BIOL 320	General Microbiology	4
BIOL 321	Food Microbiology	3
CHEM 355-356	Practical Lab Internship in Chemistry I and II	3/6
CHEM 365-366	Undergraduate Research in Chemistry	3/6
CHEM 385	General Biochemistry	3
CHEM 386	Modern Techniques in Biochemistry	3
CHEM 411	Advanced Inorganic Chemistry	3
CHEM 451	Organic Synthesis	3
CHEM 475	Preparation for Chemistry Licensing	3

CHEM 485	Electrochemistry	3
CHEM 481	Computational Chemistry	3
MATH 215	Scientific Computer Programming	3
MATH 305-306	Probability and Statistics I and II	6
MATH 350	Linear Algebra	3
MATH 395	Differential Equations	3
ENCH 358	Environmental Chemistry I	3
ENCH 359	Environmental Chemistry II	3
ENCH 362	Environmental Geochemistry	3
ENCH 367	Environmental Hydrogeology	3
ENCH 368	Environmental Research	3
ENCH 370	Environmental Toxicology	3

Free Elective Courses** **(6 credits)**

*A minimum of 700 points on the CEEB Mathematics Achievement Test is required, otherwise the student should take MATH 151 and MATH 152.

**The following courses are not accepted as major electives nor free electives: BIOL 101-102, MATH 100, 120, 121, 126, 155, 199, 200, PHSC 101-102 or their equivalents.

COURSE DESCRIPTIONS

(Courses marked with @ could be offered in both modalities, traditional or on-line.)

BIOL 101-102 (for non-majors) @
Introduction to Biological Science I and II
Six Credits

Study of the basic biological principles, using the levels of biological organization. The course studies the chemical context of life, the structure and function of macromolecules, the cell functionality and the principal metabolic process. The study of the human anatomy and physiology of circulatory, respiratory, digestive and urinary systems are covered. The second part of the Biological Science curse, focuses on the human anatomy and physiology of nervous, endocrine and reproductive systems. Also, an overview of animal reproduction and development is discussed. The course studies Mendelian inheritance and the molecular basis of inheritance. Finally, an introduction to ecology, taxonomy and evolution is discussed.

BIOL 103 @
Biology for Health Science Students
Three Credits

Science course that prepares the student to acquire the fundamental concepts of the Biology Science such as: matter characteristics, the cell, introduction to Physiology, Human Anatomy and introduction to genetics. Said course is offered to the Health Science students.

BIOL 200 @
Principles of Human Anatomy
Three Credits

The course is an introduction to the study of nervous, muscular, and osteoarticular systems. Emphasis is placed on the relationship of these systems to the development of language and speech.

Prerequisite: BIOL 103

BIOL 203-204
General Biology I and II
Eight Credits

The course covers basic biology for natural science students. It includes the study of the diversity of organisms, with emphasis on their ecology, evolution, cellular biochemistry, genetics, and fundamental aspects of their structure and function. Three hours of lecture and one three-hour laboratory per week.

BIOL 230
Fungi and Mankind
Three Credits

The course covers fungi characteristics, diversity, and their impact on humanity. The main focus will be on the importance of fungi for humans and for ecosystems. In addition, concepts related to the fields of medicine and industry will be discussed.

Prerequisites: BIOL 102, BIOL 203 or CHEM 204

BIOL 300
Microbiology for Health Sciences Students
Four Credits

The course of Microbiology for Health Sciences Students offers an overview of the world of microorganisms and the techniques to study them and focus on the relationship of microorganisms with human beings from the medical perspective. Course topics include the discussion of the basic features of microorganisms (e.g. fungi, algae, bacteria and viruses) and the fundamental concepts of microbiology areas such as: Bacteriology, Mycology, Virology, Parasitology and Immunology. The course emphasizes on pathogenic microorganisms and the diagnosis of infectious diseases. Also ethical issues are discusses and analyzed regarding the management, manipulation of microorganisms and the application of modern techniques to study them and health consequences.

Prerequisite: BIOL 103

BIOL 303-304
Human Biology I and II
Eight Credits
The course integrates the study of the structure of the human organism, its development and histology, with the function of organs and systems. Also, other medical aspects discuss are: anatomical anomalies and issues related to health. It emphasizes cellular concepts, histological structures, and the study of Osteoarticular, muscle and nerve systems, targeting students to value life, human dignity, respect, integrity, justice and responsibility of every human being. Laboratory experiences will allow students to understand the concepts of human anatomy and physiology of special senses, endocrine, cardiovascular, respiratory, digestive, urinary and reproductive systems. Activities include histology and dissection of the components of each system. Laboratory exercises will allow the development of skills in the use of equipment, interpretation of results and demonstration of the relationship between anatomy and human physiology. Three hours of lecture and one three-hour laboratory per week.

Prerequisites: BIOL 204 or BIOL 103

BIOL 310
Introduction to Animal Behavior
Three Credits
Introduction to animal behavior, emphasizing the evolution, neurophysiology, genetic, ecology, behavioral development, as well as behavioral patterns, mechanisms, functions and learning processes related to behavior and human ethology. It will discuss some aspects of the correct scientific and ethical use of experimental animals.

Prerequisite: BIOL 204

Recommended: BIOL 329, BIOL 340

BIOL 312
General Zoology
Four Credits
Study of different animals groups with emphasis on taxonomy, morphology, physiology, ecology, evolution and an integrated ethical vision.

Prerequisite: BIOL 204

BIOL 318
Parasitology
Four Credits
Introduction to parasitology studying aspects of taxonomy, ecology, evolution, clinical and epidemiology of parasites important to humans. The course pretends to cover general parasitology, but taking into special account those parasites prevalent in the Caribbean, most specifically in Puerto Rico and to the ethical principles that guide the technical practices for the study of parasites.

Prerequisite: BIOL 204

BIOL 320
Microbiology
Four Credits
General microbiology course is aimed at students of biology and General Science interested in learning about the microbial world. In this introductory course students will study the morphology, taxonomy, ecology and the fundamental characteristics of microorganisms (e.g. bacteria, fungi, algae, protozoa and viruses) physiology. It also explores the basic techniques of enrichment, selection, isolation, enumeration and identification of microorganisms. The course not only discusses the ability of microorganisms to cause diseases, but also highlights its role in research, the ecosystem and the economy. Also, ethical issues will be discussed and analyzed regarding the management, handling of microorganisms and the application of modern techniques and their impact on health, the environment and the economy. Three hours of lecture and four hours of laboratory per week.

Prerequisites: BIOL 204, CHEM 352

BIOL 321
Food Microbiology
Three Credits
The course discusses the physical and chemical factors affecting the microbiology of food such as pH, activity of water, oxidation-reduction potential and nutrients. The course studies the different groups of microorganisms such as: fungi, bacteria and viruses and the interaction of these with food (e.g. grain, red meat, beef and chicken, seafood, vegetables and dairy products). Selected topics of the course are aimed to understand how pathogens cause disease, how food poisoning is transmitted and how can it be controlled. The course emphasized the industrial aspect and the role of microorganisms in the manufacture of foods such as bread, dairy products, alcoholic beverages, etc. Current food microbial issues related to food preservation and safety regulations are discussed in the course. During the course students will explore and analyze ethical issues related to the management and manipulation of microorganisms with a special interest in the manufacture of food, public health, microbiological sanitation and future challenges.

Prerequisites: BIOL 320 or BIOL 300

BIOL 322
Immunology
Four Credits
In the Immunology course fundamental concepts are discussed in which historical, evolutionary, cytological, anatomical, physiological and clinical aspects of immunology are explore. The course examines how the body responds and what are the immunological mechanisms employed against the infections by bacteria, viruses, and other foreign materials. Also, aspects about cellular mediating immunity in health and diseases are discussed. The topics in the course cover fundamental aspects of molecular and cellular immunology areas and present applications and technologies used in modern medicine. The course raises ethical issues related to the implementation and development of technologies for the control of infections and invasions of hazardous biological agents and other foreign materials.

Prerequisites: BIOL 204, CHEM 204

BIOL 323
Industrial Microbiology
Four Credits
This courses deals with the use of microorganisms in industry, particularly in the manufacture and quality control of different pharmaceutical products. It also provides the student with an introduction to bioprocess, regulations, GMP, and GLP.

Prerequisites: BIOL 320, BIOL 350

BIOL 325
General Botany
Four Credits
The General Botany course presents basic concepts of plant biology focusing on the structure, function, reproduction and evolution of plants. Issues related to the role of plants in the environment and human activities will also be discussed. During the course students will discuss issues and current ideas on plants and agriculture, horticulture, medicine, biotechnology, ecology, conservation and environmental issues. Students will identify and analyze ethical concerns about the consequences of scientific research, the protection of plant diversity and its habitats in the development of life and the environment.

Prerequisite: BIOL 204

BIOL 329
General Ecology
Four Credits
Study of the fundamental concepts and principles of terrestrial ecology. The student will apply these ecological concepts to Puerto Rico's ecosystems. They will visit local ecosystems and will use ecological techniques in the laboratory and the field. These techniques are based on environmental ethical principles.

Prerequisites: BIOL 204, MATH 152 (or MATH 155) or BIOL 367

BIOL 331
Developmental Biology
Four Credits
The study of the organismal, cellular and molecular aspects of animal and plant development.. Three hours of lecture and three hours of laboratory per week.

Prerequisite: BIOL 340

BIOL 332
Human Embryology
Three Credits
Study of pre-natal normal development from the fertilized egg to a multicellular entity. Also includes the origin and causes of embryo malformations.

Prerequisite: BIOL 204

BIOL 333
Introduction to Marine Biology
Four Credits
Study of the biology of marine plants and animals, and the relationship with the environment. Introduction to the study of marine provinces and costal ecosystems of Puerto Rico and the world, promoting the ethical principles. Three hours of lecture and a three-hour laboratory per week.

Prerequisite: BIOL 204

BIOL 335
Biodiversity and Conservation
Three Credits
The course examines the genetic and ecological principles and the concepts of island biogeography as they relate to endangered species conservation, the management of small populations and the value of protected areas. Strong emphasis is placed on sociological, economic and political components of species conservation.

Prerequisites: BIOL 204, BIOL 329

BIOL 340
Genetics
Four Credits
The course deals with principles of heredity with emphasis on structure of genetic material, mechanism of transmission, cytonetics, evolution, and population genetics.

Prerequisite: BIOL 204

BIOL 345
Evolution
Three Credits
Introduction of living things evolution, focusing on genetic basis of evolution, genetic variation, reconstruction of phylogeny, natural selection, origin of species, geological history, human, cultural and future evolution and intervention of modern technologies in the evolutionary processes. Discussion of present and future ethical conflicts in the evolution direction.

Prerequisite: BIOL 340

BIOL 347
Diagnosis and Control of Food Plant Diseases
Four Credits
The course centers on the study of methods and techniques used in the diagnosis and control of diseases of tropical food plants. The identification to genera and sometimes to species of plant pathogens will be conducted using symptoms and signs under field conditions, as well as through microscopic observations and the use of taxonomic keys in the laboratory. Special attention will be devoted to control measures for important plant diseases. One hour of lecture and six hours of laboratory per week.

Prerequisites: BIOL 204 and/or BIOL 230

BIOL 349
Pathology of Food Plants
Four Credits
The course centers on the study of diseases of food plants. Emphasis will be placed on diseases of tropical food plants; their hosts, symptomatology, etiology, disease cycle, epiphytology, distribution, economic importance and control. Three hours of lecture and three hours of laboratory per week.

Prerequisite: BIOL 325

BIOL 350
Biochemistry
Four Credits
The course covers the chemistry and metabolism of organic molecules and their relation to the regulation and processes of organisms, cells, and sub-cellular components.

Prerequisites: BIOL 204, CHEM 352 or CHEM 225

BIOL 351
Practical Internship in Biology I
Three Credits
The course is a practical internship in another university institution, private industry, or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization by the dean of the School of Science and Technology.

BIOL 352
Practical Internship in Biology II
Three Credits
The course is a practical internship in another university institution, private industry or government agency. A minimum of sixty (60) hours in required.

Prerequisite: A written authorization by the dean of the School of Science and Technology.

BIOL 355
Cellular and Molecular Biology
Four Credits
The Cellular and Molecular Biology course is an introductory one, where the basic properties of cells, organelles and molecules that determine their structures and functions are discussed. Also examines the properties of the system of differentiated cells and tissues. The main objective of the course is to provide students with a basic knowledge of structural and functional properties of the cells. From this fundamental perspective, students are introduced to important issues related to cell biology, microbiology, biochemistry, genetics and biotechnology. During the course students will identify and analyze ethical problems related to research and application of modern techniques in molecular and cellular biology.

Prerequisite: BIOL 204

BIOL 357
Special Topics in Biology
Three Credits
The course centers on discussion of topics in modern biology. A topic will be discussed each semester, using recent scientific publications. Topics may include

Biotechnology, Conservation Biology, Biodiversity, Applied Microbiology, and Applied Ecology, among others.

Prerequisite: BIOL 204

BIOL 360
Ornithology
Four Credits
The course deals with the biology of birds, including their functional morphology, physiology, behavior, ecology, biogeography, evolution, taxonomy, natural history, and conservation, with emphasis on New World families. The laboratory includes examination of bird internal anatomy and external morphology, ecology and behavior, as well as taxonomy and field identification. Independent projects emphasize research skills.

Prerequisites: BIOL 204, BIOL 312

BIOL 365
Undergraduate Research in Biology I
Three Credits
During the course of Undergraduate Research students will learn the basic concepts of biology research using the scientific method. The course provides the opportunity for the students to play an active role in developing a project plan, gathering relevant information, organizing and synthesizing information to answer the research questions posed, interpreting the implications of the information generated by the research, applying generated information in practice and disseminating results. These activities will be undertaken through the learning of basic laboratory techniques, as well as the compilation and analysis of scientific information. During the course students may address ethical issues that are aimed to create a responsible conduct in research. The work schedule should last one semester, and should not exceed nine (9) hours per week.

Prerequisite: GESC 264, BIOL 367. One course of the third year level in biology plus recommendation of the researcher.

BIOL 366
Undergraduate Research in Biology II
Three Credits
The course is a continuation of scientific laboratory and/or field research. The weekly schedule will be agreed upon by each student and the professor chosen to supervise the research. The work schedule should not exceed nine (9) hours per week and should last one semester.

Prerequisite: One course of the third year level in biology plus recommendation of the researcher.

BIOL 367
Basic Biostatistics
Three Credits
The course is a study of biological data collection, grouping, analysis, and interpretation. Students will understand fundamental statistics techniques for table and graph presentations, measures of central tendency and dispersion, probability distribution, experimental design hypothesis testing, linear regression and contingency test. They will also practice the application of a computer package to perform analyses. Each student will be required to select and analyze real life science data for a project.

Prerequisites: BIOL 204, MATH 155

BIOL 410
Introduction to Biotechnology
Four Credits
The course is intended primarily for senior undergraduate students. It provides an overview of industrial biotechnology and will include lab safety, ethical aspects, and documentation.

Prerequisites: BIOL 204, CHEM 204

BIOL 450
Bioprocess Engineering
Four Credits
Topics covered in the course include a basic instruction in plant design and support equipment in industrial biotechnology, general building design, water systems, HVAC, steam generators for sterilization, and biowaste decontamination systems.

Prerequisite: BIOL 410

BIOL 460
Techniques in Biotechnology
Four Credits
The course will provide the students with general concepts and procedures employed in a Biotechnology laboratory. Emphasis is placed on the procedures and equipment used to separate, purify, and quantify biological molecules (proteins, lipids, and nucleic acids) using hands-on experiences. Some of the techniques presented are spectrophotometry, electrophoresis, chromatography, PCR, cloning, ELISA, and sequencing.

Prerequisites: BIOL 410, BIOL 355

CHEM 203
General Chemistry I
Four Credits
Emphasis in this course is aimed to the study of the states of the matter, atomic and molecular structures, nomenclature of inorganic compounds, classification of elements in the periodic table, chemical bond, chemical equations and reactions, stoichiometry. In the laboratory students are trained in the use of basic laboratory techniques such as the use of volumetric equipment, titration and qualitative analysis. Students are taught to keep a good laboratory notebook and safety on the laboratory.

Co-requisites: MATH 151 or MATH 155

CHEM 204
General Chemistry II
Four Credits
Emphasis in this course is aimed to the study of intermolecular forces, properties of solids and liquids, solutions: types and properties, way to express concentration of solutions, chemical kinetics, chemical equilibrium, acid-base reactions, thermodynamics and electrochemistry including discussion of oxidation-reduction reactions. In the laboratory students are trained in the use of basic laboratory techniques such as the use of volumetric equipment, titration and qualitative analysis. Students are taught to keep a good laboratory notebook and safety on the laboratory.

Co-requisite: MATH 152

CHEM 221
Analytical Chemistry
Four Credits
Principles of quantitative analysis. Material presented includes gravimetric, volumetric, spectrophotometric and electrochemical methods of analysis. Separation techniques including chromatography are discussed. Statistical analysis of data is discussed. Theoretical explanations of neutralization (acid-base), solubility of precipitates, reactions of complex formations, oxi-reduction reactions, spectroscopy, and graphical methods to visualize the chemistry involved are emphasized.

Prerequisites: CHEM 204, MATH 152 or MATH 155

CHEM 224
Fundamentals of General Chemistry
Four Credits
Study of the principles of General Chemistry designed for students of health related professions. The course includes topics about measurement systems, matter and energy, chemical reactions, atomic and molecular structure, chemical bonds, radioactivity, stoichiometry, solutions, liquid and gas states, chemical equilibrium, chemical kinetics, acids and bases.

Prerequisite: MATH 120

CHEM 225
Fundamentals of Organic and Biological Chemistry
Four Credits
Study of the principles of Organic and Biological Chemistry designed for students of health related professions. The course Includes topics about structure and reactions of saturated organic compounds: alkanes, cycloalkanes and haloalkanes. Structure and reactions of unsaturated compounds: alkenes, alkynes and dienes. Stereochemistry. Structure and reactions of aromatic compounds. Structure and reactions of organic compounds containing oxygen, nitrogen and sulfur: alcohols, ethers, aldehydes and ketones, carboxylic acids, amines, amides, sulfur compounds and thiols. Structure and functions of lipids, aminoacids, proteins, enzymes and nucleic acids. Metabolic pathways and energy production.

Prerequisite: CHEM 224

CHEM 311
Descriptive Inorganic Chemistry
Four Credits
Study of the chemistry of all of the elements and their compounds, based on the discussion of their structures. The formation of the different types of bondings is discussed from the point of view of the Molecular Orbital and Valence Shell theories. The concept of symmetry and point group are introduced and applied to the molecular geometry, and vibrational spectra of inorganic compounds. The physical and chemical properties associated with the electronic configuration of atoms and molecules are studied. The elements and their compounds are described by families, generalizing and explaining their periodic tendencies. The electronic structure, bonding, as well as the spectroscopical and magnetic properties of the transition elements are discussed, along with their applications to other systems.

Prerequisites: CHEM 204, MATH 221

CHEM 351
Organic Chemistry I
Four Credits
The Organic chemistry course studies the carbon and hydrogen compounds and its derivatives with others heteroatom such as: halogens, oxygen, nitrogen, sulfur, phosphorus and some metals.This course discusses the nomenclature and physical properties of the different families of organic compounds. The synthetic methods and the reactions of the alkanes, alkenes, cycloalkanes, alkynes,

dienes, alkyl halides, aromatic compounds, and derivatives are also presented. Emphasis is done the reactions mechanisms, specially: SN1, SN2, E-1, E-2, double and triple bonds additions, electrophilic aromatic substitutions in benzene and its derivatives, alcohols dehydration, aldol condensation, Cannizzaro reaction, epoxidation of alkenes, Sandmeyer reaction and Cope and Hofmann amines elimination.

Prerequisite: CHEM 204

CHEM 352
Organic Chemistry II
Four Credits

The Organic chemistry course studies the carbon and hydrogen compounds and its derivatives with others heteroatom such as: halogens, oxygen, nitrogen, sulfur, phosphorus and some metals. This course discusses the nomenclature and physical properties of the different families of organic compounds. The synthetic methods and the reactions of the alkanes, alkenes, cycloalkanes, alkynes, dienes, alkyl halides, aromatic compounds, and derivatives are also presented. Emphasis is done the reactions mechanisms, specially: SN1, SN2, E-1, E-2, double and triple bonds additions, electrophilic aromatic substitutions in benzene and its derivatives, alcohols dehydration, aldol condensation, Cannizzaro reaction, epoxidation of alkenes, Sandmeyer reaction and Cope and Hofmann amines elimination. With respect to the compound structure, the course discusses the structural, geometrical and optical isomerism, emphasizing the conditions that have to be fulfilled for them to exist. The spectroscopic method of analysis and identification of functional group and structure assignment are discussed. Specifically IR , UV, NMR and MS spectroscopy.

Prerequisite: CHEM 351

CHEM 355
Practical Internship in Chemistry I
Three Credits

Practical internship in another university institution, private industry or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization from the Dean or Associate Dean of the School of Science and Technology.

CHEM 356
Practical Internship in Chemistry II
Three Credits

The course is a practical internship in another university institution, private industry or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization from the Dean or Associate Dean of the School of Science and Technology.

CHEM 365
Undergraduate Research in Chemistry I
Three Credits

This is a scientific laboratory and/or field research. The weekly schedule will be agreed upon by each student and the professor chosen to supervise research. The work schedule should not exceed nine (9) hours per week and should last one semester.

Prerequisite: Authorization from the Department Chair.

CHEM 366
Undergraduate Research in Chemistry II
Three Credits

This is a scientific laboratory and/or field research. The weekly schedule will be agreed upon by each student and the professor chosen to supervise research. The work schedule should not exceed nine (9) hours per week and should last one semester.

Prerequisite: Authorization from the Department Chair.

CHEM 383-384
General Biochemistry I and II
Eight Credits

The course deals with basic concepts of thermodynamics and their biochemical applications. It includes systematic discussion of biological macromolecules, such as proteins, enzymes, nucleic acids, carbohydrates and lipids structure, characterization, physical properties and methods of isolation. The pathways for the degradation and biosynthesis of the major classes of biological molecules will be discussed. The bioenergetic aspect of metabolism will be discussed first within the context of the whole catabolism and anabolism, the individual pathway, and enzymatic reactions. Three hours of lecture and three hours of laboratory per week.

Prerequisites: BIOL 203-204, CHEM 351-352

CHEM 385
General Biochemistry
Four credits

This course provides to the student a general overview of the basic concepts of Thermodynamics and their biochemical applications. In addition, systematic discussion of biological molecules, such as amino acids, proteins, nucleic acids, carbohydrates, and lipid structures, are discussed. Characterization, physical properties, and method of isolation of these molecules are studied. The pathways for the degradation and biosynthesis of the major classes of biological molecules will be discussed. The bioenergetic aspects of metabolism will be discussed first within the context of the whole catabolism and anabolism, individual pathways and enzymatic reactions.

Prerequisites: CHEM 352, BIOL 204

CHEM 390
Spectroscopic Methods for Organic Chemistry
Three Credits

This course serves to the students as training for the interpretation of spectroscopic data in the identification of molecular structures. This is an introductory course, where the fundamentals of Nuclear Magnetic Resonance (13C-NMR and 1H-NMR), Infrared Spectroscopy (IR), Ultraviolet Spectroscopy (UV), and Mass Spectrometry (MS) are discussed. When possible, practical experiments will be combined with theoretical discussion, in order to provide the students with more effective training.

Prerequisites: CHEM 221, CHEM 352

CHEM 411
Advanced Inorganic Chemistry
Three Credits

The course is an advanced study of transition metal compounds. The electronic structure, bonding, as well as the spectroscopic and magnetic properties of the transition elements are discussed, along with their applications to other systems. Several aspects of bioinorganic chemistry are studied, particularly the function of inorganic elements and inorganic compounds in living systems. Supramolecular chemistry is also discussed.

Prerequisites: CHEM 311, CHEM 464

CHEM 430
Instrumental Analysis
Four Credits

Introduction to principles of electronics that a scientits must know to understand and use more efficiently modern instrumentation. Study of the theoretical aspects and practical applications of modern instruments used for chemical analysis.Includes study of Infrared, Ultraviolet and Visible spectroscopy. Also the different types of chromatography, atomic absorption and polarimetry. The methods using electrochemical analysis and those methods bases on the use of X-rays, mass spectrometry (MS), nuclear magnetic resonance (NMR), and electron sping resonance (ESR). Emphasis is placed in the usefulness to connect an instrument to a computer, and to process the amount of information obtained from and analysis.

Prerequisites: CHEM 221, MATH 221

CHEM 451
Organic Synthesis
Three credits

The course describes the synthesis of organic functional groups and carbon-carbon bond formation. It also focuses on different oxidation and reduction reagents and conditions, as well as on stereo chemical principles. Emphasis is placed on manipulation of functional groups, application of reaction sequences for specific synthesis of compounds, such as reaction mechanisms stereochemistry, conformational considerations and strategies, in order to provide the student with the necessary tools for solving synthetic problems using the elements of organic chemistry. Retrosynthesis analysis is thoroughly discussed and is applied to the synthesis of known compounds.

Prerequisites: CHEM 352, CHEM 464

CHEM 463
Physical Chemistry I
Four Credits

The course covers the basic principles and applications of thermodinamics of chemical systems. Calculations of thermodynamic magnitudes and functions in different processes are studied using the Principles and Laws of Thermodynamics. The concepts of temperature, work, heat, enthalpy, entropy, chemical equilibrium and ideal and real systems in gas and condensed phase are studied. It also analysis chemical reactions under thermodynamics view, establishing considerations about the energetic balance, its spontaneity and extension, in which they take place. The studies of homogeneous and heterogeneous systems in which the phase changes of the substances take place are also in the core of this course.

Prerequisites: CHEM 221, MATH 223, PHSC 204

CHEM 464
Physical Chemistry II
Four Credits
The Physical Chemistry II course is divided in two main topics: Quantum Mechanics and Kinetic. In the first topic introduces some of the basic principles of quantum mechanics. The concept of all properties of a system are expressed in terms of a wave function which is obtained by solving the Schrödinger equation will be studied. The calculations of molecules will make possible to understand the nature of the chemical bond. The application of quantum mechanics to spectroscopy, the study of the absorption and emission of electromagnetic radiation, will be treated at the end of this topic. The second topic is concerned with the rates and mechanisms of chemical reactions. The calculation of the rates of certain processes by use of a simple model of atoms and molecules in the gas phase for ideal and real gases will be elaborated.

Prerequisite: CHEM 463

CHEM 475
Preparation for Chemistry Licensing
Three Credits
This course is designed for chemistry students to succeed in the exams required by the State Department of Puerto Rico to grant the Chemist License. The course is a review of the main topics of General, Organic, Analytical and Physical Chemistry with emphases in the kind of questions that usually are presented in these exams. It also provides a valuable global vision of the concepts already covered in the core courses of the program reinforcing the main capabilities a Chemist should have to work and succeed in its future professional life, including ethical behavior and stress management.

CHEM 481
Introduction to Computational Chemistry
Three Credits
The course covers the principles of quantum mechanics and statistical mechanics, with a specific focus on applications in chemistry. The course will provide a rigorous background for understanding modern quantum mechanical calculations. A major goal is to illustrate how theory and experiment work together in the development of a viable model for the nano-world of atoms and molecules. However, while the primary concern of this course is an operational mastery of fundamental principles, the rich historical and philosophical background of quantum theory will not be neglected. As in all Physical Chemistry courses at Universidad del Turabo, development of problem solving and critical thinking skills are stressed.

Prerequisite: CHEM 464

CHEM 485
Electrochemistry
Three Credits
The Electrochemistry course discusses the theory and applications of electrochemical processes in solution and in the solid state. The first part of the course introduces some basic concepts and definitions, as well as the thermodynamics involved in electrochemical systems. Thermodynamic arguments will be used to derive expressions for the electric potential of cells and for solution-electrode interfaces. The course also covers the dynamic aspects of the electrochemical processes. Transport properties of electrolytes and the kinetics of electrochemical reactions will be discussed to explain the microscopic and macroscopic flux of electrons at the interface of an electrode and an ionic solution. The second part of the course will deal with the instrumental techniques used to perform electrochemical measurements. The fundamentals of these techniques will be explained in terms of the basic concepts discussed in the first part of the curriculum. Some applications, such as fuel cells, batteries, electrochemical sensors, catalysis, and corrosion will be presented in the last part of the course.

Prerequisite: CHEM 464

ENCH 358
Environmental Chemistry I
Three Credits
The course deals with basic principles of environmental chemistry. Topics include properties of chemical substances related to the environment, their transformation, degradation, and toxicity. Environmental toxicology principles and concepts are also introduced.

Prerequisite: CHEM 352

ENCH 359
Environmental Chemistry II
Three Credits
The course deals with characterization of specific contaminants. Natural environmental processes, including photosynthesis, atmospheric chemistry and soil contamination are also discussed.

Prerequisite: ENCH 358

ENCH 360
Environmental Analysis Techniques
Four Credits
The course covers the following topics: methods and techniques for the design and execution of sample plans in

diverse environmental systems covering air, soil, and water; preservation methods and sample analysis considering physical, chemical and microbiological parameters, and interpretation of results.

Prerequisite: ENCH 359

ENCH 362
Environmental Geochemistry
Three Credits
The course deals with the application of quantitative methods and physical-chemical analysis to the study of the distribution and movement of chemical elements in geological processes. Emphasis is placed on the transport and fate of organic and inorganic pollutants in earth.

Prerequisite: CHEM 464

ENCH 363
Atmospheric Chemistry
Four Credits
The course is an introduction to the chemical and physical processes determining the composition of the atmosphere and their implications for climate, ecosystems, and human welfare. Emphasis is placed on how anthropogenic activity has affected those processes.

Prerequisites: CHEM 204, PHSC 206

ENCH 367
Environmental Hydrogeology
Three Credits
The course is a survey of the geologic and hydrologic factors controlling the occurrence, movement, and chemical quality of ground water. Topics include physical, chemical, and biological characteristics of surface and subsurface water, aquifer characterization, runoff processes, fluvial processes, water supply and consumption, contaminant transport, and remediation techniques.

Prerequisite: CHEM 464

ENCH 368
Environmental Research
Three Credits
The course centers on the study of basic concepts of research in environmental chemistry. Emphasis is placed on basic research techniques and the search for scientific information.

Prerequisite: Authorization from the Department Chair.

ENCH 370
Environmental Toxicology
Three Credits
The course centers on a study of the distribution of toxic agents in the environment. Emphasis is placed on the transport, bioaccumulation, degradation, and ecological effects of toxic agents.

Prerequisites: CHEM 352, ENCH 359

ENCH 371
Environmental Microbiology
Four Credits
The course deals with interactions between microorganisms and naturally occurring polymers and how this relates to the degradation and persistence of environmental pollutants. Emphasis will be placed on microbial ecology, together with basic degradation processes and the ways in which they can be used in bioremediation strategies of contaminated aquatic and terrestrial systems.

Prerequisites: BIOL 204, CHEM 352, ENCH 359

GESC 105
Introduction to Scientific Study
Three Credits
This is a required course for all students entering the School of Science and Technology. It includes the development of techniques and skills required in scientific studies.

GESC 107 @
Introduction to the Computer and its Applications
Three Credits
The course is an introduction to the use of the computer, the Windows operating system and Internet navigation. Students will use applications such as Word, Excel, and Power Point. Data handling and graphic presentations are stressed.

GESC 227
Environmental Health
Three Credits
The course deals with health, the environment, and pollution. It includes an introduction to ecology, human activity in natural ecosystems, overpopulation, water and atmospheric pollution, solid waste, noise, and radiation.

Prerequisites: BIOL 101-102 or BIOL 203-204

GESC 264 @
Introduction to Scientific Research
Three Credits
The course covers basic concepts of scientific research. Emphasis is placed on the application of the components of the scientific method. The course offers training in scientific literature searches, editing techniques, oral presentations, and poster presentations.

Prerequisites: GESC 105, GESC 107

GESC 361-362-363-364
Seminars on Topics in Modern Science
One to Four Credits
The course introduces the student to topics in modern science. Outstanding local and international scientists and professors will be invited. The course addresses specific needs of professional groups, such as public and private school teachers and other professionals. Credits vary from one to four depending on the hours. One semester each.

Prerequisites: To be determined by the course level.

INSC 101
Integrated Sciences I
Three Credits
This is a science course in which the student discovers basic principles of physical and earth sciences. It prepares students to take decisions and solve problems regarding the universe, their planet, their environment and surroundings. It provides students the skills they need to analyze published articles related to science discoveries. The development of scientific concepts is emphasized by means of the inquiry method, through interdisciplinary teaching and an integrated curriculum.

INSC 102
Integrated Sciences II
Three Credits
This is a science course in which students discovers basic principles of chemistry and biology sciences. It prepares students to make decisions and solve problems regarding the universe, their planet, their environment and surroundings. It provides then the necessary skills to analyze published articles related to science discoveries. The development of scientific concepts is emphasized by means of the inquiry method through, interdisciplinary teaching and an integrated curriculum. The course is offered to education students and to future elementary and secondary school teachers.

MATH 100 @
Basic Mathematics
Three Credits
The course is an introduction to mathematics for students who need to improve basic skills. It covers fundamental operations with natural and cardinal numbers, fractions, and decimals; ratios and proportions; percents and measures. The course will be offered to students with CEEB Mathematics Achievement Test scores below 490, or scores on the Department's Placement Test below 70%. One semester.

MATH 107
Basic Fundamentals of Mathematics
Three Credits
This course will develop basic mathematical competences in the following areas: arithmetic, algebra, geometry, probability, and statistics. The main topics covered are: arithmetic operations, equations and linear inequalities, area and perimeter of polygons and circles, Cartesian coordinates, similarity and congruence of triangles. Special emphasis is placed on problem solving.

MATH 120
Elementary Algebra
Three Credits
This course includes topics of elementary algebra such as: set theory, the real numbers, algebraic expressions, linear equations, linear inequalities, polynomials and their operations and factorizations.

Prerequisite: MATH 100 or a minimum of 70% on the departmental placement test or 490-549 on the CEEB Mathematics Achievement Test.

MATH 121
Intermediate Algebra
Three Credits
This course covers factorization of polynomials, linear inequalities, problem solving; absolute-value equations and inequalities; operations and simplifications with algebraic fractions; linear equation graphics, linear equations systems and solution methods; graphics, substitution and elimination. Topics include inequalities for two variables and rational exponentials, as well as solution of radical expressions, equations involving radicals, and quadratic inequalities. Emphasis is on problem-solving.

Prerequisite: MATH 120 or a minimum of 70% on the departmental placement test or a minimum of 550 on the CEEB Mathematics Achievement Test

MATH 125
Fundamental Topics in Mathematics I
Three Credits
This is a course for students of the School of Education. It includes number systems, theory of numbers, real number systems, basic concepts of algebra, linear equations and graphs, and financial mathematics.

MATH 126
Fundamental Topics in Mathematics II
Three Credits
This course includes problem-solving, set theory, logic, geometry, measurement, probability, statistics, theory of numbers, and fundamental topics for students of the Schools of Education, Humanities and Office Administration.

Prerequisite: MATH 125

MATH 151
Algebra and Trigonometry I
Four Credits
The course covers the real number system and its properties. Topics include properties of exponents; solving inequalities (including absolute value, quadratic and linear inequalities) and interval notation; solution of equations, relations, and functions; graph properties of functions, rational functions, logarithmic and exponential functions, as well as solution of linear systems of equations using determinants and matrices.

Prerequisite: MATH 121 or a minimum of 70% on the departamental placement test or a minimum of 650 on the CEEB Achievement Test or a minimum of 3 on the CEEB Advanced Placement Test (Level 1).

MATH 152
Algebra and Trigonometry II
Four Credits
The course covers circular functions, properties and graphs; trigonometric functions, trigonometric identities and equation applications, problems using sine and cosine law; vectors and applications, complex numbers (geometrical representation and operations), polar coordinates and De Moivre's Theorem. Topics in analytic geometry include circle, parabola, ellypse elipse, and hyperbola; axis notation and translations.

Prerequisite: MATH 151 or a minimum of 70% on the departmental placement test or a minimum of 675 on the CEEB Achievement Test or a minimum of 3 on the CEEB Advanced Placement Test (Level 1).

MATH 155
Pre-Calculus (Compendium)
Three Credits
This course covers the system of real numbers and its properties; properties of exponents; solution of inequalities (including absolute valve quadratic and linear inequalities) and interval notation; solution of equations, relations, functions, graph properties of functions, rational functions, logarithmic and exponential functions; solution of linear systems of equations using determinants and matrices. Also covered are circular functions, properties and graphs; trigonometric functions, trigonometric identities and equation applications, problems using sine and cosine law; vectors and applications, complex numbers (geometrical representation and operations); polar coordinates and De Moivre's Theorem. Analytic geometry topics include circle, parabola, elipse, and hyperbola, as well as as axis notation and translations.

Prerequisite: A minimum of 675 on the CEEB Mathematics Achievement Test.

MATH 170
Basic Geometry
Three Credits
The course covers basic concepts of geometry for students of the International School of Design. This course covers basic concepts of plane and spatial geometry. Emphasis is placed on the use of the ruler, protractor and compass for diverse geometric constructions.

Prerequisite: Admission to the International School of Design

MATH 173
Plane and Space Geometry I
Three Credits
The course centers on basic concepts of geometry including the straight line, angles, triangles, elementary constructions. It includes demonstrations using postulates, definitions and theorems. Also included are the Theorem of Congruency, regular polygons, Pythagoras' Theorem and its applications.

Prerequisites: MATH 151-152

MATH 174
Plane and Space Geometry II
Three Credits
The course covers circumference, areas, polygonal gerions, plane Cartesian geometry, spatial geometry, solid bodies and surfaces, surface areas, volume, and basic non-Euclidean geometry.

Prerequisite: MATH 173

MATH 199
Quantitative Methods I
Three Credits
Students will study the following topics: functions and their properties; linear and quadratic equations and their graphs; linear inequalities; quadratic inequalities; exponential and logarithmic functions; solution of systems of equations, and mathematical progressions.

Prerequisite: MATH 121 or a minimum of 70% on the departmental placement test or a minimum of 700 in the CEEB Achievement Test or a minimum of 3 on the CEEB Advanced Placement Test (Level 1).

MATH 200
Quantitative Methods II
Three Credits Hours
The course covers linear programming, the simplex method, limits, differential calculus, optimization and introduction to integral calculus.

Prerequisite: MATH 199 or a minimum of 3 on the CEEB Advanced Placement Test (Level 2).

MATH 215
Scientific Computer Programming
Three Credits
The course introduces science and mathematics students to computer programming. Topics include basic problem-solving skills, including translating problems into BASIC computer language for computer processing. The course includes explanations of the language of arithmetical operations. Three hours of lecture and two hours of laboratory per week.

Prerequisites: MATH 151-152

MATH 221
Analytic Geometry and Calculus I
Four Credits
The course covers the intuitive concept of the limit of a function. Topics include the derivative and its applications, anti-differentiation, the definite integral, areas, and volumes. The fundamental calculus theorem is also covered. Five hours of lecture per week.

Prerequisites: MATH 151-152 or MATH 155 or a minimum of 3 on the CEEB Advanced Test (Level 2).

MATH 222
Analytic Geometry and Calculus II
Four Credits
The course centers on integration of transcendental functions. Topics include integration techniques, indeterminate forms, improper integrals, sequences and series. It also covers analytic geometry, planes, curves and polar coordinates. Five hours of lecture per week.

Prerequisite: MATH 301

MATH 223
Calculus III
Four Credits
This course includes the calculus of vectors, parametric curves, partial derivatives and multiple integrals.

Prerequisite: MATH 302 or MATH 222

MATH 290
Theory of Numbers
Three Credits
This course covers divisibility, congruency, Gauss intergers, and Diophantine equations. Course activities will center on proving theorems.

Prerequisite: MATH 301

MATH 305
Probability and Statistics I
Three Credits
The course deals with basic principles of statistics: data collection and classification, measurement of central tendency, variance, probability and distribution (the normal, the Poisson, the binomial and others), sampling theory in finite populations, and principles of experimental design.

Prerequisite: MATH 301

MATH 306
Probability and Statistics II
Three Credits
The course covers proof of hypothesis, students t-test, Z transformation, chi-square, differences of means, frequency distribution, analysis of variance (ANOVA), linear correlation, regression analysis and non-parametric statistics, as well as Mann Whitney, T-Test, and Sign Test.

Prerequisite: MATH 305

MATH 313
Analytical Geometry and Calculus III
Three Credits
This course will cover the following topics: vectors, parametric curves, partial derivatives, and multiple integrals.

Prerequisite: MATH 302

MATH 315
Computer Programming with Pascal
Four Credits
The course is an introduction to computer science for education students. Students will learn programming with Pascal. Lectures and laboratory.

Prerequisites: MATH 151-152

MATH 325
Digital Computation
Three Credits
The course deals with basic and intermediate concepts of digital electronic circuits and their relation to computers. Digital and algebraic logic and their applications and concepts of memory are covered.

Prerequisites: MATH 151-152 and a computer course.

MATH 330
Data Structure
Three Credits
The course covers basic processes of the computer, including linear and orthogonal listings, chains and arrangements, tree storage and search techniques.

Prerequisites: MATH 151-152

MATH 340
Discrete Methods
Three Credits
The course is designed primarily for science and education students majoring in mathematics. Topics include set theory, graph theory and combinational analysis as applied to computers. Group theory and Boolean algebra and their application to computers will also be discussed.

Prerequisites: MATH 301-302

MATH 345
Abstract Algebra
Three Credits
This is an introductory abstract algebra course for students specializing in mathematics. It covers sets, functions, binary operations, integers, groups, rings, domains, fields, and polynomials. Emphasis is placed on theorems and application problems.

Prerequisites: MATH 301-302

MATH 350
Linear Algebra
Three Credits
This course is for students specializing in mathematics. It covers two-variable linear equations systems, “n x m” linear systems, and homogeneous and heterogeneous systems. It includes matrix operations and vector spaces, as well as quadratic forms, linear transformation and linear programming.

Prerequisites: MATH 301-302

MATH 355
Practical Internship in Mathematics I
Three Credits
This is a practical internship in another university institution, private industry, or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization by the dean of the School of Science and Technology.

MATH 356
Practical Internship in Mathematics II
Three Credits
This is a practical internship in another university institution, private industry, or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization by the dean of the School of Science and Technology.

MATH 365
Research in Mathematics I
Three Credits
This course is a scientific laboratory and/or field research. The weekly schedule will be agreed upon by the student and the professor chosen to supervise research. The work schedule should not exceed nine (9) hours per week and should last one semester.

Prerequisite: A mathematics course at the third year level.

MATH 366
Research in Mathematics II
Three Credits
This course is a scientific laboratory and/or field research. The weekly schedule will be agreed upon by the student and the professor chosen to supervise research. The work schedule should not exceed nine (9) hours per week and should last one semester.

Prerequisite: A mathematics course at the third year level. Recommendation of the researcher.

MATH 367
Combinatorial Analysis
Three Credits
The course covers fundamental concepts of all branches of combinatorial analysis. The course includes enumeration problems, counting equivalence classes, the principle of exclusion and inclusion, and generator functions. The course also deals with combinatorial structures, and applications of graph theory to computer science.

Prerequisites: MATH 301-302, MATH 340, and MATH 350

MATH 370
Numerical Analysis
Three Credits
The course emphasizes algorithms in numerical analysis and their application to computer science. The course includes interpolation, non-linear equations, systems and approximation by polynomials, and integration.

Prerequisite: MATH 301-302

MATH 395
Differential Equations
Three Credits
The course covers ordinary differential equations and first and second order lineal equations, as well as special cases of superior order equations. It emphasizes applications in physics, chemistry and engineering.

Prerequisite: MATH 302

PHSC 101-102 @
Introduction to Physical Science I and II
Six Credits
From Greek philosophers through Newton, the course covers the structure and methodology of physical science laws of conservation, origin of the laws of chemistry, laws of gases and their behavior, atomic theory and periodic tables, electrostatics, and theory of light. Bohr's theory and nuclear physics will also be covered.

Co-requisite: MATH 121

PHSC 203-204
Physics I and II
Eight Credits
The course covers statics, dynamics, and motion (rotational). Topics include the law of conservation, thermodynamics, waves, electrostatics magnetism, light, lenses and mirrors. Three hours of lecture and three hours of laboratory per week.

Prerequisite: MATH 221

PHSC 205-206
Physics I and II for Chemistry, Engineering, Mathematics, and Physics
Eight Credits
These two courses examine the basic laws of physics and their applications. Topics include principles of vector mechanics, angular motion, simple harmonic motion, heat, introduction to thermodynamics, electrostatics, magnetism, Maxwell's laws, AC circuits, optics, principles of modern physics, and applications. Three hours of lecture and three hours of laboratory per week.

Co-requisite: MATH 222

PHSC 207
Laboratory for PHSC 205
One Credit
This course will help students interpret and verify the main definitions, laws and theories of mechanics and thermodynamics and their practical application. It empnasizes the principal experimental techniques and work with measuring instruments. Students will develolp experimental skills which will allow them to acquire new knowledge.

Prerequisite: MATH 221

Co-requisite: PSHC 205

PHSC 208
Laboratory for PHSC 206
One Credit
This course will help students interpret and verify the main definitions, laws and theories of electricity and magnetism their practical applications. It emphasizes the principal experimental techniques and work with measuring instrument Students will develop experimental skills which will allow them to acquire new knowledge.

Prerequisite: MATH 222

Co-requisite: PSHC 206

PHSC 355
Practical Internship in Physics I
Three Credits
The course is a practical internship in another university institution, private industry, or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization by the dean of the School of Science and Technology.

PHSC 356
Practical Internship in Physics II
Three Credits
The course is a practical internship in another university institution, private industry, or government agency. A minimum of sixty (60) hours is required.

Prerequisite: A written authorization by the dean of the School of Science and Technology.

PHSC 359
Modern Physics
Four Credits
The course is an introduction to the theory of relativity, waves and particles, the theory of the atom, Bohr's model, Schroedinger's equation, and LASER applications.

Prerequisites: MATH 222 and PHSC 204 or PHSC 206. MATH 223 is highly recommended.

PHSC 365
Undergraduate Research in Physics I
Three Credits
The course is a scientific laboratory and/or field research. The weekly schedule will be agreed upon by the student and the professor chosen to supervise research. The work schedule should not exceed nine (9) hours per week and should last one semester.

Prerequisite: One third year course in physics. Recommendation of the researcher.

PHSC 366
Undergraduate Research in Physics II
Three Credits
The course is a scientific laboratory and/or field research. The weekly schedule will be agreed upon by the student and the professor chosen to supervise research. The work schedule should not exceed nine (9) hour per week and should last one semester.

Prerequisite: One third year course in physics. Recommendation of the researcher.

SCHOOL OF SOCIAL AND HUMAN SCIENCES

The School of Social and Human Sciences at Universidad del Turabo offers degree programs which enable students to compete optimally in the workplace. At the undergraduate level, the School offers a Bachelor of Arts degree in social sciences with majors in criminology, psychology, social work, public administration, general social sciences, and communication. In addition, the School offers a Bachelor's Degree in Humanities with majors in socio-humanistic studies and in graphic design.

VISION

To develop productive and effective members of the global community with a professional, social, ethical and humanistic foundation.

MISSION

A twofold mission characterizes the School of Social and Human Sciences.

The school provides high quality academic programs at both the undergraduate and graduate level. The School undertakes this in a setting where excellence in teaching and learning are encouraged in the classroom, in practical internships, and in strong relationships with community projects. The basic goal is to provide our graduates not only competency in their chosen field, but also the diversity of experience needed to understand and appreciate the contributions of other disciplines.

The School is also responsible for the general social and humanistic foundation of all students at Universidad del Turabo. The General Education curriculum is student-centered, emphasizing the importance of global interdependence and language competence. To this end, the school has established a **Language Center** to improve the students' abilities to understand and express ideas in an articulate fashion. In addition, our interdisciplinary curriculum is geared toward analyzing human and social problems and seeking solutions through an understanding of human diversity.

The general objectives in all School curricula and programs are to:

1. Maintain academic excellence through study, teaching and social research.
2. Promote the knowledge and preservation of Puerto Rican and universal cultural values.
3. Develop the understanding that collaboration is necessary to achieve the sharing of ideas within disciplines, institutions, communities and nations.
4. Develop communicative competency in Spanish and English.
5. Develop the capacity to analyze problems and seek solutions.
6. Promote understanding of the human condition, helping students to view the world with compassion and promoting responsible and ethical behavior.

STAFF

Marco A. Gil de Lamadrid / Dean

Tomasita Pabón /Associate Dean

Edward Fankhannel / Associate Dean

Félix R. Huertas / Associate Dean of General Studies

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Víctor Manuel García / Director, Communications Department

María M. Ortiz Rivera / Director, Department of Social Work

Jessica Rodríguez Velázquez / Out Patient Clinic Director

Rosa M. Rodríguez / Administrative Director

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MA, University of Puerto Rico

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MA, Catholic University of America

Jessica Velázquez Rodríguez / Lecturer
PsyD., Universidad del Turabo

Raúl Velázquez-Zapater / Professor
EdD, Nova University

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PhD, Universidad Complutense

Zoran Vujisic-Jovovic / Instructor
PhD, Rhodes University

Vidamaris Zayas Velázquez / Assistant Professor
PsyD, Universidad Carlos Albizu

AREA OF SOCIAL SCIENCES

The Area of Social Sciences studies human nature, culture, ideas, institutions, human relations, social change and human beings' relation with the environment.

The School offers Bachelor of Arts degrees with majors in psychology, criminology, public administration, social work, general social sciences and communication.

Objectives:

1. Provide the student with interdisciplinary knowledge that makes it possible to understand modern society and its primary social problems.

2. Help the student to obtain a scientific and philosophic education, analytical and observant of human and organizational behavior.

3. Foster critical analysis and research of the economic, social and political situation in Puerto Rico today, and encourage interest in searching for alternative models and solutions.

4. Prepare the student to pursue graduate studies in the social sciences and related fields.

PROGRAMS OF STUDY

BACHELOR'S DEGREE IN SOCIAL SCIENCE: GENERAL PROGRAM

Total Credits	**117**
General Studies Courses	**48**
Complementary Courses	**12**
Professional Courses in Social Sc.	**21**
Major Courses	**24**
Elective Courses	**12**

General Studies Courses		**(48 credits)**
SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Basic Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research And Writing	3
BIOL 101	Introduction to Biological Sciences I	3
BIOL 102	Introduction to Biological Sciences II	3
MATH 126	Fundamentals Topics in Math	3
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilization and Universal Culture II	3
HIST 253	History of Puerto Rico	3
SOSC 111	Individuals, Community, Government and Social Responsibility I	3
SOSC 112	Individuals, Community, Government and Social Responsibility II	3
SOCI 358	Social Problems of Puerto Rico	3
SOHU 105	Freshmen Seminar	3

Complementary Courses		**(12 credits)**
HIST 273	History of the United States of America	3
GEOG 205	Global Communities and Resources	3
SPAN 331	Public Speaking	3
STAT 300	Elements of Statistics I	3

Professional Courses in Social Sciences		**(21 credits)**
ECON 121-122	Economic Principles and Problems I and II	6
POSC 380	Constitutional Law	3
PSYC 123	General Psychology (Compendium)	3
PSYC 305	Human Relations and Public Service	3
SOSC 320	Social Research Techniques I	3
SOCI 325	Social of Deviance	3

Major Required Courses		**(24 credits)**
PSYC 205	Personal Growth and Development	3
PSYC 225	Social Psychology	3
GEOG 225	Geography of Puerto Rico	3
POSC 253	Political Systems of Puerto Rico	3
POSC 203	Principles of Political Sciences (Compendium)	3
GEOG 201	Physical Geography	3
GEOG 202	Human Geography	3
ECON 253	Econ Development of PR	3

Free Electives **(12 credits)**

BACHELOR´S DEGREE IN SOCIAL SCIENCE: PSYCHOLOGY

Total Credits	**120**
General Studies Courses	**48**
Complementary Courses	**12**
Professional Courses	**18**
Core Courses	**30**
Elective Courses	**12**

General Studies Courses		**(48 credits)**
SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Basic Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
MATH 126	Fundamental Topics in Math	3
BIOL 101	Introduction to Biological Sciences I	3
BIOL 102	Introduction to Biological Sciences II	3
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilizations and Universal Culture II	3
PHIL 201	Introduction to Philosophy	3
SOSC 111	Individuals, Community, Government and Social Responsibility I	3
SOSC 112	Individual, Community, Government and Social Responsibility II	3
PSYC 205	Personal Growth & Development	3
SOHU 105	Freshman Seminar	3

Complementary General Courses		**(12 credits)**
GEOG 205	Community & Global Resources	3
STAT 300	Statistics Elements I	3
SPAN 331	Public Speaking	3
HIST 253	History of Puerto Rico (Compendium)	3

Professional General Courses		**(18 credits)**
SOSC 320	Techniques of Social Investigation	3
SOCI 203	Principles of Sociology (Compendium)	3
STAT 301	Statistics Elements II	3
GEOG 202	Human Geography	3
PSYC 121-122	Psychology I and II	6

Core Courses		**(30 credits)**
PSYC 225	Social Psychology	3
PSYC 281-282	Personality Development I and II	6
PSYC 321	Theories of Personality	3
PSYC 350	Principle of Psychopathology	3
PSYC 400	Experimental Psychology	4
PSYC 450	Seminary of Integration	2

Core Courses Elective (Select 3 courses)		
PSYC 221	Child Psychology	3
PSYC 222	Adolescent Psychology	3
PSYC 305	Human Relations and Public Service	3
PSYC 307	Group Dynamics	3
PSYC 343	Learning Theories	3
PSYC 355	Industrial Psychology	3
PSYC 360	Seminar on Human Sexuality	3
PSYC 405	Physiological Psychology	3

Free Electives **(12 credits)**

BACHELOR´S DEGREE IN SOCIAL SCIENCES: CRIMINOLOGY

Total Credits	**120**
General Studies Courses	**48**
Complementary Courses	**12**
Professional Courses in Social Sc.	**18**
Major Courses	**30**
Elective Courses	**12**

General Studies Courses (48 credits)

SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Intermediate Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research And Writing	3
MATH 126	Fundamentals Topics in Math	3
BIOL 101-102	Introduction to Biological Science I and II	3
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilization and Universal Culture II	3
HIST 253	History of Puerto Rico	3
SOSC 111	Individual, Community, Government And Social Responsibility I	3
SOSC 112	Individuals, Community, Government and Social Responsibility II	3
SOCI 358	Social Problems of Puerto Rico	3
SOHU 105	Freshmen Seminar	3

Complementary Courses (12 credits)

HIST 273	History of the United States of America	3
GEOG 205	Global Communities and Resources	3
SPAN 331	Public Speaking	3
STAT 300	Elements of Statistics I	3

Professional Courses in Social Sciences (18 credits)

ECON 123	Economic Principles and Problems (Compendium)	3
POSC 380	Constitutional Law	3
PSYC 123	General Psychology (Compendium)	3
PSYC 350	Principles of Psychopathology	3
SOSC 320	Social Research Techniques I	3
SOCI 325	Social of Deviance	3

Major Courses (30 credits)

CRIM 205	Introduction to Criminology	3
CRIM 300	Criminal Law	3
CRIM 305	Criminal Justice System in Puerto Rico	3
CRIM 320	Criminal Investigation Techniques	3
CRIM 325	Juvenile Delinquency in Puerto Rico	3
CRIM 327	Correctional Program: Administration Principles	3
CRIM 400	Criminal Procedure	3
CRIM 415	Evidence	3
CRIM 450	Legal Medicine	3
CRIM 475	Practicum	3

Elective Courses (12 credits)

BACHELOR'S DEGREE IN SOCIAL SCIENCES: COMMUNICATIONS

Total Credits	**120**
General Studies Courses	**48**
Complementary Courses	**12**
Professional Courses	**18**
Major Courses	**36**
Elective Courses	**6**

Admission Requirement: a grade point average of at least 2.70 (4.0 scale).

General Studies Courses (48 credits)

SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Basic Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research And Writing	3
MATH 126	Fundamentals Topics in Math	3
INSC 101-102	Integrated Science I and II	6
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilization and Universal Culture II	3
ART 101	Art Appreciation	3
SOSC 111	Individuals, Community, Government and Social Responsibility I	3
SOSC 112	Individuals, Community, Government and Social Responsibility II	3
GEOG 205	Global Communities and Resources	3
SOHU 105	Freshman Seminar	3

Complementary Courses (12 credits)

SOCI 358	Social Problems of Puerto Rico	3
SOSC 320	Social Research Techniques	3
SPAN 331	Public Speaking	3
STAT 300	Elements of Statistics I	3

Professional Courses in Social Sciences (18 credits)

PSYC 123	General Psychology (Compendium)	3
POSC 390	International Political Systems	3
ECON 207	New World Order Economy	3
COMM 205	Social Communication Theories	3
COMM 211	Communication Ethics	3
GRAD 201	Graphic Communication Media	3

Major Courses		(36 credits)
COMM 210	Communication: Legal and Ethical Aspects	3
COMM 230	Fundamental Principles for the Journalist	3
COMM 305	Writing Style in Journalism	3
COMM 307	Writing for the Media	3
COMM 311	Introduction to Photojournalism	3
COMM 320	Introduction to Public Relations	3
COMM 325	Introduction to Advertising	3
COMM 380	Broadcasting Principles	3
COMM 385	Broadcasting Production and Direction	3
COMM 400	Television Principles	3
COMM 430	Journalism Workshop	3
COMM 450	Supervised Practicum in Communication	3

Electives Courses **(6 credits)**

BACHELOR'S DEGREE IN SOCIAL SCIENCES: SOCIAL WORK

Total Credits	**120**
General Studies Courses	**48**
Required Courses	**27**
Major Courses	**42**
Elective Courses	**3**

General Studies Courses		(48 credits)
SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Basic Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
MATH 126	Fundamentals Topics in Math	3
BIOL 101	Introduction to Biological Science I	3
BIOL 102	Introduction to Biological Science II	3
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilization and Universal Culture II	3
HIST 253	History of Puerto Rico	3
SOSC 111	Individuals, Community, Government and Social Responsibility I	3
SOSC 112	Individuals, Community, Government and Social Responsibility II	3
PSYC 123	General Psychology (Compendium)	3
SOHU 105	Freshman Seminar	3

Complementary Courses		(12 credits)
GEOG 205	Global Communities and Resources	3
SPAN 331	Public Speaking	3
STAT 300	Elements of Statistics I	3
SOCI 203	Principles of Sociology	3

Professional Courses		(15 credits)
ECON 123	Economics Principles & Problems (Compendium)	3
POSC 380	Constitutional Law	3
PSYC 225	Social Psychology	3
GEOG 202	Human Geography	3
SOCI 358	Social Problems Puerto Rico	3

Major Courses		(42 credits)
SOWO 200	Introduction to Social Work	3
SOWO 211	Human Behavior Social Environment 1	3
SOWO 212	Human Behavior Environment 2	3
SOWO 300	Social Policy	3
SOWO 311	Social Work Methodology	3
SOWO 312	Social Work Methodology II: Individual and Family	3
SOWO 318	Social Work Methodology III: Groups and Communities	3
SOWO 320	Social Research Techniques	3
SOWO 325	Introduction to Social Gerontology	3
SOWO 441	Practicum Seminar I	2
SOWO 442	Practicum Seminar II	2
SOWO 451	Supervised Practice I	4
SOWO 452	Supervised Practice II	4
SOWO 330	Seminar: Current Topics in Social Work	3

Elective Courses **(3 credits)**

AREA OF HUMAN SCIENCES

The Humanities Area is dedicated to the intellectual development of the individual in a framework of study, reflection and research of history, literature, philosophy, fine arts and languages, realizing the need for achievement and self-fulfillment.

The Humanities Area offers most of the General Education courses: first and second year English, Spanish and Humanities. It also offers the specialized English and Spanish courses for the Bachelor of Arts in Education and English and Spanish courses for the students in the School of Business Administration. The Humanities Area continues to offer remedial courses in English and Spanish.

Departmental exams have been developed in first-year English and Spanish. They are computerized and are administered in the laboratory. New students are given placement tests, which assign them to the correct level of first-year English and Spanish. Students can test out of the first year completely and six credits will be accredited to them.

The Universidad del Turabo Choir, the Theater Workshop, and the Center for Humanistic Studies are part of the Humanities Area, and they are the core of many artistic and cultural activities.

The Humanities Area also administers the Language Study Center. This Center was created with the purpose of researching in the areas of language, psychology, sociology, and humanities in general. Pilot studies have been carried out in conversational English, writing in English and Spanish, and also in the field of communication. These pilot studies have been instrumental in the revision of the curricula of the different areas.

The objectives of the Humanities Area are:

1. To broaden the student's cultural horizons through the study of the great masters of art and philosophy.
2. To deepen the student's sensibility through the study of music, art and theater.
3. To foster an appreciation for the achievements and traditions of Puerto Rican culture through the study of Puerto Rican history and art.
4. To develop the oral and written communication skills of the students in both English and Spanish for personal and professional achievement.
5. To encourage the study of foreign languages.

PROGRAMS OF STUDY

BACHELLOR'S DEGREE IN HUMANITIES: SOCIO-HUMANISTIC STUDIES

Total Credits	**108**
General Studies Courses	**48**
Complementary Courses	**12**
Major Courses	**18**
Major Elective Courses	**18**
Free Elective Courses	**12**

General Studies Courses		**(48 credits)**
SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Basic Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research and Writing	3
MATH 126	Fundamentals Topics in Math	3
BIOL 101	Introduction to Biological Science I	3
BIOL 102	Introduction to Biological Science II	3
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilization and Universal Culture II	3
HIST 253	History of Puerto Rico	3
SOSC 111	Individuals, Community, Government and Social Responsibility I	3
SOSC 112	Individuals, Community, Government and Social Responsibility II	3
SOCI 358	Social Problems of Puerto Rico	3
SOHU 105	Freshmen Seminar	3

Complementary Courses		**(12 credits)**
ARTE 101	Art Appreciation	3
PHIL 201	Introduction to Philosophy I	3
HIST 273	History of the United States of America	3
STAT 300	Social Research Techniques I	3

Major Courses		**(18 credits)**
PSYC 123	General Psychology (Compendium)	3
SOCI 203	Sociology Principles (Compendium)	3
POSC 387	Law and Society	3
POSC 380	Constitutional Law	3
SOSC 320	Social Research Techniques I	3
GEOG 205	Global Communities and Resources	3

Major Elective Courses **(18 credits)**
The students and their Mentors will select the major electives courses.

Free Elective Courses **(12 credits)**

BACHELOR'S DEGREE IN HUMANITIES: GRAPHIC DESIGN

Total Credits	**120**
General Studies Courses	**48**
Complementary Courses	**12**
Professional Courses	**18**
Major Courses	**36**
Free Elective Courses	**6**

General Studies Courses		**(48 credits)**
SPAN 152	Fundamentals of Reading and Writing I	3
SPAN 250	Writing Techniques	3
SPAN 255	Research and Writing	3
ENGL 152	Basic Communicative English II	3
ENGL 153	Advanced Communicative English	3
ENGL 231	Research And Writing	3
MATH 126	Fundamentals Topics in Math	3
INSC101-102	Integrated Sciences I and II	6
HUMA 111	Civilization and Universal Culture I	3
HUMA 112	Civilization and Universal Culture II	3
ART 101	Art Appreciation	3
SOSC 111	Individual, Community, Government and Social Responsibility I	3
SOSC 112	Individuals, Community, Government and Social Responsibility II	3
GEOG 205	Global Communities and Resources	3
SOHU 105	Freshman Seminar	3

Complementary Courses		**(12 credits)**
SOCI 358	Social Problems Puerto Rico	3
SOSC 320	Social Research Techniques	3
SPAN 331	Public Speaking	3
STAT 300	Elements of Statistics I	3

Professional Courses		**(18 credits)**
PSYC 123	General Psychology (Compendium)	3
POSC 390	International Political Systems	3
ECON 207	New World Order Economy	3
GRAD 201	Graphic Communication Media	3
COMM 205	Social Communication Theory	3
COMM 211	Communication Ethics	3

Major Courses		**(36 credits)**
COMM 210	Legal/Ethical Aspects of Communication	3
COMM 311	Introduction to Photojournalism	3
COMM 320	Introduction to Public Relations	3
COMM 325	Introduction to Advertising	3
COMM 430	Journalism Workshop	3
GRAD 205	Introduction to the Computer	

	in Graphic Art	3
GRAD 207	Graphic Design	3
GRAD 300	Typography and Design	3
GRAD 305	Image Preparation	3
GRAD 330	Printing Processes	3
GRAD 400	Introduction to Image Animation	3
	Graphic Design	3
COMM 450	Supervised Practicum in Communication	3

Free Elective Courses **(6 credits)**

COURSE DESCRIPTIONS

(Courses marked with @ could be offered in both modalities, traditional or on-line.)

ANTH 205
General Anthropology
Three Credits
The course is a general introduction to the biological and cultural evolution of the human species. Topics covered include principles, theories, process; methods and techniques used by the anthropologist in order to explain changes, as well as stability, adaptation and extinction of the human species.

Prerequisites: SOSC 101-102

ART 101
Art Appreciation
Three Credits
The course deals with concepts of aesthetic organization: composition, elements, perspective, form, value, texture and theory of color. Pictoral techniques and drawing are also discussed.

ART 121-122
Drawing I and II
Six Credits
The course covers basic principles of drawing. It includes training in the different media of graphic expression, along with exercises in structure, proportion, light and shadow, rhythm, balance, and the basic concepts of perspective.

ART 201-202
Theater Arts I and II
Six Credits
The course centers on drama from a historical perspective, and includes an introduction to the theater arts. Students may be assigned to participate in small-scale productions.

COMM 205
Social Communication Theories
Three Credits
The course covers diverse theoretical concepts and their relationship with the social impact of the media. Emphasis is placed on understanding the mechanisms and procedures used to manipulate information.

Prerequisites: SOSC 101-102

COMM 210
Communication: Legal and Ethical Aspects
Three Credits
The course will analyze the legislation and regulations related to the media and their ethical and professional responsibilities.

Prerequisites: SOSC 101-102

COMM 211
Communication Ethics
Three Credits
The course deals with ethical and sociological principles in mass communications. Emphasis is placed on basic problems inherent in freedom of expression and freedom of the press, and provides the student with the necessary conceptual tools to understand them. Primary sources of information will be studied, among others, the Bill of Rights of the Constitution of Puerto Rico, the First Amendment to the Constitution of the United States, and current codes of ethics.

Prerequisites: SOSC 101-102

COMM 230
Fundamental Principles for the Journalist
Three Credits
The aim of this course is to develop in the students' knowledge and skills necessary in the preparation of written documents relevant to all areas of mass media communications. The first part of the course is fundamentally about writing principles. Through workshops and seminars, the second part provides students ample opportunities to put into practice all concepts learned.

Prerequisites: SOSC 101-102, SPAN 151-152

COMM 305
Writing Style in Journalism
Three Credits
The course offers the student the basic techniques of simple news editing. It also defines the concept of news, its value and importance.

Prerequisites: 12 credits in Spanish

COMM 307
Writing for the Media
Three Credits
The course centers on a theoretical and practical view of the principles of scriptwriting. Television, radio and movies are included.

Prerequisite: COMM 205

COMM 310
Communication Technology: Cultural, Educational, and Economic Impact
Three Credits
The course deals with communication technology and its impact on today's world: the media for the message. Topics include the digital telephone, television, computers, and the impact of current developments in the field of communication.

Prerequisites: COMM 210, COMM 380, COMM 400

COMM 311
Photojournalism
Three Credits
This course will enable students to obtain real experience in the field of photojournalism. Students will examine technological changes relating to photography and the impact these changes have had on mass media. In-class discussion combined with practical experiences will enable students to learn about photographic theories and photojournalism techniques such as: shutter speed, image composition, among others. At the end of the course, students will prepare a portfolio containing different journalistic images, in addition to a field experience covering hard and soft news.

COMM 320
Introduction to Public Relations
Three Credits
The course deals with basic elements of public relations theory and practice. It includes analyses of the different definitions proposed by the experts and the function of public relations in the free world.

Prerequisite: COMM 210

COMM 325
Introduction to Advertising
Three Credits
The course centers on the study of advertising as a social function. It includes analysis and selection of the advertising method and its creative aspect.

Prerequisite: COMM 205

COMM 350
Advertising Methods
Three Credits
The course deals with the phases involved in the creation and presentation of the advertising campaign. It emphasizes the study of its objectives, plans and strategies.

Prerequisite: COMM 320

COMM 360
Advanced Public Relations
Three Credits
The course includes research methods, conceptualization of the public relations program, and the specializations of the profession in accordance with the types of public.

Prerequisite: COMM 320

COMM 380
Broadcasting Principles
Three Credits
The course deals with radio broadcasting as a means of social communication. Topics include its social and historical context and theoretical and practical applications.

Prerequisite: COMM 205

COMM 385
Broadcasting Production and Direction
Three Credits
The course is a workshop in audio equipment. It includes recording and mixing, and the elaboration of the script for newscasts and educational programs.

Prerequisite: COMM 380

COMM 400
Principles of Television
Three Credits
The course deals with fundamentals concepts of television; both theoretical and practical aspects will be considered. Emphasis is placed on the history, social impact, and application of TV production.

Prerequisite: COMM 205

COMM 410
Television Production
Three Credits
The course covers practical techniques for television production. It includes equipment, direction, and coordination with the technical staff.

Prerequisite: COMM 400

COMM 430
Journalism Workshop
Three Credits
The course is an advanced journalism workshop. It includes news publication, diagramming, editing of headlines, and the printing process of a real publication.

Prerequisite: COMM 305

COMM 450
Supervised Practicum in Communication
Three Credits

The course is a work experience in an area of communication, in collaboration with other professionals in the media.

Prerequisites: COMM 205, COMM 210, COMM 305, COMM 307, COMM 320, COMM 325, COMM 380, COMM 400

CRIM 205
Introduction to Criminology
Three Credits

The course presents an outline of the field, its development, present trends, and specializations. Topics include criminology as an empirical science, crime, the delinquent, and the victim, as well as investigation and criminal statistics.

Prerequisites: SOSC 101-102

CRIM 300
Criminal Law
Three Credits

The course deals with general principles of the Criminal Code. Topics include types of crimes, penalties, and security measures, as well as comparative study of cases to analyze the elements of a crime.

Prerequisite: CRIM 205

CRIM 305
Criminal Justice System in Puerto Rico
Three Credits

The course is an overview of the criminal justice system in Puerto Rico. Topics include a comparative approach to the legal framework, the system's structures, functions, procedures, relationships to other institutions and its role in democracy.

CRIM 320
Criminal Investigation Techniques
Three Credits

The course centers on scientific methods of investigation within a legal framework. Case studies are thoroughly analyzed. Observation techniques and evaluation of relevant information will be discussed. Modern methods of locating, obtaining and interpreting information will be presented.

Prerequisite: SOSC 320

CRIM 325
Juvenile Delinquency in Puerto Rico
Three Credits

The course centers on the definition of the problems of juvenile delinquency in Puerto Rico. Topics include social, cultural, psychological and legal aspects; causes and prevention; prosecution and treatment of the juvenile delinquent.

Prerequisite: SOSC 101-102

CRIM 327
Correctional Programs: Administration Principles
Three Credits

The course deals with the principles of the correctional system in Puerto Rico: philosophy, legal framework and regulations. Topics include structures, functions and procedures in the administration of penal institutions, the parole program, the adult probation system, the classification program, the diagnosis and treatment of inmates. The area of custody programs and treatment of minors is also discussed.

Prerequisite: CRIM 205

CRIM 330
Administration and Organization Policy
Three Credits

The course centers on the study of principles of organization and administration of the police force in Puerto Rico. Emphasis is placed on organizational theory, administrative procedures, administration and supervision programs.

Prerequisites: SOSC 101-102

CRIM 400
Criminal Procedures
Three Credits

The course is an introduction to the understanding and application of criminal procedures and case law, the beginning of judicial action and its development by stages. Emphasis is placed on the rights of the accused.

Prerequisite: CRIM 300

CRIM 415
Evidence
Three Credits

The course deals with rules of evidence and their application in criminal cases. Topics include techniques for the presentation of evidence, preparation of cases, and court testimony.

Prerequisite: CRIM 400

CRIM 420
Seminar: Case Study in Police Administration
Three Credits

The course covers legal and institutional approaches to administrative case through case studies. Topics include procedures and adjudication.

Prerequisite: CRIM 330

CRIM 425 - 426
Criminalistic I and II
Six Credits

The course deals with methods, techniques, and procedures used in gathering, securing and analyzing evidence in criminal cases. Identification and subsequent presentation in court will be discussed.

Prerequisite: CRIM 400

CRIM 430
Correctional System of Puerto Rico
Three Credits
The course consists of the presentation and discussion of current conditions in the Puerto Rican correctional system. It includes legal, organizational and operational aspects.

Prerequisite: CRIM 305

CRIM 435
Case Preparation and Testimony
Three Credits
The course deals with the development of skills needed for preparing reports and for procedural handling of evidence. Presentation of evidence and testimony is emphasized.

Prerequisite: CRIM 400

CRIM 440
Seminar: Prevention, Prosecution and Treatment
Three Credits
The course centers on the discussion of fundamental problems in the prevention of crime, prosecution, custody and treatment of the offender. Topics include legal, social, cultural, physical, human and economic resources, as well as participation and commitment of the community.

Prerequisite: CRIM 205

CRIM 450
Legal Medicine
Three Credits
The course deals with the legal aspects of medicine. Medical and legal cases will be discussed, including cases of malpractice. Emphasis is placed on case discussion, laboratory practice, techniques and theories related to legal medicine.

Prerequisite: CRIM 300

CRIM 465
Seminar: Civil Rights of the Accused
Three Credits
The course is an analytical interpretation of Section II, Article 2 of the Commonwealth Constitution, which establishes the rights of the accused in criminal proceedings.

Prerequisite: CRIM 300

CRIM 475
Practicum
Three Credits
The course is an integration of theory and experience through observation in a judicial or correctional institution.

Prerequisites: 24 major credits, authorization from Criminology Program Coordinator

ECON 121-122
Economic Principles and Problems I and II
Six Credits
The course deals with economic theories and practice. Topics include value and price, exchange, distribution, production, employment, national income, international commerce, public expenses, economic cycles, social welfare and influence of government on the economy.

Prerequisites: SOSC 101-102

ECON 123
Economics Principles and Problems (Compendium)
Three Credits
The course covers economic theories, value and price, distribution, protection and the role of government in the economy.

Prerequisite: SOSC 101-102

ECON 207
New World Order Economy
Three Credits
The course includes a diagnostic view of contemporary economic phases and their social, environmental and political effects. It also includes discussion of fundamental economic perspectives for future societies.

ECON 351
History of Economic Thought
Three Credits
The course centers on theoretical analysis through works of leading economists.

Prerequisites: ECON 121-122

ECON 253
Economy Development of Puerto Rico
Three Credits
The course covers characteristics and trends of the Puerto Rican economy. It includes an analysis of the local economic structure and its relationship to international economics.

Prerequisites: ECON 121-122

ECON 363
Economics Trends in Latin America
Three Credits
The course centers on political and institutional forces and problems that affect the development of Latin American countries.

Prerequisites: ECON 121-122

ECON 373
Economic Development of the United States
Three Credits
The course covers trends and development of the economy of the United States. National and international growth will be emphasized.

Prerequisites: ECON 121-122

ECON 385
Development and Underdevelopment
Three Credits
The course deals with problems, characteristics and policies of the underdeveloped countries. Theories of economic growth and their application in Puerto Rico are emphasized.

Prerequisites: ECON 121-122

ECON 400
Microeconomic Theory
Three Credits
The course deals with determining national income and employment, price and growth rate level in the economic system. Topics include spending and saving, private investment, prosperity and depression, money, and implications of national income public policy.

Prerequisites: ECON 121-122

ECON 420
International Economics
Three Credits
The course deals with international trade, including problems and policies, balance of payments, debts, international monetary problems, and international financial organizations.

Prerequisites: ECON 121-122

ENGL 097
Developmental English I
Three Contact Hours
This is a listening-speaking course in which students practice oral communication skills that can be put to immediate use. Students will learn the appropriate language for different social and professional situations, including formal and informal speech. The course will expose students to authentic, natural English, both receptively and productively, to develop understanding and expression. The curriculum has an audio-oral focus, moving from listening to a fuller command of integrated listening and speaking skills.

ENGL 098
Developmental English II
Three Credits
This course prepares students for interaction with both native and non-native speakers of English. Students will learn to understand spoken and written English and to express themselves confidently, effectively, and fluently. They will learn the appropriate language for different social and professional situations, including formal and informal speech, through the development of integrated listening and speaking skills. Additionally, the course will develop writing skills at the level of basic sentences and simple paragraphs.

ENGL 151
Basic Communicative English I
Three Credits
In this first semester of the first year English course, emphasis will be on improving listening comprehension of spoken English.. Four hours of instruction and one hour of laboratory weekly are required.

ENGL 152
Basic Communicative English II
Three Credits
In this second semester of the first year English course, emphasis will be on speaking skills, especially of functional language for "real world" situations. Four hours of instruction and one hour of laboratory weekly are required.

Prerequisite: ENGL 151

ENGL 153 @
Advanced Communicative English: Speaking II & Writing
Three Credits
This is an advanced English course for first year students. Emphasis is on speaking (including role-playing and simple oral presentations) and writing skills, specifically paragraphs and short compositions. Four hours of instruction are required.

Prerequisite: ENGL 152

ENGL 205-206
Introduction to Literary Genres I and II
Six Credits
This is a required course for English majors. Topics include the short story, and poetry, as well as the essay drama, and their techniques.

Prerequisites: ENGL 152-153

ENGL 211-212
Business English I and II
Six Credits
This is a required course for students majoring in business administration. Emphasis is on grammar, as well as oral and written business English. Students will practice writing a variety of business letters; they will also prepare a résumé and participate in role-playing for job interviews.

Prerequisites: ENGL 151-152

ENGL 221-222
Second Year English I and II
Six Credits
The course centers on the development of reading skills (identifying main ideas, vocabulary in context, inferences, cause-effect, and more. Basic writing skills will also be developed.

Prerequisites: ENGL 151-152

ENGL 231
Research and Writing
Three Credits
This is a required course for English majors and engineering students. Intensive practice in writing essays, monographs, reports, and conducting research is also provided.

Prerequisites: ENGL 152-153

ENGL 245
English Grammar
Three Credits
The course deals with fundamentals of English grammar. Emphasis is given to the "traditional" approach (parts-of-speech).

Prerequisites: ENGL 152-153

ENGL 317
English Literature
Six Credits
This is a survey course of English literature, from the Renaissance through the present. It includes identification and comparison of styles among different authors. The course includes class discussion and monographs on political, social, intellectual and cultural change in England, as reflected in its literature.

Prerequisites: ENGL 205-206

ENGL 321
American Literature
Six Credits
This is a required course for English majors. It is a survey course of United States literature, from colonial times to the present. It includes a chronological overview of authors and works.

Prerequisites: ENGL 205-206

ENGL 331
Public Speaking
Three Credits
The course deals with the theory and practice of public speaking. It emphasizes the importance of nonverbal communication (body language, eye contact, attire) and verbal techniques (pronunciation, intonation, volume, rate). Cross-cultural differences in the art of communication are discussed. Students will practice delivering a variety of speeches, which include self-introduction, personal experience, presentation of a guest speaker, informative, and persuasive speeches. Some speeches may require the use of visual aids.

Prerequisites: ENGL 152-153

ENGL 342
Adolescent Literature
Three Credits
This course is required for certification in English by the Department of Education. It centers on the study of adolescent literature and its development and relevance in American literature.

Prerequisites: ENGL 205-206

ENGL 345
Children's Literature
Three Credits
This course is required for certification by the Department of Education for students majoring in English. It centers on the history of literature for children, and includes famous authors and works.

Prerequisites: ENGL 205-206

ENGL 360
Comparative Analysis: English and Spanish
Three Credits
The course deals with the comparison of English and Spanish based on phonetics, syntax, morphology and lexicology.

Prerequisites: ENGL 245, ENGL 371

ENGL 371
Introduction to Linguistics
Three Credits
The course is designed for English teachers at the secondary level. It includes basic principles of linguistic science, among which are theories of the origin and acquisition of language, phonetics, morphology, syntax, and semantics. Dialects and nonstandard languages are discussed.

Prerequisites: ENGL 153, ENGL 245

FRCH 101-102
Basic Course in French
Six Credits
This is a basic conversational French course, with emphasis on pronunciation and grammar. Reading and writing assignments are also included.

FRCH 201-202
Intermediate French I and II
Six Credits
The course centers on the study of French grammar, and includes practice in reading, conversation and writing.

Prerequisites: FRCH 101-102

GEOG 201
Physical Geography
Three Credits
The course deals with principles of geography and their application to the environment, climate, soil, vegetation and natural resources.

Prerequisites: SOSC 101 - 102

GEOG 202
Human Geography
Three Credits
The course is an introduction to human and cultural geography. Topics include variation of human traits, diversity of economic systems, and population changes.

Prerequisite: GEOG 201

GEOG 205 @
Global Communities and Resources:
A Critical View
Three Credits
The course is an introduction to human problems in the contemporary world. Physical geography and different theories related to this phenomenon are considered. Implications of problems related to the economical and political development of Puerto Rican society will also be discussed.

Prerequisites: SOSC 101-102

GEOG 207
Historical Geography
Three Credits
The course deals with the relationship between historical events and their geographic setting.

Prerequisites: GEOG 201 - 202

GEOG 225
Geography of Puerto Rico
Three Credits
The course centers on physical, biotic, and human aspects of Puerto Rico, its regions and its environment.

Prerequisites: GEOG 201-202

GEOG 263
Central, South America and the Caribbean
Geography
Three Credits
The course deals with geographical regions, natural resources, government, climate, vegetation, soil, population, economic structure, and infrastructure, as well as their relationship to other regions of the world.

Prerequisites: GEOG 201 - 202

GEOG 273
North American Geography
Three Credits
The course centers on the United States and Canada. Topics include physical characteristics, economic resources, climate, culture, and economic development.

Prerequisites: GEOG 201 - 202

GRAD 201
Graphic Communication Media
Three Credits
The course deals with foundations and concepts of the graphic communications. Students study the different graphic communications media such as digital video for multimedia works, graphic design, typography, effective print communication, design and composition of pages, illustrations, as well as the foundations of design. Students stay current and study aspects and new developments in the publishing industry. Topics include technological development and how to stay in contact with traditional operations, in view of emerging demands in methods and design creations, management, programming and distribution.

GRAD 205
Introduction to the Computer in Graphic Arts
Three Credits
This course introduces the components (hardware and software) of computer systems (IBM compatible and Macintosh). It also develops basic command of the keyboard. In addition, students acquire problem-solving techniques and learn how to be productive when using information systems.

GRAD 207
Graphic Design
Three Credits
The course covers theory, analysis, and practice in the development of design. Stuents will develop the skills needed for the preparation of thumbnails and rough layouts. Each type of layout and its function in the creative process is analyzed. The course includes computerized layout design, using PageMaker, Freehand, and Basic Photoshop.

GRAD 300
Typography and Design
Three Credits
The course centers on theory, analysis, and practice in the use of various forms of typography. Rules of typographic composition are analyzed and applied to both manual and computerized graphic design. Basic Photoshop and Illustrator programs are used.

GRAD 305
Image Preparation
Three Credits
The course deals with basic principles of copy preparation based on knowledge acquired in Graphic Arts (AGRA 3022). Emphasis is placed on the study, analysis, and application of methods and elements for developing final copies for reproduction purposes. Basic Photoshop, Freehand and PageMaker programs are used.

GRAD 306
Introduction to Digital Image
Three Credits
The course is an introduction to the theory and practice of digital photography focusing on visual communications media, using digital and conventional cameras along with the Photoshop program for editing images. Students will acquire a reasonable command of the process of digital image creation, which will allow them to produce works in the print media, the arts and advertising.

GRAD 320
Digital Photography
Three Credits
This is an introductory course in the use and handling of digital cameras to take fixed or moving pictures. The computer is used with Adobe Photoshop, which is the primary program to edit photo images and webpage design. Students will use the digital camera to take pictures and the computer to correct color, contrast, image manipulation and size determination. They will have considerable practice in the use of filters, image formats, and applications. In addition, they will use printers to print halftones, duotones, positives, transparencies, and color images.

GRAD 330
Printing Processes
Three Credits
This is an introductory course in the principal printing processes in graphic arts. Among the main processes that will be studied are: letterpress, gravure, lithography, flexography, and screen printing. Similarities and differences among different printing processes in the publication industry will be established. In addition, orientation is given to the study and analysis in the selection of the appropriate process to apply in a given situation, considering the number of impressions, colors, cost, finishing operations, inks, and other materials.

GRAD 400
Introduction to Image Animation
Three Credits
The course deals with foundations of planning and creation of interactive animation which involves tridimensional scenes and objects. Students will use the computer for the manipulation of objects and tridimensional animation. Basic problems of animation in three dimensions (3D) will be studied. These will include key framing, parenting, visual texture, focus clarity and the movement of the camera. Students will also be trained to plan their projects ahead of time and create storyboards so they can communicate with their clients and direct the production of image animations.

GRAD 450
Supervised Practice in Graphic Design
Three Credits
This course of supervised practice will enable the students to relate to a real work experience in the field of graphic design. The students will have the opportunity to apply all of their creative potential, knowledge, skills, abilities and experience acquired throughout their academic preparation. They will work directly with professionals in six areas: Advertising agencies, graphic design studios, printing shops, newspapers, publishers (books and magazines), and companies with print shops. They will have the opportunity to practice computerized graphic design, digital photography, management and animation of digital images, webpage design, and other tasks related to design.

HIST 203
Ancient History
Three Credits
The course centers on ancient civilizations of the Middle East, Greece, and Rome; their political, economic and social institutions will be discussed.

Prerequisites: HUMA 115-116

HIST 204
Medieval History
Three Credits
The course deals with the reign of the barbarians. Topics include the Byzantine Empire, Islam, Charlemagne's empire, feudalism, the Crusades, the Reconquest of Spain, and the Hundred Years' War. The Church in the Low Middle Ages will be discussed, as well as political, economic, and social institutions of the medieval world.

Prerequisites: HUMA 115-116

HIST 230
Renaissance, Reform and the Rise of the State
Three Credits
The course centers on the Renaissance, as well as the religious crises of the XVI, XVII and XVIII centuries.

Prerequisites: HUMA 115-116

HIST 231
European History XIX Century
Three Credits
The course deals with the development of liberalism, nationalism and industrialization in conflict with authoritarian forces then prevalent on the continent. Topics include the development of nations and international rivalry leading to World War I.

Prerequisites: HUMA 115-116

HIST 232
Contemporary World Problems
Three Credits
The course centers on conflicts and tensions in the contemporary world, such as the Korean War, the Vietnam War, the Arab-Israeli conflict, NATO, and the Warsaw Pact. Topics also include the Cuban Revolution, Latin America and its revolutionary movements, and the present global situation.

Prerequisites: HUMA115-116

HIST 251-252
History of Puerto Rico I and II
Six Credits
The course covers the historical evolution of Puerto Rico, from the Taíno culture to the present, emphasizing the XVIII, XIX and XX centuries.

HIST 253
History of Puerto Rico (Compendium)
Three Credits
The course is a compendium of History 251-252, and is limited to students of education, as well as social sciences students majoring in criminology.

HIST 257
Puerto Rico in the XX Century
Three Credits
The course deals with political, economic, social, and cultural problems beginning with the American sovereignty in 1898 up to the present.

HIST 261-262
Latin American History I and II
Six Credits
The course centers on the historical evolution of Latin American countries from pre-Columbian cultures to the present.

Prerequisites: HUMA 115-116

HIST 271-272
History of the United States of America I and II
Six Credits
The course deals with political, social, economic and cultural development of the United States from colonial times to the present.

HIST 273
History of the United States of America
Three Credits
The course is a compendium of History 271-272 and is directed only to education students.

HIST 305
History of the Caribbean
Three Credits
The course deals with political, economic, social, and cultural development of the Caribbean countries.

Prerequisites: HUMA115-116

HIST 320
History of Africa
Three Credits
The course centers on political, economic, social and cultural development of the African countries, emphasizing the colonial period, the struggle for independence, and the rise of the new nation states.

Prerequisites: HUMA 115-116

HUMA 111
Civilizations and Universal Culture I
Three Credits
The course centers on studying the development of human beings, with emphasis on culture, arts, philosophy, religions, and ideas. Students are encouraged to understand the differences among countries and societies of the world.

HUMA 112
Civilizations and Universal Culture II
Three Credits
The course deals with the development of human beings. Events within different civilizations and their relevance to diverse realities in the contemporary world will be analyzed.

Prerequisite: HUMA 111

HUMA 115-116
Introduction to Western Civilization I and II
Six Credits
The course is an introduction to Greek and Roman culture. Topics include drama, literature, art and philosophy, as well as the history of Christianity, medieval culture, feudalism, guilds, scholasticism, Romanesque, and gothic-style literature.

ITAL 101-102
Basic Italian
Six Credits
The course centers on conversational Italian. Laboratory work, reading and writing are integrated into the course.

ITAL 201-202
Intermediate Italian
Six Credits
The course deals with grammar, reading, writing, and conversation.

Prerequisites: ITAL 101-102

MUSI 101
Music Appreciation
Three Credits
The course centers on music as a source of aesthetic enjoyment. Students learn to recognize the forms of musical composition (folk and art songs, the fugue, the sonata, the symphony, the opera, etc.) through lectures, recordings, and demonstrations by the professor, other students, or guest artists.

MUSI 103-104
Choir
Six Credits
The course deals with group instruction in voice and singing. It includes interpretation of choral music, with emphasis on the folklore of Puerto Rico. The choir participates in the Institution's activities. The course is open to all students.

PHIL 201-202
Introduction to Philosophy I and II
Six Credits
The course centers on the nature and development of philosophical thought and its problems. Students will study the principal philosophers from Greece to the present.

Prerequisites: HUMA 115-116

POSC 201 - 202
Introduction to Political Science I and II
Three Credits
The course deals with the history of political thought. Topics include the formation of the modern state, contemporary political ideology, theory of political institutions, international relations and the means created in the modern state for the participation of citizens.

Prerequisites: SOSC 101 - 102

POSC 203
Principles of Political Science (Compendium)
Three Credits
The course centers on the analysis of the modern state, its structure and citizen participation. Political decision-making in contemporary societies will be discussed.

Prerequisites: SOSC 101 - 102

POSC 253
Political System of Puerto Rico
Three Credits
The course deals with political institutions in Puerto Rico from 1870 to the present. Legal and political evolution from the "Carta Autonómica" to the legislation establishing the elected governorship and the Commonwealth will be discussed.

Prerequisites: SOSC 101 - 102

POSC 355
Legislative Process
Three Credits
The course covers the functions and organization of the legislative branch, its relationship to other branches; its powers and limitations, as well as legislative procedures, investigations, reports and case law applicable to the legislative process.

Prerequisite: POSC 253

POSC 358
Administrative Law
Three Credits
The course deals with the development of administrative law. Topics include administrative action, procedures and agencies, review by the courts, interpretation of legislation, regulations and retroactivity. Administrative discretion in policy-making, jurisdiction and investigative powers will also be discussed, together with notification and hearing, the decision-making process, and other related topics.

Prerequisite: POSC 253

POSC 373
Political System of the United States
Three Credits
The course covers the evolution of the federal government, its structure, procedures and functions. Emphasis will be placed on organization, as well as on separation of powers in the legislative, executive and judicial branches.

Prerequisites: POSC 201 - 202

POSC 380
Constitutional Law
Three Credits
The course is an introduction to the constitutional development of Puerto Rico, with emphasis on civil rights provisions in the Constitution.

Prerequisite: POSC 253

POSC 385
Civil Rights of Puerto Rico
Three Credits
The course deals with statutory, constitutional and Supreme Court case law sources of civil rights guarantees in Puerto Rico. Emphasis is on case studies of contradictory government actions, including legislation limiting the rights.

Prerequisite: POSC 353

POSC 387
Law and Society
The course is a study of the relationship between law and society. Topics include a theoretical vision of the legal system in the substantive content of the influence of social factors in its development. The relationship between law and social change will be analyzed.

Prerequisities: SOSC 101-102

POSC 390
International Political Systems
Three Credits
The course centers on study and discussion of the political systems from an international perspective, and contemporary political ideologies. Emphasis is placed on the study of political behavior, political participation, governance and international relations.

Prerequisites: SOSC 101, SOSC 102

POSC 401 - 402
Comparative Government I and II
Six Credits
The course is a comparative study of the political and constitutional development of the European nations, centering on their governments' political institutions, their role in international organizations, and international relations.

Prerequisites: POSC 201 - 202

POSC 407
Political and Constitutional History of Puerto Rico
Three Credits
The course deals with the political history of Puerto Rico under Spanish and American rule.

Prerequisite: POSC 253

POSC 411 - 412
Political Theory I and II
Six Credits
The course centers on the development of political theory. Topics include social and political reality in different areas and their contribution to the development of political thought. Political theories, beliefs and systems of different countries will be discussed.

Prerequisites: SOSC 101 - 102

PSYC 121-122
Psychology I and II
Six Credits
The course is an introduction to basic theories of human behavior and their relation to social progress and individual growth.

Prerequisites: SOSC 101-102

PSYC 123
Survey Course in Psychology
Three Credits
This course is a condensed version of PSYC 121-122.

Prerequisites: SOSC 101-102

PSYC 205
Personal Growth and Development
Three Credits
The course emphasizes the dynamics of human behavior, and techniques for effective interpersonal relations. Human activity and mechanisms for personal and social adjustment are analyzed in order to achieve understanding of oneself and others.

Prerequisites: PSYC 121-122

PSYC 207
Ethnopsychology and Human Environment
Three Credits
The course uses an interdisciplinary approach for studying *lumpen* behavior and the role of the human mind and human values in contemporary Puerto Rican society.

Emphasis is placed on critical thinking as a means of examining this phenomenon.

Prerequisites: SOSC 101-102

PSYC 221
Child Psychology
Three Credits
Main theories of child development, emphasizing cognition, learning, personality and behavior. Recommended for elementary education students.

Prerequisites: PSYC 121-122 or EDUC 171-172

PSYC 222
Adolescent Psychology
Three Credits
The course deals with adolescent development and behavior, including personality, learning, vocational selection, moral development and social adjustment in Puerto Rican society. Alienation and social commitment will also be discussed.

Prerequisites: PSYC 121-122

PSYC 225
Social Psychology
Three Credits
The course centers on the relationship between the individual and society. Attitudes, perception of group behavior, prejudices, and conformity will be discussed.

Prerequisites: PSYC 121-122

PSYC 281-282
Development of the Personality I and II
Six Credits
This is an advanced course on the development of personality. It includes discussion of theories and research on human development from conception through death. The biological, social, psychological and circumstantial forces that shape the individual will be covered. Focus is on early adulthood, maturity and old age.

Prerequisites: PSYC 221-222

PSYC 305
Human Relations and Public Service
Three Credits
The course deals with the complexity and the dynamics of human relationships. The variables that influence individual behavior in group situations will be studied. Topics include motivation, leadership, communication, resistance to change, and the importance of good human relations in public service.

Prerequisites: PSYC 121-122 or PSYC 123

PSYC 307
Group Dynamics
Three Credits
The course covers group dynamics, cohesion, structure, emotional factors, leadership, and communication. The classroom situation is used as a laboratory for the concepts studied.

Prerequisites: PSYC 121-122 or PSYC 123

PSYC 321
Theories of Personality
Three Credits
The course deals with theories, problems and research regarding the role of motivational, perceptive, socio-economic, biological, genetic, somatic, and learning factors in the development of the personality.

Prerequisites: PSYC 121-122

PSYC 325
Introduction to Gerontology
Three Credits
The course deals with physiological and psychological aspects of aging. Resources for servicing the older citizen in Puerto Rico will be discussed.

Prerequisites: PSYC 121-122 or PSYC 123

PSYC 330
Measurement Techniques of Personality
Three Credits
The course centers on techniques for assessing psychological variables, including mental and motor ability, interests, attitudes, and goals. Statistical bases in the construction of scales and normalization of tests will be presented.

Prerequisites: PSYC 121-122, STAT 300-301

PSYC 343
Psychology of Learning
Three Credits
The course covers theories of learning as a determinant of behavior. Topics include variables in the learning process, experimentation and application to education. Clinical experience will be provided.

Prerequisites: PSYC 121-122

PSYC 350
Principles of Psychopathology
Three Credits
The course covers dynamics, diagnosis, and prediction of abnormal behavior. Neuroses, psychotic disorders and personality disturbances such as alcoholism, sexual deviation and others will be discussed. Psychotherapies used in the treatment of abnormal behavior will be analyzed.

Prerequisites: PSYC 121-122 or PSYC 123

PSYC 355
Industrial Psychology
Three Credits
The course deals with the application of psychological techniques to industry and business. Emphasis is on promotion and recruitment of personnel. Psychological factors that determine efficiency of industrial organizations will be discussed.

Prerequisites: PSYC 121-122

PSYC 360
Human Sexuality
Three Credits
This course addresses sexuality as an integral part of human functioning and relationships. Physiological, sociological and psychological aspects of sexual behavior will be covered, including the cultural factors in sexuality, ethical dimensions and sexually transmitted diseases, such as AIDS.

Prerequisites: PSYC 121 and PSYC 102, PSYC 122-123

PSYC 400
Experimental Psychology
Four Credits
The course is an introduction to experimental methods from a methodological point of view. Topics emphasized include epistemological bases of sciences, ethical issues in conducting experimental research, APA Ethical Standards, scientific and non-scientific approaches to knowledge, and goals of scientific methods. Other topics discussed include independent and dependent age, external validity, experimental and statistical hypothesis, identification of statistically significant effects, elements of descriptive and inferential statistics, treatment effects, experimental treatment, control and experimental groups, and features of the experimental methods. Basic experimental designs discussed include completely randomized, within subject, and factorial designs. Emphasis will be placed on independent group designs, random groups, matched groups and others. Experimental thesis designs will be carefully discussed and applied.

Prerequisites: PSYC 121-122, STAT 300-301

PSYC 405
Physiological Psychology
Three Credits
The course covers physiology and human behavior, including the central nervous system, the autonomous nervous system, cortical processes, processes of emotion, motivation, and behavioral disorders with physical etiology. Relationship between learning and psychological processes will be discussed.

Prerequisites: PSYC 121-122 or PSYC 123

PSYC 415
Techniques and Counseling
Three Credits
The course centers on counseling techniques and skills. Emphasis is on the discovery and diagnosis of symptoms, therapy and patients' behavior.

Prerequisites: PSYC 121-122 or PSYC 123, PSYC 350

PSYC 420
Counseling and Therapy
Three Credits
The course aims to prepare the student for giving short-term therapy, including crisis intervention, reality therapy, and other types of therapy for patients seeking prompt relief from their symptoms. Training will be through group dynamics. The student will be taught to distinguish between patients or clients who may benefit from this type of assistance, to make a psycho-diagnosis, and to develop an evaluation plan.

Prerequisites: PSYC 121-122 or PSYC 123, PSYC 350

PSYC 450
Psychology Integration Seminar
Two Credits
The course centers on analyzing psychologists' work and functions in diverse service settings. It includes discussion of the psychologist's Code of Ethics and the most relevant laws involved in the rendering of psychological services. The design and implementation of a community service activity are also included.

PUAD 201
Introduction to Public Administration
Three Credits
The course covers the theory of public administration and the field of organizational science. Problem identification and classification use of models for analyzing the different structures will be included.

Prerequisites: SOSC 101-102

PUAD 203
Public Personnel Administration
Three Credits
The course deals with theoretical, legal and practical aspects of personnel administration. The Commonwealth Personnel Law and it regulations are studied, in order to gauge their impact on Puerto Rico's public administration practices.

Prerequisites: SOSC 101-102

PUAD 205
Ethics and Public Administration
Three Credits
The course centers on the theory and practice of ethics in Puerto Rico's public administration. Standards of ethical conduct and administrative sanctions, as contemplated in the Commonwealth Personnel Law will be discussed.

Prerequisite: PUAD 201

PUAD 215
Communication and Writing in Public Service
Three Credits
The course deals with communication levels in public administration, departments and agencies. Topics include the different types of documents that public officials must produce. Writing exercises are emphasized.

Prerequisites: SPAN 101-102

PUAD 305
Public Personnel Recruitment and Classification
Three Credits
The course centers on theoretical and practical knowledge of methods and techniques of selection, recruitment and classification of personnel.

Prerequisite: PUAD 203

PUAD 310
Public Personnel Training
Three Credits
The course deals with the importance of training in the dynamics of an organization. The function of training, training methods, techniques and tools will be discussed. Evaluation of personnel training programs is included.

Prerequisite: PUAD 203

PUAD 315
Organizational Psychology
Three Credits
The course centers on human behavior in the organization. Main theories of organization and organizational development will be discussed. Research on structure and organizational climate will be studied.

Prerequisite: PSYC 123

PUAD 325
Municipal Government Administration
Three Credits
The course covers the structure and operation of Puerto Rico's municipal governments. Problems of municipal administration, laws governing the municipalities and their agencies will be discussed.

Prerequisite: POSC 203

PUAD 327
Introduction to Public Policy
Three Credits
The course centers on analyzing the concept of public policy and its development in contemporary public policy administration. Topics include drafting and evaluation of public policy. Students will participate in the critical analysis of prevailing government policies regarding current social problems.

Prerequisite: PUAD 201

PUAD 330
Evaluation of Government Programs
Three Credits
The course deals with the process of program development and evaluation in government, including decision-making structures and process, as well as effective problem-solving.

Prerequisite: SOSC 320

PUAD 360
Labor Relations and Collective Bargaining
Three Credits
The course covers labor relations in Puerto Rico, including legislation and case law in local and federal jurisdictions.

Prerequisite: POSC 358

PUAD 380
Statistical Software for the Social Science
Three Credits
The course deals with computer software for social science statistical processes, such as measurement of central tendencies, dispersion, correlation, regression, prediction, and graphics.

Prerequisites: STAT 300-301

PUAD 400
Planning and Government
Three Credits
The course covers the nature, scope, and application of planning and its techniques. Social movements, government processes and new planning styles will be examined.

Prerequisite: PUAD 201

PUAD 401
Administration and Fiscal Policy
Three Credits
The course deals with administration of fiscal resources, legal foundations of fiscal administration, and fiscal policy and the political context. Public spending and interagency relations in the management of public funds will be analyzed.

Prerequisite: ECON 123

PUAD 405
Tax Policy and Government Budgeting
Three Credits

The course centers on an analysis of the process of establishing government income and expenses. Tax policy and public spending in the framework of income distribution will be discussed, taking Puerto Rico as a case study.

Prerequisites: PUAD 201, PUAD 401

PUAD 407
Investment Analysis
Three Credits
The course centers on training in analysis and evaluation of investments in the private and public sectors. Techniques for estimating social benefits derived from public investment will be discussed.

Prerequisites: ECON 121-122

PUAD 450
Practice in Public Administration
Three Credits
The course centers on practice in a government agency selected by the practice supervisor and the dean. Students must correlate experience with theory. They must meet regularly with their counselor and will be trained, supervised, and evaluated by agency personnel.

Prerequisites: 15 major credits, consent of dean

PUAD 451 to 487
Seminars: Special Topics in Public Administration in Puerto Rico (course number depends on seminar being offered during a given semester)
Three Credits
Subject matter of the course will be announced at pre-registration. Seminars may be offered with or without credit to public and private officials, to whom the institution will award a certificate of attendance.

SOCI 201-202
Sociology Principles I and II
Six Credits
The course deals with the individual in the social environment, social organization, social change and control. Mental health, juvenile delinquency, crime, unemployment and racial conflict will be discussed. Topics include the influence of institutions, such as the family, the school, the church and the state.

Prerequisites: SOSC 101-102

SOCI 203
Sociology Principles (Compendium)
Three Credits
The course is a compendium of Soci 201-202 for criminology students. Topics include social organization, cultural phenomena, and socialization. Basic institutions, social deviation, stratification, social mobility, social and cultural change will also be discussed.

Prerequisites: SOSC 101-102

SOCI 321
Sociology of Culture
Three Credits
The course deals with the relationship between society and culture. Concepts of cultural interaction within society will be discussed.

Prerequisites: SOCI 201-202

SOCI 325
Sociology of Deviance
Three Credits
Theories of social deviance. The role of social and cultural values in the definition of deviant behavior. Emphasizes the influence of traditional and modern society in deviant behavior.

Prerequisites: SOCI 201-202 or 203

SOCI 327
Community Development
Three Credits
The course centers on the origin and structure of communities, with emphasis on social, economic and technological forces that promote change. Decision-making

mechanisms and the role of local leadership will be discussed.

Prerequisites: SOCI 201-202 or 203

SOCI 330
Marriage and Family
Three Credits
The course deals with function, patterns and role of marriage and the family. The social and personal problems of the family in a changing society will be discussed. The family's influence on the development of the personality will be included.

Prerequisites: SOCI 201-202

SOCI 345
Industrial Sociology
Three Credits
The course deals with the effects of industrialization on modern society. Topics include relationships between corporations and community, social organization of labor, and labor-management relations.

Prerequisites: SOCI 201-202

SOCI 350
Sociological Theory
Three Credits
The course covers the principal schools of thought and their major exponents. Research techniques are included.

Prerequisites: SOCI 201-202

SOCI 355
Population Problems
Three Credits
The course deals with theories of population, fertility, mortality and migration. The population problem in Puerto Rico and the world will be discussed.

Prerequisites: SOCI 201-202

SOCI 358
Social Problems of Puerto Rico
Three Credits
The course deals with social problems in contemporary Puerto Rico. Historical perspective on the problems, their causes, public and private problem-solving policies will be discussed. Topics include demographic problems, poverty, educational deprivation, crime, drugs and alcohol and the problems of victims in Puerto Rico.

Prerequisites: SOSC 101-102

SOHU 105
Freshman Seminar
Three Credits
The course centers on counseling and enabling students regarding their university life. Emphasis is on academic and personal development and forming ethical and socially responsible citizens.

SOSC 101-102
Introduction Study of Social Sciences I and II
Six Credits
The course centers on human society. Topics include the individual and his or her relationship to society, collective behavior, Puerto Rico and its relationship to the social and historical development of western civilization. Economic, psychological, sociological, anthropological and political problems of the contemporary world will also be discussed.

SOSC 111
Individual, Community, Government and Social Responsibility I
Three Credits
The course deals with civic, social, cultural, and psychological elements of individuals in society. Emphasis is on personal, interpersonal and social dimensions.

SOSC 112
Individual, Community, Government and Social Responsibility II
Three Credits
The course centers on the study of civic, social, cultural, and psychological elements of individuals in society, with emphasis on citizenship, political, economical and environmental dimensions.

SOSC 320
Social Research Techniques
Three Credits
The course deals with research methods and techniques for the social sciences.

Prerequisite: STAT 300

SOWO 200
Introduction to Social Work
Three Credits
The course will promote philosophical and practical understanding of social work services. It includes an analysis of the historical development of social work as practiced in Puerto Rico, and the characteristics that distinguish it from other professions related to social welfare.

Prerequisites: SOSC 101-102

SOWO 210
Human Behavior and Social Environment
Three Credits
The course aims to explore, the relationship between human behavior and social environment, using the social systems approach. Biological, psychological, and social factors influencing such behavior, from the individual to society's social systems, will be discussed.

Prerequisites: PSYC 123, SOCI 203, SOWO 200

SOWO 211
Human Behavior Social Environment 1
Three Credits
The course deals with the complexity of human behavior within an eco-social systems approach, taking into account the interaction of biological, psychological, social, economic, political, cultural and spiritual aspects. The course gives a multiple, mutual, and multi-directional vision of the causality of human behavior, presenting the general systems theory as it can be applied to all levels (micro, mezzo, and macro) of social systems that are subject to social work intervention. In this course special emphasis is given to the micro individual level as a social system.

Prerequisites: SOSC 101-102

SOWO 212
Human Behavior Environment 2
Three Credits
Building on the eco-social approach presented in SOWO 211, this course follows the continuum of the micro-mezzo-macro levels of intervention. The family is studied as a micro-social system; groups are studied as a mezzo-social system and communities, and organizations and societies as macro-social systems. The structural, functional, and evolutionary aspects of behavior of families and groups, within a context of human diversity, will be studied. Organizations, communities and societies will be examined from an eco-social perspective, integrating the concepts of power, oppression, discrimination, strengths, perspective, and empowerment.

Prerequisites: SOWO 200, SOWO 210, PSYC 123

SOWO 300
Social Policy
Three Credits
The course covers philosophical and historical foundations of the social welfare system. Dynamics, development and process of social policies in Puerto Rico and their connection with the local cultural, political, and economic system will be discussed.

Prerequisites: PSYC 123, SOCI 203

SOWO 310
Individual Help or Casework
Three Credits
The course deals with the skills needed to support practice with individual clients. Emphasis is placed on identification and planning for early intervention to solve individual social problems. The course also promotes the development of helpful practices for record keeping.

SOWO 311
Social Work Methodology I
Three Credits
This course fosters the development of the skills, concepts and values needed for a general practice at all levels of intervention. The professional relationship, the social work interview and associated skills and methods are emphasized.

Prerequisites: SOWO 200, SOWO 210-211, PSYC 225

SOWO 312
Social Work Methodology II: Individuals and Families
Three Credits Hour
The course covers the development of the specific skills and concepts needed for individual and family intervention. Using the problem-solving model, this course emphasizes the phases of assessment, plan of action and intervention of the general method. Intervention with families is studied, using the eco-structural model stressing the particular social problems confronted within the Puerto Rican context. The importance and skills of social work documentation are also covered.

Prerequisite: SOWO 311

SOWO 317
Group Dynamics
Three Credits
The course deals with group dynamics, cohesion, structure, and emotional factors. Topics include leadership and communications. The classroom situation is used as a laboratory for the concepts studied.

Prerequisites: SOWO 200, SOWO 310

SOWO 318
Social Work Methodology III: Groups and Communities
Three Credits
The course centers on the development of the specific skills and concepts needed for group and community intervention. Group work is presented as a method of intervention, stressing the skills needed for the organization and management of group dynamics. In community work, the understanding of power is emphasized, developing strategies for consciousness-raising about oppression, discrimination and their elimination. The course also

presents both the history of both group and community social work, and their development in Puerto Rico.

Prerequisites: SOWO 200, SOWO 211-212, SOWO 311-312

SOWO 320
Social Research Techniques
Three Credits
This course focuses on the study and application of the scientific method. It also promotes the use of social research methods for solving empirical and theoretical problems in the social sciences.

Prerequisites: STAT 300-301

SOWO 325
Introduction to Social Gerontology
Three Credits
The course covers physiological and psychological aspects of aging. Resources for serving the older citizen in Puerto Rico will be discussed.

Prerequisite: PSYC 123

SOWO 330
Seminary: Current Topics in Social Work
Three Credits
Analysis of a diversity of current subjects applicable to the generalist practice of the Social Work profession. Discussion of themes such as cultural diversity, diasporas, alternate lifestyles, political and economic processes, postmodern human relations and their impact on the philosophy, knowledge, skills and practice of social work at the undergraduate level. Provides opportunities for students to examine and strengthen their professional and personal values prior to their admittance to Supervised Practicum (SOWO 451-452).

Prerequisites: SOWO 200, SOWO 211, SOWO 212, SOWO 300, SOWO 311, SOWO 300, SOWO 320

SOWO 327
Community Development
Three Credits
The course deals with the origin and structure of communities, emphasizing social, economic and technological forces that promote change, decision-making mechanisms, and the role of local leadership.

Prerequisites: SOWO 200, SOWO 300, SOWO 310

SOWO 440
Seminar
Three Credits
This is an integrative seminar which covers diverse issues, dilemmas, value conflicts, ethics, and techniques associated with the practice of social work. Analysis and oral presentation of controversial issues are presented to stimulate the development of students' analytical and creative capacity.

Prerequisites: SOWO 200, SOWO 300, SOWO 310

SOWO 441
Practicum Seminar I
Two Credits
This seminar, which accompanies the Social Work Practicum 1, provides complementary information to the practicum course. Through class discussion, students are provided with the opportunity to apply critical thinking skills to the specific cases and the diverse populations which are confronted in the practicum experience. Using the strengths perspective, the student is encouraged to work towards the elimination of oppression and discrimination. The Generalist Method will be enriched with diverse models of intervention. The legal and ethical aspects of the profession will also be discussed, as well as specific issues relating to the practicum agencies, as they arise.

Prerequisites: SOWO 200, SOWO 211-212, SOWO 311-312, SOWO 318

SOWO 442
Practicum Seminar II
Two Credits
This seminar, which accompanies the Social Work Practicum 2, provides complementary information to the practicum course. The seminar emphasizes the following methodological processes: the diagnostic phase, the plan of action, and the termination of the professional relationship. The Generalist Method will be enriched with diverse models of intervention, as needed, in relationship to specific situations encountered in the practicum experience.

Prerequisites: SOWO 441, SOWO 451

SOWO 450
Social Work Practice
Four Credits
This supervised practice is an integral part of the social work curriculum. Students are asked to participate in direct service activities, providing them the opportunity to apply theoretical knowledge and skills in a reflective and self-analytical way. During the practice, students initiate their professional experience under the supervision, support, and coordination of an experienced social worker.

Prerequisites: SOWO 200, SOWO 300, SOWO 310, PSYC 307, SOCI 203, SOCI 325 SOSC 320

SOWO 451
Supervised Practice I
Four Credits
Social Work Practicum 1 provides students with practical, hands-on experience so that they may have the opportunity to apply theories, methodologies, and skills learned in the classroom, in an ethical and responsible manner, under the supervision of an experienced professional. The student will be expected to successfully initiate the objectives of the course as presented in the Practicum Manual.

Prerequisites: SOWO 200, SOWO 211-212, SOWO 311-312, SOWO 318

SOWO 452
Supervised Practice II
Four Credits
The student will continue the practical, hands-on experience in the Social Work Practicum 2 and will be expected to master and complete the objectives of the course as presented in the Practicum Manual.

Prerequisites: SOWO 441, SOWO 451

SPAN 097
Basic Communication Skills in Spanish
Three Contact Hours
The course develops students' basic oral, reading and writing skills, through the study and analysis of reading selections. Lexical and syntactic elements are studied and analyzed.

SPAN 098
Introduction to Reading and Writing Skills
Three Contact Hours
The course is an introduction to the analysis of reading and writing skills. Writing skills will be reinforced in the language lab.

SPAN 100
Remedial Spanish
No Credit
The objective of the course is enrichment of vocabulary and basic grammar for students whose Spanish reading and writing skills are deficient.

***SPAN 151-152**
Fundamentals of Reading and Writing I and II
Six Credits
This is a first year Spanish course which aims to develop communication skills. Emphasis is on basic grammar, reading comprehension, and basic composition.

SPAN 107-108
Fundamentals of Reading and Writing Bilingual I and II
Six Credits
The course emphasizes the development of reading and writing skills of for students of Spanish as a second language. Its objective is vocabulary enrichment and grammar from a bilingual point of view. Students are required to attend a weekly session in the language laboratory.

SPAN 201-202
Business Spanish I and II
Six Credits
The course aims to develop communication skills directed at business correspondence. Emphasis is on the contribution of logic, psychology, ethics, and grammar to communications.

Prerequisites: SPAN 151-152

SPAN 213
Literary Genres I
Six Credits
The course deals with the literary genres: poetry, drama, the short story, the novel, and the essay. Emphasis is on the origins and development of each genre, as well as on the analysis of different literary works.

Prerequisites: SPAN 151-152

SPAN 215
Advanced Composition
Three Credits
The course emphasizes the development of the skills needed to write logically and correctly. Research techniques will also be covered.

Prerequisites: SPAN 151-152

SPAN 221-222
Spanish Literature I and II
Six Credits
The course is an introduction to the history of Spanish literature. It includes an overview from the Middle Ages to the Renaissance. The course aims to familiarize the student with cultural movements and representative works of each period.

Prerequisite: SPAN 213

SPAN 230
Introduction to Linguistics
Three Credits
The course is an introduction to linguistic terminology and methods. Topics include phonology, morphosyntaxis, and semantics.

Prerequisite: SPAN 265

SPAN 250 @
Writing Techniques
Three Credits
This course will provide the necessary tools for developing skills in writing letters, paragraphs, and essays.

Prerequisite: SPAN 151, SPAN 152

SPAN 255 @
Research and Writing
Three Credits
This course is designed to develop research and writing skills in an acceptable academic format. Attention will be given to the APA format, the writing process, and the use of reference materials to sustain writing ideas. Prerequisite: SPAN 151, SPAN 152, SPAN 250

SPAN 265
Advanced Grammar
Three Credits
The course covers the components and the structure of the Spanish language. Emphasizes is on the study of linguistic change. The course aims to improve students' oral and written communication skills.

Prerequisites: SPAN 151-152

SPAN 323
Spanish Literature
Three Credits
The course covers Spanish literature from the Golden Century to the present.

Prerequisite: SPAN 213

SPAN 451-452
Puerto Rican Literature I and II
Six Credits
The course covers Puerto Rican literature from its origins to the present. It includes analysis of representative works of the different literary movements.

Requisite: SPAN 213

SPAN 461-462
Spanish-American Literature I and II
Six Credits
The course covers Latin American literature and literary movements from the colonial period to the present.

Prerequisite: SPAN 213

*Students will be placed into appropriate levels by CEEB scores or by department placement exams.

Note: Literature courses need not be taken in numerical order, but the student's understanding of the chronology will be aided by following the numerical sequence.

STAT 300
Elements of Statistics I
Three Credits
The course deals with statistics for the social sciences student. It includes sampling, averages, mode, median, and probability.

Prerequisite: MATH 100

STAT 301
Elements of Statistics II
Three Credits
The course deals with statistics as applied to psychology, economics, and other social sciences. Topics include probability and probability curves, games and variance, random variables, statistical inference, nonparametric tests, and correlation coefficient. Experimental design, Baye's Formula, and decision-making theory will be discussed. Multivariable and bivariable lineal analysis will also be presented.

Prerequisite: STAT 300

RETENTION INDEXES

BACHELOR PROGRAM
108 CREDITS

Department	Level	Major
70	1	Sociohumanistic Studies
Attempted Credits	**%Credits Required**	**Retention Rate**
1-24	50%	1.5
25-49	53%	1.6
50-74	56%	1.7
75-99	59%	1.8
100-124	62%	1.9
125-149	64%	2
150-162	67%	2

BACHELOR PROGRAM
117 CREDITS

Department	Level	Major
70	1	Social Sciences General
Attempted Credits	**%Credits Required**	**Retention Rate**
1-24	50%	1.5
25-49	53%	1.6
50-74	56%	1.7
75-99	59%	1.8
100-124	62%	1.9
125-149	64%	2
150-176	67%	2

BACHELOR PROGRAM
119 CREDITS

Department	Level	Major
10	1	Office Technology Management
Attempted Credits	**%Credits Required**	**Retention Rate**
1-24	50%	1.5
25-49	53%	1.6
50-74	56%	1.7
75-99	59%	1.8
100-124	62%	1.9
125-149	64%	2
150-179	67%	2

BACHELOR PROGRAM
120 CREDITS

Department	Level	Major
70	1	Criminal Justice
70	1	Social Work
70	1	Psychology
70	1	Public Administration
70	1	Comunications
70	1	Graphic Design (Soc. Scs.)
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-180	67%	2

BACHELOR PROGRAM
122 CREDITS

Department	Level	Major
20	1	Natural Sciences General
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-183	67%	2

BACHELOR PROGRAM
123 CREDITS

Department	Level	Major
26	1	Speech-Language Therapy
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-185	67%	2

BACHELOR PROGRAM
124 CREDITS

Department	Level	Major
60	**1**	**Graphic Design (Design Sch.)**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-186	67%	2

BACHELOR PROGRAM
125 CREDITS

Department	Level	Major
10	**1**	**Management**
10	**1**	**Marketing**
26	**1**	**Sign Language Interpretation**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-188	67%	2

BACHELOR PROGRAM
126 CREDITS

Department	Level	Major
10	**1**	**Computerized Information Systems**
10	**1**	**Office Management**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-189	67%	2

BACHELOR PROGRAM
127 CREDITS

Department	Level	Major
20	**1**	**Biology**
60	**1**	**Interior Design**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-27	50%	1.5
28-54	53%	1.6
55-81	56%	1.7
82-108	59%	1.8
109-135	62%	1.9
136-162	64%	2
163-191	67%	2

BACHELOR PROGRAM
128 CREDITS

Department	Level	Major
26	**1**	**Nursing**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-28	50%	1.5
29-56	53%	1.6
57-84	56%	1.7
85-112	59%	1.8
113-140	62%	1.9
141-168	65%	2
169-192	67%	2

BACHELOR PROGRAM
129 CREDITS

Department	Level	Major
26	**1**	**Industrial Design**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-28	50%	1.5
29-56	53%	1.6
57-84	56%	1.7
85-112	59%	1.8
113-140	62%	1.9
141-168	65%	2
169-193	67%	2

BACHELOR PROGRAM
130 CREDITS

Department	Level	Major
10	1	Accounting
40	1	Secondary Educ. Biology
40	1	Secondary Education Math

Attempted Credits	%Credits Required	Retention Rate
1-28	50%	1.5
29-56	53%	1.6
57-84	56%	1.7
85-112	59%	1.8
113-140	62%	1.9
141-168	64%	2
169-195	67%	2

BACHELOR PROGRAM
131 CREDITS

Department	Level	Major
40	1	Elementary Educ. K-3
40	1	Elementary Educ. 4th-6th
40	1	Elementary Educ. Teaching English as a Second Lang
40	1	Secondary Educ. Teaching English as a Second Lang.
40	1	Special Educ. Mild Handicaps
40	1	Elementary Educ. Preschool
40	1	Secondary Educ. Vocational Industrial
40	1	Secondary Educ. Social Sciences
40	1	Secondary Educ. Spanish
40	1	Special Educ. Speech, Language & Hearing Impairments
40	1	General Elementary Educ.
40	1	Physical Educ. Elementary
40	1	Physical Educ. Secondary

Attempted Credits	%Credits Required	Retention Rate
1-28	50%	1.5
29-56	53%	1.6
57-84	56%	1.7
85-112	59%	1.8
113-140	62%	1.9
141-168	64%	2
169-196	67%	2

BACHELOR PROGRAM
132 CREDITS

Department	Level	Major
70	1	Municipal Government

Attempted Credits	%Credits Required	Retention Rate
1-28	50%	1.5
29-56	53%	1.6
57-84	56%	1.7
85-112	59%	1.8
113-140	62%	1.9
141-168	64%	2
169-198	67%	2

BACHELOR PROGRAM
133 CREDITS

Department	Level	Major
20	1	Chemistry
40	1	Secondary Educ. Chemistry

Attempted Credits	%Credits Required	Retention Rate
1-30	50%	1.5
31-60	53%	1.6
61-90	56%	1.7
91-120	59%	1.8
121-150	62%	1.9
151-180	65%	2
181-200	67%	2

BACHELOR PROGRAM
134 CREDITS

Department	Level	Major
26	1	Nutrition and Dietetics
40	1	Secondary Educ. History
40	1	Secondary Educ. Chemistry

Attempted Credits	%Credits Required	Retention Rate
1-30	50%	1.5
31-60	53%	1.6
61-90	56%	1.7
91-120	59%	1.8
121-150	62%	1.9
151-180	65%	2
181-201	67%	2

BACHELOR PROGRAM 154 CREDITS		
Department	**Level**	**Major**
80	**1**	**Mechanical Engineering**
80	**1**	**Industrial & Management Engineering**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-30	50%	1.5
31-60	53%	1.6
61-90	56%	1.7
91-120	59%	1.8
121-150	62%	1.9
151-180	65%	2
181-231	67%	2

BACHELOR PROGRAM 155 CREDITS		
Department	**Level**	**Major**
80	**1**	**Electric Engineering**
80	**1**	**Computer Engineering**
Attempted Credits	**%Credits Required**	**Retention Rate**
1-30	50%	1.5
31-60	53%	1.6
61-90	56%	1.7
91-120	59%	1.8
121-150	62%	1.9
151-180	65%	2
181-233	67%	2