Institutes

INSTITUTE FOR BANKING & FINANCE (IBAF)
The Institute of Banking and Finance serves as a hub for executive training in the country. The institute offers seminars for middle managers and top executives of financial institutions, who work in increasingly complex and uncertain environments. IBAF’s courses are designed to provide participants with methods to manage their banks’ portfolios in such contexts.

CISCO INSTITUTE
This institute offers Cisco courses in computer networking, and trains Cisco instructors for the Middle East and North Africa (MENA). It performs quality visits to regional and local Cisco academies in said region. The visits are meant to ensure the academies offer high-standards Cisco courses, and have the proper manpower and equipment resources to perform the work.

INSTITUTE FOR DIPLOMACY & CONFLICT TRANSFORMATION (IDCT)
The end of the Cold War has created new geopolitical realities in the world, generating new types of global and internal conflicts that require policymakers and scholars to go beyond the traditional rules of diplomacy. New techniques for resolving conflict such as conflict prevention, confidence building, peace building, and peace making are part of these efforts. Moreover, diplomacy refers now to more than an interaction between two or more governments to incorporate unofficial exchanges of private citizens as well as unofficial diplomacy. The Institute for Diplomacy and Conflict Transformation aims to employ a progressive definition of diplomacy in its efforts to create a culture of peace that would reduce violence and increase justice. Director: Dr. Walid Moubarak.

INSTITUTE OF FAMILY & ENTREPRENEURIAL BUSINESSES (IFEB)
The Institute of Family and Entrepreneurial Business serves family-owned and-operated businesses. This institute develops educational programs to support individuals and families in maintaining successful family enterprises. It aims to further the continuity and prosperity of Lebanese and Middle Eastern family businesses by conducting research, spreading information, updating professionals, and providing problem-solving assistance to family enterprises.

INSTITUTE FOR HOSPITALITY & TOURISM MANAGEMENT STUDIES (IHTMS)
The Institute for Hospitality and Tourism caters to the training and research needs of this sector. This institute conducts applied research to solve particular problems and identifies factors affecting hospitality and tourism development. IHTMS also determines what makes tourism possible and investigates how tourism can become an important contributor to the wealth of Lebanon.

HUMAN RESOURCES INSTITUTE
This institute seeks to provide high-quality human resources development programs to prepare Lebanese and regional employees, and human resources professionals and their employers, for the future. The institute’s activities include research of current issues, professional development programs, and comprehensive publications programs.

INSTITUTE OF ISLAMIC ART & ARCHITECTURE (IIAA)
This institute is mainly concerned with the investigation, documentation and interpretation of the material heritage of Islam, particularly as it pertains to cultural manifestations in the Arab world. Its mission is to expand the teaching of Islamic art and architecture, to promote excellence in academic research, and to further the understanding of Islamic architecture and urbanism, in light of contemporary design practices.
INSTITUTE FOR MEDIA TRAINING & RESEARCH (IMTR)
The LAU’s Institute for Media Training and Research emerged from the consolidation of two institutes that had been active at LAU for a number of years: the Beirut Institute for Media Arts and the Institute for Professional Journalists. The merging of the two institutes capitalizes on the strengths of each by combining and expanding the scope of their traditional activities and by allowing for new ones, in line with the tendency toward convergence in the media industry. IMTR activities aim at promoting media research, encouraging debate on media effects and responsibility, and improving standards among students and young professionals. Director: Dr. Yasmine Dabbous

INSTITUTE FOR MIGRATION STUDIES (IMS)
The Institute for Migration Studies breaks the academic drought on this important, albeit often ignored, subject. It strives to conduct research and publish key findings and scholarly works in the field of migration studies. LAU, with its vision for excellence in education and research, offers the perfect locale for the functioning and success of such an institute. In its pursuit of pioneering and innovative research activities, IMS cooperates with international institutions and research centers that have similar research agendas. It aims to establish affiliations with sister institutes in universities located in Arab countries. The objective is to establish a network for migration research in the Arab world housed at LAU. Director: Dr. Paul Tabar

INSTITUTE FOR PEACE AND JUSTICE EDUCATION (IPJE)
The Institute for Peace and Justice Education was established in 1997. In 2001 it became part of a consortium of international university-based peace education institutes with partners in New York, Japan, the Philippines and Argentina. The consortium is an initiative of the Global Campaign for Peace Education launched by the Hague Appeal for Peace. The Institute endorses the GCPE aiming at institutionalizing peace education. A culture of peace will be achieved when citizens of the world understand global problems; have the skills to resolve conflict constructively; know and live by international standards of human rights, gender and racial equality; appreciate cultural diversity; and respect the integrity of the Earth. Director: Dr. Irma-Kaarina Ghosn

SOFTWARE INSTITUTE
The software and information technology sectors in Lebanon can be important components of national economic development plans. The Software Institute aims to support the process of realizing Lebanon’s potential to develop its software industry and services in order to make it regionally competitive and internationally visible. Director: Dr. Danielle Azar.

TEACHER TRAINING INSTITUTE (TTI)
The main purpose of the Teacher Training Institute is to meet the unique curriculum and reform needs of schools throughout the country. Today’s teachers are expected to play a variety of roles in the classroom: educators, motivators, guides, counselors, coaches and disciplinarians. In addition, teachers must continually educate themselves, learning about new advances in education, new technologies and new ways to encourage their students to reach their full potential. Director: Dr. Iman Osta.

URBAN PLANNING INSTITUTE (UPI)
The institute’s purpose is to address problems of urban growth and environmental change in Lebanon and the Middle East. It aims at assisting certain Lebanese ministries in studies related to planning, zoning, land use, demographic projections, CAD mapping, urban statistics, utilities, conservation and recycling of resources, land management, natural reserves, etc.

INSTITUTE FOR WATER RESOURCES & ENVIRONMENTAL TECHNOLOGIES (IWRET)
This institute aims to promote usable technology in areas of water resources, environmental protection, and agriculture in the Middle East. It seeks to initiate new ideas and venues for applied research.
Labs and Centers

SCHOOL OF ARCHITECTURE & DESIGN

BEIRUT FACILITIES:

Architecture Computer Lab
This lab is dedicated to architecture, interior architecture, and interior design applications. It is used for computer lab courses as well as a support facility for design studios.

Architecture Laser Lab
The laser lab is equipped for the digital production of models for architecture and design applications. It has a state-of-the-art laser-cutting machine, which allows students to build their design models in-house.

Graphic Design Computer Labs
There are three graphic design computer labs dedicated to all graphic design digital production services. The labs are equipped with state-of-the-art computers, digital cameras, scanners, plotters, and other equipment. The labs are open to graphic design students, and for the support of all graphic design studios, in addition to design workshops held during the semester. One of the labs is dedicated to all digital graphic design studio courses.

Photography Studio
This studio is open to all students taking photography courses. It allows students to develop films and prints in the dark room. It is equipped for studio photography, with a professional digital camera, as well as small, medium & large format analogue cameras, and full digital studio equipment.

Silkscreen Studio
This studio is open to students enrolled in the silkscreen course. It is used for silkscreen and binding projects, and fully equipped with screen-printing machines, frames, water guns, light room and printing material.

Ceramics Workshop
This workshop is equipped with all the tools needed for the production of ceramic artworks, such as slab rollers, coil extruder, wheels and kilns. It is open to students taking the ceramics courses.

Wood & Metal Workshop
This workshop is equipped with metal and wood machinery used for the production of three-dimensional hand-made design models. It allows students to produce their own study and final models for architecture and design studios.

BYBLOS FACILITIES:

Architecture Computer Lab
This lab is dedicated to architecture, interior architecture, and interior design applications. It is used for computer lab courses as well as a support facility for design studios.

Architecture Laser Lab
The laser lab is equipped for the digital production of models for architecture and design applications. It has a state-of-the-art laser-cutting machine, which allows students to build their design models in-house, in addition to a new 3D printing machine.
Graphic Design Computer Lab
The graphic design computer lab is dedicated to all graphic design digital production services. The lab is equipped with state-of-the-art computers, digital cameras, scanners, plotters, and other equipment. It is open to graphic design students, and used for the support of all graphic design studios.

Photography Studio
This studio is open to all students taking photography courses. It allows students to develop films and prints in the dark room. It is equipped for studio photography, with a professional digital camera, as well as small-, medium- and large-format analogue cameras, and full digital studio equipment.

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SCHOOL OF ARTS & SCIENCES

DEPARTMENT OF COMMUNICATION ARTS:
The Department of Communication Arts houses the following facilities: A newsroom; TV/Film studios; a radio studio, and three theatres.

DEPARTMENT OF COMPUTER SCIENCE AND MATHEMATICS:
The Department of Computer Science and Mathematics houses modern computing and networking technologies that are continually updated and expanded. The facilities include approximately 250 high-end computing workstations that run both Linux and Microsoft operating systems, Apple Macintosh computers, two high-performance Beowulf Linux Clusters used for teaching and research, and a GPU Computing Center. All workstations and peripherals are networked and served using an IBM BladeCenter. The computer centers are also equipped with a variety of computing software that are continuously updated, such as programming environments, cluster computing, simulation software, mathematical software and research software tools.

DEPARTMENT OF EDUCATION:
Early Childhood Education Laboratory School (ECE LS)
LAU’s ECE LS is a modern-day regular preschool that caters to children 2 to 4 years of age. It adopts a holistic child-centered approach to learning and development. The preschool is fully equipped with a lab setting consisting of two observation booths overlooking the two classrooms, with one-sided mirrors, video cameras, sound systems, dimmer lights, and computers, all connected to the classrooms to allow for uninterrupted observations for parents, students, visiting teachers, faculty, and staff.

The role of the LAU ECC is many-fold:
1. It provides quality care for the children, in a nurturing and child-centered environment;
2. It uses, from an academic perspective, a multidisciplinary educational approach: while its primary purpose is to serve as a professional learning platform for students majoring in early childhood education, it also benefits students majoring in education, psychology, music, drama, nursing, among others;
3. It serves as a training hub for ECE professionals both nationally and internationally, thus supporting positive growth, recognition and reputation;
4. It provides a rich environment for research in early childhood development and education as well as promotes collaborative research between faculties locally, regionally and internationally;
5. It encourages involvement on the part of the community.
DEPARTMENT OF ENGLISH LANGUAGE INSTRUCTION:

English Language Laboratory
The English Language Laboratory (located on the Beirut campus) is a learning environment that offers programmed texts, DVDS, CDs, etc., for the development of different skills and increased effectiveness in the use of basic learning tools. Laboratory sessions reinforce listening, speaking, reading, writing, and note-taking. Computer-assisted language learning (CALL) tools are offered to support the learners. Self-access facilities are also available. Online learning is offered as part of reinforcing academic learning skills through the university’s e-learning provider, WebCT/Blackboard. Online materials and links undergo continuous updates.

In addition to regular class work, the English Language Lab offers a service called the Take Over Program (TOP), aiming to help learners overcome English language problems that may impede their academic work. Students can come to TOP with any number of English language problems, such as reading, comprehension, and writing well-constructed essays. The program is very flexible; students can join or leave it at any time. It is based on face-to-face tutorials and sometimes on classes of up to five students with similar language problems. TOP is also offered through WebCT/Blackboard.

Writing Center
The LAU Writing Center, located on the Beirut campus, is devoted to academic excellence and student-centeredness. The center aims at promoting a general culture of writing at the university, at enhancing writing across the curriculum, and at helping students develop as more thoughtful, independent, and rhetorically effective writers. It is not a drop-off, editing, or proofreading service; rather, it is a place where writers can develop their writing skills and strategies.

Free, one-hour individual consultations are offered to all members of the LAU community. Undergraduate and graduate students from any discipline are welcome to share any text, at any stage of the writing process, with writing tutors who will guide them in a nondirective style. Tutors are trained to respect each writer’s level of achievement, encourage analytical thinking, and discuss strategies for writing. Texts may include academic essays, research papers, reading responses, résumés and curriculum vitae, among others.

DEPARTMENT OF NATURAL SCIENCES, BEIRUT CAMPUS:

Biology Laboratories
The biology laboratories of the Beirut campus, consist of two teaching labs and one research lab. These labs serve both undergraduate and graduate students and are well equipped with sophisticated and modern instrumentation supporting all disciplines of biology.

Biology Teaching Lab (Sage 106)
This lab accommodates 20 undergraduate students per session mainly majoring in biology and pharmacy, in addition to freshman students. The main equipment includes microscopes, balances, pH meters, fridges, a rotary evaporator, centrifuges (high speed and refrigerated), incubators, shakers, UV-Visible spectrophotometers, an automated gel stainer/destainer, a hybridization oven, autoclaves, a fluorometer, an electroporator, Isoelectric Focusing, pulse-field gel electrophoresis-sis, different types of electrophoresis setups (horizontal and vertical) and a dishwasher. This lab is also fully equipped with an audiovisual system including video-microscopy and LCD projector for continuous demonstration and experimental purposes. Annexed to the biology lab is a storage facility and small room for preparing reagents.

Biology Teaching Lab (Sage 109)
The most recent addition to our biology labs, it can accommodate 20 students per session and is mainly equipped for experiments in genetics and cell/molecular biology lab courses in addition to the senior study. It contains a microtome, a tissue embedding system, a refrigerated centrifuge, a deep freeze (-80˚ C), a homogenizer, a thermal cycler, Western blot apparatus and electrophoresis setups in addition to a balance, a water bath and a pH meter. This lab is also partially used as a research lab, serving the research needs of biology faculty as well as senior and graduate students.
The Fluorescent Microscopy Lab
Annexed to the second teaching lab, this is a small room equipped with a state-of-the-art inverted fluorescent microscope.

The Research Lab and Cell Culture Facility
This facility is primarily equipped to serve as a cell culture facility and is mainly used as a research facility by senior and graduate students as well as biology faculty. Despite its modest size, this facility is very well equipped and contains several state-of-the-art pieces of equipment, including a Type IIA biological safety cabinet, two CO\textsubscript{2} incubators, an Accuri C6 flow cytometer, an ELISA plate reader and washer, an inverted microscope, an imaging system, a liquid nitrogen storage tank and an autoclave, in addition to a mini-centrifuge, an analytical balance, a water bath and vortexes.

Chemistry Laboratories
The three chemistry labs in Beirut are equipped for practical course work by students majoring in chemistry, biology and pharmacy. The labs accommodate up to 50 students of all levels. The labs support experiments ranging from freshman-level to those requiring advanced analysis and techniques. They include basic equipment such as PC-controlled viscosity meters, osmometers, BOD analyzers, turbiditimeters, refractometers and polarimeters.

An advanced system of instrumentation supporting all branches of chemistry include a wide range of spectrophotometers UV-visible; infrared FTIR; highly advanced PC-controlled chromatography systems, GC and HPLC and ion chromatography; total organic carbon and NCHS elemental analyzers systems; atomic absorption.

Two of the labs contain fume hoods that provide workspaces for four students at a time. Annexed to the chemistry laboratories are storage facilities with the latest safety equipment of gas detection, chemical spill and fire alarm systems. The labs employ the latest methods for waste treatment and management.

Physics Laboratories
The physics laboratory underwent a complete renovation in 2012. The new physics lab, which is designed to accommodate 20 students, has computer stations, each with probes and sensors for automated data acquisition through interfaces for precise data collection and analysis.

The upgraded lab is now equipped with multimedia system that allows projection of computer monitor and video images on wall screens. The facility provides freshmen, premed, engineering, chemistry and biology students with lab courses covering topics in introductory physics, classical and modern physics, mechanics, and electricity and magnetism.

It houses sophisticated and up-to-date experimental setups including probe-ware accessories, photogate accessories, dynamic systems accessories, rotational system accessories, fluid dynamics setups, electrostatic systems, electronic circuits, power supplies, optics systems, spectral light sources, spectrosopes, fundamental constants setups, and many other equipment.

DEPARTMENT OF NATURAL SCIENCES, BYBLOS CAMPUS:
The natural sciences laboratories in Byblos are equipped with technological instruments that enable students to conduct both basic and highly specialized research. In addition to facilities available in the department, students have access to those of the School of Pharmacy.

Biology Laboratories
Each of two teaching labs accommodates around 20 students and is equipped with all necessary facilities for undergraduate lab teaching (microscopes with or without cameras, incubators, centrifuges, balances, pH meters, UV-visible spectrophotometers, spirometers, kymographs, environmental chamber, etc.). Annexed to the lab are two relatively smaller rooms. One serves as a store room for chemicals, glass and plastic-ware, the other contains a high-speed centrifuge, an ultracentrifuge, two refrigerators and other minor equipment.

Core Molecular Microbiology Research Lab
This lab is equipped with state-of-the-art tools for molecular microbiology research. It is equipped with a DNA sequencer, three thermal cyclers, a real-time PCR, a UV-visible spectrophotometer, a biology bacterial identification system, a
PCR preparation unit, and two air incubators, as well as other minor instruments.

**Two Core Molecular Biology Labs**
Each lab consists of three benches serving as working areas for graduate students. These labs are equipped specifically to fit molecular biology research needs. These labs are equipped with thermal cyclers, pulse-field gel electrophoresis unit, gel documentation systems, fermenters, vacuum concentrator, vacuum blotter, sonicators, homogenizers, freeze dryer, gel electrophoresis apparatus, Western blot apparatus, automated gel stainer/destainer, radioactive/fluorescent microplate counter, rotary evaporator, autoclaves, hybridization oven/UV cross linker, deep freeze, refrigerators, inverted and regular microscopes, laminar flow hood, and many other small instruments. Each lab has several computer terminals accessible to graduate students and linked to the university network and high-speed internet.

**The Genomics and Proteomics Research Labs**
To partake in the wonderful opportunities offered by genetic research and to contribute to global efforts to improve human health, a comprehensive center for genetics and genomics research was established in 2005 at LAU, by the schools of Arts and Sciences, Medicine, and Pharmacy, under the umbrella of the Institute of Human Genetics (IHG).

The Genomics and Proteomics Lab, the core unit of IHG, has received major support in grants and equipment for the development of genomics, proteomics and glycomics research, and comprises additionally the only accredited molecular microbiology lab outside the European Union as a regular member of the SeqNet organization for microbial sequencing.

The planned center for genetics research will cover a full spectrum of activities and provide opportunities in the following.

**Genomics Facility Core:** The initial objectives of the facility core are to make available to LAU investigators a wide range of reliable, validated assays for analyzing changes in gene expression. Applying the latest U.S. standards in genomics-based programs, the lab links fundamental life science research programs with applied research across the campus. It serves as a research facility to faculty and graduate students in many disciplines including biological, medical and pharmacological sciences.

**Genetic Information and Counseling:** In addition to socio-cultural information, those who become associated with the center can undergo analyses to determine the existence of genetic risk factors for common and rare disease, drug reactions and eventually dosing regimens (pharmacogenomics), and other information on health-related risks and benefits which can be learned from genomic analysis.

**Gene Mining and Drug Discovery:** The center will use functional genomics technologies to generate a comprehensive and multidimensional description of well-defined states of complex diseases, which will be used as a platform for studying the causes of these complex diseases. Lebanese and Middle Eastern populations provide a unique opportunity to study the genetics of complex diseases as the average rate of consanguineous marriages can range from 25% to more than 50%.

**The Cell Culture IVF/Epifluorescent Microscopy Lab**
This is a dry lab that contains an inverted epifluorescent microscope equipped with a micromanipulating system for in vitro fertilization, two laminar flow hoods, two CO₂ incubators, ELISA reader, refrigerators, etc.

**The Proteomics Lab**
It is a dry lab that houses a state-of-the-art proteomic analyzer MALDI TOF TOF in addition to an IR and Nano-LC. This lab is mainly used by faculty and graduate students. It is also accommodates undergraduate students working on their senior study.

**Nutrition Laboratories**

**Nutrition Teaching Lab:** The lab is equipped with necessary machines for food analysis including a muffle furnace, a protein digestion and distillation apparatus, a fiber analyzer and fat extraction units.
Dual-Energy X-Ray Absorptiometry (DXA): DXA scans are used by nutrition students to primarily evaluate bone mineral density. It also helps them to measure total body composition and fat content with a high degree of accuracy.

Animal Room
The animal room contains two animal species (Spague Dawley rats and BALB/c mice) that are inbred with a consistent average stock of more than 500 rats and 300 mice.

The Chemistry Lab
This lab is utilized in a variety of courses serving chemistry, biology, and pre-pharmacy students. The lab accommodates approximately 20 students per session and is equipped for the General Chemistry, Quantitative Analysis and Organic Chemistry I and II lab courses. As such, the lab houses various fume hood types along with required safety installations.

The Chemistry Lab
Adjacent to the lab is a chemical storage and a glass storage room as well as the supervisor's office. Combined with the various wet and dry laboratories located in the vicinity, these labs house advanced instrumentation including a 300 MHz NMR spectrometer, gas chromatograph, gas chromatography–mass spectrometry (GC-MS) instruments with autosampler capability, various HPLC units, UV-visible spectrophotometers, fluorometer, electrochemical work station, spin coater, chemical microwave, high vacuum sublimation system, freeze dryer, and nitrogen liquefier, to name a few.

SCHOOL OF ENGINEERING

CIVIL ENGINEERING LABORATORIES
The Department of Civil Engineering is committed to provide hands-on measurements and experimentation, as a vital component of the educational program. The Civil Engineering Laboratories provide undergraduate students with state-of-the-art equipment for experimentation and demonstration of the basic concepts covered in class. The labs also serve for research by the faculty, and for students’ final-year projects.

The Civil Engineering Laboratories play a leading role in serving as testing facilities, as well as in technical consultation for several engineering firms and private entities, following internationally accepted standards and testing procedures.

The Civil Engineering Laboratories house the following sub-specialty laboratories:

The Construction Materials Laboratory is equipped with a 400-ton Forney hydraulic testing rig, a high precision, displacement controlled, Instron testing frame, equipment for standard testing of aggregates and concrete, in both fresh and hardened stages, equipment for non-destructive testing of different elements of existing structures, such as ultrasonic device, Schmidt hammer, Windsor probe, Rebar scan, and core drills. Most standard tests can be performed on almost all the building and construction materials, including concrete, aggregates, asphalt, various metals, and related constituents.

The Environmental and Water Quality Laboratory is equipped with sampling devices and quality analysis of water/wastewater, jar tests, stream gauging, top of the line point and depth sediment samplers, bed load samplers, fluorimeters, UV-visible spectrophotometers, colorimeters, peristaltic pumps, gas meters, centrifuges, incubators, and furnaces, in addition to mobile environmental monitoring stations for air pollution field measurements. This lab has a full range of standard equipment for performing routine environmental analyses of unit processes and operations in water and wastewater treatment, water quality parameters, investigations in fresh and marine water quality, solid waste characterization and properties, evaluation of treatment processes, digestion and co-digestion, reactor performance, solid waste management, environmental impact monitoring, and environmental site investigations.

The GPS/GIS and Surveying Laboratory is equipped with mobile stations, and the only continuous monitoring GPS station in Lebanon, namely the LAUG station, which is part of the UNAVCO consortium in the United States and the International GPS Service (IGS). This lab helps students understand the basic principles of surveying by conducting numerous field exercises. Most of the
field exercises are conducted outside the lab room to gather field data. Reduction and calculation of field data for final result is done in the lab room. In addition, activities include: collecting and modifying topographic maps, preparing digitized and GIS referenced maps with related features, DGPS measurements, presenting a general overview (of geography, population, climate, water resources, water flows, dams, wastewater, water withdrawals, irrigation and drainage) on maps, surveying and collecting various data, and analyzing those data.

The Soil and Geotechnical Laboratory is equipped with automated direct shear boxes, triaxial cells, permeability cells, and a full SHARP asphalt concrete testing laboratory, in addition to a reflected-light high-precision microscope facility. Standard laboratory and field identification tests of soils, and their properties in the disturbed and undisturbed forms, may be performed on soils.

The Water Resources Laboratory features modern instruments and apparatuses for testing of various fluids and water resources. Tests may be performed to measure fluid properties and behavior, flow measurements, piping systems, pumps and their characteristics, flow conditions, open channels, turbines, suspended sediments and bed load analysis, river flows and characteristics, flow measuring devices calibration and standardization, fluid friction, calibration of weirs, orifices, hydraulic jumps, forces on gates, hydraulic benches, flow regimes identification, flow velocities, dispersion studies, water depths and discharges, build the corresponding hydrographs, offer technical consultations on hydraulic, and hydrologic, flow problems.

**ELECTRICAL AND COMPUTER ENGINEERING LABORATORIES**

The Communication Systems Laboratory introduces students to the different analog and digital communication systems using educational modulation and demodulation boards. The data acquisition for the associated experiments is done using MATLAB/SIMULINK, which provide a display of various signals in time and frequency domain.

The Control Systems Laboratory introduces students to the implementation of PID-controllers, and two-step controllers, to first order delay, as well as third order delay, systems using educational PID boards and DC servo boards. Experiments and analysis use industrial standard oscilloscopes, and data-acquisition boards interfaced via SIMULINK/MATLAB.

The Digital Design Laboratory is the home of the microprocessors and reconfigurable computing courses. Here, students who take microprocessor programming courses come into contact with real life, step-by-step, processor programming. They learn to program, at the assembly level, and culminate in practical projects based on the used microcontrollers.

In addition, FPGA-based hardware boards are used for rapid prototyping. Students use hardware languages such as VHDL to design more complex digital circuits, such as pipelined simple processors, VGA controllers, and neural networks, and execute them on the FPGA platforms.

The Electromechanics and Power Laboratory features test benches for testing three-phase circuits, single and three-phase transformers, AC machines both synchronous and induction, and DC machines. A model of a transmission line is also available for simulating power line capability and compensation. A power electronics test bench can simulate AC/DC DC/AC DC/DC conversions using thyristors, GTOs and MOSFETs.

The Linux Laboratory is targeted towards the Linux Operating System environment. Linux and UNIX have always been the best platforms in terms of reliability, and many reputable companies use UNIX servers for their core network services.

The Micro-Computer Laboratory is a general engineering area where students, from all the engineering majors, gather to work on their assignments and projects, or simply browse the internet. It is composed of high-end workstations, dual booting Microsoft Windows, and Ubuntu Linux units. Most of the general engineering applications, as well as office productivity software, are centralized in this area.

The Networking Laboratory features the latest networking devices from Cisco Systems.
INDUSTRIAL AND MECHANICAL ENGINEERING LABORATORIES

The Fluid Mechanics Laboratory is equipped with the necessary facilities and equipment to allow students to understand the behavior of fluids. It includes several means for measuring different fluid properties, fluid flow, fluid friction, calibration of weirs, orifices, pumps, turbines, hydraulic jumps, forces on gates, hydraulic benches, flow regimes identification, in addition to a five meter-long open channel with proper controls and mechanisms. It also includes particle image velocimetry equipment that allows students to visualize fluid structures.

The Heat Transfer Laboratory features equipment on which various experiments can be performed to demonstrate the three basic modes of heat transfer which include: conduction (linear and radial), convection (steady and unsteady state), and radiation heat transfer. The lab also includes a heat exchanger unit where several types of heat exchangers, such as shell and tube, concentric tube, plate and jacketed vessel heat exchangers, can be studied. Instrumentation is provided for the evaluation of the processes occurring in each heat exchanger.

The HVAC Laboratory consists of an air conditioning laboratory unit, which allows the processes governing air conditioning to be demonstrated. It also allows students to investigate the measurement and calculation of all the thermodynamic processes involved in the heating, cooling, humidification, and dehumidification of air, as well as the mixing of two air streams.

The Internal Combustion Engines Laboratory features a petrol engine and a diesel engine. Both engines can be connected to a dynamometer and control unit. The engines and control unit are equipped with the instrumentation required to allow students to monitor and measure the different parameters required to analyze the operation of the engine, such as RPM, torque, inlet and exhaust temperatures, inlet air flow rate, and fuel flow rate. In addition, the lab includes a sectioned, electrically operated, four-cylinder engine, which allows students to observe the operation of the engine’s internal parts.

The Machine Dynamics Laboratory has a range of equipment designed to meet the needs of students who are required to understand the basic principles of machines. The lab includes a whirling of shafts apparatus, a cam analysis machine, a balancing of reciprocating masses apparatus, in addition to a vibration apparatus, where experiments can be performed on pendulums, springs and rotors, covering free and forced vibration, damping, and torsional oscillations.

The Manufacturing Laboratory features a four axis CNC vertical milling machine, and a CNC lathe. The lab is equipped with twenty computers networked to the machines in a classroom environment. This setup allows the students to build, analyze, and then manufacture, a modelled part.

The Materials Testing Laboratory features a servo-hydraulic testing system, where a wide variety of tests can be performed ranging from simple tension/compression tests, to fracture mechanics, mechanical fatigue, and high-rate testing. The system includes a console with controlling software, which allows the tests to be programmed and controlled, and the data to be acquired and processed. This lab also includes a Brinell test machine to measure the hardness of metals.

The Instrumentation Laboratory is an environment that helps students become familiar with instrumentation and measurement techniques. It features data acquisition modules connected to computers and to which several types of sensors can be connected. Acquired data can be collected, analyzed processed and stored using LabVIEW software. This system also allows the students to develop their own virtual instruments.

The Industrial Computing Laboratory is a general purpose computing lab equipped with 20 computers. It features state-of-the-art engineering software such as Arena for simulation, Catia for ergonomics and manufacturing, JMP for quality control, Ansys and Comsol for thermofluids simulations, Fluent, AutoCad, etc.

The Ergonomics Laboratory features equipment and software required for ergonomic design and analysis, such as an anthropometric kit, a thermo-anemometer, a sound level meter, a light meter, a psychometer with IR thermometer, a body composition monitor, a distance meter, and a baseline hydraulic dynamometer. In addition, the lab features workstations equipped with DELMIA
software enabling the students to perform digital human measurement, human building, human task analysis, human posture analysis and human activity analysis.

The Packaging Laboratory features an incline impact tester, a paper bursting machine, a cardboard bursting machine and a universal testing machine. The equipment allows students to analyze and perform tests on various packages and packaging materials.

The Machine Shop includes a metal working area and a wood working area. It provides the students with hands-on experience in the use of tools and equipment used in manufacturing processes, such as lathes, saws, drilling machines, welding equipment, grooving machines, etc.

THE ALICE RAMEZ CHAGOURY SCHOOL OF NURSING

CLINICAL SIMULATION CENTER
The Alice Ramez Chagoury School of Nursing shares a Clinical Simulation Center with the Gilbert and Rose-Marie Chagoury School of Medicine on the Byblos campus. The center has been designed to look and function like the health care settings in which students will practice after graduation.

The nine-bay inpatient simulation laboratory replicates clinical units in hospitals, such as general ward, intensive care unit, and newborn nursery. This laboratory is equipped with state-of-the-art medical equipment and supplies; infant, pediatric and adult human patient simulators; and clinical skills task trainers. The eight-room outpatient laboratory replicates a typical ambulatory clinic and its accoutrements.

The center is equipped with videotaping capability so faculty can review and assess student progress in acquiring foundational and advanced clinical skills and students can review and reflect on their performance. The center provides a realistic and safe setting for students as they learn complex skills, apply theoretical knowledge to simulated patient care situations and develop teamwork skills. Experiential learning in the center enhances students’ competence and confidence when caring for patients in hospitals and other care delivery sites.

THE SCHOOL OF PHARMACY

PHARMACY LABS
The Pharmacy Research Lab is designed to allow faculty and Pharm.D. candidates to conduct research. Instruments in the lab include HPLC systems, which are equipped with a variety of detectors (absorbance, PDA, electrochemical, fluorescence, conductivity, and refractive index), enabling their use for a variety of applications. In addition, the lab is equipped with a freeze dryer, incubators, and a centrifuge apparatus.

The Pharmaceutical Analysis Lab is designed to familiarize pharmacy students with the different techniques used in pharmaceutical analysis. These techniques include those used in the pharmaceutical industry such as spectroscopic, chromatographic, enzymatic and biotechnology methods. For this purpose, the lab is equipped with an HPLC, a GC, a dissolution apparatus, an FT-IR spectrophotometer, an ELISA, an electrophoresis, a microplate reader, and a PCR.

The NMR and GC-MS Lab is mainly used by faculty, and contains a 300 MHz NMR spectrometer, suitable to run different 1D and 2D NMR (homo and heteronuclear) experiments. There are two GC-MS system, one of which is equipped with a purge and trap system. The GC-MS systems are used to separate and identify volatile compounds in plants and biological fluids.

At the Compounding Laboratory students learn the fundamental techniques used for the extemporaneous preparation of dosage forms, as part of the requirements of the Dosage Forms I and Dosage Forms II courses. The lab deals with the formulation, preparation, handling, and evaluation of pharmaceutical products. It includes the preparation of drug products using traditional approaches (mortar and pestle, spatula and slab), as well as modern technology. Basic equipment includes the water bath, hot plate, magnetic stirrer, oven, electronic balance, and vortex. More sophisticated equipment such as the optical
microscope, sieve shaker, planetary mixer, homogenizer, fluidized-bed dryer, tablet press, hardness tester (also measures the thickness and diameter of the tablet), friabilator, and disintegration apparatus, are also available.

The Pharmacy Dispensing Laboratory supports course instruction on the proper techniques and skills required to safely and accurately distribute drugs to patients. Emphasis is on computerized patient record keeping, patient counseling, finding errors and omissions in prescriptions, and communication with other health care providers and patients. The lab is designed to mimic a community pharmacy. It includes shelved medications, storage cabinets, counseling area desks, auxiliary medication labels, personal computers, a printer, a bar code reader, and pharmacy textbooks.