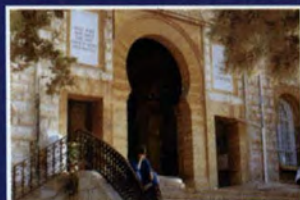# AMERICAN UNIVERSITY OF BEIRUT

CATALOGUE 1999 - 2000

[GATE OF OPPORTUNITY]

[BUILDING THE FUTURE]

[INSPIRATION & DEDICATION]

AMERICAN UNIVERSITY OF BEIRUT

1999-2000 CATALOGUE

Address all correspondence regarding admission to:

The Registrar
American University of Beirut
Beirut
Lebanon

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Student Responsibility for Catalogue Information

Students are held individually responsible for the information contained in this Catalogue. Failure to read and comply with Faculty and University regulations will not exempt students from whatever penalties they may incur.

All students have post office boxes assigned to them.
It is the responsibility of students to check their post office boxes regularly for official announcements and information.

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CONTENTS

FACULTY OF MEDICINE

UNIVERSITY CALENDAR
ACADEMIC YEAR 1998-99

1999

June	10	Thurs.		Registration and payment of fees for Medicine III and IV.
June	15	Tues.		Clerkships begin for Medicine III and IV.
August	26	Thurs.		Registration and payment of fees for Medicine I & II.
Sept	1	Wed.		Classes begin for Medicine II.
Sept	6	Mon.		Classes begin for Medicine I.
Sept	20-23			Pre-registration for new students in all Faculties and DEP except Medicine.
Sept.	24	Frid.		Deadline for submitting applications for deferral of payment for the first semester.
Sept.	27, 28, 29, 30, Oct 1			First Semester on-line registration begins for New Students in all Faculties and DEP except Medicine.
Sept.	28,29, 30, Oct 1-2			Payment of fees for First Semester
Oct.	4	Mon.	8.00 a.m.	First Semester begins for all Faculties and DEP except Medicine.
Nov.	1	Mon.		All Saints' Day, holiday.
Nov.	22	Mon.		Independence Day, holiday.
Dec.	3	Frid.		Founder's Day.
Dec.	23	Thurs.	10:00 p.m.	Christmas Vacation begins.

2000

Jan.	2	Sun.	10:00 p.m.	Christmas Vacation ends.
Jan.	8-10*			Id al Fitr, holiday.
Jan.	11-14			Second Semester advising for current students.
Jan.	17-21			Second Semester on-line course registration for current students
Jan.	24	Mon.	8:00 a.m.	Reading Period begins.
Jan.	27	Thurs.	10:00 p.m.	Reading Period ends.
Jan.	28	Frid.	8:00 a.m.	First Semester Examinations begin.
Jan.	28	Frid.		Deadline for submitting applications for deferral of payment for the second semester.
Jan.	31, Feb 1-8			Payment of fees for Second Semester.

Feb.	1-4			Second Semester Pre-registration and on-line registration for new students.
Feb	5	Frid.	10:00 p.m.	First Semester ends for all Faculties and DEP except Medicine.
Feb	16	Tues.	8:00 a.m.	Second Semester begins for all Faculties and DEP except Medicine.
Feb	9	Wed.		St. Maroun's Day, holiday
Feb	10	Thurs.	8:00 a.m.	Second Semester begins for all Faculties and DEP except Medicine.
March	16-17*	Thurs., Frid.		Al-Adha, holiday.
April	6*	Thurs.		Hijra New Year, holiday
April	15*	Sat.		Ashoura, holiday
April	20	Thurs.	10:00 p.m.	Latin & Greek Orthodox Easter vacation begins.
May	1	Mon.	10:00 p.m.	Labor Day; Latin & Greek Orthodox Easter vacation ends.
May	6	Sat.		Martyr's Day, holiday.
May	8-12			Advising and on-line registration for current students for the Summer.
May	15-19			Advising for current students for First Semester of the 2000-2001 academic year.
May	20	Sat.		Classes end for Medicine II.
May	22-26			On-line registration for current students for the First Semester 2000-2001 academic year.
June	3	Sat.	8:00 a.m.	Reading Period begins.
June	7	Wed.	10:00 p.m.	Reading Period ends
June	8	Thurs.	8:00 a.m.	Second Semester Examinations begin.
June	14	Wed.		Clerkships end for Medicine III and IV.
June	15*	Thurs.		Prophet's Birthday, holiday.
June	17	Sat.	10:00 p.m.	Second Semester ends for all Faculties and DEP except Medicine.
June	26-28			Pre-registration and on-line registration for new students for the Summer.
June	28	Wed.		Commencement Exercises.
June	27-July 1		10:00 p.m.	Payment of fees for Summer
June	30	Frid.	10:00 p.m.	Classes end for Medicine I.

SUMMER SESSION 2000

July	3	Mon.	7.30 a.m.	Classes begin for all Faculties and DEP except Medicine.
Aug.	15	Tue.		Assumption Day, holiday.
Aug.	22-25, 28			Reading Period and Final Examinations for all Faculties and DEP except Medicine and Agricultural & Food Sciences.
Aug.	28-Sept. 4			Reading Period & Final Examinations for the Faculty of Agricultural & Food Sciences.

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* Id al-Fitr, al-Adha, the Hijra New Year, Ashoura, and the Prophet's Birthday are determined after sighting the moon and because of that, the actual dates may not coincide with the dates in this calendar. The holiday will be the first three days of the feast as declared for Id al-Fitr, the first two teaching days for al-Adha, and the first teaching day for Hijra New Year, Ashoura and Prophet's Birthday.

ALMA MATER

Far, far above the waters
Of the deep blue sea,
Lies the Campus of the College
Where we love to be.
Far away, behold! Kanisah!
Far beyond, Sannin!
Rising hoary to the heavens,
Clad in glorious sheen.

Chorus: Look before us!
Shout the chorus!
See the banner wave–
AUB in thee we glory,
Make us true and brave!

From Iraq or from Arabia,
From the banks so green
Of the great Egyptian river,
Or from Palestine;
From the waters of Abana
Lebanon serene,
We salute thee, Alma Mater!
Oriental Queen.

Hail to thee our Alma Mater!
We would ever be
Worthy children. Make us faithful,
Faithful e'er to thee.
Wheresoe'er the land that calls us,
E'en across the sea,
We'll salute thee, Alma Mater!
Hail! O Hail! to thee.

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[1] As of August 1, 1998

[2] Until June 30, 1998

[3] Until October 31, 1998

[4] Until December 31, 1999

[5] As of February 14, 1999

[6] Until September 30, 1999

[7] As of March 1, 1999

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[8] As of November 10, 1998

[9] As of October 1, 1998

[10] As of July 1, 1998

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[11] Until June 30, 1999

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Makhluf J. Haddadin, Ph.D., Vice President Academic Affairs

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[12]As of September 1, 1998

[13] As of October, 1998

[14] As of March 6, 1998

[15] Until June 30, 1999

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INTRODUCTION

The American University of Beirut (AUB) is a private, non-sectarian institution of higher learning, founded in 1866, which functions under a charter from the State of New York. It is administrated by a private, autonomous Board of Trustees.

The University has five Faculties: Arts and Sciences; Medicine (which includes the School of Nursing); Engineering and Architecture; Agricultural and Food Sciences, and Health Sciences. In addition, there is a Division of Education Programs.

The University is co-educational, and women are admitted to all Faculties. The language of instruction is English.

AUB, as a private institution, depends on several sources for financial support, as tuition and income from endowments cover only part of its budget. Therefore, the University relies on contributions from foundations and governments, with a major part coming from the United States Agency for International Development; it also relies on contributions from alumni, individuals, industry, and business in various parts of the world. AUB continues in its campaign for long-term financing. Information concerning fund-raising may be obtained from the Office of Development, American University of Beirut, Lebanon, and from the American University of Beirut, New York, USA (see page 15 for detailed addresses).

STATEMENT OF POLICY

The purpose of the American University of Beirut, as an institution of higher learning, is to share in the education of the youth of the Middle East, in the service of its peoples, and in the advancement of knowledge.

The University emphasizes scholarship that enables students to think for themselves. It stresses high academic standards and high principles of character. It aims to produce men and women who not only are technically competent in their professional fields but who also have breadth of vision, a sense of civic and moral responsibility, and devotion to the fundamental values of human life. In its service to students, the University strives to realize the ideals of its motto: "That they may have life and have it more abundantly."

The University has been dedicated since its foundation, and continues to be dedicated, to the cultivation of high ethical, moral, and spiritual values.

The University believes in and encourages freedom of thought and expression. It expects, however, that this freedom be enjoyed in a spirit of integrity and with a full sense of responsibility.

The University believes that each member of its community — students, faculty, staff, and administration — has the right to individual self-expression; it has not taken, and will

never take, any action to infringe upon the proper exercise of this right. It must insist, however, that inherent in this right is an obligation: the obligation of each member of the AUB community to give his/her colleagues the same right. Each has the right of peaceful dissent, but no one has the right to prevent those who disagree with him/her from pursuing their proper activities.

All members of the University are expected to conduct themselves in accordance with the spirit of this declaration of policy, the regulations of the University, and the laws of the Republic of Lebanon, whose hospitality gives the institution the privilege of carrying out its educational activities within the framework of academic freedom.

HISTORY

In 1862, American Missionaries in Lebanon and Syria, under the American Board of Commissioners for Foreign Missions, asked Dr. Daniel Bliss to withdraw from the evangelistic work of the Mission in Lebanon in order to found a college of higher learning which would include medical training. It was felt that this college should have an American educational character, should be administered independently from the Mission, and should be maintained by its own funds. Dr. Bliss sailed for the United States in the summer of 1862 to solicit funds for the new enterprise. By August 1864, he had raised $100,000 but because of inflation during the Civil War it was decided that he should raise a sterling fund in England in order to start the operations of the college, leaving the dollar fund to appreciate in value. After collecting £4,000 in England, he sailed for Beirut in March, 1866.

While Dr. Bliss was raising money for the new school, the state of New York on April 24, 1863, granted a charter under the name of Syrian Protestant College. The College opened with its first class of 16 students on December 3, 1866.

The cornerstone of College Hall, the first building on the present campus in Ras Beirut, was laid on December 7, 1871, by the Honorable William E. Dodge, Sr., then Treasurer of the Board of Trustees, at a ceremony during which President Daniel Bliss expressed the guiding principle of the College in these words:

> "This College is for all conditions and classes of men without regard to color, nationality, race or religion. A man, white, black, or yellow, Christian, Jew, Mohammedan or heathen, may enter and enjoy all the advantages of this institution for three, four or eight years; and go out believing in one God, in many gods, or in no God. But it will be impossible for anyone to continue with us long without knowing what we believe to be the truth and our reasons for that belief."

College Hall and the first medical building were completed and occupied in 1873 and the bell in the tower of College Hall pealed for the first time in March 1874. However, College Hall was extensively damaged by a savage explosion in the early morning of November 8, 1991 and had to be demolished.

On November 8, 1992, at a ceremony marking the first anniversary of the bombing and at which the cornerstone of the new College Hall was laid by His Excellency the President of the Republic Mr. Elias Hraoui, the then President of AUB, Dr. Frederic Herter, said the following:

> "Today, 120 years after the dedication of the original building, I still find myself awed by the words of our Founder. But the past century has brought changes to our institution. We are no longer a Protestant missionary outpost. The American University today is a secular university of size and import; certainly the Middle East has become more populous and complex in its sociopolitical structure. But the credo of Daniel Bliss is as true today as in 1871, and I think he would be proud indeed of AUB were he alive now. We remain an institution with doors open to all who wish to learn, regardless of color, or sex, or nationality, or political belief, or religious persuasion; we welcome diversity, new ideas, new faces; we insist on freedom of expression and action, as long as it does not endanger the public welfare; and we hold that nothing exists within the realm of human knowledge or experience which cannot or should not be examined. Further, we believe that the purpose of an education is to open doors to the mind and the spirit, to stimulate curiosity and imagination, to develop the capacity in our students to think for themselves. Finally, we hold that with the gift of learning comes the responsibility for the human community, an obligation to use knowledge and skills thoughtfully and in the interests of all. This implies a sense of caring.

> "We are firm in these beliefs, and in the nature of our mission. We are proud of what AUB has done in its long history – for Lebanon, for the Middle East, and, indeed, for the entire civilized world – and we are proud of our joint American-Lebanese heritage. To those who would do us ill, this ceremony today should be a defiant answer – we are here to stay, bombs notwithstanding, and we look ahead with confidence to another century of education and service."

The School of Medicine was started in 1867. A Preparatory School (which was then part of the College) was started in 1871 (now International College); the School of Pharmacy (which closed in 1979) was also started in 1871. The School of Commerce, later incorporated in the Faculty of Arts and Sciences, began in 1900. With the opening of the Hospital in 1905, a School of Nursing was started that same year. In 1910 a School of Dentistry was opened, and operated for thirty years. The Faculty of Engineering and Architecture was started in 1951; the Faculty of Agriculture, now the Faculty of Agricultural and Food Sciences, in 1952; and the School of Public Health, now the Faculty of Health Sciences, in 1954. The Division of Education Programs was established in 1976.

On November 18, 1920, the Board of Regents of the State University of New York changed the name of the institution from Syrian Protestant College to American University of Beirut; other charter amendments expanded the functions of the University.

AUB has had twelve presidents. Marquand House, completed and occupied in 1879, has been the residence of all presidents of the University.

President	Dr. Daniel Bliss	1866-1902
President	Dr. Howard S. Bliss	1902-1920
Acting President	Dean Edward F. Nickoley	1920-1923
President	Dr. Bayard Dodge	1923-1948
President	Dr. Stephen B.L. Penrose, Jr.	1948-1954
Acting President	Dr. Costi K. Zurayk	1954-1957
President	Dr. J. Paul Leonard	1957-1961
President	Mr. Norman Burns	1961-1965
President	Dr. Samuel B. Kirkwood	1965-1976
Interim President	Dr. James Cowan	1976-1977
President	Dr. Harold E. Hoelscher	1977-1981
Acting President	Mr. David S. Dodge	1981-1982
President	Dr. Malcolm H. Kerr	1981-1984
Acting President	Dr. Samir K. Thabet	1984
President	Dr. Calvin Plimpton	1984-1987
President	Dr. Frederic P. Herter	1987-1993
President	Dr. Robert M. Haddad	1993-1996
President	Mr. David S. Dodge	1996-1997
President	Dr. John Waterbury	1998-

The second and fourth presidents, Dr. Howard Bliss and Dr. Stephen Penrose, died while in office. Dr Malcolm Kerr, the ninth president, was assassinated on January 18, 1984.

At the end of July 1998, the total number of Degrees, Diplomas and Certificates awarded since June 1870 totaled 60,764.

LOCATION AND CLIMATE

The University is situated in Beirut, Lebanon, the crossroads of the Middle East. The campus on the Ras Beirut peninsula is next to the Mediterranean Sea and looks over St. George's Bay towards northern Lebanon and the snow-capped mountains to the east. The campus of just over 28 hectares (70 acres) has over 50 buildings, including the academic buildings, two halls for student activities, two men's and five women's dormitories, faculty apartments, and the Medical Center.

Lebanon enjoys a Mediterranean climate, and for eight months of the year light clothes may be worn. The rainy winter season from November to March, however, is damp and cold at times. Although most Beirut buildings are centrally heated, warm clothing is

recommended for the winter months. The average annual rainfall of 86 cm (34 inches) comes chiefly in the winter when the temperature may drop below 7°C (50°F). Except for this rainy season, the weather of Beirut is delightful. The campus abounds in luxuriant flowers and trees, which makes it one of the most beautiful in the world.

ACADEMIC SERVICES

The UNIVERSITY LIBRARIES consist of two central libraries—namely, the Saab Memorial Medical Library and Jafet Memorial Library—with three branch libraries: the Engineering and Architecture Library, the Science and Agriculture Library with the Farm Library attached to it.

The Library at first occupied rooms in College Hall and in 1925 the medical books were moved separately to Van Dyck Hall. The construction of Jafet Memorial Library was made possible through a generous donation from the family of the industrialist Nami Jafet in 1952. Since then, expansion has been necessary to meet the challenge of growing academic programs. Thus, departmental libraries were created. The Engineering Library, which was opened in 1953, was transferred to larger premises in 1971 under the new title of Engineering and Architecture Library. The Agriculture Technical Reference Room was opened in 1958, as was the Farm Library. The former became the Science and Agriculture Library in 1962.

The Jafet Library, altered and enlarged in 1960, still proved too small for present day demands. Since 1992, it has undergone further expansion and remodeling, providing a 59.6% increase in student reading room areas, and a 151% increase in stack/storage areas. Building works were completed in the summer of 1996. Several phases of library automation have been implemented since April, 1997; full automation of library functions will be reached in 1999; subscriptions to CD-ROM and on-line databases will continue.

The central library, along with its branches, has over 461,445 volumes and 1,414 manuscripts, with 2,889 subscriptions to periodicals, of which about 239 are in Arabic. There are also nearly 951,386 audiovisual items of all kinds. The Archives and Special Collections Department of the Library includes 9,681 volumes of theses, projects and dissertations, 13,309 photographs, 2,209 posters and 1,747 maps.

The Saab Memorial Medical Library (SML), is dedicated to the memory of Dr. Nicholas Saab (through a generous gift from his parents), who graduated from the AUB School of Medicine in 1959. The Medical Library has been functioning in its present quarters as part of the Medical Center since 1975 and qualifies as one of the best medical libraries in the Middle East. The collection consists of 1,200 periodical subscriptions, over 71,000 backfile periodical volumes, nearly 39,000 books, including over 2,000 books of historical value (such as Avicenna's book: *Cannon of Medicine*, published in 1593), and nearly 2,300 audio-visual items, including computer software. SML has eight CD-ROM bibliographic medical databases on AUB's intranet. The Library has been fully

automated since 1990 using Data Trek, Inc. 'Manager Series,' and has been connected on-line to DIALOG (Knight-Rider) since 1985, and also has Internet access. In 1978, SML was designated by W.H.O. as the national focal point for Lebanon. The Library has a special collection called the *'Lebanese Corner,'* which includes publications about Lebanon or those by Lebanese authors in the fields of medicine or other health related topics. This collection can be accessed from the AUB home page. SML services are provided to mainly AUB clientele, and to all the other medical and allied health users throughout Lebanon. With its rich, up-to-date medical collection, SML aims to promote the research in the medical and allied health fields. SML is currently open 45 hours per week.

Reference services are provided to the AUB community primarily, and to other academic institutions in Lebanon. With its rich collection, the Libraries strive to meet the research and intellectual needs of Lebanon and other countries. The Jafet Library is currently open 79 hours per week.

The **OFFICE OF UNIVERSITY PUBLICATIONS** was established as such in 1970. However, the University has been publishing books by faculty members since the turn of the century. AUB's publications (about 100 in print) are distributed all over the world. The University also publishes two annual journals of world renown: *Berytus,* a journal of Archaeological Studies, and *Al-Abhath*, the journal of the Center for Arab and Middle East Studies.

The **UNIVERSITY ARCHEOLOGICAL MUSEUM** occupies the ground floor of Post Hall. It is the third oldest museum in the Near East. The museum brings together distinctively Near Eastern archaeological collections that are displayed with a view to their educational use for students and scholars in Near Eastern Archaeology. The museum covers the periods stretching from the Stone Age to the Islamic Period, covering all aspects of ancient civilizations. The museum is also opened to the general public.

The **GEOLOGICAL MUSEUM** is housed in the Department of Geology, which occupies the upper floor of Post Hall. It is the only Geological Museum in Lebanon and could thus be considered of a national status. It contains over then thousand specimens within several collections, including the mineral and rock collections, the paleontology collections, and a world class fossil-fish collection. A small part of these scientific collections is used for teaching and research for Geology students and visiting scholars.

The **BIOLOGICAL COLLECTION** of the Natural History Museum is housed in the Biology Department. It consists of rich collections of various animals native to Lebanon and the Middle East including reptiles, fish, and mammals, in addition to the Van Dyck bird collection, which dates back to the late 19th century. The extensive insect collection includes the Peyron's beetle collection and the recently acquired collection of Professor Emeritus Dr. Abdul Munim Talhouk. Also under the care of the Biology Department is the **POST HERBARIUM**, which is listed in the directory of world herbaria. The collection contains specimens from the flora of the Eastern Mediterranean, mentioned in *The Flora of Syria, Palestine and Sinai* by Dr. George Post, one of the first faculty members of this institution, known then as the Syrian Protestant College.

The **UNIVERSITY INFORMATION TECHNOLOGY** is managing two major computing Facilities, the Campus and Medical Center.

The Campus Unit is equipped with an IBM MainFrame (ES9000), running VM, VSE/ESA Operating Systems. In addition, it has a number of PC-based server running Novel Netware, Windows, Windows NT, and AIX-UNIX. Academic and Administrative users access the systems either through dedicated terminals or PC workstations on their Local Area Networks. The MainFrame is used to run the mission critical applications of the University—namely, the Financial and Administrative application packages, the Student Information System, and the Course Instruction and Research. Various Programming languages and statistical packages are available. Moreover, Campus Unit operates a Computer laboratory with around forty networked PCs. This laboratory is used for course instruction by the various departments and for personal use by the students. Many popular and specialized PC software packages are available on the server.

The PC Support Unit of the Computer Center provides software and hardware support to faculty members and administration. The PC Support unit maintains and administers the campus fiber-optic back-bone, the Local Area Networks connected to it, the University connection to the Internet and the E-mail subsystem.

The Medical Center Unit is dedicated to the Administrative, Billing and Medical Operation of the Hospital. It operates an IBM AS/400 and an advanced system S36 with terminals spread throughout the hospital. A gateway connects the hospital system to the campus network.

The **PERSONAL COMPUTING AND NETWORKING SUPPORT DEPARTMENT** (PCNS) maintains and administers the campus data network AUBnet and the internet services. AUBnet is a state of the art high-speed fiber-optic ATM network connecting all the campus and medical center buildings. AUBnet provides modern internet services, databases, and multimedia access from classrooms, dormitories, students' public labs, and all the academic and administrative buildings. PCNS provides software and hardware support to faculty members and administration. PCNS maintains and administers the campus internet servers, dialup servers, user's accounts, AUB official web server, and the campus Digital Documentation Center.

The **MEDICAL CENTER**, is the teaching hospital of the Faculty of Medicine of the American University of Beirut. It consists of 421 beds serving 18, 511 inpatients per year, and 157,889 outpatients (consisting of 65,932 private clinic visits, 51,082 OPD, 36,405 emergency visits, and 5,470 family medicine) per year. Postgraduate training in specialties and subspecialties with 85 interns and 160 residents and fellows are supported with the most modern and sophisticated esoteric services. Modalities include MRI, Spiral CT, two-headed nuclear scanners, lithotripsy, two linear accelerators for radiation oncology, cardiac catheterization, etc. Also, between the University and the Hospital, clinical and basic science research is conducted, which is sustained by philanthropic research grants. The Hospital enjoys a reputation as a referral center in the Middle East. The medical care is modeled after North American healthcare system standards. There is

a managerial undertaking to meet the standards of the Joint Commission on Accreditation of Healthcare Organizations and to be accredited once more.

Errata:

Please note the following important date changes:

1) The deadline for receipt of undergraduate applications for the 2000-2001 fall semester is January **15, 2000** and not March 1, 2000 (page 32).
2) The **December 1999** sitting for SAT I is the **latest** date acceptable for Admissions to the 2000-2001 fall semester (page 39).
3) The school record of an applicant to the freshman and sophomore class and to the first year in the professional Faculties will be evaluated on the basis of his/her record during the **first** and **second** secondary years. The record of the third secondary year will not be considered (page 30).
4) The deadline for Early Admission for the fall semester of 2000-2001 is **November 30, 1999** and not December 10, 1999 (page 40).
5) **June 30, 2000** is the deadline for all accepted undergraduate students to inform the University of their decision to join AUB for the 2000-2001 fall semester by paying a nonrefundable deposit of 300 USD toward their tuition and by indicating their choice of major in case they are accepted to more than one major.

ADMISSIONS

The American University of Beirut, a private institution with limited facilities, places particular emphasis on quality education and therefore adopts admission criteria designed to insure the selection of the best-qualified candidates.

POLICY STATEMENT

The American University of Beirut admits students regardless of race, color, religion, gender, disability, or national origin to all the rights, privileges, programs, and activities generally accorded or made available to students at the school. The University does not discriminate on the basis of race, color, religion, gender, disability, or national origin in the administration of its educational policies, admissions policies, scholarship and loan programs, or athletic or other school-administered programs.

The University stands for high academic standards. Its degrees and diplomas are recognized internationally; in order that they may continue to be so recognized, they must be based upon satisfactory completion of the full requirements set forth in this catalogue.

English Language Proficiency Requirement

As the language of instruction is English, command of the language, both oral and written, is fundamental to every student's success in his or her study program. To determine how the English Language Proficiency Requirement may be met, see page 36 of this catalogue.

Attendance Requirements

In accordance with the charter that governs the operations of the American University of Beirut, no student may pursue his or her education through correspondence or by merely passing examinations that the University may give. Regular attendance at classes, lectures, laboratory sessions, and seminars is essential to qualify the student for any degree granted by the University.

CRITERIA FOR ADMISSION

The requirements for admission stated below are in all cases the minimum demanded by the University and their fulfillment by a candidate does not automatically ensure his or her selection. Candidates are finally selected from the most promising of the eligible applicants and up to the limits of available space.

A. Academic Record

With growing emphasis on graduate study and education, the University seeks to admit students with high scholastic records and intellectual potential. These qualities are determined by careful examination of the applicant's academic record over the last three years, including average and rank in class and the recommendations of principals and/or teachers. In addition, applicants may be required to sit for certain predesignated tests, the scores on which will help Admissions Committees in predicting the applicant's chances of success at the University.

B. Health and Character

Every candidate is required to pass a medical examination. Special consideration will be given to applicants who show evidence of sound moral character, interest in community affairs, and potential for leadership.

C. Geographic Distribution

A major purpose of the University is to provide quality education for the youth of the Middle East. While the University attracts students from about 57 countries, its policy is to give priority to applicants from Lebanon, the Arab World, and other countries of the Middle East. Within this region which the University serves, however, geographic distribution of students is maintained as a principle of selection.

D. Children of Alumni

It is the policy of the University to maintain strong and continuing ties with its alumni. Thus it considers the attendance of the children of its alumni an important element for ensuring the maintenance of these ties and the continuation of its traditions.

SELECTION FOR ADMISSION

The selection of applicants for admission to a Faculty or Division at the University is the prerogative of the admissions committee of the Faculty or Division to which the application is made. Acceptance for admission is normally provisional: the accepted applicant will not be able to register unless all the conditions stated in the letter of acceptance sent to the applicant by the Director of Admissions are met **prior to the date set for registration**. For example, it is the responsibility of the applicant to produce, prior to registration, evidence of having received the certificate or degree on the basis of which admission was sought. It is also the responsibility of the applicant to produce, prior to registration, evidence of having met the English Language Proficiency Requirement. The Faculty of Engineering and Architecture will not accept the scores of English Language Proficiency tests if the date on which the test was taken is later than the end of August 1998.

CANDIDATE'S FOLDER

For purposes of admission and selection, a special folder for every candidate is kept in the Office of Admissions. This folder includes:

- An application for admission.

- A copy of the certificate or diploma required for admission.

- A report on the applicant's grades for at least the last three years of schooling, including average and rank in class. Schools that do not provide complete information, particularly average and rank in class, may jeopardize the admission of their students. Applicants should request that the officials of the schools they have attended for the last three years send their school grades directly to the Office of Admissions.

- An evaluation by the principal of the school and, if possible, evaluations by two teachers.

- The results of entrance examinations taken for the purpose of admission, and the scores on tests taken in fulfillment of the English Language Proficiency Requirement. Information on tests required for the various classes and majors is provided in this Catalogue. **Applicants should request testing centers to send score reports directly to the Office of Admissions**.

- A photocopy of the applicant's identity card or passport and the required passport size colored photographs.

APPLICATIONS FOR ADMISSION

An application fee of LL 75,000 (or an equivalent amount in US dollars) is charged. **Applicants may apply for admission to the first or to the second semester of the academic year**. Students accepted for admission to the second semester in the Faculty of Engineering and Architecture or in the Faculty of Health Sciences will be classified as 'special students' taking non-Engineering or non-Health Sciences courses that are required of them; as of the first semester of the academic year 1999-2000 they will be able to carry a normal Engineering and Architecture or Health Sciences schedule of courses.

Applications for admission must be received at the Office of the Registrar within the deadlines as set in the proceeding chart.

Deadlines for receiving applications for admission

For admission to the:	Undergraduate Study	Graduate Study
Second Semester of the academic year 1999-2000	November 30, 1999	January 4, 2000
First Semester of the academic year 2000-2001	March 1, 2000	May 31, 2000
Second Semester of the academic year 2000-2001	November 30, 2000	January 3, 2001

Applications for admission are available at the Office of Admissions and will be mailed to applicants upon request. To request application booklets and forms, applicants may contact the Office of Admissions at the following addresses:

Mailing address: Office of Admissions
                          American University of Beirut
                          P.O.Box 11-236
                          Beirut, Lebanon

E-Mail address: admissions@aub.edu.lb
Fax number: 00961-1-744469
Telephone: 00961-1-374374 / 00961-1-374444

Applicants residing in North America may request application booklets and forms from the office of the University in New York using the following addresses:

Mailing address: American University of Beirut
                          850 Third Avenue, 18th floor
                          New York, NY 10022

E-mail address: mills@aub.edu
Fax number: (212) 5837680
Telephone: (212) 5837650

Recommendations, transcripts of records, and all other documents presented to complete an application for admission are the property of the AUB. Applicants, irrespective of whether they are accepted or not accepted, may not claim these documents back.

Undergraduate applicants who are accepted to the Faculty of Arts and Sciences, Faculty of Agricultural and Food Sciences, Faculty of Engineering and Architecture, Faculty of Health Sciences, Nursing Degree II program, or the Division of Education Programs for the Fall Semester of an academic year and who do not register for that semester, may be eligible for admission to the Spring Semester of the same academic year **pending availability of places and provided they fulfill all the admission requirements that are stated in their letters of admission.** Applicants who wish to be considered for admission to the Spring Semester on the basis of their letters of admission to the Fall Semester of the same academic year should fill in a special form available at the Office of

Admissions. The deadline for submitting this form is **December 15 of the same academic year**. such applicants are eligible for consideration for admission to the Spring Semester to the Faculty of Engineering and Architecture or to the Faculty of Health Sciences as 'Special Students' taking non-Engineering or non-Health Sciences courses. The admission of such applicants is also **pending availability of places and conditional upon the fulfillment of the admission requirements that are stated in their letters of admission.**

Applicants who have been accepted for the Fall Semester or for the Spring Semester in two different faculties and who actually register in one of these, and who intend to use their second acceptance to register for the following semester, must fill in a special form available at the Office of Admissions. Applicants who intend to use their Fall Semester letter of admission for consideration for admission to the following Spring Semester must submit this form at the Office of Admissions **at least one month before the beginning of the Spring Semester.** Applicants who intend to use their Spring Semester letter of admission for consideration for admission to the Fall Semester of the following academic year must submit this form to the Office of Admissions **at least one month before the beginning of the Fall Semester. Admission to the second faculty is also pending availability of places.**

The applications and the documents submitted by applicants who are denied admission or who are granted admission but do not register are not kept in the Registrar's permanent records.

Applicants may apply to a maximum of three Faculties, or to a maximum of two Faculties and the Division of Education Programs.

With the exception of some transfer and advanced standing applicants, admission to undergraduate study may be either at the Freshman level in the Faculty of Arts and Sciences or at the Sophomore level in the Faculty of Arts and Sciences and the equivalent classes in the other faculties and the Division of Education Programs. **An applicant may not apply for admission at more than one of these two levels**. For example, an applicant may not apply for admission to the Freshman class and at the same time apply for admission to the Sophomore class or to the equivalent classes in the other faculties. Applicants for admission to the Freshman class may apply only to the Freshman class.

The applicant may choose up to three majors in each of the Faculty of Arts and Sciences and the Faculty of Engineering and Architecture, up to two majors in each of the Faculty of Health Sciences and the Faculty of Agricultural and Food Sciences, one major in the School of Nursing and one major in the Division of Education Programs.

Names of Students

No student will be allowed to register without first presenting his or her identity card or passport. The names of students will be recorded in the University books as they appear on these documents. Students whose names are not spelled in English or in Arabic on

their passports or identity cards may have their names spelled on certificates and diplomas according to their personal preferences.

Selection of Applicants

The selection of applicants for admission to any of the five faculties or to the Division of Education Programs is made by the Admissions Committee of that faculty or division. The Office of Admissions is responsible for the administration of the admissions policy and all correspondence pertaining to admission. Acceptance for admission is normally provisional: the accepted applicant will not be able to register unless all the conditions stated in the letter of acceptance sent to the applicant by the Office of Admissions are met **prior to the date set for registration**. For example, it is the responsibility of the applicant to produce, prior to registration, evidence of having received the certificate or diploma on the basis of which admission was sought. It is also the responsibility of the applicant to produce, prior to registration, evidence of having met the English Language Proficiency Requirement.

Admission to any faculty or division by transfer from another faculty or division at the University requires the approval of the Admissions Committee of the faculty or division to which admission is sought.

Admission of University Employees

Employees of the University who meet at least minimum admission requirements are given admission by the Director of Admissions as special part-time students. Such applicants should, however, take the SAT I within the set deadlines and meet the English Language Proficiency Requirement prior to registration. **If such employees leave the service of the AUB but wish to pursue their education at the University, they must apply for admission in competition with other applicants.**

Children of Alumni

It is the policy of the University to maintain strong and continuing ties with its alumni. Thus it considers the attendance of the children of its alumni an important element for ensuring the maintenance of these ties and the continuation of its traditions.

Change of Nationality

Candidates admitted to the University as non-Lebanese will not be permitted to change their nationality to Lebanese on the records of the University unless they had already fulfilled the requirements for admission of Lebanese students at the time of admission to the University.

REQUIREMENTS FOR ADMISSION TO UNDERGRADUATE STUDY

A. General Requirements

New Students

When applying for undergraduate study, new students must submit a formal application to the Office of Admissions within the deadlines specified in the chart on page 30 of this Catalogue. Upon request, the Office of Admissions will send the applicant the necessary application forms that must be completed and returned with the documents required enclosed. Applicants whose files are complete within the set deadlines will be notified of the decisions of the Admissions Committees by the end of April for applicants for admission to the Fall Semester and by the end of December for applicants for admission to the Spring Semester.

Old Students

Students in good standing, including regular University Orientation Program (UOP) students, who withdraw from the University voluntarily and who subsequently seek to return, shall be granted automatic readmission to their former faculty, division, or school provided that the period between the end of the semester or session in which withdrawal took place and the beginning of the semester or session for which readmission is sought is not more than a period of four regular semesters. Students who have left the University for more than two years need the approval of the Admissions Committee of their faculty or division to be readmitted. **Students who were on probation when they withdrew from the University need the approval of the Admissions Committee of their faculty or division in order to be readmitted**. The readmission request must be submitted to the Office of Admissions at least one month prior to the beginning of the semester or summer session to which readmission is sought. Graduate students seeking readmission should consult the section on "Graduate Study" at the end of this Catalogue.

The Admissions Committee of the Faculty of Arts and Sciences requires the following:

1. All students who have left the University for a period of more than two years must sit for the English Placement Test (EPT). They must then complete the English Communications Skills Courses as determined by the EPT. For information on the EPT, see page 37.

2. Students who were on probation when they left the University will be readmitted on strict probation for one semester and must take 12 or 13 credits. They will be dropped from the University if they do not remove their probation at the end of the semester.

B. The English Language Proficiency Requirement (ELPR)

Applicants for admission must demonstrate a level of English proficiency consistent with the demands of a program carried on almost exclusively in the English language. This may be done in any one of the following ways:

- By passing the English Entrance Examination (EEE) of this University with a minimum score of 450 for applicants to the Freshman Class, 500 for applicants to the Sophomore Class in the Faculty of Arts and Sciences or to the equivalent classes in the other Faculties.
- By achieving on the Test of English as a Foreign Language (TOEFL) a minimum score of 525 for applicants to the Freshman Class, 575 for applicants to the Sophomore Class in the Faculty of Arts and Sciences or to the equivalent classes in the other Faculties. (Institutional TOEFL scores are not accepted for consideration for admission to the AUB). Applicants who took the Computer Based TOEFL, should have a score of not less than 200 for admission to the Freshman Class, and a score of not less than 230 for admission to the Sophomore Class and the classes that are equivalent to it.
- By achieving a minimum score of 500 on the Verbal Reasoning section of the Scholastic Assessment Test (SAT I) for applicants seeking admission at the undergraduate level.
- By achieving a minimum score of 20 on the English Test of the American College Testing Program (ACT) for applicants seeking admission at the undergraduate level.
- By achieving on the International English Language Testing System (IELTS) a minimum score (overall band) of 6.5 for applicants to the Freshman Class, 7.0 for applicants to the Sophomore Class in the Faculty of Arts and Sciences or to the equivalent classes in the other faculties.

The Educational Testing Service, Princeton, NJ 08540, USA, will upon request provide information and application forms relating to the TOEFL. The address of the ACT is P.O. Box 414, Iowa City, Iowa 52240, USA. Upon registering for these tests applicants must specify that results be sent to the Office of Admissions at this University. Applicants who take the TOEFL are kindly requested to use the institutional code number for the AUB: **0902** when registering for the test. For information pertaining to IELTS applicants may contact the British Council in their respective countries.

Students seeking transfer to the undergraduate program, should submit evidence of attendance at a recognized college or university and should meet the English Language Proficiency Requirement.

Applicants to the graduate program, other than the AUB graduates, must also meet the English Language Proficiency Requirement applicable to them (see the paragraph on the English Language Proficiency Requirement in the section on Graduate Study on page 498 of this catalogue).

Students currently enrolled at North American or British Universities who are applying for admission to the AUB as **special students not working for a degree** are exempted from the English Language Proficiency Requirement (ELPR).

The EEE scores are valid for one academic year; the TOEFL scores are valid for two academic years beyond the academic year during which the test was taken.

The Faculty of Engineering and Architecture will not accept the scores of English Language Proficiency tests such as the EEE or the TOEFL if the date on which the examination or test was taken is later than the end of August 1999.

Newly accepted applicants who have met the English Language Proficiency Requirement must take the English Placement Test as specified in section 2 below.

1. The University Orientation Program (UOP)

Applicants who have been accepted for the Freshman Class or for First Year Nursing but who have not met the English Language Proficiency Requirement may apply to join the University Orientation Program (UOP). Applicants accepted for the Sophomore Class in the Faculty of Arts and Sciences, or for the First Year in the Faculty of Agricultural and Food Sciences, or for the First Year in the Faculty of Health Sciences, or for undergraduate study in the Division of Education Programs (DEP), or for Second Year Nursing, may also apply to join the University Orientation Program. Admission to the UOP is according to vacancies available and subject to a Placement Test.

Students are allowed a maximum of two semesters at the UOP. If by the end of the first semester at the UOP, the student has not met the English Language Proficiency Requirement, the student is allowed to enroll for one more semester at the UOP. Failure to meet the English Language Proficiency Requirement by the end of this second semester results in the student losing his or her admission to the University. A student admitted to the UOP for any given semester must finish that semester at the UOP even if he or she manages, prior to the end of the semester, to obtain the required score on the EEE or on the TOEFL, or on any other examination acknowledged by the University for the purpose of meeting the English Language Proficiency Requirement. (For further details on the UOP see page 483 of this catalogue.)

Note that the option of joining the University Orientation Program is not available to applicants accepted for admission to the Faculty of Engineering and Architecture.

2. The English Placement Test (EPT)

The English Placement Test is required of all newly accepted applicants at the undergraduate level. The EPT is **not** used for the purpose of selection for admission. Applicants who have been granted admission are required to take the EPT and to take the appropriate English courses as will be determined by the level of the applicant's

performance on the EPT. For additional information on the EPT, see Part Three of the 2000-2001 Admissions Manual. Newly accepted applicants at the graduate level who do not meet the English Language Proficiency Requirement are required to take the EPT as specified in paragraph (c) below.

a) *Applicants accepted for the Freshman Class or for First Year Nursing* who meet the English Language Proficiency Requirement are required to take the EPT and to take such remedial English courses as will be determined by the level of the applicant's performance on the EPT. Those who do not meet the ELPR may apply to join the University Orientation Program.

b) *Applicants accepted for the Sophomore Class in the Faculty of Arts and Sciences or for the equivalent classes of the other faculties and the Division of Education Programs* who meet the English Language Proficiency Requirement are required to sit for the EPT, and to take such remedial English courses as will be determined by the EPT. Those who do not meet the ELPR may apply to join the University Orientation Program (UOP). Note that the UOP option is not available to applicants to the Faculty of Engineering and Architecture. Also note that applicants to the Faculty of Engineering and Architecture who take the EPT and are placed in English 101 will not be allowed to register as regular students in the Faculty of Engineering and Architecture, but will be allowed to register only as special students in the Faculty taking English and Non-Engineering courses only. The student will be allowed to register as a regular First Year student in the Faculty of Engineering and Architecture in October of the following year without being required to sit again for the entrance examinations, provided that he or she has passed English 101 by that time.

c) *New applicants accepted for Graduate or Prospective Graduate Study* who score at least 550 on the EEE, or at least 600 on the paper-based TOEFL, or at least 250 on the computer-based TOEFL, will be admitted with no further English requirements. Those who score between 500 and 549 on the EEE, or between 575 and 599 on the paper-based TOEFL, or between 230 and 249 on the computer-based TOEFL, will be required to sit for the EPT. The faculties of Arts and Sciences and Agricultural and Food Sciences require such applicants to take remedial English courses as will be determined by the EPT. The faculties of Engineering and Architecture, Health Sciences, Medicine and the Division of Education Programs require such applicants to qualify for, and take, English 203, otherwise they lose their places.

C. The Scholastic Assessment Test (SAT I) (The Verbal and Mathematical Reasoning Tests).

Applicants for admission to the Freshman Class in the Faculty of Arts and Sciences, to the First Year in the School of Nursing, to the Sophomore Classes in the Faculty of Arts and Sciences, to the Sophomore Class in the Division of Education Programs, to the First Year in the Faculty of Engineering and Architecture, to the First Year in the Faculty of

Agricultural and Food Sciences, to the First Year in the Faculty of Health Sciences, or to the Second Year in the School of Nursing **are required to take the SAT I (Reasoning Test).** The SAT I is divided into two parts: Mathematical Reasoning and Verbal Reasoning. The score on each of these two parts will be counted; applicants are, therefore, urged to take them both. An applicant may take the SAT I more than once. If the Office of Admissions receives more than one valid SAT I score for the same applicant, then **the highest score for each of the Mathematical Reasoning and the Verbal Reasoning will be counted.**

The AUB will consider a SAT score to be valid for two academic years beyond the academic year during which the test was taken. An academic year begins the first day of October and ends on the last day of the following September. For example, a SAT score for a test taken during the academic year 1997-1998 will still be valid for the purpose of admission to any semester of the academic year 1999-2000 but will not be valid for admission to any semester of the academic year 2000-2001 or subsequent years. Scores on SATs taken during the academic year 1996-1997 or earlier are no longer valid for admission to the AUB.

SAT I scores on tests that are not taken within the range of dates indicated in the following chart will not be accepted.

Deadlines for taking the SAT I

For admission to the:	The SAT I should be taken not later than the:	The SAT I should not have been taken earlier than the:
Second Semester of the academic year 1999-2000	November 1999 testing session.	October 1997 testing session
First Semester of the academic year 2000-2001	January 2000 testing session	October 1998 testing session
Second Semester of the academic year 2000-2001	November 2000 testing session	October 1998 testing session

The Office of Admissions will accept only SAT scores that are sent directly from the Educational Testing Service to the Office of Admissions. Applicants for admission to the American University of Beirut should make sure, when registering for the SAT I, to enter in the appropriate item on the Registration Form the code number for the American University of Beirut: **0902.** For more details on the dates and the locations of the SAT tests, contact the testing center nearest to you. In Lebanon, applicants may contact AMIDEAST. The Equivalence Committee of the Lebanese Ministry of Education requires **Lebanese applicants for admission to the Freshman Class,** to take the SAT II Subject Tests **in addition** to the SAT I Reasoning Test. For details see the section on "Admission of Lebanese Applicants to the Freshman Class" on page 43of this Catalogue.

It is the responsibility of applicants to register for, and take, required tests within the deadlines that are set by the University.

POLICY ON EARLY ADMISSION TO UNDERGRADUATE STUDY

A. Criteria for Early Admission

Applicants for admission to undergraduate study will qualify for early admission if they:

1) Rank in the top 30% of their class in each of the last two years prior to application for admission; and

2) Obtain a minimum total SAT I score as indicated below:

Applicants to:	Minimum total SAT I score
Freshman Arts	1100
Freshman Sciences	1200
Sophomore Arts, Nursing, or Education	1150
Sophomore Sciences, or applicants to First Year in the Professional Schools	1250

Accepted applicants should meet, prior to registration, the admission conditions that will be spelled out in the letter of admission. These conditions normally include:
1. Proof of having met the English Language Proficiency Requirement (ELPR). For the ELPR see page 36 of this Catalogue.
2. Proof of having received the certificate or diploma on the basis of which admission is sought.

B. Procedure for Early Admission

Applications that are to be considered for early admission should be received at the Office of Admissions not later than December 10, 1999. To be considered for early admission an application must be complete. Applicants should make sure that valid SAT I scores and transcripts of grades for the last two years of secondary education are received at the Office of Admissions not later than December 10, 1999. For the validity dates of SAT I scores see the chart on page 39. Students wishing to apply for early admission are advised to start taking their SAT I sufficiently early in order to insure that their applications are complete within the above deadline. If the Office of Admissions receives more than one valid SAT I score for the same applicant, then the highest score for each of the Mathematical Reasoning and the Verbal Reasoning will be counted. In addition to the grades on the various subjects, the transcript of grades should include (for each year) the passing grade, the average of the class, the average of the applicant, the rank of the applicant in his or her class, and the number of students in the class.

Decisions on early admission to the Fall Semester of 2000-2001 will be made by January 10, 2000. The applications of students who apply for, but are not granted, early admission will be placed in the pool of all other applicants to the same level and to the same Faculty or Division, and will be given equal consideration. The Admissions

Committees of the various faculties and the Division of Education Programs normally select for admission by the end of April.

APPLICATIONS FOR ADMISSION TO GRADUATE STUDY

Applications for admission to graduate study should be submitted to the Office of Admissions before May 31 for students who wish to begin graduate study in the Summer or the First Semester and before January 5 for those who wish to begin their studies in the Second Semester. A student may apply to more than one faculty or division and to more than one major. Those who apply to one or two faculties will be charged an application fee of LL 75,000. Applicants to more than two faculties will be charged an additional fee of LL 75,000 for each additional faculty to which they apply. Applicants may apply (without incurring any additional charges) to a maximum of three majors that are offered within the same faculty. Applicants will be charged an additional fee of LL 25,000 for each major to which they apply beyond the three majors within the same faculty that are covered by the initial application fee. For the purpose of determining the application fee the Division of Education Programs is considered a "Faculty."

To be eligible for admission to graduate study an applicant must hold a university degree preceded by a secondary school certificate recognized by the Lebanese Ministry of Education as equivalent to the Lebanese Baccalaureate Part II, and recognized by the University. The applicant must also have an average, in the field of his or her intended graduate study or related fields, acceptable to the appropriate faculty graduate committee. Applicants to the graduate program, other than AUB graduates, must meet the English Language Proficiency Requirement (ELPR). For information on the ELPR, see page 36 of this catalogue. Applicants for graduate study in the Faculty of Arts and Sciences are required to take the Graduate Record Examination (GRE) or the Graduate Management Admission Test (GMAT) as follows:

- Applicants to Business Administration must take the GMAT.
- Applicants to Money and Banking must take either the GMAT or the GRE (both the General Test and the GRE Subject Test in Economics).
- Applicants to all other majors listed in the application form must take the GRE General Test plus the GRE Subject Test in those areas where a GRE Subject Test is available, namely: Biology, Chemistry, Computer Sciences, Economics, Geology, History, Literature in English, Mathematics, Physics, Psychology, and Sociology.

It is essential that the scores that applicants obtain on these tests be available to the appropriate Departments and Faculty Graduate Committees at the time when selection for admission to graduate study is being made. It is the responsibility of applicants to register for, and take, these tests at such dates as to ensure that the Office of Admissions would receive their scores prior to that time. For more information on the EEE, please contact the Office of Tests and Measurements, AUB. For more information on the TOEFL, GRE, or GMAT, please contact ETS or AMIDEAST.

For detailed information regarding admission to graduate study, see the admission section in the chapter on "Graduate Study" on page 498 of this Catalogue.

ADMISSION TO THE SUMMER SESSION

Candidates who are not registered as regular students at the AUB but who wish to join only the Summer Session must submit their applications before June 1. The Director of Admissions evaluates such applications and decides on the admission or non-admission of applicants. Currently registered students need not fill in an application for admission to the Summer Session . Applicants from outside the AUB should meet our admission requirements; they must hold a recognized secondary school certificate and meet the English Language Proficiency Requirement as specified on page 36 of this Catalogue.

ADMISSION TO NON-DEGREE AND OTHER PROGRAMS

Some Faculties and Schools offer non-degree and special programs for which admission requirements differ from those of the degree programs. For information about the admission requirements of these programs, refer to the appropriate Faculty or School section and to the chapters on the Division of Education Programs and Extension Programs in this catalogue.

ADMISSION QUALIFICATIONS AND TESTS

A. Admission to the Freshman Class

All applicants to the Freshman Class, Lebanese or Non-Lebanese, should hold a secondary school certificate based on twelve years of schooling starting with Elementary I awarded either by government or private schools and recognized by the Lebanese Ministry of Education and by the University. For more information on the SAT I, see page 38. **All applicants to the Freshman Class are required to take the SAT I (Reasoning Tests). SAT I scores for tests that are not taken within the deadlines set by the University will not be accepted.** It is the responsibility of applicants to register for, and take the required SAT I within the deadlines that are indicated in the chart on page 39 of this Catalogue.

Applicants who want their scores to be reported directly to the AUB, should make sure, when registering for the SAT I, to enter under the appropriate item on the registration form the institution code number assigned to the American University of Beirut: **0902.**

For more details on the dates and the locations of these tests, contact the testing center nearest to you. In Lebanon, applicants may contact AMIDEAST.

B. Admission of Lebanese Applicants to the Freshman Class

Lebanese applicants to the Freshman Class who followed a High School Diploma Program based on twelve years of schooling counting from Grade One, and recognized by the Lebanese Ministry of Education and by the University, must have obtained, prior to the time set for registration by the University, a "permission" from the Equivalence Committee of the Lebanese Ministry of Education allowing them to pursue their higher education on the basis of a foreign (non-Lebanese) program:

سماح بمتابعة الدراسة حسب المنهج الأجنبي

To obtain this "permission" applicants should apply at the Equivalence Committee لجنة

المعـــادلات of the Ministry of Education, Youth, and Sports located at the UNESCO in Beirut. The applicant should produce evidence of having lived and studied outside Lebanon for not less than two years. This evidence, normally, consists of proof of legal

residence (إقامـــة) in a foreign country and the official grades of two years of secondary education in that country. (If the years of study abroad were at the elementary level, then proof of legal residence and the school grades should be for three years). The applicant

should also have a photocopy of his or her passport, Lebanese ID, or إخراج قيد plus a recent photograph. Applicants are advised to begin the process of securing this "permission" at least two months prior to the time set for registration by the University.

Students who secure such a "permission" and are admitted to the University would be entitled, upon the completion of the Freshman Class, to have their Freshman Class equated by the Equivalence Committee of the Lebanese Ministry of Education, Youth, and Sports to the Lebanese Baccalaureate Part II. To be promoted to the Sophomore Class or to the equivalent classes in the other faculties, a Lebanese student must produce evidence of having received the Lebanese Baccalaureate Part II or its equivalent.

Lebanese applicants who are admitted to the Freshman Class should check with their advisors at registration time to make sure that the number of credits and the types of subjects that they take during their Freshman Year are in compliance with the specifications of the Equivalence Committee of the Lebanese Ministry of Education. These specifications are as follows:

Subject[1]	Minimum Number of Credits per Subject	
	Freshman Arts	*Freshman Sciences*
Humanities	12	9
Natural Sciences	3	9
Social Sciences	9	--
Mathematics	--	6
"Electives"	6	6
Total	30	30

The Lebanese Ministry of Education requires Lebanese applicants for admission to the Freshman Class, who have secured permission to pursue their higher education on the basis of a foreign program, **to take both the SAT I and the SAT II (Subject Tests). The SAT I and SAT II should be taken prior to admission to the Freshman class.** The Ministry further requires, for the purpose of equating the Freshman Year to the Lebanese Baccalaureate Part II, the applicant to have already obtained on the SAT I and the three SAT II subjects a minimum total score of 2000 points on the Recentered scale.

The Equivalence Committee of the Lebanese Ministry of Education specifies that the SAT II tests must be taken as follows:

For admission to Freshman Sciences:
> Mathematics IIC - Obligatory
> Plus two tests from Biology, Chemistry, or Physics.

For admission to Freshman Arts:
> Mathematics I or IC - Obligatory
> English (Writing or Literature)
> One science from Biology, Chemistry, or Physics.

As already noted, candidates admitted to the University as non-Lebanese will not be permitted to change their nationality to Lebanese in the records of the University unless they had already fulfilled the requirements for admission of Lebanese students at the time of admission to the University.

All applicants are reminded that they must meet the English Language Proficiency Requirement as spelled out on page 36 of this catalogue.

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[1] Humanities are: Arabic Language or Literature, English Language or Literature, History, Archaeology, and Philosophy.
Natural Sciences are: Biology, Chemistry, Geology, and Physics.
Social Sciences are: Business, Economics, Political Studies, Public Administration, Psychology, Sociology, and Anthropology.
Cultural Studies may be counted either as Humanities or as Social Sciences but a CS course may not be counted for the same applicant more than once. Statistics and Computer Science may be counted as Mathematics.

C. Admission to the Sophomore Class in the Faculty of Arts and Sciences or to the Equivalent Classes in the Other Faculties and the Division of Education Programs

Applicants for admission to the Sophomore Class or to the equivalent classes in the other faculties and the Division of Education Programs should hold the Lebanese Baccalaureate Part II, or its equivalent as recognized by the Lebanese Ministry of Education and by the University. The University does not recognize High School Diplomas or certificates that may be based on less than twelve years of schooling starting with Grade One. For example, the GCE certificate at Ordinary level, and one year of the "College d'Enseignement General et Professional" (CEGEP), do not admit to the University at any level. The Lebanese Baccalaureate Part II enables its holders to apply to the Sophomore Class or to the corresponding classes in the other faculties. The GCE certificate with at least two subjects (not including Arabic) at Advanced level (GCE Advanced Supplementary subjects are not recognized by the University for purposes of admission) and at least three subjects at Ordinary level is equivalent to the Lebanese Baccalaureate Part II and qualifies its holders for consideration for admission to the Sophomore Class in the Faculty of Arts and Sciences or to the equivalent classes in the other faculties. The "Diplome d'Etudes Collegiales" (DEC) which is based on two years of the CEGEP Program, qualifies its holders for consideration for admission to the Sophomore Class in the Faculty of Arts and Sciences or to the corresponding classes in the other faculties.

Applicants who hold certificates that are equivalent to the Lebanese Baccalaureate Part II are entitled for consideration for admission to the University, but the class to which such equivalent certificates may admit will depend upon the certificate itself.

Applicants for admission to the Sophomore Class in the Faculty of Arts and Sciences or the equivalent classes in the other faculties and the Division of Education Programs must take the SAT I Reasoning Tests (both Verbal and Mathematical). For more information on the SAT I, see pages 38-39. These tests must be taken within the deadlines that are indicated in the chart on page 39 of this Catalogue. **The Admissions Committees will not accept SAT scores for tests that are not taken within the set deadlines.**

All applicants are reminded that they must meet the English Language Proficiency Requirement as spelled out on page 36 of this Catalogue.

ADMITTING CERTIFICATES

A. Lebanese Baccalaureates
There are four different types of Lebanese Baccalaureates: Philosophy, Mathematics, Experimental Sciences, and Technical.

Philosophy admits to the Sophomore Class in Arts* or Business in the Faculty of Arts and Sciences; to the Sophomore Class in the Division of Education Programs; to the First Year in Graphic Design in the Faculty of Engineering and Architecture; or to Second Year Nursing.**

Mathematics and Experimental Sciences admit to the Sophomore Class in Sciences, Arts, or Business in the Faculty of Arts and Sciences; to the equivalent classes in the other faculties; to the Sophomore Class in the Division of Education Programs; or to Second Year Nursing.

Technical Baccalaureate Part II admits to programs that are similar in nature to the area of concentration of the Technical Baccalaureate. However, holders of the Technical Baccalaureate Part II, should sit for the SAT I Reasoning Tests (both Verbal and Mathematical), and should meet the English Language Proficiency Requirement.

The chart on pages 50-53 shows the class to which holders of secondary certificates may apply and the requirements that must be met.

B. Certificates Issued by Governments

Government secondary certificates, **other than** the Lebanese Baccalaureate Part II, the French Baccalaureate, the German Abitur and the GCE in the required subjects (3 at Ordinary level and 2 at Advanced, not including Arabic and not including GCE Advanced Supplementary subjects), entitle their holders to apply to the Freshman Class provided they take the SAT I Reasoning Tests (both Verbal and Mathematical). These certificates also allow their holders to apply for entrance to the Sophomore Class or to the equivalent classes in the other faculties on condition that they take the required SAT I Reasoning Tests.

Government secondary certificates are normally divided into literary and scientific. Literary certificates qualify for consideration for admission, on the whole, to Arts* or Business. The Scientific certificates qualify for consideration for admission to all majors (Sciences, Business or Arts).

C. Commercial, Agricultural, and Vocational Secondary Certificates

These certificates are generally not recognized for admission to the American University of Beirut. If, however, such certificates are recognized by the government of the country where the applicant studied to be equivalent to the official secondary school certificate,

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* Arts majors are: Arabic Language or Literature, Archaeology, Economics, English Language, English Literature, History, Mathematics (B.A.), Philosophy, Political Studies, Public Administration, Psychology, and Sociology-Anthropology.
** Students applying to the School of Nursing on the basis of a "Philosophy" or an equivalent certificate, may be required, if admitted, to take Chemistry 200.

their holders will be eligible for consideration for admission to the Sophomore Class or equivalent classes, on condition that they take the required SAT I within the deadline indicated in the chart on page 39 and provided that they meet the English Language Proficiency Requirement (see page 36). The programs to which such certificates admit will depend on the area of concentration of the certificate.

D. Informal Educational Preparation

Requirements of formal education for admission to the Freshman Class may be waived for applicants who have passed their 25th birthday. Such applicants should, however, meet the English Language Proficiency Requirement, obtain satisfactory scores on the SAT I Reasoning Tests (both Verbal and Mathematical), and meet the specific requirements established by the University Committee on Admissions.

E. Transfer Applicants

Candidates transferring from recognized institutions of higher education are eligible for consideration for admission subject to the following conditions:

a) That they have completed a class equivalent in standard to the Freshman Class of the Faculty of Arts and Sciences of the AUB and have taken the courses which are required in that class by the AUB.

b) Applicants for transfer to the Sophomore class in the Faculty of Arts and Sciences, to the Sophomore class in the Division of Education Programs, or to the equivalent classes in the other faculties must take the SAT I within the deadlines indicated in the chart on page 37.

c) Applicants to the Junior class in the Faculty of Arts and Sciences, to the Junior class in the Division of Education Programs, or to the equivalent classes in the Faculty of Agricultural and Food Sciences, Faculty of Health Sciences, or the School of Nursing, should have completed the equivalent of the Sophomore Class at the college or university from which they are transferring. **Such applicants need not take the SAT I**. Applicants for transfer to Term III or Term VI in the Faculty of Engineering and Architecture should have completed the equivalent of the Sophomore Class at the college or university from which they are transferring and **must sit for the required SAT I** as specified on page 39 of this catalogue. The decision on the admission of all these transfer applicants will depend very heavily on their academic records at the institutions from which they are transferring.

d) That prior to their admission to the institution from which they are transferring, they had met the requirements for admission to this University.

e) That they meet the English Language Proficiency Requirement (see page 36).

Transfer applicants may be given credit for courses completed in the institutions from which they are transferring if they had obtained grades on those courses of not less than 70 and on condition that these courses are approved for a degree at the AUB. Candidates who believe that their previous academic training entitles them to advanced status may present their cases in writing to Director of Admissions, together with official transcripts of their records and other supporting documents.

Students who believe that they have attained a level of competence in a particular subject matter equal to that of a required course may, upon securing the approval of the relevant department and passing an examination in the subject matter of the course, no longer be obligated to take that course but would still be required to take some other course in its place.

F. Secondary Certificates

The AUB, judging by the past performance at the University of holders of various secondary certificates, recognizes some secondary school certificates for eligibility for admission. Holders of these certificates may be required to pass certain examinations in addition to meeting the English Language Proficiency Requirement.

Some systems of education grant two or more types of certificates (such as literary or scientific). Holders of literary certificates are eligible for admission to Arts* or Business Programs. Holders of certificates with a scientific and/or mathematical rientation ay e admitted to Science, Arts,* or Business Programs.

Some systems of education do not distinguish in their secondary certificates among literary, scientific, or other types of certificates, but indicate the subjects passed. The applications of holders of such certificates will be evaluated, on a case by case basis, by the appropriate Admissions Committee. In all cases, applicants must take the SAT I Reasoning Tests (both Verbal and Mathematical) within the deadlines indicated in the chart on page 39 and must meet the English Language Proficiency Requirement (see page 36).

SECONDARY SCHOOL CERTIFICATES AND THE CLASSES TO WHICH THEY ADMIT

The University requires certain certificates to show passes with "credit" standard. Certificates that do not meet this standard will not be considered.

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* Arts majors are: Arabic Language or Literature, Archaeology, Economics, English Language, English Literature, History, Mathematics (B.A.), Philosophy, Political Studies, Public Administration, Psychology, and Sociology-Anthropology

Students who followed in the last two or three years of secondary school education a 'Literary' or 'Arts' track may apply for admission to:
a) Freshman Arts or First Year Nursing, if the certificate admits to the Freshman level; or to:
b) Majors in the Humanities, the Social Sciences, Business Administration, Education, First Year Graphic Design, or Second Year Nursing, if the certificate admits to the Sophomore Class and the equivalent classes in the other faculties.

Students who followed in the last two or three years of secondary education a 'sciences' track may apply for admission to all majors that are offered at the level to which the certificate admits. A 'sciences' track must include a concentration of Mathematics subjects and at least one science (offered at the more rigorous levels such as 'Advanced,' 'Higher,' etc.). Applicants should take the science subject of their intended major. For example, applicants who indicate Chemistry as their intended major should have taken, in addition to the Mathematics subject, the appropriate Chemistry subjects offered in the curriculum of the secondary school program on which their secondary school certificate is based. Applicants to Engineering majors should have taken Physics in addition to the Mathematics subject.

In the chart on the following pages, detailed information is provided on the kind of certificate (first column), and the class or classes to which it admits (second column). In all cases, the SAT I Reasoning Tests (both Verbal and Mathematical) must be taken within the deadlines indicated in the chart on page 39and the English Language Proficiency Requirement must also be met (see page 36). The abbreviations used in the chart are as follows:

Agri	= Agricultural and Food Sciences	Geol	= Geology
Arch	= Architecture	GD	= Graphic Design
Biol	= Biology	HS	= Health Sciences
BusAdm	= Business Administration	Math	= Mathematics
Chem	= Chemistry	Nurs	= Nursing
CompSc	= Computer Science	PetStud	= Petroleum Studies
Educ	= Education	Philo	= Philosophy
Eng'g	= Engineering	Phys	= Physics
Engl	= Enlgish	Soph	= Sophomore
ExpSc	= Experimental Sciences	Stat	= Statistics
Fresh	= Freshman		

CERTIFICATE, CLASS, AND EXAMINATION CHART

All endnotes that are indicated in the chart appear on page 52.

CERTIFICATE	CLASS AND DEPARTMENT TO WHICH THE CERTIFICATE ADMITS
High School Diploma or Secondary School Leaving Certificate, based on at least twelve years of schooling starting with Elementary I Class.	• Fresh Arts, Fresh Sciences, or Nurs I.
Government Secondary Certificates (literary).	• Fresh Arts, BusAdm, or Nurs I.
Government Secondary Certificates (scientific).	• Fresh Sciences, Fresh Arts, BusAdm or Nurs I.
Government Secondary Certificates also qualify for admission to the Sophomore Class in the Faculty of Arts and Sciences and the Division of Education Programs and to equivalent classes in the other faculties.	
Literary	• Soph Arts[1], BusAdm or Educ (BA Program), Nurs II[2] or GD I.
Scientific	• Soph Sciences[1], Arts[1], BusAdm, Educ (BA Program), Nurs II[2], Agri I, HS I, Eng'g I, ARCH I, or GD I.
Lebanese Baccalaureate, French Baccalaureate, German Abitur, and GCE (Five different subjects, at least two of which at Advanced Level, not including Arabic).	• These certificates admit to the Sophomore Class in the Faculty of Arts and Sciences, to the Sophomore Class in the Division of Education Programs, or to the equivalent classes in the other faculties. • Holders of these certificates may not apply to the Freshman Class.
Lebanese or French Baccalaureate (Philo).	• Soph Arts[1], BusAdm, Educ (BA Program), Nurs II[2] or GD I.
Lebanese or French Baccalaureate (ExpSci or Math).	• Soph Sciences[1], Arts[1], BusAdm, Educ (BA program), Agri I, HS I, Eng'g I, ARCH I, GD I, or Nurs II[2].

CERTIFICATE	CLASS AND DEPARTMENT TO WHICH THE CERTIFICATE ADMITS

GCE or Oxford and Cambridge Higher Certificate
A total of five different subjects are required, at least two of which are at Advanced level.

Arabic at Advanced level may not be counted as one of the two required subjects at Advanced level.

The GCE Advanced Supplementary subjects are not recognized for the purpose of admission.

A GCE certificate based only on O-level subjects does not admit to the University at any level.

For those who followed the literary track

- Soph Arts[1], BusAdm, Educ (BA Program), GD I, or Nurs II[2].

For those who followed the scientific track

- Soph Sciences[1], Soph Arts[1], BusAdm, Educ, GD I, or Nurs. II[2].
- Applicants to HS I and Agri I must pass Math and Chem at Advanced level.
- Applicants to Eng'g I or ARCH I must pass Math and Phys at Advanced level.
- Applicants to GD I must pass Math and one subject from Biol, Chem, or Phys at advanced level.
- Applicants to the Sophomore Sciences Class in the Faculty of Arts and Sciences must pass Math at Advanced level and another science subject at Advanced level according to their major field of study as indicated below.

Soph Sciences with Majors in:

Must take the following subjects at Advanced level:
- Math and Biol.
- Math and Chem.
- Math and Phys.
- Math and Phys.
- Math and one from Biol, Chem, or Phys.

- Biol
- Chem
- Phys
- CompSc
- Geol, Math, PetStud, or Stat.

CERTIFICATE	CLASS AND DEPARTMENT TO WHICH THE CERTIFICATE ADMITS

International Baccalaureate Diploma
Six different subjects are required:
Three at Higher level (HL) and 3 at Subsidiary level (SL).

For admission to the Freshman Class:
A combination of 3 HL and 3 SL which includes one of the following: Mathematical Studies, Math Methods, or Math HL.

- Fresh Arts, or Nurs I

A combination of 3 HL & 3 SL which includes at least one from: Biol, Chem, or Phys, plus either Math Methods or Math HL.

- Fresh Sciences, or Nurs I

For admission to the Sophomore and Equivalent Classes:
A combination of 3 HL and 3 SL which includes one of the following: Mathematical Studies, Math Methods, or Math HL.

- Soph Arts[1], BusAdm, Educ (BA Program), GD I, or Nurs II[2]

Applicants to Soph Sciences and equivalent classes according to their major field of study as indicated below:
Soph Sciences with majors in:

Must take a combination of 3 at HL and 3 at SL that includes:
- Biol at HL plus Math Methods or Math HL.
- Chem at HL plus Math Methods or Math HL.
- Phys at HL plus Math Methods SL or Math HL.
- One from Biol, Chem, or Phys, plus Math Methods or Math HL.
- Phys at HL plus Math HL.
- Chem at HL, plus Math Methods or Math HL.

- Biol
- Chem
- Phys or Comp. Sci.
- CompSc, Geol, GD I, Math, or Stat.
- Eng'g I or ARCH I.
- Agri I, HS I, or Nurs II.

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[1] Arts majors are: Arabic Language or Literature, Archaeology, Economics, English Language, English Literature, History, Mathematics (B.A.), Philosophy, Political Studies, Public Administration, Psychology, and Sociology-Anthropology. Sciences majors are: Biol, Chem, CompSc, Geol, Math (B.S.), PetStud, Phys, and Stat.

[2] Students applying for admission to the School of Nursing on the basis of a "Philosophy" or equivalent certificate may be required, if admitted, to take Chemistry 200.

REMINDERS AND SUMMARY OF IMPORTANT REQUIREMENTS

- Applicants for admission to the Freshman Class as well as applicants for admission to the Sophomore Class in the Faculty of Arts and Sciences or to the equivalent classes in the other faculties and the Division of Education Programs are required to take the SAT I (both the Mathematical Reasoning and the Verbal Reasoning). For information on the SAT I, see pages 38-39.
- Applicants for admission to the University to all faculties and at all levels are required to meet the English Language Proficiency Requirement (ELPR) as spelled out on page 33 of this Catalogue. Applicants who have been selected for admission but have not met the ELPR may qualify for the University Orientation Program (UOP). (For information on the UOP see page 37 and page 483.)

- All accepted applicants who meet the English Language Proficiency Requirement are required to take the English Placement Test (EPT) (see page 37).

- Lebanese applicants to the Freshman Class are required by the Equivalence Committee of the Lebanese Ministry of Education to take **both the SAT I and the SAT II**. Both tests must be taken **prior** to admission to the Freshman Class. (For more details see page 43.)

- Government Secondary Certificates, other than the Lebanese Baccalaureate Part II, French Baccalaureate, German Abitur, and GCE in the required subjects (3 at Ordinary level and 2 at Advanced not including Arabic and not including Advanced Supplementary subjects), entitle their holders to apply to the Freshman Class provided they take the SAT I Reasoning Tests (both Verbal and Mathematical). Government Secondary Certificates also entitle their holders to apply to the Sophomore Class or to the equivalent classes in the other faculties provided they take the required SAT I Reasoning Tests (both Verbal and Mathematical).

- Secondary school literary certificates on the whole qualify for admission to Arts, Business Administration, Education, Nursing, or Graphic Design; scientific certificates qualify for admission to all majors in all faculties.

- Applications for admission must be submitted within the deadlines that are indicated in the chart on page 32. The Office of Admissions will not forward to the Admissions Committee applications received after the set deadlines.

Applicants are reminded that they should take the required SAT I within the deadlines indicated in the chart on page 39. The Office of Admissions will not forward to the Admissions Committees scores of tests that are not taken within the set deadlines. For information pertaining to test dates and deadlines for registration for the SAT tests, contact the Educational Testing Service, Princeton, NJ 08540, USA, or the designated testing center in your area. In Lebanon applicants may contact AMIDEAST.

For further information pertaining to Admissions, please write to, or call:

Office of Admissions
American University of Beirut
P.O.Box 11-236
Beirut, Lebanon
Tel: 374374 - 374444 - 340460 (Ext. 2590 or 2585)
Fax: 00961 1 744469
E-Mail: admissions@aub.edu.lb

OR

Office of Admissions
American University of Beirut
850 Third Avenue, 18th Floor
New York, N.Y. 10022-6297
Tel: (212) 583-7600/ Fax: (212) 583-7650/ E-Mail: mills@aub.edu.

REGISTRATION OF AUB PROGRAMS AND DEGREES

The Education Department of the State of New York has registered, under Section 52.2 of the Regulations of the Commissioner of Education (Chapter II of Title 8 of the Official Compilation of Codes, Rules and Regulations of the State of New York), the following curricula at the American University of Beirut leading to the degrees and certificates indicated:

Programs	Degrees or Certificates
Faculty of Arts and Sciences	
Anthropology	M.A.
Archaeology	B.A., M.A.
Biology	B.S., M.S.
Business Administration	B.B.A., M.B.A.
Chemistry	B.S., M.S.
Economics	B.A., M.A.
English Language	B.A., M.A.
English Literature	B.A., M.A.
Geology	B.S., M.S.
History	B.A., M.A.
Mathematics	B.A., B.S., M.A., M.S.
Middle East Studies	M.A.
Philosophy	B.A., M.A.
Physics	B.S., M.S.
Political Studies	B.A., M.A.
Psychology	B.A., M.A.
Public Administration	B.A., M.A.
Sociology	M.A.
Sociology/Anthropology	B.A.
Statistics	M.A., M.S.
Faculty of Medicine	
Biochemistry	M.S.
Medicine	M.D.
Nursing	B.S.N.
Faculty of Health Sciences	
Environmental Health	B.S.
Epidemiology and Biostatistics	M.P.H.
Epidemiology	M.S.
Health and Hospital Administration	M.P.H.
Public Health	M.P.H.

Programs	Degrees or Certificates
Faculty of Engineering and Architecture	
Architecture	B.Arch.
Civil Engineering	B.E., M.E.
Electrical Engineering	B.E., M.E.
Mechanical Engineering	B.E., M.E.
Urban Planning and Urban Design	M.E.
Faculty of Agricultural and Food Sciences	
Agricultural Economics	M.S.
Agricultural Extension	M.S.
Agronomy	Ph.D.
Animal Sciences	M.S.
Crop Production	M.S.
Food Technology	M.S.
General Agriculture	B.S.
Irrigation	M.S.
Mechanization	M.S.
Nutrition	M.S.
Nutrition and Dietetics	B.S.
Plant Protection	M.S.
Poultry Science	M.S.

ADDITIONAL DEGREES

Faculty of Arts and Sciences	
Arab History	Ph.D.
Arabic	Ph.D.
Arabic Language and Literature	B.A., M.A.
Computer Science	B.S.
Money and Banking	M.M.B.
Petroleum Studies	B.S.
Statistics	B.S.
Faculty of Medicine	
Basic Medical Sciences	Ph.D.
Human Morphology	M.S.
Microbiology	M.S.
Pharmacology and Therapeutics	M.S.
Physiology	M.S.

Programs	Degrees or Certificates
Faculty of Health Sciences	
Medical Laboratory Technology	B.S.
Population Studies	M.S.
Faculty of Engineering and Architecture	
Applied Energy	M. of Mechanical Eng'g
Computer and Communications Eng.	B.E., M.E.
Engineering Management	M.E.M.
Environmental and Water Resources Eng.	M.E.
Electronics, Devices and Systems	M.E.
Electric Power Engineering	M.E.
Graphic Design	B.G.D.
Materials and Manufacturing	M. of Mechanical Eng'g
Thermal and Fluid Science	M. of Mechanical Eng'g
Faculty of Agricultural and Food Sciences	
Diploma of Ingénieur Agricole	Diploma
Soils and Mechanization	M.S.
Interfaculty Programs	
Environmental Sciences	M.S. (majors in: Ecosystem Management, Environmental Technology, and Environmental Health)
Neuroscience	M.S.
Nutrition	M.S.
Division of Education Programs	
Diploma in Educational Management and Leadership	D.Ed.M.L.
Diploma in Special Education	D.S.Ed.
Education	M.A.
Education/Elementary	B.A.
Teaching Diploma	T.D.

RECOGNITION OF AUB DEGREES BY THE LEBANESE MINISTRY OF EDUCATION

The Lebanese Ministry of Education recognizes all the degrees awarded by the American University of Beirut provided students are admitted on the basis of the Lebanese Baccalaureate Part II or its equivalent as determined by the Lebanese Ministry of Education.

Degrees granted by AUB	Lebanese equivalent of these degrees
B.A., B.S., B.B.A	Licence
B.A. or B.S. plus the Teaching Diploma and on condition that the semester credit hours earned at the Sophomore class level and above add up to 108	Licence d'Enseignement
M.A., M.S., M.B.A.	Diplome d'Etude Superieur
Ph.D.	Doctorat

The Ministry of Education also recognizes degrees in Medicine, Engineering and Architecture, and Agriculture as equivalent to the corresponding degrees awarded or recognized by the Lebanese University.

The University points out that it is the responsibility of the students themselves to see to it that the degrees they receive from the University are duly evaluated by their respective governments.

REGISTRATION

A registration guide will be distributed to every student before registration begins. In preparation for their registration, students are advised to read this section of the catalogue carefully since it contains basic information concerning registration procedures.

Before proceeding to registration, new students must make sure that all conditions for admission, particularly those that are set in the letter of admission sent to them by the Director of Admissions, are cleared at the Office of Admissions. Subsequent to such clearance, both new and old students should follow the steps indicated in the guide to registration.

Upon completion of registration, students should pick up their Identification Cards in accordance with a schedule that will be announced by the Registrar.

Students may introduce final adjustments to their schedules during the Drop and Add Period. The Drop and Add Period normally extends for two days and begins one week after the first day of classes.

CROSS-REGISTRATION

A. Students enrolled at the AUB taking courses at other universities

A student studying at the American University of Beirut may be allowed to cross-register a course at other institutions such as the Lebanese American University or at Haigazian University College if all of the following conditions are met:

1. The semester for which the course is to be cross-registered is the semester at the end of which the student expects to graduate.
2. The course in which the student intends to cross-register is equivalent to a course that the AUB offers. (The number and title of each of the two equivalent courses should be clearly indicated).
3. The course is required of the student by the AUB.
4. The course is not offered at the AUB during the semester at the end of which the student expects to graduate.
5. The Chairperson of the Department in which the student is majoring sends to the Registrar a written statement confirming that all of the conditions listed above have been met.

B. Students enrolled at other universities taking courses at the AUB

For purposes of cross registration, students studying at Balamand, Haigazian, LAU, NDU, or NEST who may wish to take courses at AUB should complete the following procedures:
1. Secure the permission of their institutions to take specified courses at AUB.
2. Secure the permission of the Dean of the Faculty concerned at AUB.
3. Present the above permissions at the Office of the Registrar.
4. Register in accordance with the instructions specified in the registration guide.

Copies of the registration guides are sent to the above named institutions.

AID AND BURSARY STUDENTS

These students must report upon arrival to the AUB Bursary/AID Students' Office, West Hall, to secure forms needed for their registration.

PASSPORTS AND VISAS

Foreign students joining AUB should have their passports valid for a period not less than 13 months from the date of joining the University; they should also secure an entry visa to Lebanon from the nearest embassy or consulate of Lebanon in their country. The Office of Student Affairs provides the necessary certificates for registered foreign students to enable them to acquire residence permits from the appropriate Lebanese authorities.

NATIONAL SOCIAL SECURITY FUND (NSSF) MEDICAL BRANCH

Membership in the NSSF is mandatory by law for all Lebanese students; non-Lebanese students may not join. In order to facilitate enrollment in the NSSF Medical Branch, Lebanese students are urged to have with them at Registration the following items:

1. A social security application form (correctly filled in). Copies of this form will be available for distribution at the time of registration to students who have not filled this form.

2. A photocopy of their Lebanese identity card.

3. Their NSSF number (if already registered).

4. The NSSF number of either parent (if insured with the NSSF through father or mother).

5. Family record إخراج قيد عائلي : This item is required of married students only.

MEDICAL RECORD

The Entrance Medical Record Form will be sent with the Letter of Admission to all new students who have already been accepted for admission to AUB. It should be completed by the student's family physician and mailed (as soon as possible but before the period of registration) in a pre-addressed envelope that will be included in the Letter of Admission package.' The completed Medical Record Form may, alternatively, be delivered by hand to the Office of the Registrar.

All new students shall have a tuberculin test at the time of the preliminary medical check, held at West Hall, and should report 48 hours later for a final check on the tuberculin test. Upon clearing the medical test, the student will be issued a clearance slip to proceed with registration. Students will not be registered unless they obtain this clearance slip. Students who report late for the medical check will be charged a late fee.

Medical checks may be completed in advance of the above dates provided that the student reports to the University Health Services on Campus and brings along the letter of acceptance and the entrance medical record.

Old students are not required to complete any medical forms. Important changes in the student's medical condition and/or updating immunizations should be reported to a University Physician by appointment at the Health Services Center early in the first semester. **Information will be kept confidential.**

Upon completion of these steps, students should consult with their advisors on matters that relate to the selection of courses according to the dates indicated in the registration guide. The registration guide will be available to students and advisors.

SPECIAL INSTRUCTIONS

A. Special Instructions for Arts and Sciences Students Regarding Course Schedules

In preparing their course schedules, Arts and Sciences students should take the following into consideration:

1. Students who lack Freshman courses must register for these courses during the Sophomore year, if these courses are offered.
2. All students who fail a required course are obliged to repeat that course during the following semester, if the course is offered. If the course in which they failed is not required, they need not take it again.
3. No student will be allowed to register for a course unless its prerequisites are completed.

B. Auditors

Students who wish to audit courses must secure the approval of the professor who is teaching the course that they wish to audit and should pay due fees to the Comptroller's Office. Auditors are not issued student numbers and the University does not provide them with University identity cards.

PAYMENT OF FEES

All students must finalize registration, including payment of tuition and other charges, by the announced deadlines. For full instructions on payment of fees, see the section on "Fees and Expenses" on page 70 of this catalogue.

POLICY ON TRANSFER OF MAJOR WITHIN THE FACULTY OF ARTS AND SCIENCES

Students wishing to transfer from one major to another in the Faculty of Arts and Sciences may do so only after they have completed at least one full semester of work in their current majors. Special Transfer Forms are available at the Office of the Registrar. The Transfer Form must be submitted to the Chairperson of the prospective department not later than three weeks **before** the end of a semester. The transfer, if approved, becomes effective at the beginning of the next semester.

Procedures for transferring are as follows: after filling the Transfer Form, students should attach to it their grades for the last two semesters, and submit it to the Chairperson of their current Department who will make his or her recommendation to the Chairperson of their prospective Department.

Transfers within Arts or within Sciences will be decided by the Departments concerned without referring to the Arts and Sciences Admissions Committee. The Office of the Dean of Arts and Sciences and the Registrar must be notified of such transfers by the Chairperson of the Department to which the student is transferring.

For all other transfers within the Faculty of Arts and Sciences, the Chairperson of the prospective Department will study the Transfer Form, complete it, and present it to the Arts and Sciences Admissions Committee for action. The decision of the Committee will be communicated by the Registrar in writing to the student concerned with copies to the Office of the Dean and the Chairpersons of the Departments concerned.

TRANSFER FROM ONE FACULTY TO ANOTHER WITHIN THE UNIVERSITY

Students who wish to transfer from one faculty to another should fill in the regular application for admission form which new applicants for admission to the University must fill. Transfer applicants should include with their applications their AUB grades. The deadlines for submitting applications to transfer from one Faculty to another are the same deadlines that apply for the submission of new applications for admission to the University (please see the chart on page 32). For the purpose of transfer from one faculty to another, the Division of Education Programs is treated as a 'faculty'.

DISCLOSURE OF STUDENT RECORDS

The University may disclose routine information without prior written consent from the student. This information will be of a "directory nature" and may include only the following items: student's name, degrees received, major field(s) of study, awards received and participation in officially recognized activities and sports.

With the exceptions specified in (A) through (E) below, the University will release other personally identifiable information, including information from academic records, only upon prior written consent of the student. This consent must specify the information that is to be disclosed; must state the purpose of the disclosure; and must provide the names and addresses of the individuals or institutions to whom disclosure is to be made. However, the University may disclose such personally identifiable information, including information on academic records, without prior written consent of the student, under the following circumstances:

Information will be disclosed upon the request of officers of other educational institutions where the student seeks to enroll. In such cases the student will be given, upon his or her request, a copy of the information sent to the institution.

A) Information will be provided to financial aid services in connection with financial aid for which the student has applied or which the student has received.

B) Information will be disclosed to parents of a dependent student.

C) Information will be disclosed in compliance with a judicial order.

D) Information will be disclosed as necessary to academic officers, academic advisors and faculty members within the University.

As stated above, written consent of the student will be required for the disclosure of personally identifiable information from academic records, to any individuals or parties not listed in (A) through (E) above.

GRADUATION REQUIREMENTS

Students are strongly advised to check carefully by themselves and with their advisors that all graduation requirements are fulfilled. Failure to do so may mean that a student will have to spend an additional semester, or more, in order to complete graduation requirements.

COMMENCEMENT EXERCISES

Commencement Exercises are held at the end of the academic year. Students who graduate in October or February may participate in the Commencement Exercises. Graduates of October, 1999 or graduates of February 2000 who which to participate in the June, 2000 Commencement Exercises should notify the Office of the Registrar of their intention by filling in a special form (Form CE1) and submitting it at the Office of the Registrar **not later than June 15, 2000.**

Students who graduate in June will have places served for them in the June Commencement Exercises. June graduates who opt **not** to participate in the Commencement Exercises should fill in Form CE2 and submit it at the Office of the Registrar **not later than June 15, 2000.** June graduates who do not receive their degrees during the Commencement Exercises and **who have submitted Form CE2 within the above indicated deadline,** may receive their diplomas at the Office of the Registrar at a date subsequent to the date of the Commencement.

NAMES ON DIPLOMAS AND DEGREES

Names on diplomas and degrees will be spelled exactly as they appear on passports or identity cards.

According to the Lebanese Ministry of Education, names of Lebanese students should include first name, father's name, and family name.

Names on AUB diplomas and degrees appear both in Arabic and in English. If a name on a passport or an identity card does not appear in both languages, then the name that does not appear in one of these languages will be spelled on AUB diplomas and degrees according to the personal preference of the student concerned.
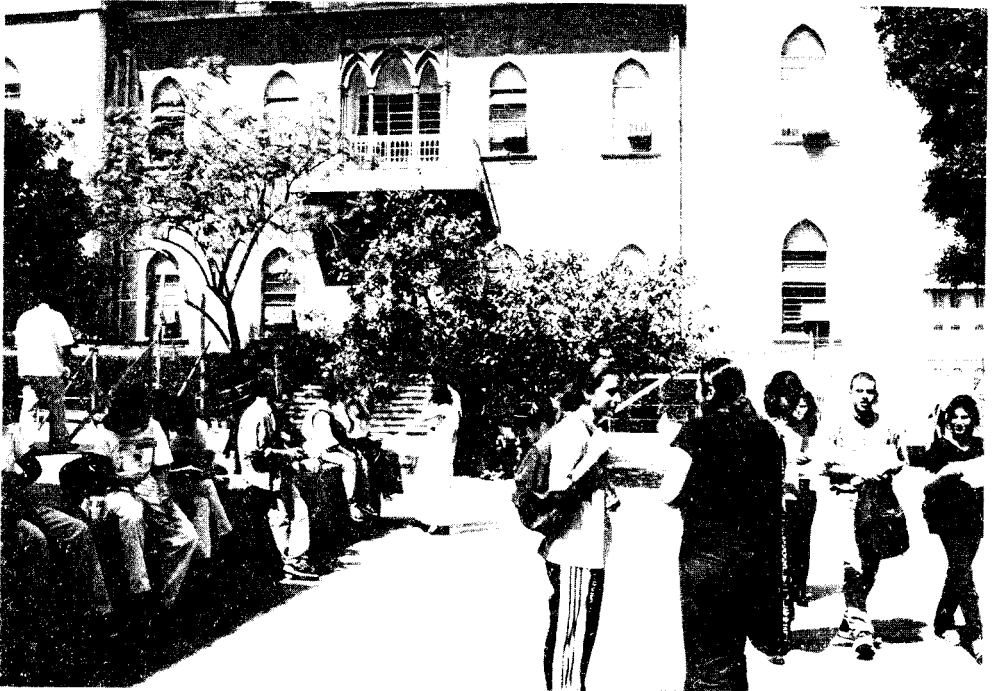
STUDENT LIFE

STATEMENT OF POLICY FOR STUDENTS

In associating himself/herself with his/her University, an action which is purely voluntary, the student must accept that by freedom of choice he/she imposed upon himself/herself the standards, the rules and the conditions established by the legally constituted authority of the University. Thus, any student may withdraw from the University whenever he/she considers the obligations assumed upon enrollment inconsistent with his/her expectations. Coexistent with this principle must be the acceptance of the right of the University, upon evidence of the student's inability to abide by its regulations, to insist upon his/her withdrawal and/or refuse his/her readmission.

OFFICE OF STUDENT AFFAIRS

Through its Office of Student Affairs the University directs, guides, and encourages a number of activities and services to complement the academic work of the student and to provide an enriching cultural, physical, social, and morally uplifting environment.

ATHLETICS AND RECREATION

A complete program of athletics in the form of individual or team sports is made available to students, faculty and staff. The program includes football, basketball, volleyball, softball, handball, track, tennis, table tennis, swimming, archery, body building, physical fitness, wrestling, boxing, karate, full contact, taek weon du, judo, canoeing and windsurfing. Athletic facilities include fields for football and softball, outdoor basketball and volleyball courts, one indoor court for basketball, volleyball and handball, a 400-meter track, six tennis courts, a swimming beach and a University gym machine. For recreational and other extracurricular activities, students are encouraged to use the facilities of West Hall, the main center for student functions and relaxation. Meetings, exhibitions, receptions, and competitions are held here. West Hall is also the home of the following student clubs: Badminton, Ballet, Caricature and Comic Art, Chess, Camping and Hiking, Cinema, Drama, Folk Dance, Music, Photography, Red Cross, Social Service, Ushering, Communication, Debate, Environment, and Civic Welfare.

The sports clubs include Canoe and Life Saving, and Diving. Through the West Hall Office, students can arrange for functions that they wish to hold at any one of the various halls on campus designated for that purpose.

STUDENT HOUSING

Policy

As a service to students, the University provides accommodation on campus. **Freshman students**, whose parents reside outside Beirut or its suburbs, are required to live in the University Residence Halls throughout their first year, unless otherwise authorized by their parents. Their life on campus facilitates their adjustment, reduces the temptations that distract students from their studies, and enriches their total University experience.

Furthermore, the continuous presence of students on campus promotes co-curricular activities that form an integral part of the Liberal Arts System of education. It is through these activities that students pursue their interests and develop their personalities. Within the dormitories students from all levels and from all specializations meet together and develop cherished and enduring friendships.

Arrangements for On-Campus Housing

Arrangements for on-campus housing are made through the **Office of Student Affairs.**

New students are sent "Room Reservation Forms" along with their letters of provisional acceptance. These forms must be filled and returned to the Office of Student Affairs before **August 1, for the Fall Semester, and before February 1, for the Spring Semester.**

Accommodation at the dormitories is made on a yearly basis. However, students may withdraw at the end of any semester. Students who wish to continue living on campus should indicate so, every year, by filling an application during the month of June.

Students who do not live in the University Residence halls during the Fall Semester, and wish to do so in the Spring and/or Summer Session, can apply, but accommoding them will be subject to the availability of places.

The "Housing Fee" will be charged, for each semester separately, along with the tuition and other fees. These charges appear on the "Statement of Fees".

Residence Halls

There are four Residence Halls for Women capable of accommodating around five hundred students, and two Halls for men to accommodate around six hundred students.

All have heating, hot water, and the commonly expected furniture (bed, desk, chair, and closet). Washing machines, dryers, and irons are provided. Residents bring their own pillows, blankets, towels and linen.

Accommodation is made on the basis of two students per room. If the number of residents permits, some rooms may be given as private rooms.

Head Residents and Student Hall Assistants reside in the hall, and are always there to help students and attend to their needs.

FOOD SERVICE

The University operates a modern, cafeteria-style food service on the campus. Students have the option of using the food service facilities of AUB or eating elsewhere, but most students find it desirable to eat at AUB because of the low prices and good quality wholesome food.

The University also operates snack facilities where students and their guests can obtain a variety of hot and cold food and refreshments.

MEDICAL CARE

The University Health Services (UHS) on campus provides medical care to members of the University community at large. Patients are seen Monday through Friday from 8 a.m. to 12 noon and 1 to 4 p.m. Appointments can be made at the reception desk in advance, either by calling in person or by telephone between 8.30 a.m. and 4.00 p.m. A physician is also available to receive patients on a "walk-in" basis. These patients must have problems of an urgent nature, otherwise they will be given a return appointment for a later time. In case of emergency, the patient should report directly to the Emergency Unit at the Medical Center or to the nearest emergency service or physician.

A list of doctors on call is available at http://www.aub.edu.lb/uhs/, with information about how to most benefit from the UHS services.

FEES AND EXPENSES (1999-2000)

The American University of Beirut is a non-profit institution. The charge to students is kept at the minimum consistent with the provision of high quality instruction and adequate facilities and equipment. **THE UNIVERSITY RESERVES THE RIGHT TO CHANGE ANY OR ALL FEES AT ANY TIME WITHOUT PRIOR NOTICE**. Such changes will be applicable to students currently registered in the University as well as to new students.

Students will not be permitted to enter classes at the beginning of the term until their fees are paid or special arrangements have been made with the University Comptroller (see below under "Payment of Fees"). All fees are quoted in Lebanese Pounds.

PAYMENT OF FEES

Up-to-date schedules for registration and payment of fees should be obtained from the Registrar's Office.

1. Each AUB student bears full responsibility for paying all of his/her tuition fees and other charges levied.

2. All students must finalize registration, **including payment of tuition fees and other charges**, by October 2, 1999 for the first semester, and February 8, 2000 for the second semester. Under special circumstances, late registration will be permitted during a period of *no more than five working days after the announced deadline*, but subject to a late registration fee of LL 100,000.

3. Students who demonstrate financial need may make formal application for deferred payment arrangements **for tuition fees only** to the Office of the Comptroller y September 24, 1999 for the first semester, and January 28, 2000 for the second semester. No applications for deferrals will be accepted thereafter. Deferred payments are not a right and will only be agreed to under specific and special circumstances. Students who arrange for deferred payments are still required to complete all registration formalities within the set deadlines. **Deferred payment arrangements are not permitted for the Summer Session in any Faculty or in the Division of Education Programs.**

4. Applications for deferred payment arrangements will be reviewed by a committee made up of the Vice President for Academic Affairs (Chairperson), the Dean of Student Affairs, the Dean of the applicant's Faculty, and the Comptroller. The Office of the Comptroller is responsible for administering all deferred payment arrangements.

5. A continuing student, including a student of Med I, **as well as a graduate student who has studied at AUB**, who applies for deferred payment arrangements, must pay at least 60% of the net amount of tuition due; an entering student must pay at least 80%. All other **charges** must be paid in full with no deferrals. Should the application for deferred payment not be approved, the student must pay the balance, in addition to a late registration fee of LL 100,000. Should the student's application be approved, the student must pay the balance, plus a deferred application fee of LL 50,000, together with the late payment fee as calculated. All the above arrangements must be concluded by the announced deadlines.

6. Every student granted deferred payment arrangements must sign a statement indicating agreement that failure to complete payment by the set deadline ill esult in receiving **no credit** for the semester in which the student has defaulted on payment.

TUITION FEES

The following tables give tuition fees for each semester and for the summer session, by Faculties and Divisions. These fees cover tuition, general services, and graduation fees. They do *not* cover fees for special services, books, supplies, athletic equipment, bedding, board and room.

FACULTY OF ARTS AND SCIENCES

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
HUMANITIES AND SOCIAL SCIENCES			
Undergraduate and special students			
12 or more credits per semester	5,410,000	5,410,000	
Less than 12 credits per semester or summer session (per credit)	449,800	449,800	449,800
Graduate (per credit)	571,700	571,700	571,700
SCIENCES			
Undergraduate and special students			
12 or more credits per semester	5,731,000	5,731,000	
Less than 12 credits per semester or summer session (per credit)	484,500	484,500	484,500
Graduate (per credit)	592,600	592,600	592,600

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
BUSINESS AND MANAGEMENT; INSTITUTE OF MONEY & BANKING			
Undergraduate and special students			
12 or more credits per semester	6,597,800	6,597,800	
Less than 12 credits per semester or summer session (per credit)	549,100	549,100	549,100
Graduate (per credit)	618,800	618,800	618,800

FACULTY OF AGRICULTURAL AND FOOD SCIENCES

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
Undergraduate and special students			
12 or more credits per semester	6,659,100	6,659,100	
Less than 12 credits per semester or summer session (per credit)	557,800	557,800	557,800
Graduate (per credit)	679,900	679,900	679,900

FACULTY OF ENGINEERING AND ARCHITECTURE

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
Undergraduate and special students			
12 or more credits per semester	7,370,800	7,370,800	
Less than 12 credits per semester or summer session (per credit)	618,800	618,800	618,800
Summer Training			1,045,700
Graduate (per credit)	714,800	714,800	714,800

FACULTY OF MEDICINE

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
M.D. Program			
First Year through Fourth Year	14,023,600	14,023,600	
Annual Microscope Fee			
(for Med.I and Med II only)	725,800		
Graduate (per credit)	719,700	719,700	719,700

SCHOOL OF NURSING

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
B.S.N Program			
12 or more credits per semester	5,330,800	5,330,800	
Less than 12 credits per semester			
or summer session (per credit)	487,900	487,900	487,900

MEDICAL CENTER

	Tuition Fees in Lebanese Pounds	
	First Semester 1999-2000	Second Semester 1999-2000
X-ray technician training		
(First Year only)	1,060,400	1,060,400

FACULTY OF HEALTH SCIENCES

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
Undergraduate and special students			
12 or more credits per semester	7,109,400	7,109,400	
Less than 12 credit per semester or summer session (per credit)	592,600	592,600	592,600
Summer Program			1,041,000
Graduate			
M.S. Program per credit	697,300	697,300	697,300
M.P.H Program:			
Full-time students	9,270,200	9,270,200	
Part-time students (per credit)	697,300	697,300	697,300

DIVISION OF EDUCATION PROGRAMS

	Tuition Fees in Lebanese Pounds		
	First Semester 1999-2000	Second Semester 1999-2000	Summer 2000
Undergraduate and special students			
12 or more credits per semester	5,410,000	5,410,000	
Less than 12 credits per semester or summer session (per credit)	449,800	449,800	449,800
Graduate (per credit)	571,700	571,700	571,700
University Orientation Program	6,141,000	6,141,000	3,363,900

AUDITORS

The fee for auditors, in all faculties, per credit, is LL 296,400.

RESIDENCE FEES FOR STUDENTS REGISTERED FOR THESIS OR DISSERTATION

	Tuition Fees in Lebanese Pounds	
	AUB Students[1]	Non-AUB Students[2]
Humanities & Social Sciences	3,117,900	4,510,300
Sciences	4,313,900	4,706,300
Business & Management; Money & Banking	4,510,300	4,902,400
Education	4,117,900	4,510,300
Agricultural & Food Sciences	4,902,400	5,490,600
Engineering	5,098,400	5,686,800
Medical Sciences	6,428,700	5,882,800
Health Sciences	5,098,400	5,686,800

OTHER FEES AND EXPENSES

Entrance Examination Fees

The University Application Fee of LL 75,000 is paid to the Comptroller's Office at the time of application. Examination fees are paid at the Cashier's Office at the time the candidate arranges to take entrance examinations. The dates for registration for entrance examinations are available at the Office of the Tests and Measurements.

	Name of Test	Regular Fees	Special Session or Late Registration Fees
		LL	LL
1.	English Entrance Exam (EEE)	50,000	55,000
2.	Intermediate English Exam (IET)	15,000	
3.	Elementary English Test (EET)	15,000	

This amount is equivalent to a 6 credit tuition, and is valid for a maximum of four thesis registration sessions. For subsequent thesis registration, a thesis fee equivalent to three graduate credits is applied. Students should register for a thesis in the semester in which they graduate.

[2] The residence fee per semester or term is charged to non-AUB students working at this University on a thesis sponsored by their Universities and Colleges.

General Deposit Fee

A general deposit of LL 250,000 is required of every student on their initial enrolment in AUB. This deposit is held until the student graduates or discontinues his or her course of study, at which time the deposit, less any indebtedness, will be returned.

Hospitalization Insurance Fees

The Hospitalization Insurance Plan fee for students is separate from the tuition fee. Students may elect to enroll in the Hospitalization Insurance Plan. The fee for 12 months beginning in October is LL 338,730; for one semester and one summer session beginning in February LL 254,047; and for one summer session LL 169,365. A married student will have the option of including his spouse and children at additional fees as outlined in the regulations for the Hospitalization Insurance Plan.

National Social Security Fund — Medical Branch

Those Lebanese students, whose membership in the NSSF-Medical Branch is required by law, will be charged a fee of LL 90,000 for the year.

Residence Fees

The residence fee depends on the type of room. The fee for 1998-1999, for one semester, per student, is:

for a regular double occupancy room:	LL 1,397,400
for a semi-private double occupancy room:	LL 1,602,800
Private	LL 2,000,000
AREC-Spring	LL 705,000

Student Activity Fee

A fee of LL 50,000 is charged annually to cover student activities and the cost of the Yearbook.

Food Service Costs

The cost of food, per semester, for students using the University's self-service cafeteria and restaurant facilities ranges from LL 3,500,000 to LL 4,500,000 depending upon the individual student's tastes and needs.

Incidental Expenses

The estimate of incidental expenses for books, stationery, supplies, and laundry ranges from LL 2,500,000 to LL 3,500,000 per academic year, depending on the course for which the student registers. Expenses for travel, clothing, and pocket money are left to parental discretion.

Late Registration and Payment Fees

Any student registering during late registration will be charged a late registration fee of LL 100,000.

Administrative Fee

Whenever applicable, an administrative fee LL 1,893,690 per year per student is charged to sponsors of bursary students for the special services rendered by the Bursary Students' Office.

Manner of Payment

Payment should be made by certified bank checks or banker's checks payable to the American University of Beirut at the University's banks in the area. Arrangements and particulars will be announced . Any funds received in excess of previously listed charges will be refunded by the University Comptroller's Office to the student directly.

Withdrawals

In the event a student withdraws for justifiable reasons after registration, the following refund schedule will be applied. per semester or term:

Before official beginning of classes...............................75% of tuition
During first week of classes...50% of tuition
During second week of classes ....25% of tuition

Refunds are not made for the summer session.

NO REFUND WILL BE MADE OF RESIDENCE FEES OR FEES FOR SPECIAL SERVICES RENDERED TO STUDENTS.

FINANCIAL AID TO STUDENTS

UNIVERSITY ASSISTANCE

Opportunities for needy and qualified students to receive financial aid are available in the form of scholarship grants, student work scholarships and graduate assistantships. All such assistance is available only by application and under certain regulations. For a complete listing of University scholarship awards and prizes, see below. The following is a list of the types of assistance, including a brief description of each and information concerning the application procedure.

Merit Scholarship

A Merit Scholarship is awarded on the basis of merit. This scholarship was established in March 1999 for implementation effective as of the 1999-2000 academic year for new students. The awards will be renewed for the recipients provided they maintain an annual minimum average of 85% in successive years and until they receive their first undergraduate degree from AUB.

Scholarship Grants

These are outright grants of assistance to students based on need and academic achievement. The amounts awarded may vary from a small part of the tuition to full support for tuition, room, board, and books. The source of the scholarship, the financial need of the student, and academic achievement will be the final determining factors.

Student Work Scholarship

As part of its Student Aid program, the University provides all full-time students the opportunity to participate in its "Work Scholarship program". The purpose of this program is to give students the opportunity to enhance their learning through work and to cover part of their educational expenses.

Opportunities are available for students to work in the various campus offices and the Medical Center. Any full-time regular student may apply. Selection, however, is made on the basis of capability, need, and availability of a suitable job; placement will be made on first-come, first-served basis. Students are allowed to work a specified number of hours per week, and the rate per hour is established according to the type of work performed by each student.

Graduate Assistantships

For students at the graduate level, there are fellowships that cover tuition costs and partial living expenses. In return for this assistance, the student is expected to work a specified

number of hours weekly for an academic department. Students are usually selected on the basis of a high academic record and their value to the department

APPLICATIONS

Applications for scholarship grants and student work scholarships may be secured from the Office of Student Affairs.

Applications for graduate assistantships may be obtained from the Dean's Office of the Faculty to which the student is applying. The period during which scholarship applications are submitted to Student Affairs is announced annually; normally during the months of March, April and part of May for assistance during the following academic year.

LIST OF SCHOLARSHIPS AND LOANS

Scholarship Grants

AANA Metropolitan New York Chapter
Teddy A. Abdo Scholarship
Khayreddine and Adel Abdul Wahab Scholarship Fund
Albert Abela Scholarship
Labib Abou Atme Scholarship
Bassam S. Abu Ghazaleh Scholarship
Theodore Abu Hamzy Educational Trust
Abu Dhabi Alumni Scholarship
Abu Dhabi Alumni Medical Science Scholarship
Nicolas Abu Mrad Scholarship
Fuad Muhsin Afnan Memorial Scholarship Fund
Farouk W. Agha Scholarship
Samih Alami Memorial Endowed Scholarship
Mrs. Laila Ali-Rida Scholarship
Allied Business Bank Scholarship
Alumni of North America Scholarship Fund
Alumni Students Scholarship
Partners of Arthur Andersen & Co. Scholarship
Anonymous Scholarship
The Ameen and Sophia-Taft and Nelly Antoun Endowed Scholarship Fund
Arabia Insurance Company Scholarship
Arabian Mining Habre & Co. Scholarship
J.J. Arakelyan Scholarship Fund
Aramex International Scholarship
AREC '78 and Friends Scholarship
AREEN Projects Scholarship Fund
Joseph Asmar Scholarship

Khalid and Alfida Ataya Scholarship
AUB Alumni Association of Australia Scholarship
AUB Alumni Association—Doha Scholarship
AUB Alumni Association—Dubai Branch Scholarship
AUB Alumni Association—Greece Branch Scholarship
AUB Alumni Association —Oman Branch Endowed Scholarship
AUB Alumni Association—Swiss Branch Scholarship
AUB Alumni Association—UK Branch Endowed Scholarship
AUB Alumni Development Scholarship
AUB Alumni in Geneva Scholarship
AUB Alumni at National Petroleum Construction Company (N.P.C.C.), Abu Dhabi
Azm and Saadeh Foundation
Mary Bajada Memorial Scholarship Fund
Abdul Aziz Al Bahar Scholarship
Fuad Bardawil Scholarship
Fuad and Madelene Bardawil Scholarship
Wafic Barrage Scholarship
Bassatne Petroleum Company Scholarship
Eisa A. Bateh and Bros. Scholarship
Ziad Beydoun Memorial Scholarship
Anis Abdul Hamid Bibi Memorial Scholarship
Saudi Binladin Group Scholarship
Hanna Bisharat Scholarship Fund
Bliss Memorial Scholarship Fund
Daniel Bliss Fund
Mrs. Daniel Bliss Fund
Elmer and Mamdouha Bobst Foundation Scholarship
Mamdouha and Elmer Bobst Scholarship
Husam Boubess Scholarship
The British Bank Foundation Scholarship
Gladys Brooks Scholarship
Khalil Bsheer Memorial Scholarship
Centennial Scholarship Fund
Anwar Challah Scholarship
The Chartouni Family Operating Scholarship Fund
Chase Manhattan Bank Scholarship
Samir El Cheikh Memorial Scholarship
Chinese Class Scholarship
Hanna Said Choulji Scholarship Fund
Citibank N.A. Scholarship
Clapp-Constance Scholarship
Class of 1941 Silver Jubilee Fund
Class of 1948 Medical School Fund
Coca-Cola Scholarship
Archie and Mary Crawford Endowed Scholarship Fund
Crescent Petroleum Company Scholarship Fund

Cyprus Alumni Scholarship
Kamil Dajani Memorial Scholarship
Dr. Nadim Fawzi Daouk Scholarship
Zouheir Chafik Daouk Memorial Scholarship
Dar Al-Maal Al-Islami Scholarship
Darwish Engineering (Emirates) Scholarship
The Abdul Hadi Debs Endowment Scholarship for Academic Excellence
The Abdul Hadi Debs Scholarship
Adnan Derbas Scholarship
Vivian Demirjian Scholarship
Deputy President Discretionary Fund
Office of Development Scholarship
Badr Dimechkie Scholarship
Julia Tomey Dimechkie Scholarship
The David S. Dodge Endowed Scholarship
Dr. Harry G. Dorman Scholarship
Douma Ladies' Charitable Society of Boston, Massachusetts Scholarship
Eastern Province Saudi Arabia endowed Scholarship Fund
Eastern Province Saudi Arabia Scholarship Fund
Harold Morton Esty Memorial Fund
Aznive Etinoff Memorial Scholarship
Sheikh Abdel Kader and Mrs. Naheda Al Fadl Scholarship
Issa I. Farah Scholalrship
Muneef Assaf Farah Scholarship
Suhayl Assaf Farah Scholarship
George F. Faris Memorial Scholarship
Nabih Faris Scholarship Fund
Nazir Abdel-Hamid Farra Memorial Scholarship
J.M. Fawaz Fund
David A. Fuleihan Scholarship
Yousef Gaith Scholarship
Gaza Scholarship Fund
The Ismail Ghandour Scholarship
Francis Greene Jr. Scholarship
William J. Gossen Scholarship Fund
Khalaf Al-Habtoor Scholarship
Dr. Chafik Haddad Memorial Scholarship
Mrs. Salma Haddadin Scholarship
Haggar Foundation Scholarship
Charles Hagopian Scholarship
Tala Al-Haj Scholarship
Al-Hani Construction and Trading Bureau Scholarship
Ishaq Hanna Memorial Scholarship
Hazar-AUB Development Scholarship
George Issa Hazboun Memorial Scholarship
The Herter Scholarship Fund

HH Shaikh Khaled Bin Hamad Al-Thani Endowed Scholarship
HH Sheikh Dr. Sultan Bin Mohamed Al-Qasimi Endowed Scholarship
H.T.F. Scholarship Fund Montreal
Akram Abdul-Mohsen Hijazi Scholarship
Philip and Mary Hitti Scholarship
Maximilian E. And Marion O. Hoffman Foundation Scholarship
HRH Prince Talal Ben Abdel Aziz Endowed Scholarship Fund
HRH Prince Turki Bin Abdel Aziz Scholarship
Harold B. Hoskins Scholarship
Albert Hourani Memorial Scholarship
Dr. Farouk S. Idriss Endowed Medical Scholarship
Houda Idris Scholarship
Dr. Yakub Inati Medical Endowment Scholarship
Intermedic (Jean Farah & Co.) S.A.L. Scholarship
Ray R. Irani Scholarship
Rida Irani Memorial Scholarship
Abdul Hafiz Itani Scholarship
Abdul Halim Jabre Scholarship
Kamal Jabre Scholarship
The Morris Janowitz Scholarship Fund
Sakina Jarudi Scholarship
Yervant Jidejian Memorial Scholarship
Mr. and Mrs. Mustafa Jundi Scholarship Fund
Jamilee Dagher Jureidini Scholarship
Zohrab A. Kaprielian Scholarship
Maan and Wadad Karami Scholarship
Fawzi Kawash Scholarship
Stella B. Kern Scholarship
Elsa Reckman Kerr and Stanley Kerr Scholarship
Malcolm H. Kerr Memorial Scholarship
The Charles Kettaneh Foundation Scholarship
Abdallah Joseph Khabbaz Scholarship
Mohamed Khaled Scholarship
Ahmad S. Al-Khalidy Scholarship Fund
Mahmud Khanafer Scholarship
Zein Khatoun Scholarship
Hassan Salah Khayat Memorial Scholarship
Marie Al-Khoury Scholarship Fund
Samuel B. and Grace H. Kirkwood Scholarship Fund
Ramzi N. Kteily Scholarship
Violette Haddad Kteily Memorial Endowed Scholarship
Sadie B. Latouf Scholarship Fund
Hamoud K. Makarem Scholarship
Pauline Nadim Makdisi Memorial Scholarship
Peter Hanna Malak Scholarship
The Maloof Family Endowed Scholarship

Farahe Maloof Medical Scholarship
Faris S. Maloof Memorial Scholarship
Michel Najem Maloof Scholarship
Anis B. & Mima Malouf Scholarship Fund
Edward W. Manchester Memorial Scholarship
Anthony E. Mansour Scholarship
Louise L. Massabky Scholarship
Antoine G. Massabky Scholarship
Elias and Shirine Matta Scholarship
Mr. & Mrs. Fadil Khalil Matta Scholarship
Medical Alumni Endowed Scholarship
Dr. Farid M. Melhem Scholarship
Ibrahim Melhem Scholarship
Najeeb N. Meshaka Memorial Scholarship Fund
Metropolitan Philip Saliba Scholarship
Ramiz Mikdashi Endowed Scholarship Fund
Stephen A. Miller Scholarship Fund
S. M. Minassian Scholarship Fund
Dr. John Mirhij Scholarship Fund
John Miskoff Scholarship
Tewfic Pasha Moufarrige Memorial Scholarship
Al-Moghtareb Bank Scholarship
Ardemis Diane Mouneimne Scholarship
Nada Suheil Muasher Endowed Scholarship
Sami Mubarak Scholarship
Raef Murtada Scholarship
Faisal Al-Mutawa Scholarship
Dean Robert E. Najemy Memorial Scholarship
Fuad Nakhleh Scholarship
Anis W. Nassar Scholarship
K.W. Nasser Scholarship Fund
Suleiman Nuwayhid Memorial Scholarship
Suleiman Olayan Scholarship
Daniel and Emily Oliver Scholarship
Ghayath Omari Memorial Scholarship
Abdullah Oseiran Memorial Scholarship
The Ousseimi Foundation Scholarship Fund
Salem Suleiman Al-Othman Memorial Endowment Scholarship
Eileen E. Page Medical Scholarship
Howard W. Page Scholarship Fund
Francis Asbury Palmer Fund Scholarship
Salim Musalli Pasha Scholarship Fund
Pepsi Cola International Scholarship
Petrofac International Ltd. Scholarship
Pilgrim Scholarship Fund
Donald C. Platten Memorial Scholarship

The Procter and Gamble Business Administration Scholarship
The Procter and Gamble Engineering Scholarship
The State of Qatar Scholarship Fund
A.M. Al-Qattan Scholarship
A.M. Rabbat Memorial Scholarship
Fahd Al-Rajaan Scholarship
Hazimeh S. Rasi Scholarship
Julia Dodge Rea Scholarship Fund
Abdullah Rishani Memorial Transportation Fellowship
Dorothy H. Rogers Memorial Scholarship
The Reuters Scholarship in Business and Management supported by the Reuters Foundation
Farid Sa'd Graduate Scholarship in Sciences or Technology
Diana Tamari Sabbagh Graduate Scholarship
Zahieh Tawfik Al-Sadek Memorial Scholarship
Riad T. Sadik Scholarship
Hani Safieddine Scholarship
Ingeborg Sa'i Scholarship
Fuad Es-Said Scholarship
Salwa Es-Said Scholarship
Karim Rida Said Foundation Scholarship
Nasser Saidi—IMB Scholarship
Husni Ahmad Sawwaf Scholarship
Asma Sayyour Scholarship Fund
Dr. Edward D. Seinfeld Scholarship
Archak and Maroum Senekjian Scholarship
Dr. Michael A. Shadid Scholarship
Shaheen Bros. Scholarship Fund
Azeez and Saleemeh Shaheen Scholarship Fund
Selma Shaheen Nursing Scholarship
Shukri H. Shammas Scholarship
Abdul Hamid Sharaf Scholarship
Adma Shehadi Memorial Scholarship Fund
Shehadi A. Shehadi Memorial Scholarship
Ramsey U. Sheikh Scholarship
Jabir Shibli Scholarship Fund
Anas C. Sinno Scholarship
Peggy Smith Memorial Scholarship
The Starr Foundation Scholarship
Khalil Sukkar Memorial Scholarship
Abdel Rahman Tabbarah Scholarship
Adnan Anis Tabbarah Scholarship
Fadwa Nassif Taleb Scholarship
May Halabi Taleb Scholarship
Farouk Tamr Scholarship
Dr. Nizar Tannir Scholarship

Khalil Thabet Memorial Scholarship
Dr. Kaisar Tomeh Memorial Scholarship
Dr. Fuad and Alice Trabulsi Endowment Scholarship
Sleyman and Sofia Trabulsi Scholarship
Makram Ghassan Tueni Scholarship Fund
Shafik and Mary Tumeh Endowment Scholarship
Al-Turki Scholarship to Students in Education
Sheikh Saleh Turki Scholarship
University Student Faculty Committee Endowed Scholarship
U.S. Omen Scholarship
Gordon H. Ward Scholarship
Dr. Samuel E. White (Waheed) Scholarship
C.R. Whittlesey Memorial Scholarship
World President's Organization Scholarship
Dr. Joseph Yammine Fund
Habib B. Yared Memorial Scholarship Fund
Khalid El-Yashruti Memorial Scholarship
Samir Ahmad Zaabri Scholarship
Sana Najjar Zahr Scholarship
Michel Abdo Zeidan Scholarship
Julia Ziadeh Scholarship Fund
Dr. Nicola Ziadeh Endowed Scholarship Fund
Constantine Zurayk Scholarship

Scholarship Loans

AUB Physicians Loan Fund
Maria Aziz Loan Fund
Dorothy Berry Loan Fund
The Business and Management Chapter Aid Fund
Southern California Loan Fund
Dr. William Carslaw Memorial Loan Fund
Mary Crawford Loan Fund
Ramzi Fawzi Daouk Memorial Loan Fund
Dikranian Fund
Engineering Students' Loan Fund
Geology Society Student Loan Fund
Yusuf El-Ghanim Loan Fund
Helen Lewis Goodyear Memorial Fund
Yusuf K. Hitti Loan Fund
John F. Kennedy Memorial Fund
Lucy Keverian Memorial Loan Fund
Hamoud K. Makarem Memorial Loan Fund
Mathematics Fund
Medical Alumni Fund

Medical Faculties Alumni Loan Fund
John Miskoff Loan Fund
F.K. Mitri Loan Fund
Elizabeth Moser Student Nurses' Fund
Nursing Students' Loan Fund—Aramco
Southern California Chapter of AANA
Student Aid Loan Fund
Student Nurses' Fund—Alumni Branch
U.S. Omen Loan Fund
Jane E. Van Zand Loan fund

Emergency Loans

Dean's Loan Fund
Agriculture Dean's Loan Fund
Engineering Dean's Loan Fund
Engineering Students' Society Loan Fund

LIST OF UNIVERSITY PRIZES AND AWARDS

Murad al-Akl Awards: First prize $150 and second prize $100 awarded on a competitive basis for the best essay, speech, or debate on the subject, "How I Can Serve My Fellow Man."

Areen Projects' Award for Excellence in Architecture: First prize $1,500. Second prize $1,000. Third prize $600. For the best three architecture graduation projects that best serve the community in Lebanon.

Imad A. Al-Assir Horticulture Research Award: $ 500 awarded to a graduate student or researcher in Horticulture.

AUB Foundation Award for Excellence in Teaching

Fawzi W. Azar Award: The Azar Family and Builder's Design Consultants will contribute $10,000 annually towards the tuition of a fifth year architecture student who must have one of the five highest averages for all design courses of the first, second and third year and one of the three highest grades in the last project of his/her fourth year of Architecture.

Sheikh Fawzi Azar Memorial Prize: Awarded to a Lebanese Faculty member or student from the Faculty of Arts and Sciences, Department of Social and Behavioral Sciences, for subjective research on: "The role of business in the formation and support of Lebanese society since Independence."

Anwar Challah Prizes: Three prizes to Syrian students in Business Administration, Engineering and Agriculture; and three prizes to needy students of Syrian origin, preferably born in Damascus.

Mary Crawford Award: $150 awarded to the senior students in the School of Nursing who meet the criteria for selection as "Miss Nightingale."

Dean's Award for Creative Achievement: Awarded to a student in each of the main programs of the Faculty of Engineering and Architecture (architecture, graphic design, civil engineering, computer and communications engineering, electrical engineering, and mechanical engineering) who has demonstrated outstanding creativity in his/her approach to academic work.

The Distinguished Graduate Award: Awarded to a graduating student in each of the undergraduate engineering programs of the Faculty of Engineering and Architecture (civil engineering, computer and communications engineering, electrical engineering, mechanical engineering) in recognition of outstanding academic achievement, character, and contribution to the Faculty throughout his/her tenure in the Faculty.

Edgecombe Memorial Prize: $150 awarded to the outstanding student in Third Year Agriculture.

Kashadurian Award: To a deserving student who was at AREC and has shown outstanding performance in farm skills and practices, and appreciation for farm life at AREC.

FAFS Alumni Award: To a qualified and needy agriculture student(s) at AREC with a cumulative average of 75% or more.

Fawzi W. Azar Architectural Award: $10,000 awarded annually towards the tuition of one or more fifth-year student(s) in the Architecture program of the Faculty of Engineering and Architecture.

Future Television Academic Excellence Award: Two awards of $3000 and $2000 each awarded to two final year students with the best final project in the Graphic Design program of the Faculty of Engineering and Architecture.

Poppy Haddad Award: $150 awarded to an outstanding senior student in the School of Nursing.

The Joanna Haidar Award: Annual award of $500 to a deserving and needy AREC student having a cumulative average of 75 and above. The student should be environmentally aware and interested in agricultural practices and development.

Philip K. Hitti Prize: Awarded in books to the senior student in the Faculty of Arts and Sciences who, in the judgment of the President of the University, the Dean of the

Faculty and the Chairman of the Department concerned, exemplifies in his/her academic career the scholarly spirit of AUB at its best.

Nadim Khalaf Memorial Award: $500 awarded at the end of each academic year to a graduating senior student in economics with the highest average in economics during his/her undergraduate studies at AUB.

Charli S. Korban Awards: $1500 awarded to the most outstanding undergraduate student in the Electrical Engineering Department, and $1500 to the most outstanding graduate student in the Electrical Engineering Department.

Mrs. Robert J. Lewis Memorial Award: For the best paper written during the current year on Neuroscience.

Lions Award: non-cash award to an outstanding student in the School of Nursing.

I.E. Muhanna Award of Excellence: $1,000 awarded to the most outstanding senior Lebanese student in the Department of Mathematics.

Dean Najjar Award: An award to needy medical students.

Penrose Award: Non-cash honorary awards made on the basis of scholarship, character, leadership and contribution to University life to the outstanding graduate of each Faculty.

Saba and Co. Award: Annual cash award to the senior student with the highest average in accounting.

Henriette Sabra Award: $150 awarded to an outstanding senior student in the School of Nursing.

Dr. Munib Shahid Award: Given annually to the Fourth year Medical Student with the best performance in Internal Medicine and a mature character.

Hanneh Shahine Award: $150 awarded to an outstanding senior student in the School of Nursing.

Ann Smith Award: $150 awarded to an outstanding senior student in the School of Nursing.

Franklin Thomas Moore - Ethel Jessup Memorial Prize: Established by the children and friends of Dr. and Mrs. Franklin T. Moore; awarded to the senior medical student who has shown the highest proficiency in Obstetrics and Gynecology or, lacking such, in any Department, and in his personal life a dedication to humanity, a zeal for truth, and a belief in God.

Dean Thomas Sutherland Prizes: Awarded annually at graduation to outstanding Faculty of Agriculture and Food Sciences graduates. For undergraduate excellence, $250 to recipient of Penrose Award for the year. For graduate excellence, $250 to the M.S. graduate with the thesis judged best overall for design, research, presentation, and contribution to its field.

Nimr Tuqan Memorial Prize in pathology: In memory of the late Dr. Nimr Tuqan, to be awarded to the student of Medicine II who excels in his/her work in the department of Pathology.

Sana Najjar Zahr Award: To a Senior agriculture student who will continue his/her studies for an M.Sc. in Agriculture.

PLACEMENT ON THE DEAN'S HONOR LIST

To be placed on the Dean's Honor List at the end of a given semester (term), a student must:
1. Be carrying at least twelve credits of courses other than repeated courses.
2. Not be on probation.
3. Have passed all the courses of the semester (term) and attained, in all courses taken other than repeated courses, an overall average of 85 or more, or of 80 while ranking approximately in the top 10% of the class. In the Faculty of Medicine, the Dean's Honor List is limited to the upper 15 percent of the class.
4. Not have been subjected to any disciplinary action within the University.
5. Not be repeating the year in any of the following Faculties: Faculty of Medicine. Faculty of Engineering and Architecture, Faculty of Agricultural and Food Sciences, and Faculty of Health Sciences.

BURSARY STUDENTS' OFFICE (BSO)

This Office is fully responsible for administering the bursary students programs with direct contact with the- sponsors. These include the regular degree courses as well as sponsored non-degree courses and training programs at any academic level requested by the sponsors.

The BSO, as liaison between AUB and bursary sponsors, coordinates and distributes all information necessary for the implementation of instructions and actions regarding bursary students. In addition, the BSO represents the students' sponsors on campus and acts as guardian to the sponsored students, as well as a liaison between the students and their sponsors.

The sponsored students who profit from the services of this Office are classified as bursary students.

This classification is applied to any student who receives a full or partial scholarship from a government, agency, business firm, foundation, international organization, or other educational institution. The selection of these candidates is made by the sponsoring agency.

The applications of these candidates must be submitted **by the Sponsors, along with a sponsorship letter, to the Bursary Office** which is responsible for handling the process of these applications.
Currently, the following organizations are included: AUH Contracted Nurses/BSN program and one contracted BSN sponsorship from the Women's Auxiliary Association in the name of Mrs. Annette Hajjar, in addition to the Ministry of Education from the State of Qatar.
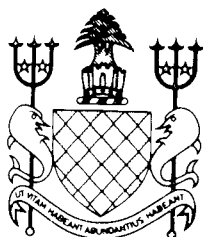
Faculty of
Arts and Sciences

FACULTY OF ARTS AND SCIENCES

FACULTY LIST 1998-99

Officers of the Faculty

John Waterbury	President of the University
Peter Heath	Provost
Khalil Bitar	Dean of the Faculty
Ramzi Baalbaki	Associate Dean
Rudolph Jabbour	Executive Officer
Leila Knio	Student Record Officer
Syrine Hout	Secretary of the Faculty
Waddah Nasr	Registrar
Salim Kanaan	Director of Admissions

Ex-Officio Members

Helen Bikhazi	University Librarian
Karma El Hassan	Director, Office of Test and Measurements

Professors Emeriti

Abbas, Ihsan, Ph.D., University of Cairo; Arabic
Abu-Chaar, Charles, Ph.D., University of Washington; Biology
Fakhry, Majid, Ph.D., University of Edinburgh; Philosophy
Ghattas, Emile, Ph.D., Columbia University; Business and Management
Issidorides, Costas H., Ph.D., University of Iowa; Chemistry
Kennedy, Edward S., Ph.D., Lehigh University; Mathematics
Muwafi, Amin, Ph.D., University of Florida; Mathematics
Najm, Muhammad, Ph.D., University of Cairo; Arabic
Prothro, Edwin, Ph.D., Louisiana State University; Social and Behavioral Sciences
Tarazi, Fuad, Ph.D., University of Cairo; Arabic
Yazigi, Kamal, Ph.D., University of Chicago; Arabic
Yff, Peter, Ph.D., University of Illinois; Mathematics
Ziadeh, Nicola, Ph.D., University of London; History and Archaeology
Zurayk, Costi, Ph.D., Princeton University; History and Archaeology

Professors

Abi Khuzam, Faruk, Ph.D., Syracuse University; Mathematics
Baalbaki, Ramzi, Ph.D., University of London; Arabic
Baydoun, Elias, Ph.D., University of Cambridge; Biology
Bitar, Khalil, Ph.D., Yale University; Physics
Chamsuddine, Ali, Ph.D., University of London; Physics

Dajani, Nabil, Ph.D., University of Iowa; Social and Behavioral Sciences
El-Eid, Mounib, Ph.D., University of Darmstadt; Physics
Haddadin, Makhluf, Ph.D., University of Colorado; Chemistry
Hanna, Azmi, Ph.D., University of Erlangen; Mathematics
Heath, Peter, Ph.D., Harvard University; Arabic
Khairallah, Assaad, Ph.D., Princeton University; Arabic
Khalaf, Samir, Ph.D., Princeton University; Social and Behavioral Sciences
Lyzzaik, Abdallah, Ph.D., University of Cincinnati; Mathematics
Makarem, Sami, Ph.D., University of Michigan; Arabic
Makdisi, Samir, Ph.D., Columbia University; Economics
Naimy, Nadim, Ph.D., University of Cambridge; Arabic
Palmer, Monte, Ph.D., University of Wisconsin; Political Studies and
    Public Administration
Seeden, Helga, Ph.D., University of London; History and Archaeology
Seikaly, Samir, Ph.D., University of London; History and Archaeology
Shamsuddin, Ahmad, Ph.D., Leeds University; Mathematics
Waterbury, John, Ph.D., Columbia University; Political Studies and
    Public Administration

Visiting Professor

Musallam, Basim, Ph.D., Harvard University; History & Archaeology
Schlenoff, Joseph, Ph.D., University of Massachusetts, Chemistry

Associate Professors

Abdel-Rahman, Abdel-Fattah, Ph.D., McGill University; Geology
Abou Ghantous, Michel, Doctorat, University of Grenoble; Physics
Abu-Husayn, Abdul Rahim, Ph.D., AUB; History and Archaeology
Abu-Khuzam, Hazar, Ph.D., University of California; Mathematics
Amyuni, Mona, Doctorat, University of Paris; Civilization Sequence Program
Betts, Robert, Ph.D., Johns Hopkins University; Civilization Sequence Program
Butcher, Kevin, Ph.D., University of London; History and Archaeology
Christidis, Theodore, Ph.D., AUB; Physics
Dagher, Shawki, Ph.D., University of Massachusetts; Biology
Eid, Nimr, Ph.D., University of Texas; Business and Management
Faour, Muhammad, Ph.D., University of Michigan; Social and Behavioral Sciences
Gali-Muhtasib, Hala, Ph.D., Kansas State University; Biology
Haidar, Nassar, Ph.D., University of Birmingham; Mathematics and Physics
Hamzeh, A. Nizar, Ph.D., University of Southern California; Political Studies and Public
    Administration
Harik, Judith, Ph.D., University of Iowa; Political Studies and Public Administration
Jureidini, Wadi', Ph.D., Harvard University; Mathematics
Kasparian, Mary, Ph.D., University of Leeds; Chemistry

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* On tenure appointment

Khashan, Hilal, Ph.D., Florida State University; Political Studies and Public Admin-
    istration
Khazen, Farid, Ph.D., Johns Hopkins University; Political Studies and Public Adminis-
        tration
Kisirwani, Marun, Ph.D., Indiana University; Political Studies and Public Administration
Kuraydiyyah, Sawsan, Ph.D., AUB; Biology
Moussalli, Ahmad, Ph.D., University of Maryland; Civilization Sequence Program and
        Political Studies and Public Administration
Nahlus, Nazih, Ph.D., University of California; Mathematics
Nasr, Waddah, Ph.D., University of Minnesota; Philosophy
Nasri, Ahmad, Ph.D., University of East Anglia; Mathematics
Nassar, Christopher, Ph.D., University of Wisconsin; Civilization Sequence Program and
English.
Nehme, Michel, Ph.D., Rutgers University; Political Studies and Public Administration
Nikiel, Jacek, Ph.D., University of Warsaw; Mathematics
Sader, Helen, Ph.D., Tubingen University; History and Archaeology
Safieh-Garabedian, Bared, Ph.D., University of London; Biology
Salameh, Abdu, Ph.D., Loughborough University of Technology; Chemistry
Salem, Paul, Ph.D., Harvard University; Political Studies and Public Administration
Shaaban, Kassim, Ph.D., University of Texas; English
Shehadeh, Lamia, Ph.D., Harvard; Civilization Sequence Program
Shibl, Yusuf, Ph.D., University of California; Business and Management
Sirhan, Ghazi, Ph.D., North Carolina State University; Economics
Sleiman, Hanadi, Ph.D., Stanford University; Chemistry
Sultan, Rabih, Ph.D., University of Indiana; Chemistry
Talhouk, Rabih, Ph.D., Ohio State University; Biology

Visiting Associate Professor

El Fakhani, Said, Ph.D., University of Texas; Business and Management

Assistant Professors

Abdallah, Hanin, Ph.D., University of Virginia; Business and Management
Agha, Saleh S., Ph.D., University of Toronto; Arabic
Alami, Tarek, Ph.D., The American University, Washington DC; Economics
Al-Ghoul, Mazen, Ph.D., McGill University; Chemistry
Amin, Issam, Ph.D., University of Khartoum; Geology
Azzam, Intisar, Ph.D., University of California, Irvine; Social and Behavioral Sciences
Baalbaki, Imad, Ph.D., Georgia Institute of Technology; Business and Management
Bassin, Jatinder, Ph.D., Hatfield Polytechnic; Chemistry
Behmardi, Vahid, Ph.D., Cambridge University; Arabic
Bornedal, Peter, Ph.D., University of Copenhagen; Civilization Sequence Program

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[o] On furlough or leave

Conolly, Oliver, Ph.D., Corpus Christi College, Cambridge; Philosophy
Dadoyan, Seeta, Ph.D., University of Yeravan; Civilization Sequence Program
Darwiche, Nadine, Ph.D., George Washington University, Biology
Dedoussis, Evangelos, Ph.D., University of Griffith; Business and Management
Diab, Hassan, Ph.D., Syracuse University; Social and Behavioral Sciences and
        Civilization Sequence Program
El-Cheikh, Nadia, Ph.D., Harvard University; History and Archaeology
Ghaleb, Mary, Ph.D., University of Texas; English
Gharzeddine, Marwan, Ph.D., University of Massachesetts; Social and Behavioral
        Sciences
Ghaziri, Hassan, Ph.D., Ecole Polytechnique Lausanne; Business and Management
Greipsson, Sigurdur, Ph.D., University of East Anglia; Biology
Haddad, John, Ph.D., University of Waterloo; Mathematics
Halaoui, Lara, Ph.D., Duke University; Chemistry
Haydar, Bashshar, Ph.D., Columbia University; Philosophy
Hout, Syrine, Ph.D., University of Columbia; English
Imam, Abdulrazaq, Ph.D., University of West Virginia; Social and Behavioral Sciences
Isber, Samih, Ph.D., University of Montpellier; Physics
Jabir, Imad, Ph.D., Oklahoma State University; Economics
Jalloul, Ghinwa, Ph.D., University of Sydney; Mathematics
Jarrar, Maher, Ph.D., University of Tubingen; Civilization Sequence Program
Kassab, Elizabeth, Ph.D., University of Fribourg; Philosophy
Khalidi, Muhammad, Ph.D., University of Columbia; Philosophy
Klushin, Leonid, Ph.D., University of Leningrad; Physics
Knio, Khouzama, Ph.D., University of California, Riverside; Biology
Kortz, Ulrich, Ph.D., University of George Town; Chemistry
Meloy, John, Ph.D., University of Chicago; History & Archaeology
Monsour, Michael, Ph.D., University of Maryland; Mathematics
Nasr, Sonia, Ph.D., Purdue University; Biology
Neaime, Simon, Ph.D., University of York; Money and Banking and Economics
Pashakis, Ioannis, Ph.D., York University; Economics
Sabra, Wafic, Ph.D., London University; Physics
Sadek, Riyad, Ph.D., Manchester University; Biology
Saumarez Smith, Richard, Ph.D., Cambridge University; Civilization Sequence Program
Shayya, Bassam, Ph.D. University of Wisconsin; Mathematics
Spencer, Sara, Ph.D., University of London; Geology
Tabbal, Malek, Ph.D., Ecole Polytechniq, Canada; Physics
Tarraf, Charbel, Ph.D., University of Virginia; Biology
Touma, Jihad, Ph.D., Massachusetts Institute of Technology; Physics
Van Ophuijsen, Johannes, Ph.D., University of Leiden; Civilization Sequence Program

Visiting Assistant Professors

Al-Jadir, Lina; Ph.D., University of Geneva; Mathematics
El-Tannir, Akram, Ph.D., Georgia Institute of Technology
Schlenoff, Zeina, Ph.D., University of Massachusetts; C.S. Program
Wackett, James, Ph.D., University of North Dakota; English

Widdicombe, Susan, Ph.D., University of Oxford; CBR and Social and Behavioral
    Sciences

Visiting Senior Lecturer

Osseiran, Nahid, Ph.D., University of London; Social & Behavioral Sciences

Lecturers

Abbas, Abdul Wahed, Ph.D., University of London; Mathematics
Abdallah, Kamel, Ph.D., University of Ohio; Business and Management
Abu-Salih, Abbas, Ph.D., Texas at Austin; Civilization Sequence Program
Agha, Saleh J., Ph.D., Oxford University; Philosophy
Aker, Nizar, M.S., AUB; Geology
Antoun, Randa, Ph.D., University of York; Political Studies and Public Administration
Arabi, Oussama, Doctorat, University of Paris; Philosophy
Awaida, May, Ph.D., University of Leicester; Social and Behavioral Sciences
Azour, Jihad, Ph.D., IEP, France; Money and Banking
Bodakian, Berjouhi, Ph.D., University of London; Physics
Chamsuddin, Houssam, LLM, University of Exter; Business and Management
Dabbagh, Salah, Doctorat, University of Lyon; Business and Management
El-Khalil, Youssef, Ph.D., France; Business and Management
Fabri, Marguerite, Ph.D., University of Syracuse; Political Studies and Public
    Administration
Fahd, Nabil, Ph.D., George Washington University; Business and Management
Ferguson, Kenneth, Ph.D., Cornell University; Philosophy
Haidar, Ali, Ph.D., Swiss Federal Institute of Technology; Geology
Hamadeh, Najla, Ph.D., Georgetown University; Civilization Sequence Program
Harakeh, Hani, Ph.D., AUB; Biology
Hobeika, Louis, Ph.D., University of Pennsylvania; Money and Banking
Itani, Imad, Ph.D., University of Chicago; Money and Banking
Jeha, George, Ph.D., AUB; Arabic
Kanaan, Salim, Ph.D., AUB; Biology
Katul, Jamil, Ph.D., Duke University; Physics
Khair, Kamal, Ph.D., Geological Prospecting Institute, Moscow; Geology
Korek, Mahmoud, Ph.D., Université Claude-Bernard, France; Physics
Krayem, Hassan, Ph.D., University of Southern California; Political Studies and Public
    Administration
Kurani, David, B.A., AUB; Diploma in Acting, Bristol Old Vic Theatre School;
    Civilization Sequence Program
Masri, Shafic, Doctorat, Lebanese University; Political Studies and Public
    Administration
Nakib, Khalil, Ph.D., Florida State University; Political Studies and Public
    Administration
Nasr, Roger, C.P.A., Massachussetts Institute of Technology; Business and Management
Ramadan, Usamah, Ph.D., Michigan State University; Economics
Salam, Nawaf, Doctorat, University of Paris; Political Studies and Public Administration
Shebaya, Peter, M.A., University of Michigan; Civilization Sequence Program

Sidani, Yusuf, Ph.D., University of Mississippi; Business and Management
Sukariyah, Bassam, Ph.D., Indiana University; Social and Behavioral Sciences
Youssef, Ghazi, Ph.D., Wayne State University; Economics

Instructors

Abi-Rafeh, Randa, M.S., AUB; Chemistry
Abi-Shakra, Ziyad, M.A., AUB; History and Archaeology
Abul Husn, Khaled, M.B.A., AUB; Business and Management
Abu-Jawdeh, Siham, Ph.D., AUB; Arabic
Abun-Nasr, Wadih, C.P.A., Canada; Business and Management
Akl-Khoury, Lulu, M.A., AUB; English
Al-Khalil, Ziad, M.B.A., University of Pennsylvania; Business and Management
Al-Masri, Mazen, M.B.A., University of Illinois; Business and Management
Ali-Hassan, Hossam, M.B.A., University of McGill; Business and Management
Anouti, Jamal, M.S., University of Louisiana; Business and Management
Arab, Nidal, M.B.A., Lebanese American University; Business and Management
Arbid, Fay Zoha, M.B.A., University of Hartford; Business and Management
Assi, Lama; M.B.A., AUB; Economics
Awdeh, Ahmad, M.A., AUB; English
Baasiri, Basima, M.A., AUB; English
Barakat, Marwan, M.B.A., AUB; Business and Management
Baroudi, Elias, M.S., University of London; Business and Management
Bitar-Ghanem, George, M.A., AUB; Political Studies and Public Administration
Dabbagh, Salma, M.A., AUB; Social and Behavioral Sciences
Deeb, Hana, M.S., AUB; Chemistry
Deeb, Rima, M.A., AUB; English
Devecchi, Maria, M.A., University of Turin, Italy; English
El-Akkaoui, Walid, M.S., AUB; Business and Management
El-Khatib, Samer, C.P.A., University of Illinois; Business and Management
Elias, Rida, M.B.A., AUB; Business and Management
Fadda, Nada, M.A., The City University, London; English
Fakhry, Rima, M.A., AUB; English
Fares, Fares, M.S., Concordia University; Mathematics
Farhat, Tarek, M.S., University of Victoria; Chemistry
Gemayel, Edward, M.A., Concordia University; Business and Management
Geutcherian, Rita, M.B.A., AUB; Business and Management.
Ghanoum, Hana, M.A., Colombia University; Social and Behavioral Sciences
Ghosn, Amine, Doctorat 3eme Cycle, University of Paris; Arabic
Habbal, Dolly, M.A., AUB; Social and Behavioral Sciences
Hamdan, Wael, M.M.B., AUB; Business and Management
Hamoud, Chaza, Mphil., University of Wales; Chemistry
Hitti, Bernard, C.P.A., University of Montana; Business and Management
Iskandarani, Reema, M.A., AUB; English
Itani-Hatab, Maha, M.S., AUB; Mathematics
Jaber, Rim, M.S., University of Ottawa; Mathematics and Business

Jamali, Dima, M.A., San Jose State College; Social and Behavioral Sciences
Jamoul, Nada, CPA, University of Illinois; Business and Management
Jundi, Tala, M.B.A., AUB; Business and Management
Jurdak, Muna, M.S., AUB; Mathematics
Kanj-Harakeh, Mona, M.S., AUB; Chemistry
Kassis, Amal, M.S., AUB; Biology
Khachadourian, Zadour, M.S., AUB; Mathematics
Khalaf, Roseanne, M.A., Simmons College; English
Khauli Hanna, Leila, M.B.A., Bowling University; Business and Management
Kheireddine, Marwan, M.B.A., Columbia University; Business and Management
Khoury, Samira, M.A., AUB; Civilization Sequence Program
Khuri, Malakeh, M.A., AUB; English
Maktabi, Sawsan, M.A., AUB; English
Mansour, Rania, M.S., AUB; Chemistry
Mehchi, Maher,M.S., Carnegie University; Business and Management
Menassa, Sleiman, M.B.A., University of Michigan; Business and Management
Mikati, May, M.Phil., University of Cambridge; English
Mogharbel, Walid, M.B.A., Georgia University; Business and Management
Mroue, Ahmad, M.S., Lebanese American University; Business and Management
Mufarrij-Merhij, Rita, M.A., AUB; Social and Behavioral Sciences
Osman, Rima, M.B.A., AUB; Business and Management
Rafoul, Rafoul, M.B.A., AUB; Business and Management
Rizk, Rola, M.A., AUB; Economics
Rizkallah, Hind, M.S., AUB; Biology
Saadeh, Miryam, M.M.B., AUB; Economics
Sadek, Samar, M.S., AUB; Chemistry
Salam Abdul Malak, Hana, MA, AUB; Social and Behavioral Sciences
Salem, Suhaila, M.A., AUB; English
Serhan, Randa, MA, University of Windsor; Social and Behavioral Sciences
Seyouri, Diana, MS, University of Boston; Business and Management
Shadid, Rima, M.A., AUB; English
Shalak, Maha, M.A., AUB; English
Shalak, Rana, MS, Birmingham; Economics
Shalhoub-Khoury, Nina, M.A., AUB; English
Shibl, Shibl, M.A., AUB; English
Shmaysani-Sheato, Hayfa, M.A, AUB; English
Sidani Bohsali, Hayat, MA, AUB; Mathematics
Sinno, Zane, M.A., Georgetown University; English
Sinnu-Saoud, Nada, M.S., AUB; Biology
Tabsh, Afaf, MS, Concordia University; Mathematics
Turk-Ariss, Rima, M.A., AUB; Economics
Ubayd, Hind, M.S., AUB; Chemistry
Wazzan, Nuha, MA, AUB; English
Yared, Hala, M.A., University of Columbia; Business and Management
Yazbeck, Adel, M.S., University of Colorado; Business and Management
Zableet, Toufiq, Docteur Ingenieur, Strasbourg; Physics

Assistant Instructors

Al-Sabbagh, Firas, B.A., AUB; Chemistry
El-Zoghet, Fahd, B.S., AUB; Physics
Hassan, Rabih, B.S., AUB; Physics
Mansour, Rima, B.A., AUB; C.S. Program
Mokadem, Mohamad, B.S., AUB; Chemistry
Muhtar, Nizar, B.S., AUB; Chemistry
Naim, Kamal, B.S., AUB; Business and Management
Shaheen, Nathaly, B.A., AUB; English

Research Associate

Hakim-Doweik, Carol, Ph.D., University of Oxford; CAMES

GENERAL INFORMATION

The Faculty of Arts and Sciences offers a variety of educational programs planned for the needs and interests of individual students. At the undergraduate level the programs are based on a liberal arts approach to education, providing concentration in one discipline and exposure to other disciplines through electives; and, more importantly, developing in the student the ability to think for him/herself and to follow a rigorous methodology in the pursuit of learning. At the graduate level the programs provide specialization in various disciplines, leading to the master's degree and in some cases to the doctorate.

The student's experience in the classroom is supplemented by participation in the full life of the University community, which may involve him or her in many extracurricular activities. These experiences will help to develop balanced and educated men and women who are prepared for lives of leadership in their own communities.

ADMISSION

For complete and detailed information regarding admission to the University, including certificates recognized, see the section "Admissions" on page 29 of this catalogue.

The specific requirements for admission to the freshman or sophomore class are found on pages 43-45. Criteria for admission to graduate study are found on page 104 and in the section on admission in the chapter "Graduate Study" at the end of this catalogue.

CATEGORIES OF STUDENTS

A. FULL-TIME STUDENTS AND MAXIMUM CREDIT LOADS

To be considered full-time, a student must carry a minimum load of 12 credits per semester (for the summer full-time, see section "Summer Session," on page 118). However, students may be required by faculty members to drop below twelve credits by reason of excessive absence in one or more courses (see section "Class Attendance," page 114).

1. *Freshman* students are allowed a maximum load of *sixteen* credits each semester. Freshman science students intending to go into medicine or engineering, and who have a cumulative average of 80 or above in the first semester, may secure the permission of their advisor to take an additional course in the second semester. In all cases the final decision rests with the advisor.

   Students who, for any reason, do not complete the freshman program in their freshman year will be required to complete the program in the following year.

2. *Sophomore* students may register for a maximum of *sixteen* credits per semester. Sophomore students who need any English communication skills course may register

for a maximum of sixteen credits per semester, *including* the credits of the English course. English course requirements must be begun during the student's first semester at the University.

3. *Junior* and *Senior* students who have not completed their English communication skills requirements may register for a maximum of *sixteen* credits per semester *including* the credits of the English course.

Junior and Senior students who have completed their English communication skills requirements at the level required by their major departments may register for a maximum of *eighteen* credits per semester.

4. Students on probation are allowed a maximum load of sixteen credits only in their first semester on probation. Students who continue on probation beyond one semester may register for a maximum of *thirteen* credits per semester.

5. Students carrying more than 12 credits per semester may (with their advisor's permission) reduce their load to 12 credits, provided they do so not later than 12 weeks after the start of the semester (six weeks in the case of Summer School). Full-time students who wish to reduce their schedule to less than 12 credits, or who wish to drop a required course, must apply to the Administrative Committee for approval.

B. SPECIAL AND PART-TIME STUDENTS

1. The category of "special students" is restricted to the following types of students:

   a) Those who are not working for a degree. Such students should be accepted by the Arts and Sciences Admissions Committee and are allowed to carry a load of three or more credits.
   b) Those who have an undergraduate degree from AUB but who want to work for another undergraduate degree. Such students need the approval of the department or program in which they plan to earn the new degree and the approval of the Arts and Sciences Admissions Committee. These students must carry a minimum load of twelve credits per semester.

2. The category of "part-time students" is restricted to the following types of students:

   a) AUB staff members who are working for a degree.
   b) Those who need less than twelve credits to complete work for an undergraduate degree.
   c) Those who are granted permission by the Arts and Sciences Administrative Committee for one of the following reasons:
      • Health reasons.
      • Family problems that may influence the academic performance of the student.
   The minimum load that these students may carry is six credits.

C. AUDITORS

Auditors are admitted to courses on payment of the special auditor's fee and with the permission of the professor in charge of the course. Auditors must meet the admission requirements of the University, but this requirement may be waived upon petition to the Administrative Committee. The University does not recognize auditors as students; they may not take examinations, and the Registrar does not keep a record of their courses and thus cannot issue them any certificates.

PROGRAMS OF STUDY

A. UNDERGRADUATE PROGRAMS

Students entering the Faculty of Arts and Sciences as freshmen, except those admitted as special students or auditors, select one of the following programs:

1. Bachelor of Arts: four years.
2. Bachelor of Science: four years.
3. Bachelor of Business Administration: four years.
4. Pre-Health Sciences, pre-Engineering and Architecture, or pre-Agricultural and Food Sciences: one year (the freshman science program).

Students entering the Faculty of Arts and Sciences as sophomores select one of the following programs, for each of which a period of three years of study is normally required:

1. Bachelor of Arts.
2. Bachelor of Science.
3. Bachelor of Business Administration.

B. PREMEDICAL STUDY

Arts and Sciences students who intend ultimately to enter the Faculty of Medicine must select and complete one of the regular degree programs given as 1 to 3 immediately above. They must also complete the following minimum course requirements:

Biology: at least two courses, each with laboratory   8 credits
(normally Biology 201 and 202).

Chemistry: with laboratory, including 8 credits of organic   15 credits
chemistry (normally Chemistry 201, 203/205, 210/213,
211, 212 and one more course of at least three credits, **or**
Chemistry 201, 206, 210, 211, 212).

Physics: and basic electronics with laboratory (normally Physics 204, 205, 206, 207 **or** Physics 211, 212, 213, 214).	8 credits
Mathematics: (Mathematics 102 (Calculus II) or exemption thereof).	---
Humanities and/or Social Sciences	6 credits
English (English Communication skills requirements through English 204).	
Total	**37 credits plus English**

C. GRADUATE STUDY

All applicants to graduate study need the recommendation of the academic unit concerned. The criteria for admission to graduate study are:

1. Graduate

   i) A cumulative average of at least 80 in the major field of study.

   ii) A cumulative average of at least 75 in all work done in the sophomore, junior, and senior year.

   iii) A minimum grade of 70 in English 203 or exemption from the course, and a minimum grade of 70 in English 204.

   iv) All applicants should have taken the GRE or GMAT.

2. Graduate on Probation

   i) A cumulative average of at least 77 in the major field of study.

   ii) A cumulative average of at least 75 in all work done in the sophomore, junior, and senior year.

   iii) A minimum grade of 70 in English 203 or exemption from the course, and a minimum grade of 70 in English 204.

   iv) All applicants should have taken the GRE or GMAT.

3. Prospective Graduate

   i) A cumulative average of at least 75 in the major field of study.

   ii) At least 18 credits of supplementary undergraduate courses in the intended field of study, to be specified by the academic unit.

   iii) A minimum grade of 70 in English 203 or exemption from the course, and a minimum grade of 70 in English 204.

In order to be admitted to the graduate program the applicant should take the GRE or GMAT and should have completed the supplementary courses with an average of at least 80, based on a minimum of 18 credits in the intended field of study.

Full information and general requirements for graduate work are found in the chapter "Graduate Study" at the end of this catalogue.

D. REGULAR FRESHMAN PROGRAM

On admission to the Freshman class, a student must enroll in either the Arts program or the Sciences program. Both the Freshman Arts and the Freshman Sciences programs require completion of 30 credits, whether or not the student remains in the Faculty of Arts and Sciences or shifts to another faculty. Students intending to major in a subject within the Faculty of Arts and Sciences may be accepted as provisional majors upon completion of 24 credits.

Freshman Credit Load: - See page 101 of this catalogue.

University Requirements:

English: All new students at AUB are required to sit for an English placement test. The results of this test determine the entrance level to the English communication skills sequence (English 101, English 102, English 203 and English 204). During the Freshman year students are required to take a minimum of six credits in English.

Arabic: All students whose native language is Arabic are required to take Arabic 101 and 102. (Note that Arabic 101 is a prerequisite for 102). Students who receive an exemption from the Equivalency Committee of the Ministry of Education need not take Arabic. This must be done through the Office of the Registrar. In place of Arabic 101 and 102 such students must take six credits from courses open to Freshman students.

Lebanese students must also satisfy the requirements listed on page 40 of this catalogue in order for their Freshman year to be granted the equivalency of the Lebanese Baccalaureate Part II.

Freshman Arts:

In addition to the university requirements as stated above, Freshman Arts students are required to take the following:

Humanities: Any combination of the following providing they add up to a minimum of 6 credits.

Archaeology 101 (3)	History 101 (3)	History 102 (3)
Philosophy 101 (3)	Philosophy 102 (3)	

Any student who has scored 80 or above in English 203, or who has been exempted from English 203, may take only **one** of the following English courses, in place of the courses listed above.

English 103 (3)   English 104 (3)
English 105 (3)   English 106 (3)

Sciences: Any combination of the following providing that they add up to a minimum of 6 credits.*

Biology 103 (4)   Biology 104 (4)
Chemistry101(4)   Chemistry 102 (4)
Geology 101 (3)   Geology 102 (3)
Physics 101 (4)   Physics 102 (4)
Physics 103 (3)   Physics 105(1)
Physics 106 (1)   Physics 107(1)
Physics 200 (3)

*Students who are transferring from Sciences to Arts will receive credits for their science courses.

Electives: As necessary to add up to 30 credits in total. See Tables 1 and 2 for requirements to transfer into a major.

Freshman Sciences:

In addition to the University requirements as stated above, Freshman Science students are required to take the following:

Math: 101 and 102 (6 credits)

Science Courses: The science credit requirements for the completion of the Freshman science year consist of 8-14 credits. Freshman science students wishing to major in a specific science Department or intending to enroll in a professional Faculty must meet the requirements that are set by that Department or Faculty. Such requirements often mean taking specific Freshman science sequences. These are outlined below.

Sequence 1: Chemistry 101 and 102 (8 credits)
Sequence 2: Physics 101, 102, 105 and 106 (10 credits)
Sequence 3: Chemistry 101 and Physics 101, 102, 105 and 106 (14 credits)
Sequence 4: Chemistry 101 and 102, and Physics 103 and 107 (12 credits)
Electives: As necessary to add up to 30 credits in total.

Freshman Courses:

Students are recommended to take electives from the following list of courses. These courses have been specifically designed for, and are open only to Freshman students. Students who wish to take courses numbered 200 and above may do so exceptionally with the approval of their advisor.

Archaeology 101, Biology 103, Biology 104, Chemistry 101, Chemistry 102, Economics 101, English 103, English 104, English 105, English 106, Geology 101, Geology 102, History 101, History 102, Math 101, Math 102, Philosophy 101, Philosophy 102, Physics 101, Physics 102, Physics 103, Physics 105, Physics 106, Physics 107 and PSPA 101.

Courses numbered 200 and above:

Some courses that are numbered 200 and above are suitable for Freshman students. Note , however, that these courses are also open to Sophomores, Juniors and Seniors and therefore may be more competitive than courses offered at the 100 level. Such courses include those that are Freshman requirements (see page 105) and those that are listed in Tables 1 and 2 (see pages 108 & 109).

Transfer to a major:

Any student in his/her Freshman year who is not on probation at the time of application, may transfer into a major within the Faculty of Arts and Sciences upon completion of 24 credits, including Departmental requirements as shown in Table 1.

Transfer to other Faculties:

Any Freshman student who wishes to transfer to another Faculty must complete the Freshman program, including Faculty requirements as shown in Table 2.

Table 1: Requirements to join a major in the FAS from the freshman class

Department	Requirements	Some useful electives
Arabic	A min. cum. average of 70 in Arabic 101 and 102.	
Archaeology	A min. cum. average of 70 in History 101 and 102.	Arol 101 & Arol 201.
Biology	Completion of Science sequence 4, with a min. cum. average of 70 in Chemistry 101 and 102, and a min. cumulative average of 70 in Physics 103 and 107.	Math 208 & Math 209.
Business	A min. cum. average of 70 in the freshman year and a min. grade of 70 in Math 101 for freshman science students, or a min. grade of 70 in Math 203 for freshman arts students.	Econ 103 & either Econ 211* or Econ 212*
Chemistry	Completion of science sequence 1, with a min. Grade of 70 in each of Chemistry 101 and 102, and a min. cum. average of 70 in Math 101 and 102.	Phys 101 & 105 or Phys 102 & 106** & Math 209.
Computer Science	Completion of Science sequence 3, with a min. cum. average of 70 in Math 101 and 102.	Math 200 & Math 211.
Economics	A min. cum. average of 70 in Math 101 and 102 and a min. cum. average of 70 in English courses taken in the freshman year.	Econ 103, Econ 211*, Econ 212*, & Math 209.
English	A min. cum. average of 70 in English courses taken in the freshman year.	Engl 103, 104, 105, 106, 205 & 207
Geology	Completion of any combination of science courses totaling 9 credits or more and a min. cum. average of 70 in the freshman year.	Geol 101, 102, 201 & 203.
History	A min. cum. average of 70 in History 101 and 102.	Arol 101 & Arol 201.
Mathematics	A min. cum. average of 70 in Math 101 and 102 and a min. grade of 70 in Math 102.	Math 201 & Math 211.
Petroleum Studies	Completion of any combination of science courses Totaling 9 credits or more and a min. cum. average of 70 in the freshman year.	Geol 101, 102, 201, & 203, Econ 103, 211*or 212*, & SBHS 201.
Philosophy	A min. cum. average of 70 in English courses taken in the freshman year.	Phil 101, Phil 102*.
Physics	Completion of science sequence 2 with a min. cum. Average of 70 in Math 101 and 102 and a min. cum. Average of 70 in Physics 101, 102, 105 and 106.	Math 200.
PSPA	A min. cum. average of 70 in the freshman year and a min. cum. average of 70 in English courses taken in the freshman year.	PSPA 101, Econ 103, SBHS 201 or SBHS 202.
Psychology	A min. cum. average of 70 in English courses taken in the freshman year.	SBHS 202, PSPA 201, 202, Phil 201,Math 206, Econ 203 & one of Math 207, Educ 227 or SBHS 218.
Sociology-Anthropology	A min. cum. average of 70 in English courses taken in the freshman year.	SBHS 201, PSPA 201, 202, Phil 201, Math 206, Econ 203 & one of Math 207, Educ 227 or SBHS 218.

* English 102 is a prerequisite
** Students who wish to major in Chemistry may be accepted to the major on completion of the requirements as stated above. However, if they wish to continue in the major they must also complete PHYS 101 and 105, or 102 and 106.
It is recommended that elective courses no.200 & above be taken in the third semester.

Table 2: Requirements to apply for a major in another faculty

Major and Faculty	Requirements	Some useful electives
Agriculture	Completion of the freshman sciences program with science sequence 1.	Biol 201, Chem 200[1], 205, Math 208 and Math 209.
Architecture[2]	Completion of the freshman sciences program with science sequence 3.	Math 208 or a CVSP course*
Education	Completion of the freshman class with a minimum cumulative average of 70.	Edu. 211, Geol 201 or others depending on chosen area of specialization.
Engineering[2]	Completion of the freshman sciences program with science sequence 3.	Chem 201[3] and one of the following: Math 208, Phys 211, 212[4], Biol 210, or a CVSP course*
Environmental Health	Completion of the freshman sciences program with science sequence 1.	Biol 201, Chem 200[1] and 205.
Graphic Design[2]	Completion of the freshman sciences program. Science students are required to have taken two out of three sciences from Biology, Chemistry and Physics; or completion of the freshman arts program.	CVSP 240, 267, 274, 283, Econ 203, Engl 213 and SBHS 202.
Medical Laboratory	Completion of the freshman sciences program with science sequence 1.	Biol 201, Chem 200[1], 205, SBHS 201 and SBHS 202.
Nursing	Completion of the freshman sciences program with science sequence 1.	Biol 103, Biol 210 & Social Science Electives other than SBHS 201& SBHS 202.
Nutrition & Dietetics	Completion of the freshman sciences program with science sequence 1.	Biol 201, Chem 200[1], 205, Math 209 and SBHS 201.

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[1] Students cannot receive credit for Chemistry 200 and Chemistry 201.

[2] Students who intend to apply to the Faculty of Engineering and Architecture may wish to improve on their SAT 1 scores during the Freshman year.

[3] Chemistry 201 is a <u>sophomore</u> course, the prerequisite of which is Chemistry 101. Students are encouraged to also take Chemistry 102 although this course is not a prerequisite.

[4] The prerequisites for Physics 211 and 212 are Physics 101 and 105 or Physics 102 and 106. Math 201 is a prerequisite or co-requisite for Physics 211 and 212.

* A list of approved cultural courses (CS) is available with your advisor.

GRADUATION REQUIREMENTS

A. DEGREES OF BACHELOR OF ARTS, BACHELOR OF SCIENCE, AND BACHELOR OF BUSINESS ADMINISTRATION

The following are the graduation requirements for the degrees of B.A., B.S., and B.B.A.

1. A minimum of eight semesters of residence beginning with the freshmen class, or six semesters beginning with the sophomore class, at recognized institutions of higher learning, provided that the final two semesters and thirty credits are completed at AUB. For purposes of this requirement two summer sessions shall be considered equivalent to one semester.

2. A maximum of eight calendar years is allowed for graduation of students who begin with the freshman class; six calendar years for sophomores; four calendar years for juniors; and two calendar years for seniors. A student who fails to complete his/her degree program within these specified times must petition the Administrative Committee for an extension of time.

3. A minimum of 120 credits for students who enter as freshmen and 90 credits for students who enter as sophomores. With the approval of the Curriculum Committee, departments may establish programs that exceed these minimum credit requirements.

4. A minimum of 36 credits in the major department, in courses numbered 200 or above, of which a minimum of 30 credits must be numbered 210 or above; and a cumulative average of 70 in the major department; plus any additional requirements set by the department.

   When a student repeats a course in his/her major, the highest grade obtained in the course will be used in computing the student's average in his/her major for graduation purposes; however, a student may not repeat a course in which he/she has originally obtained a grade of 70 or above, unless his/her major department requires a grade higher than the original score. When a student repeats a course, all grades shall enter into the computation of the student's overall average for purposes of graduation with distinction or high distinction.

5. The following courses or their equivalent: English courses as determined by placement on matriculation; Civilization Sequence 201, 202, 203, and 204; for Arabic–speaking students (except those officially exempted), in addition to Arabic courses required from Freshmen, one Arabic language or literature course, as determined by Arabic placement test (APT): 201A, 201B, or any other course numbered 211 or above (213, 214, 217, 218 excluded).

All Arabic-speaking students in the Faculty of Arts and Sciences (except those officially exempted) must take the Arabic language requirements. Students entering the Freshman class must take Arabic 101, 102, and one more course as determined by their performance in Arabic 101 and 102; those entering at the Sophomore, Junior, or Senior levels must take one Arabic course as determined by the APT. The APT will be administered on the same dates and at the same frequencies as the EPT (English Placement Test).

All students in the Faculty of Arts and Sciences must take English Communication Skills courses as determined by placement upon matriculation, *and these required courses must be begun immediately on matriculation and must be continued without interruption until completed through English 204.* For example, a student entering at the lowest level must take four semesters of English (101, 102, 203 and 204, i.e., 16 credits of English); a student entering at the third level must take two semesters (203 and 204; i.e., 6 credits). *Freshmen* are required to take a *minimum of six credits* of English. Thus, a freshman who enters at level 204 must, in addition to this course, take a second course from the offerings of the English Department numbered 205-299.

6. A minimum of 18 additional credits outside the major department, exclusive of the University course requirements stated above and of the normal freshman program. (The requirement of 18 additional credits outside the major department can be satisfied by the requirements of the teaching diploma, see section 11 below, and "Department of Education" in the chapter on Division of Education Programs.)

7. Grades of 70 or more in at least 50 credits numbered 200 or above for students entering at the sophomore level. Students entering at the freshman level must obtain grades of 70 or more in at least 12 additional credits at any level above 100.

8. Students already holding a Bachelor's degree, who wish to obtain a different bachelor's degree (B.A., B.S., B.B.A.), must complete a minimum of 30 credit hours and must complete departmental requirements for the degree, with an average of 70 in those requirements.

9. All undergraduate transfer students from outside AUB to the Faculty of Arts and Sciences must take, after admission to the Faculty, a minimum of 21 credits in the major department in order to graduate from AUB.

10. A teaching major consists of a minimum of 36 credits in courses numbered 200 or above in a department offering a subject taught in elementary or secondary schools, plus the requirements of the Division of Education for the Teaching Diploma.

11. A student must spend a minimum of one semester in a department as a major before he/she graduates in that major field.

For further details concerning individual departmental requirements, see the relevant sections of this catalogue.

B. THE TEACHING DIPLOMA

See under Division of Education Programs (page 463).

C. GRADUATION WITH DISTINCTION

In order to graduate with distinction a student must have an average of 85 or higher in all work which has been done in his/her junior and senior years at AUB and must be recommended by his/her department for distinction.

In order to graduate with high distinction a student must have an average of 90 or higher in all work which has been done in the junior and senior years at AUB and must be recommended by his/her department for high distinction.

When a student repeats a course, all grades shall enter into the computation of the student's overall average, for purposes of graduation with distinction or high distinction.

D. DIRECTED STUDY

All students with averages of 85 or above in their major at the beginning of their senior year shall be eligible to elect a course of directed study. Students with averages lower than 85 may be admitted to directed study at the discretion of the department.

Students who elect a course of directed study will choose their senior courses in consultation with a faculty member selected by the student with approval of the department. Among these courses may be a tutorial of three to six credits directed by the faculty member. This tutorial may consist of independent research, original creative compositions or directed reading and will include the presentation of a report or thesis on the work.

ACADEMIC RULES AND REGULATIONS

A. CLASSIFICATION OF STUDENTS

An undergraduate student shall be considered to have completed a class when he/she has taken and passed 30 or more credits beyond the requirements for the previous class.

A student will not be granted a certificate stating that he/she has completed a class until he/she has completed the specified courses in the regular program for that class and has acquired the requisite number of credits. The credit requirements are as follows:

1. For the completion of the freshman class: 30 credits;   ⎫
2. For the completion of the sophomore class: 60 credits;   ⎬   cumulative
3. For the completion of the junior class: 90 credits.   ⎭

B. CORRECT USE OF LANGUAGE

Facility in the clear, correct, and responsible use of language is a basic requirement for graduation.

Grades on papers (term papers, essays, or examinations) that are ill-written, no matter what the course, may be lowered for the quality of the writing alone.

The final grade in any course may be lowered for consistently substandard written or oral expression; in extreme cases a failing grade may be given for this reason alone.

C. GRADES, INCOMPLETE GRADES, AND MAKE-UP EXAMINATIONS

Grading System

In the Faculty of Arts and Sciences the following grading system is used:

90, 95, 100 (A) Excellent;   W, Withdraw;
80, 85 (B) Good;   P, Pass;
70, 75 (C) Fair;   F, Fail;
60, 65 (D) Weak;   and X, no grade reported for the course.
55 to 40 (F) Failing;

All final course grades are expressed in multiples of 1.

Dean's Honor List

The list of requirements for a student to be placed on the Dean's Honor List can be found on page 89 of this catalogue.

Incomplete Grades and Make-Up Examinations

The work for a course in the Faculty of Arts and Sciences must be completed on the date on which the semester ends. No incomplete grade or "I" is given as a final grade in any course. In case of incomplete work, a grade of zero is given for the missing work, with the course grade computed accordingly. In exceptional cases, and provided the written approval of the instructor and the Administrative Committee is secured within two weeks after the submission of final grades, a student may be allowed to make up incomplete work within a period of two weeks after the beginning of the next regular semester.

It is the responsibility of the student to find out from his/her instructor the specific dates by which requirements must be fulfilled. The deadline for submission of incomplete grades by the instructor is within 72 hours after a student has completed the course work.

Failure to complete the requirements for incomplete courses within the periods specified above will result in a grade of zero for the missing work, with the course grade computed accordingly.

D. ATTENDANCE AT AND WITHDRAWAL FROM COURSES

Class Attendance

Students are expected to attend all classes and laboratory sessions. Absence of a student, whether excused or not, from any class or laboratory session does not excuse the student from his/her responsibility for the work done or for any announcements made during his/her absence.

Individual instructors may at their discretion keep attendance records. An instructor may require any student who misses more than one-fifth of the class or laboratory sessions of a given course to withdraw from the course with a W, provided that this requirement has been announced at the beginning of the semester, and provided that such a requirement is imposed not later than twelve weeks after the start of the semester (six weeks in the case of the summer session). However, students required to drop below twelve credits by reason of excessive absence will have their cases reviewed by the Administrative Committee.

Laboratory Sessions

No student may be excused from laboratory requirements; all missed laboratory work must be made up by arrangement with the department.

Examinations and Quizzes

Arts and Sciences courses normally have final examinations, except in cases where special approval of the Curriculum Committee has been obtained, as in certain laboratory courses. Final examinations are not required in tutorial and seminar courses, but the teacher may choose to give a final examination.

In all courses in which final examinations are given, a student cannot receive a passing grade without taking a final examination. A student who misses an examination or quiz may request to take a make-up. The instructor will assume final responsibility for dealing with such requests. At the beginning of each semester, the instructor will announce the policy that he intends to follow in the matter of missed examinations and quizzes, so that students are fully aware of this policy.

Withdrawal from Courses

Students are permitted to withdraw from courses, down to a minimum of 12 credits, not later than twelve weeks after the start of the semester (six weeks in the case of the summer session); W (withdrew) will be inscribed on their records.

E. PROBATION AND FAILURE

Placement on Academic Probation

A student will be placed on academic probation for any one of the following reasons:

1. If at the end of a semester, excluding Summer session, the student fails in one-third or more of the total number of credits he/she is carrying irrespective of the grades obtained in the remaining two-thirds of the total credits completed.

2. If at the end of a Summer session while carrying a minimum of 6 credits, the student fails in two courses (at least five credits) taken.

3. If at the end of a regular semester, while carrying 12 or more credits (excluding Summer session), the student does not earn a grade of 70 or higher in one-third or more of the total number of credits he/she is carrying. (Students carrying a reduced schedule of less than 12 credits, who have not failed in any of their courses, are not subject to probation regulations until they have accumulated a minimum of 12 credits. The counting of accumulated credits starts from the beginning of the reduced schedule. In all cases where 12 or more credits have been accumulated, probation regulations apply.)

A freshman or a sophomore student will not be placed on probation at the end of his/her first semester at the University.

The load of a student who is in his/her first semester on probation shall be not less than 12 or more than 16 credit hours. The load of a student who continues on probation beyond one semester shall neither be less than 12 nor more than 13 credit hours. The credit limit of 12 to 13 also applies to students who have been previously placed on and removed from probation. During a Summer session, all students on probation shall carry loads of not more than seven credits. The Administrative Committee may allow senior students on probation who expect to graduate or are repeating courses to take an extra load of one course per semester.

Removal of Probation

A student who is placed on academic probation continues on probation until it is removed by action of the Administrative Committee.

Probation will be removed:

1. At the end of a regular semester (Fall or Spring) provided that the student passes in all courses and attains a minimum grade of 70 in at least one third of the total number of credits he/she is carrying.

2. At the end of a Summer session provided that the student carries a minimum load of 6 credits and attains a minimum grade of 70 in each of two courses (at least five credits) taken.

Students on probation are advised to repeat courses in which they have obtained failing grades or low grades.

Once a senior student completes his/her graduation requirements successfully, his/her probation is automatically removed by the Registrar's Office.

Majorless Status

If a student fails to meet the departmental requirements in his/her major department, the student may become a majorless student. When a department decides that one of its students must select a new major, the department must communicate its decision to the Office of the Registrar and the Office of the Dean. Majorless students who originally were Science students become Majorless Science students, and are advised by the Science Academic Advisor, while those who originally were Arts or Business students become Majorless Arts students and are advised by the Arts Academic Advisor.

Dismissal from the University

The Administrative Committee reserves the right to drop a student from the Faculty at the end of an academic year only for what it considers to be adequate academic reason.

A student may be considered for dismissal for any one of the following reasons:

1. A student on probation for two consecutive semesters who fails in one-third or more of the total credits he/she is carrying may be dropped.

2. A student who fails to remove probation by the end of the third semester after he/she is placed on probation, and who also fails to obtain a cumulative average of sixty or above may be dropped.

3. A student placed on probation for the second time, having been placed on and removed from probation once before, will be allowed a maximum of two semesters to remove his/her probation. If he/she fails to do so, he/she may be dropped.

4. A majorless student may stay without a major for a maximum period of three semesters after which he/she may be assigned a major if he/she does not get accepted by a department, or considered for dismissal from the Faculty by the Arts and Sciences Administrative Committee.

Failure and Application for Readmission

1. Failure

If a student fails a course, no re-examination is permitted. If a course is required for graduation, students failing that course must repeat it.

A student may not register for a course for more than three times, including withdrawals, but for the third registration the permission of the student's Academic Advisor and the Academic unit concerned is required.
Occasionally the Arts and Sciences Administrative Committee may consider a fourth registration under special circumstances.

A student who at the end of his/her senior year fails to attain a cumulative average of 70 in his/her major field will be required to take additional courses in that field or to repeat courses in which that student has scored low grades, provided he/she is permitted to continue at the University.

2. Readmission

When, in accordance with University regulations, a student is dropped, the implication is that he/she is not qualified to continue his/her education. Consideration for readmission is given only if, after spending one or two years at another recognized institution of higher education, the student is able to present a satisfactory record and recommendation. The student must have achieved a grade equivalent to the grade of 75 at AUB in each one of the courses for which transfer credit may be granted.

The foregoing regulations on readmission also apply to students dropped from other AUB Faculties who apply for admission to Arts and Sciences.
Readmission of students dropped from the Faculty of Arts and Sciences by the Administrative Committee requires the approval of the latter Committee, whereas readmission of students dropped from other AUB Faculties to Arts and Sciences requires the approval of the Arts and Sciences Admissions Committee. Before action

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is taken on any application for readmission, the Committee concerned will seek the recommendation of the prospective department.

ACADEMIC ADVISORS

Each student has an academic advisor who must approve the student's schedule each semester. The student's advisor is determined as follows:

Freshman Students: Freshman Science students should consult their Freshman Science Advisor; Freshman Arts students should consult their Freshman Arts Advisor.

Sophomore Students: Sophomore students who have already decided on their major should consult with advisors in their prospective departments for advice in determining their schedules. Other sophomores should consult the Academic Advisor for Arts students, or the Academic Advisor for Science students, as appropriate.

Junior and Senior Students: Junior and Senior students have as their advisor a faculty member in the department in which they are majoring. No junior or senior student may be without a major unless that student has the permission of the Administrative Committee.

Teaching majors: Teaching majors will be advised by the Arts and Sciences department in which the subject matter courses are taken.

SUMMER SESSION

Maximum Load. The maximum academic load during a regular summer session is 10 credits (seven credits for students on probation).

Degree Courses. The degree courses offered during the summer session are identical in standard and content with those offered during the first and second semesters.

Non-Degree Courses and Summer Orientation Programs. See the chapters "Division of Education Programs" and "AUB Extension Programs" in this catalogue.

COURSES

A. NUMBERS PRECEDING COURSE TITLES

Freshman Courses (101 to 199). Ordinarily taken during the freshman year and may be counted toward graduation only as part of the freshman program.

Introductory Courses (200 to 209). May be counted toward graduation whenever taken but cannot be considered as part of the 30 credits above 210 required in the major field.

Advanced Undergraduate Courses (210 to 299). May be counted as credits in the major field.

Graduate Courses (300 to 499).

Odd-Numbered Courses. Normally offered during the first semester.

Even-Numbered Courses. Normally offered during the second semester.

B. Numbers Following Titles of Courses

The first number following the title of a course indicates the number of class hours given each week.

The second number indicates the laboratory or practice hours required each week.

The third number indicates the number of credit hours applied toward graduation. The credit assigned to each course is stated for the semester. Each hour of laboratory is considered 1/3 to 1/2 credit hour.

Courses marked *annually* are offered at least once during each academic year. Other courses marked *alternate years* and *each semester* are given accordingly. When frequency of offering is not indicated, the course is offered at the discretion of the department.

C. Course Descriptions

More detailed course descriptions are available in the individual departments for those requiring further information.

D. Courses Offered by Other Faculties

Students in Arts and Sciences may also take for credit the following courses offered in the Faculties of Medicine, Engineering and Architecture, Agricultural and Food Sciences, and Health Sciences. *All prerequisites must be satisfied.* Students who wish to take courses in other Faculties, which are not on the following list, must secure the prior approval of their advisor and the prior approval of the Curriculum Committee, for any such courses.

Faculty of Medicine

Biochemistry 211 Basic Biochemistry (6)
Biochemistry 300 Biochemistry (5) (credit for 211 *or* 300)
Biochemistry 313 Advanced Biochemistry (3)
Human Morphology 209 Basic Histology (3)

Faculty of Engineering and Architecture

CVEV 037 Surveying and Photogrammetry (3)
CVEV 055 Fluid Mechanics (3)
CVEV 084 Soil Mechanics (3)
CVEV 085 Hydrology (3)
ELEG 011 Electric Circuits I (3)
ELEG 021 Electric Circuits II (3)
ELEG 022 Basic Electronics (3)
ELEG 049 Digital Systems Design (3)
ELEG 052 Digital Electronics (3)
MCEG 044 Thermodynamics (3)
ASST 045 Application of Analytical Methods in Engineering I (3)
ASST 055 Application of Analytical Methods in Engineering II (3)

Faculty of Agricultural and Food Sciences

AEDV 212 Agricultural Economics, Principles and Policy (3)
AEDV 243 Marketing of Food Products (3)
AGRL 201 Orientation to Agriculture in the Middle East (2)
AGRL 301 Statistical Methods in Agriculture (3)
ANSC 275 Anatomy and Physiology of Farm Animals (3)
CRPP 221 Principles of Entomology (3)
CRPP 223 Principles of Plant Pathology (3)
CRPP 312 Advanced Principles and Methods in Plant Pathology (3)
CRPP 337 Advanced Crop Physiology (3)
FTNT 221 Basic Nutrition (3)
FTNT 300 Graduate Tutorial (1-3)
FTNT 310 Advanced Food Biochemistry (3)
SIMC 215 Introduction to Soils (4)
SIMC 367 Soils Conservation (3)

Faculty of Health Sciences

EPBS 222 Sampling Techniques (3)
EPBS 223 Survey Methods I (3)
EPBS 224 Survey Methods II (3)
EPBS 227 Basic Demographic Techniques (2)
EPBS 228 Introduction to Information Systems in Health (3)

DEPARTMENT OF ARABIC AND NEAR EASTERN LANGUAGES

Chairperson:	Baalbaki, R.
Professors:	Baalbaki, R.; Heath, P.; Khairallah, A.; Makarim, S.; Naimy, N.
Assistant Professors:	Agha, S.S.; Behmardi, V.; Jarrar, M.
Lecturers:	Jeha, G.
Instructors:	Abu-Jawdeh, S.; Ghosn, A.

In addition to the B.A. degree in Arabic, the Department of Arabic and Near Eastern Languages provides service courses for all Arabic-speaking students at AUB. Arabic 101 and 102 must be taken in the Freshman year; one more Arabic language or literature course; i.e. Arabic 201A, 201B, or any other course numbered 211 or above (213, 214, 217, 218 excluded) as determined by Arabic Placement Test (APT), see page 110 of this catalogue.

UNDERGRADUATE PROGRAM

Requirements for the B.A. Degree in Arabic are as follows: 211, 212, 221, 231, 232, 233, 237, 239, 241, 243, 245 (total 33 credits). In addition, the student must select at least three more courses from within the other courses in the Department (total, 9 credits; grand total, 42 credits).

When certain of the alternating required courses are not available, they may be replaced by other courses within the Department, provided the student's advisor gives consent.

101 and 102 Readings in Arabic Heritage I & II. 3.0; 3 cr. (each; 101 is a prerequisite to 102); annually. A Freshman level survey year course that traces the intellectual, literary and cultural development of the Arabs from pre-Islamic times up to the age of Ibn Khaldun. Members of Department.

201A Basic Arabic Grammar and Syntax. 3.0; 3 cr.; annually. A training course in the basic elements of Arabic grammar, syntax and morphology, with special emphasis on oral and writing skills. Members of Department.

201B Readings in Arabic Literature. 3.0; 3 cr.; annually. A close textual and analytical study of a wide variety of selections from classical and modern Arabic literature and thought, designed to evoke aesthetic and intellectual discussions of issues of Arab culture. Members of the Department.

203 and 204 Beginner's Arabic as a Foreign Language I & II. 3.0; 3cr. (each). A thorough course in basic literary Arabic, with emphasis on the vocabulary of modern literature, the press, and current affairs. Grammar and structure taught enable the students to read, understand, and translate, from and into Arabic, within a tightly controlled syntactical milieu.

205 and 206 Beginner's Arabic as a Foreign Language III & IV. 3.0; 3 cr. (each). Prerequisite: Arabic 203 and 204 or equivalent). A continuation of the carefully

graded approach begun in 203 and 204, and culminating with the exposition of the derivation system. This course empowers the students to use lexica, and to read, understand, and translate, unhampered by any loopholes in their knowledge of basic Arabic syntax and morphology.

211 and 212 Preliminary Studies in the Sciences of the Arabic Language. 3.0; 3 cr. (each); annually. A year course on Arabic morphology and grammar. It comprises reading an ancient grammatical text and training in sentence structure through *i'rab*.

213 and 214 Introductory Biblical Hebrew. 3.0; 3 cr. (each). A general survey of biblical Hebrew grammar, with special emphasis on the relation between Arabic and Hebrew within the Semitic group of languages.

217 and 218 Introductory Classical Persian. 3.0; 3 cr. (each). A year course introducing students to the Persian language. After surveying the grammar, the students are given intensive training in reading classical Persian texts.

221 and 222 Advanced Studies in Arabic Grammar. 3.0; 3 cr. (each); annually. A detailed study of stylistics *balagha* in 221 and metrics (*carud*) in 222. It surveys the contribution of the Arabs to stylistic studies and introduces their theory of versification.

225 and 226 Translation. 3.0; 3 cr. (each). This year long course is divided into a brief introduction and an extended segment in applied translation. In the introduction, theoretical problems and issues of translation are discussed; then the course is transformed into an extended workshop, where students will be preoccupied with their own translation exercises from and into both languages.

227 and 228 Advanced Studies in the Arabic Language. 3.0; 3 cr. (each). These two courses deal with various topics of Arabic linguistic sciences, mainly phonetics, semantics and lexicology.

229 Background to the Study of Classical Arabic Literature. 3.0; 3 cr. A Junior-Senior level course that deals with the impact of Greek culture on classical Arabic literature and thought and the rise and development of Arab intellectualism.

231 Pre-Islamic Poetry. 3.0; 3 cr.; alternate years. Highlights of pre-Islamic Arabian life as a poetic milieu; main problems, sources and trends of pre-Islamic poetry; critical analysis of selected outstanding poems.

232 Umayyad Poetry. 3.0; 3 cr.; alternate years. The course furnishes a compact in-depth familiarization with the economic, social and political factors affecting Umayyad poetry. Major poetic trends are surveyed. The substantial component of the course comprises critical analysis of selected outstanding and representative poems.

233 and 234 Abbasid Poetry. 3.0; 3 cr. (each); alternate years. A survey of Arab poetry during the Abbasid period with a historical, political, and social background.

235 Andalusian Literature. 3.0; 3 cr.; alternate years. Introduction to Arabic literature in Islamic Spain. Students read and analyze Andalusian poetry and prose, with special emphasis on the new literary forms which appeared in Al-Andalus.

236 Qur'anic Studies. 3.0; 3 cr.; alternate years. Introduction to major Qur'anic issues, such as the collection of the Qur'an, Qur'anic imagery, and the various trends in Qur'anic exegesis.

237 and 238 Modern Arabic Poetry. 3.0; 3 cr. (each); alternate years. A year course studying the factors that shaped modern Arabic poetry, tracing the phases of its development, and analyzing in detail its various characteristics.

239 and 240 Modern Arabic Prose. 3.0; 3 cr. (each); alternate years. In this year course the Arabic novel and the Arabic play are studied. Students are introduced to the factors leading to the rise of the two genres, their development, and the most prominent novelists and playwrights, and are exposed to the history of the Arabic theater.

241 and 242 Literary Criticism. 3.0; 3 cr. (each); annually. A year course introducing the students to literary critical theory of the classic authors and modern movements and trends. Arabic literary theory and criticism are also taught.

243 Classical Arabic Prose. 3.0; 3 cr.; annually. This course includes reading and analyzing extracts from the works of major prose writers, representing the main trends in classical Arabic prose, from the pre-Islamic period to the end of the Umayyads.

244 Classical Arabic Prose (Abbasid). 3.0; 3 cr.; annually. Introduction to the development of the classical Arabic prose from the advent of the Abbasid dynasty up to the age of al-Ma^{c}arri.

245 and 246 Background to the Study of Modern Arabic Literature. 3.0; 3 cr. (each); annually. A two semester course dealing with the Arab cultural renaissance of 1800-1940. Special emphasis is placed on the impact of the West on the making of the modern Arab mind.

247 Arabic Classical Folk Literature. 3.0; 3 cr.; alternate years. This course covers the following topics: folk-tales, the novella in *The Arabian Nights*, and the hero sagas such as Sirat Bani Hilal. It aims at studying the textual history of this special genre, its language, motives and structures. Students are also exposed to various methodological approaches of folk literature.

249 Sufi Literature. 3.0; 3 cr.; annually. The aim of this course is to acquaint the student with Sufi literature as one of the major aspects in Arabic literature.

251 and 252 Selected Topics in Arabic Language. 3.0; 3 cr. (each). Varying topics.

GRADUATE PROGRAM

The Department offers graduate programs leading to the M.A. and Ph.D. degrees. Arabic 309 is required of all graduate students.

Students who are candidates for graduate study in the Department of Arabic and Near Eastern Languages, and who do not satisfy the AUB English Entrance Examination requirements, may be accepted for graduate study provided that:

1. Students who score 500 to 574 in the EEE will be required to take English 209.

2. Students who score below 500 will be required to take a remedial course in the UOP which will prepare them either to pass the EEE or to enter English 209. Students who are enrolled in the UOP course will not be allowed to take graduate courses where English is the language of instruction.

3. All graduate students must satisfy the University English Entrance requirement before graduation.

301 Graduate Seminar in Classical Arabic Literature (poetry or prose). 3.0; 3 cr.

303 Graduate Seminar in an Epoch, a Trend or a Book in Classical Arabic Literature. 3.0; 3 cr.

305 Graduate Seminar in Qur'anic Studies. 3.0; 3 cr. Prerequisite: 236.

307 Graduate Seminar in European Literary Criticism and its Influence on Modern Arabic Literary Criticism. 3.0; 3 cr. Prerequisites: 241 and 242.

309 Graduate Seminar in Arabic Sources. 3.0; 3 cr. Required of all graduate students.

311 Graduate Seminar in an Epoch, a Trend or a Book in Modern Arabic Literature. 3.0; 3 cr.

313 Graduate Seminar in Folk Literature. 3.0; 3 cr. Prerequisite: 247.

315 Graduate Seminar in Comparative Literature. 3.0; 3 cr.

317 Graduate Seminar in Advanced Semitics or Linguistics. 3.0; 3 cr.

351 Special Topics. 1-3 cr.

399 M.A. Thesis.

401 Tutorial in Classical Arabic Literature. 3 cr.

499 Ph.D. Thesis.

DEPARTMENT OF BIOLOGY

Chairperson:	Talhouk, R.
Professors:	Baydoun, E.
Associate Professors:	Dagher, S.; Ghali-Mohtasib, H.; Kreydiyyeh, S.; Safieh-Garabedian, B.; Talhouk, R.
Assistant Professors:	Darwiche, N; Greipsson, S.; Knio, K; Nasr, S.; Tarraf, C.
Lecturers:	Harakeh, N.
Instructors:	Kassis, A.; Rizkallah, H.; Sinno-Saoud, N.

The Department of Biology offers programs leading to the degrees of Bachelor and Master of Science. All students admitted as Sophomores are eligible to continue in the program provided they obtain a minimum grade of 70 in each of Biology 201 and Biology 202. *No Biology major is allowed to register for a Biology course for a third time.* Transfer to the Biology major from other departments within the Faculty of Arts and Sciences requires departmental approval.

UNDERGRADUATE PROGRAM

Requirements for the B.S. degree in Biology are as follows: Biology 201, 202, 220, 223, 260, 270, and 293 or 294, plus a minimum of 14 credits in Biology elective courses; Chemistry 201, 206, 210, 211 and 212; Mathematics 208 and 209; Physics 204, 205, 206, and 207. Biology majors are given the option of taking a 4 credit Biology course instead of Chemistry 206 as part of the requirements for graduation.

103 Introductory Biology I. 3.3; 4 cr.; Fall. Not open to Biology majors. An introduction to living organisms including molecular and cellular aspects, tissues, organs and organ systems.

104 Introductory Biology II. 3.3; 4 cr.; Spring. Prerequisite: 103. Not open to Biology majors. Provides a brief introduction to classical and molecular genetics, developmental biology, evolution, behavior, ecology and diversity of living organisms.

200 Basic Concepts of Biology. 3.3; 4 cr. annually. An introduction to the fundamental principles of biology. It covers the chemical basis of life, the structure and function of cells, tissues and systems, the classification and diversity of plants and animals, as well as genetics, evolution, development and ecology. Members of Department.

201 General Biology I. 3.3; 4 cr.; each semester. Covers the fundamental principles of biology as applied to human beings, with emphasis on the morphology, physiology and disorders of their different systems. Members of Department.

202 General Biology II. 3.3; 4 cr.; each semester. Prerequisite: 201. An integrated approach to the biology of organisms covering perpetuation of life (emphasizing the molecular level), evolution, ecology, behavior, classification and diversity. Members of Department.

210 Human Biology. 3.0; cr.; Fall. Not open to Biology Majors. *Students cannot receive credit for both 201/202 and 210.* Covers the fundamental principles of biology as applied to human beings, with emphasis on the morphology, physiology and disorders of their different systems.

220 Introductory Biochemistry. 3.0; 3 cr.; Spring. Prerequisite: Chemistry 212. An introduction to the structure-function relationships of biomolecules, cells, enzymes and the metabolic reactions of living cells.

223 Genetics. 3.3; 4 cr.; each semester. Prerequisite: 202. Deals with the basic principles of classical and molecular genetics with emphasis on the analysis of genetic material and genetic processes at the molecular level.

224 Microbiology. 3.3; 4 cr.; each semester. Prerequisite: 223. Deals with micro-organisms, especially bacteria, and in particular those of pathogenic and industrial importance. Basic knowledge on isolation, classification, and the various metabolic processes is included.

230 Plant Morphology. 3.3; 4 cr.; Spring. Prerequisite: 202. A study of the form and structure of the different plant divisions on the basis of similarity of plan and origin. Both reproductive and non-reproductive organs are studied.

233 Non-Vascular Plants. 2.3; 3 cr.; Fall. Prerequisite: 202. An introduction to the world of non-vascular plants, emphasizing their ecological and economic important as well as their taxonomy and morphology.

234 Vascular Plants. 2.3; 3 cr.; Spring. Prerequisite: 202. Deals with the structure, life history and classification of the vascular plants, including psilophytes, club mosses, horsetails, ferns, conifers and flowering plants, emphasizing their evolutionary relationships.

235 Plant Anatomy. 2.3; 3 cr.; Fall. Prerequisite: 202. Deals with the structure and function of tissues and organs of higher plants. their origin and differentiation.

236 Plant Taxonomy. 2.3; 3 cr.; Spring. Prerequisite: 202. Deals with the identification, naming and classification of flowering plants, conifers, ferns and their natural relationships. Includes field trips.

240 Animal Behavior. 3.0; 3 cr.; Fall. Prerequisite: 202. Covers the basic concepts of animal behavior including physiological, genetic, ecological and evolutionary aspects as well as exploration of the controversial ideas of sociobiology.

241 Biology of Invertebrates. 3.3; 4 cr.; Fall. Prerequisite: 202. A study of invertebrates, excluding insects, emphasizing their morphological and functional diversity, phylogenetic relationships, classification, development and adaptation.

242 Comparative Vertebrate Anatomy. 3.3; 4 cr.; Spring. Prerequisite: 202. A comparative study of the structure and function of selected examples of chordate animals with a presentation of the history of structural organization and association of structural changes with functional adaptations.

246 Marine Biology. 3.3; 4 cr.; Spring. Prerequisite: 202. A study of the physical, chemical and biological factors that contribute to the ecology of the marine environment, nutrient cycles and productivity in the oceans and distribution of marine animals and plants in biozones.

247 Animal Physiology. 3.0; 3 cr.; Fall. Prerequisite: 202. A study of the fundamental principles and mechanisms that govern body functions in animals, with an emphasis on the molecular aspects.

248 Animal Physiology Laboratory. 0.3; 1 cr. Pre- or co-requisite: 247.

249 Parasitology. 3.3; 4 cr.; Fall. Prerequisite: 202. Provides a general overview on the classification, morphology, development and physiology of human and animal parasites.

250 Biosphere. 3.0; 3 cr. Prerequisite: 202. The course focuses on defining global environmental problems and introducing methods and models that can help to eliminate or reduce these problems.

251 Man and the Environment. 3.0; 3 cr.; Fall. Not open to Biology majors. Examines problems arising from population growth, certain agricultural practices, industrialization, exploitation of resources, etc., and discusses possible methods of conservation of existing resources and development of others. Includes field trips.

252 Ecology. 3.3; 4 cr.; each semester. Prerequisite: 202. The study of organisms in relation to their biotic and abiotic environment. It deals with population growth and regulation, species diversity, age structure, succession, food chains, energy flow and recyling of nutrients.

254 Evolution. 3.0; 3 cr.; Spring. Prerequisite: 223. Includes the study of the processes that bring about evolutionary changes in organisms, evolutionary trends, patterns of adaptations and principal factors that influence the patterns of speciation.

257 Microtechnique. 1.5; 3 cr.; Fall. Prerequisite: 202. Deals with the basic methods and standard techniques used in the preparation of different organisms or their components for study with the light microscope.

258 Histology. 2.3; 3 cr.; Spring. Prerequisite: 202. An introduction to the study of morphology and its relation to composition and function in the different constituents of tissues in living systems.

260 Cell Biology. 3.3; 4 cr.; each semester. Prerequisite: 220. Provides an understanding of the structure and function of the cell with its various organelles and components.

262 Virology. 3.0; 3 cr.; Spring. Prerequisite: 223. Provides a general overview on the classification and biophysical and biochemical characteristics of bacterial, plant and animal viruses.

263 Immunology. 3.0; 3 cr.; Fall. Prerequisite: 202. An introduction to basic immunology, types of immune responses and basic aspects of the specific and non-specific body defense mechanisms as well as the primary immunological diseases and disorders.

268 Introduction to Biotechnology. 3.0; 3 cr.; Spring. Prerequisite: 223. Application of recombinant DNA techniques to animal, plant and microbial biology. The course describes the use of genetically engineered microbes to clean the environment from chemical pollutants.

269 Laboratory Techniques in Biology. 1.4; 3 cr.; each semester. Prerequisite: 220. Basic techniques and experimental methods employed in biological research.

270 Plant Physiology. 3.3; 4 cr.; each semester. Prerequisite: 220. A study of the vital processes that occur in flowering plants, including biophysical and metabolic processes, with emphasis on photosynthesis, growth and development. Also deals with plant responses to the physical environment.

272 Phycology. 3.3; 4 cr.; Spring. Prerequisite: 202. Deals with the structure, life history and classification of the different algal groups, taking into consideration their contribution to the biosphere as primary producers and their economic importance.

273 Economic Plants. 3.0; 3 cr.; Fall. Prerequisite: 202. Deals with man's relationship to plants and their economic interest, including their diversity of use in industry and production of food and medicine.

275 Mycology. 3.3; 4 cr.; Fall. Prerequisite: 202. An introduction to the fungi with respect to their structure, physiology, life history and classification, emphasizing their role in food production and decomposition, production of drugs and antibiotics, and in human and plant diseases.

280 Endocrinology. 3.0; 3 cr.; Spring. Prerequisites: 220 and 247. A study of the role of chemical messengers in the control of physiological and metabolic processes. It deals with the biosynthesis, chemistry and secretion of hormones as well as their mechanism of action.

281 Ichthyology. 2.3; 3 cr.; Fall. Prerequisite: 246. A study of the different types of fish, their natural history, environmental and ecological adaptations. It also deals with methods of conserving and culturing fish of economic value as well as the effect of pollution on fish fauna.

284 Developmental Biology. 3.3; 4 cr.; Spring. Prerequisite: 202. Includes the study of basic mechanisms, biochemical basis and environmental factors that control embryonic development in both plants and animals, with special emphasis on vertebrate animal systems.

286 Entomology. 3.3; 4 cr.; Spring. Prerequisite: 202. An introduction to the study of insects, their diversity, classification, morphology, biology, behavior, and their medical, ecological and agricultural importance.

290 Special Topics in Biology. 1, 2, 3, or 4 cr.; each semester.

291 and 292 Undergraduate Tutorial. 2 or 3 cr.; each semester. Prerequisites: Senior standing, a minimum average of 80 in the major and consent of instructor.

293 and 294 Undergraduate Seminar. 1 cr.; each semester. Prerequisite: Senior Standing. Credit cannot be obtained for both 293 and 294.

GRADUATE PROGRAM

The Graduate Record Examination is required of all applicants for graduate work. Requirements for the M.S. degree in Biology as follows:

1. A minimum of 21 graduate level course credits. Required courses are 315, and 393 or 394.
2. Students are required to submit a thesis based on independent research.

310 Quantitative Methods in Biology. 2.3; 3 cr. Prerequisites: Math 208, Math 209 or consent of instructor. Emphasizes advanced statistical methods for biology. Includes use of computers and some software and hardware applications in various fields in biology.

315 Research Techniques in Biology. 1.5; 3 cr. Prerequisite: 260. A core course that provides practical experience in a variety of techniques currently employed in biological research, providing an understanding of their application and result interpretation.

320 Enzymology. 3.0; 3 cr. Prerequisite: 220. Describes the nature and mode of action of biological catalysts. It explains the principles of enzyme assay and the techniques used in the purification and characterization of enzymes.

328 Plant Biochemistry. 3.0; 3 cr. Prerequisite: 270. Provides information in areas of biochemistry unique to plants, including that of the cell wall, photosynthesis, assimilation of mineral nutrients, natural products and growth substances.

330 Advances in Molecular Genetics. 3.0; 3 cr. Prerequisites: 223, 260. Includes a discussion of recent developments in molecular genetics and provides an understanding of the molecular mechanisms underlying gene regulation and tissue-specific gene expression.

332 Advances in Cell Biology. 3.0; 3 cr. Prerequisites: 223, 260. Includes a discussion of recent findings in cell biology, emphasizing understanding of the research approaches used to elucidate major processes that regulate the normal function of the cell.

333 Biochemical Messengers. 3.0; 3 cr. Prerequisite: 260. A study of the intercellular and intracellular signaling via nerves, hormones, local mediators and growth factors.

336 Mechanisms of Development. 3.0; 3 cr. Prerequisites: 223, 260. Employs an experimental analysis approach for the study of different developmental events with emphasis on cellular and molecular mechanisms.

341 Advances in Microbiology. 3.0; 3 cr. Prerequisites: 220, 224. A study of energy metabolism of various microbial groups emphasizing degradation of organic compounds under aerobic and anaerobic conditions. It also deals with applications of microorganisms in industrial, medical and environmental fields.

350 Advances in Immunology. 3.0; 3 cr. Prerequisite: 263. Includes a discussion on recent developments concerning the immune system and its relation to other systems of the body.

360 Ecophysiology. 3.0; 3 cr. Prerequisites: 247, 270. Physiological adaptations and responses, growth, survival and reproduction of living organisms in stress and extreme environmental conditions.

362 Advanced Ecology. 2.3; 3 cr. Prerequisite: 252. Discussion and analysis of topics of current interest in ecology with emphasis on population and community dynamics; methods of ecological investigation and analysis; includes field work.

390 Special Topics in Biology. 1, 2, 3 or 4 cr. Prerequisites: Graduate standing and consent of instructor. Members of Department.

391 and 392 Tutorial. 2 or 3 cr. Prerequisite: Consent of instructor. Members of Department.

393 and 394 Seminar. 1 cr.

399 M.S. Thesis.

GRADUATE SCHOOL OF BUSINESS & MANAGEMENT

Director:	Baalbaki, I.
Associate Professors:	Eid, N.; Najjar, G.; Shibl, Y
Visiting Associate Professor:	Elfakhani, S.
Assistant Professors:	Abdallah, H.*; Baalbaki, I.; Dedoussis, E.; Ghaziri, H.
Visiting Assistant Professor:	Al-Tannir, A.
Lecturers:	Abdallah, K.; Chamseddine, H.; Dabbagh, S.; El-Khalil, Y.; Fahed, N.; Nakib, K.; Nasr, R.; Sidani, Y.;
Instructors:	Abou-Nasr, W.; Abul-Husn, K.; Ali-Hassan, H.; Al-Khalil, Z.; Al-Masri, M.; Araby, N.; Arbid, F.; Barakat, M.; Baroudi, E.; Elias, R.; El-Akkaoui, W.; El-Khatib, S.; Geotcherian, R.; Gemayel, E.; Hamdan,W.; Hitti, B.; Jaber, R.; Jammoul, N.; Jundi, T.; Khauli-Hanna, L.; Kheireddine, M.; Mehchi, M.; Menassah, S.; Mogharbel, W.; Mroue, A.; Osman, R.; Raffoul, R.; Rizk, A.; Seyouri, D.; Yared, H.; Yazbeck, A.
Assistant Instructor	Naim, K.

The Graduate School of Business & Management offers two programs: one leading to a Bachelor's degree and the other to a Master's degree in Business Administration. The aim of the School is to provide a well-rounded professional education in business.

The School has the following objectives:

(1) To provide a broad education designed to prepare individuals for professional and managerial positions with decision-making responsibilities.

(2) To introduce students to the basic functional fields of management and give them the opportunity to develop competence in particular areas of interest.

(3) To develop the student's capacity for independent study and continued professional growth.

(4) To prepare graduates for responsible positions in business and government.

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* On leave for the first semester.

UNDERGRADUATE PROGRAM

Students wishing to major in Business Administration are admitted by the Admissions Committee of the Faculty of Arts and Sciences. They are accepted as provisional majors in the sophomore year and are not allowed to register in business courses numbered 212 or above until they have completed Bus. Adm.201 and 256, Econ.211 or 212, Math 204 for Science students or Math 203 for Art Students, and English 203 with an overall average of 70 in the aforementioned courses. These requirements must be completed within two semesters and a summer session after entrance into the School if student starts at the English 102 or 203 level (or 3 semesters if he/she starts at 101 level). A student who does not fulfill the above requirements will be asked to select another major.

Beginning with the sophomore year, a minimum of 48 credits in Business courses, (6 credits of which are electives), 9 credits in Economics, 12 credits in Civilization Sequence Program, 12 credits in Arabic and English, 3 to 6 credits in Mathematics, and 3 to 6 credits in elective courses outside the School are required for the degree of B.B.A.

Required Business courses areas follows: 201, 212, 220, 223, 224, 231, 241, 251, 252, 254, 255, 256, 257, and 261.

201 **Introduction to Financial Accounting**. 4.0; 4 cr.; annually. Prerequisite: English 101.An overview of financial accounting. Topics covered include basic concepts of accounting, the accounting cycle, financial statements, accounting for merchandising operations, cash, receivables, inventories, plant assets, liabilities, partnerships, corporations, statement of cashflows.

212 **Management & Cost Accounting**. 3.0; 3 cr.; annually. Prerequisite: BADM 201. An introduction to internal accounting, including cost behavior and cost volume relationships, relevant information and decision-making, budgeting and budget variance analysis, responsibility accounting and product costing.

213 **Auditing**. 3.0; 3cr. Prerequisite: BADM 214 or 70 in BADM 201. This course covers the function and work of the independent public accountant. Generally accepted auditing standards and accounting principles are covered as well as test of details, test of controls and different types of reporting.

214 **Intermediate Accounting**. 3.0; 3cr. Prerequisite: BADM 201. Underlying principles and reporting standards covering the preparation and presentation of financial statements. Fundamental accounting concepts and conventions are presented as a framework for the study of individual elements of the balance sheet and income statement.

215 **Advanced Accounting**. 3.0; 3cr. Prerequisite: BADM 214 or 80 in BADM 201. Advanced level of financial accounting covering specialized topics that include accounting for business combinations and consolidations, partnerships, fiduciary and institutional entities, and international operations and foreign exchange.

218 **Introduction to Financial and Management Accounting**. 3.0; 3cr.; annually. (For non-BBA graduates). The course presents financial and managerial accounting principles and emphasizes their decision-making implications. Topics covered in financial accounting include financial statements, accounting records and systems, revenues and monetary assets, long-lived assets, sources of capital. Topics covered

in management accounting include the behavior of costs, product costing systems, budgeting and variance analysis, and the management control process.

220 Business Law. 3.0; 3cr.; annually. Prerequisite: Junior standing. This course covers laws pertaining to businessmen, business associations, the business firm, commercial paper, and letters of credit.

Financial Markets and Institutions. 3.0, 3cr.; annually. Prerequisite: 224. A study of the functions and operations of financial institutions. This course covers analysis of existing financial systems, money and capital markets, banks and non-bank financial intermediaries, term structure of interest rates, and securities markets including the stock and bond exchanges.

224 Financial Management. 3.0; 3cr.; annually. Prerequisite: Junior standing, Econ. 211 and 212. To determine and analyze the major decisions a financial manager has to make, including identification of the firm goals, time value of money, use of discount cash flow models, capital budgeting under certainty, capital structure as it relates to cost of capital, and dividend policy.

225 Investment. 3.0; 3cr. Prerequisite: BADM 223. Operations of securities markets, investment policies, valuation of individual securities, and techniques of investing in securities. The course also introduces the students to analysis of investment information, evaluation of risks and returns, and principles of portfolio selection in investment decisions.

Commercial Banking. 3.0; 3cr. Prerequisite: BADM 223. Functions and operations of commercial banks. The course covers the management aspects of commercial banks, liquidity management, assets and liability management, credit analysis, risk management, investment policy, and international banking.

228 Insurance. 3.0; 3cr. Prerequisite: Senior standing. An operational approach to risk management in business and personal affairs. The major thrust is to know the various types of insurance contracts including life, health, property and liability insurance and how to measure and manage risk The course also covers reinsurance, and the know how of making the best use of insurance contracts and coverages.

Finance. 4.0; 4cr. (For non-B.B.A. graduates). Prerequisite: 201. Combines a description and analysis of financial markets and institutions with the principles of financial management of the firm, operation of money and capital markets, discounted cash flows, risk and assets valuation, basics of capital budgeting, cost and structure of capital.

231 Management of Organizations. 3.0; 3cr.; annually. Prerequisite: Junior standing. *Business students cannot receive credit for both BADM.231 & PSPA 275.* The objective of this course is to provide the student with the basis of management theory and practice. Topics include: managerial functions, organization structures, change management, innovation, and leadership.

236 Operations Management. 3.0; 3cr. Prerequisite: BADM. 255. Introduction to operations and productivity studies. The basic elements and classification of production/operations systems and processes are emphasized in addition to the facilities needed for operations and materials management and the different quality control devices.

238 Organizational Behavior. 3.0; 3cr. Prerequisite: BADM 231. A senior level course about human behavior at work. It deals with the impact that individuals, groups, and

structure have on behavior within business organizations, for the purpose of applying such knowledge in order to improve organizational effectiveness.

239 Human Resources Management and Development. 3.0; 3cr. Prerequisite: BADM 231. The course introduces students to the environment and the various functions of human resource management such as human resource planning, human resource development, compensation systems, and employee relations.

241 Marketing Management. 3.0; 3cr; annually. Prerequisite : Econ. 211. Introduces basic concepts and practices of modern marketing as they are applied in a variety of settings: in product and service firms, consumer and business markets, and small and large businesses. Students are required to apply the theoretical concepts in case studies and actual settings.

245 International Marketing. 3.0, 3cr. Prerequisite: BADM 241. Introduces the elements of international marketing and assesses the impact of changes in the global environment on marketing strategies and policies. The course follows a practical approach as the students are required to apply the theoretical concepts in case studies and actual settings.

246 Marketing Research. 3.0; 3cr. Prerequisites: BADM 241 and 254. Designed to provide a thorough coverage of various marketing research tools along an applied orientation. A systematic coverage of the steps comprising the marketing research process, starting with research problem definition and terminating with data collection and analysis.

251 Managerial Economics. 3.0; 3cr.; annually. Prerequisite: BADM 254. This course applies the principles of economic theory to business practices to improve the decision-making process of the firm under conditions of risk and uncertainty. Demand analysis, production and cost analysis and pricing of goods and services in different market structures are emphasized.

252 Macro Business Analysis. 3.0; 3cr; annually. Prerequisite: Econ. 212. *Business students cannot receive credit for both 252 and Economics 227*. Topics covered include output and interest rate determination, fiscal and monetary policy, balance of payments and exchange rate determination. Emphasis is placed on the Lebanese experience and the business implications of the macro-economic environment.

254 Quantitative Methods for Business Decisions. 3.0; 3cr.; annually. Prerequisite: Econ. 213. *Business students can not receive credit for both 254 and Economics 214.* This is an intermediate course in business statistics which emphasizes the use of statistics as a basic decision-making tool, covering topics such as inferential analysis, regression and correlation analysis, forecasting techniques, and introduction to decision theory.

255 Operations Research. 3.0; 3cr.; annually. Prerequisite: Econ. 213. Introduction to the application of mathematics to business and management. The stress is on the formulation of business problems in mathematical models. The mathematical techniques used to solve difficult and complex problems will be considered.

256 Business Data Processing 3.0; 3cr. ; annually. An introductory computer course that covering basic hardware concepts for the business user. The software component familiarizes students with a standard spreadsheet package (Excel™) and simple programming (Visual Basic™).

257 Business Information Systems. 3.0; 3cr. annually. Prerequisite: BADM 256 or equivalent. Introduces the fundamental concepts of Business Information systems:

components, analysis, design and building. The major applications of computer-based information systems in business will be discussed, with a focus on Microsoft Access™.

261 Strategic Planning and Policy Formulation. 3.0; 3cr. annually. Prerequisite: BADM 231 and Senior standing. The course provides a basis for an integral approach to strategic management, stressing the general manager's perspective. It covers strategy formulation, implementation of strategy and policy, and evaluation and control of strategy in various types of organizations.

Senior Tutorial. 3.0; 3cr. Prerequisite: Senior standing.

M.B.A. PROGRAM

The M.B.A. program is designed for students who have the aptitude and motivation to pursue the study of Business at the graduate level. The program is structured with sufficient flexibility to serve qualified individuals who possess a bachelor's degree in Business Administration, as well as those who hold degrees in non-business fields.

The Master of Business Administration (M.B.A.) degree requires the completion of a minimum of 33 credits and a project taken either on a full or part-time basis. The required courses for the MBA are: Business Administration 304, 310, 320, 330, 340, and 341.

A student who has not taken undergraduate business and economics courses may be required to complete up to 27 additional credits in the prerequisite area. These courses provide enrichment in fundamental business areas. The number of credits required in the prerequisite area is determined on an individual basis.

Admission to the M.B.A. program will be granted only to applicants holding a bachelor's degree from an accredited institution who show promise of success in graduate business studies. Among the criteria used for admission are undergraduate grade-point average, relevant work and experience, and performance on the Graduate Management Admission Test (GMAT).

300 Special Topics. 3.0; 3cr.

301 Graduate Tutorial. 3-6cr.

303 Business Economics Analysis and Forecasting. 3.0; 3cr. Prerequisites: BADM 251, 254 or equivalent. The application of economic theory tools to business decision, using a variety of multivariate models and computer packages. Forecasting of demand, production and cost-output relationships and pricing models are presented.

304 Statistical Methods in Business Research. 3.0; 3cr.; annually. Prerequisites: BADM. 254 or equivalent. The course is designed to offer an advanced understanding of univariate and multivariate data analysis procedures. It attempts to provide a thorough coverage of the various statistical analysis tools by touching upon

their theoretical foundations and emphasizing their application in business and marketing research undertakings.

305 Seminar in Accounting Theory. 3.0; 3cr. Prerequisite: B.ADM 201 or equivalent. The course develops an overview and a perspective of accounting. It covers a historical exploration of accounting conventions and principles and deals with topical current issues in accounting. Efforts to establish standards for the profession in the U.S., internationally, and in the Middle East are reviewed.

306 Advanced Management and Cost Accounting. 3.0; 3cr.; annually. Prerequisite: BADM 212. Management use of accounting data for decision-making, planning, and control. Topics covered include: cost behavior patterns and estimation; cost analysis and pricing decisions.

310 Organization Theory. 3.0; 3cr.; annually. This course investigates the conceptual foundations of organizations and examines its varied managerial applications. Methods of inquiry, and cross-cultural transferability of the intellectual managerial tradition are highlighted and brought to bear on key issues in management practice.

311 Organizational Behavior. 3.0; 3cr. This course focuses on the human subsystem within the organizational complex and examines alternative approaches for linking individual psychological proclivities, group dynamics, and organizational requirements.

312 Human Resources Development. 3.0; 3cr. An analysis of human resources theory and principles focusing on the practical application of human resources development issues. Topics include: Job description and analysis, recruitment, training and performance appraisal, promotions, and wage and salary policies and administration.

313 Future Management Trends. 3.0; 3cr. Focuses on those existent trends which can be identified as shaping the managerial requirements of the future, the changes developing from the impinging factors and forces in our society. Emphasis is on emerging issues affecting managerial behavior.

320 Marketing Management. 3.0; 3cr.; annually. Examines the marketing management process. Topics covered include the societal, managerial and strategic underpinnings of marketing theory and practice; the marketing environment; forecasting markets and market segmentation and targeting; elements of the marketing mix.

321 Marketing Research. 3.0; 3cr. Prerequisite: BADM 241 or 320. Advanced understanding of market research with emphasis on application, thorough coverage of the steps comprising the process from defining the problem, to developing an approach, to formulating a research design and designing questionnaires, to data collection, analysis, and interpretation.

322 Consumer Behavior. 3.0; 3cr. Prerequisite: BADM 241 or BADM 320. A behavioral science perspective is followed to describe, understand, and predict the behavior of consumers in the marketplace. The course also magnifies the basic decision making processes followed by consumers when faced with a choice situation.

323 Promotion and Advertising. 3.0; 3cr. Prerequisite: BADM 241 or BADM 320. The various facets of marketing communications are individually assessed and collectively evaluated in terms of their relative importance in the promotional mix of a particular company. The applications of the promotion-related theories and concepts are stressed with emphasis on advertising and sales promotion.

324 Product Planning. 3.0; 3cr. Prerequisite: BADM 241 or BADM 320. The course offers a discussion of issues related to product design, branding, product positioning, test marketing, market segmentation, product portfolio management, as well as new product development process.

325 Strategic Marketing. 3.0; 3cr. Prerequisite: BADM 241 or BADM 320. Focuses on the development, implementation, and evaluation of marketing strategy and marketing policies for both established and new products in the light of company goals and objectives, company resources, and the marketing environment.

326 International Marketing. 3.0; 3cr. Prerequisite: BADM 241 or BADM 320. The course offers an advanced investigation of the international marketing environment. The theoretical content extends to recent findings in research related to international marketing strategy and decisions. This is coupled with a practical application of these theoretical concepts in case studies.

327 Advanced Statistical Methods in Marketing Research. 3.0; 3cr. Prerequisite: BADM 304. Designed to offer an advanced understanding of multivariate data analysis procedures. It attempts to provide a thorough coverage of a handful of advanced statistical analysis tools by touching upon their theoretical foundations and emphasizing their application in marketing research undertakings.

330 Financial Analysis and Policy. 3.0; 3cr.; annually. Prerequisite: BADM 229 or equivalent. The course covers topics such as financial management decision making, financial planning and control techniques such as forecasting financial needs, operating and financial leverage, capital budgeting under uncertainty, cost of capital, optimal financial structures, modern capital structure theories, leasing, working capital policies, and the treatment of risk.

331 Investment Analysis. 3.0; 3cr. Prerequisite: BADM 229 or equivalent. The course focuses on securities markets, investment risk-return tradeoff, asset pricing models, and stock price behavior in relation to technical analysis and to capital market efficiency hypotheses. The course also covers issues related to portfolio management and performance measures. Particular emphasis is placed on stocks, bonds, and financial futures and options.

332 International Business Finance. 3.0; 3cr. Prerequisite: BADM 229 or equivalent. A study of international financial markets and instruments. Topics covered include operations of money and capital markets, balance of payments, exchange rates theories, management of foreign exchange risk, international capital budgeting, working capital management, direct foreign investment, political risk analysis, international banking and taxation, and currency forward, futures and options markets.

333 Central Banking and Monetary Policy. 3.0, 3cr. Prerequisite: BADM 229 or equivalent. The role of the central bank in the national economy and the policy tools at its disposal to stabilize the economy. Tools of monetary policy are reviewed with special reference to Lebanese policy.

334 Commercial Bank Management. 3.0; 3cr. Prerequisite BADM 229 or equivalent. Financial decision-making procedures and policies of commercial banks. The course focuses on regulatory environment, management of assets and liabilities, credit analysis, strategic credit decision, applications of financial engineering in risk management, and management of assets and liabilities of commercial banks using the portfolio analysis approach and capital adequacy indicators.

335 Corporate Finance. 3.0; 3cr. Prerequisite BADM 330. This course examines the role of financial strategy in the overall business policy, formulating and implementing financial policies. Case analysis covers issues such as management of short-term and long-term assets, raising capital, distribution and retention of earnings, agency problems, mergers and acquisitions, corporate failure and restructuring.

336 Financial Instruments. 3.0; 3cr. Prerequisite BADM 331. This course examines a host of financial instruments and considers their use in financial management of corporations. Options and futures exchanges are examined from an economic perspective, and various pricing models of options and futures are considered.

340 Business Strategy and Policy. 3.0;3cr.; annually. Prerequisite: completion of 8 or more graduate courses. Focus of course is on strategy formulation, and implementation and development of policies in a changing environment for both profit and non-profit organizations.

341 Management Information Systems. 3.0; 3cr.; annually. Prerequisite: BADM 256 or equivalent. The main objective is to build a basic understanding of the value and uses of information systems for business operations, management decision making, and strategic advantage. The focus of the course is on real world managerial applications of information systems concepts.

342 Managerial Problem Solving. 3.0;3cr. A graduate seminar in managerial problem solving and decision support systems. Relevant literature is critically examined in so far as it influences problem-solving strategies, models, formats, and evaluation methods.

350 Project Evaluation. 3.0; 3cr. Prerequisite: BADM 229 or equivalent. Capital budgeting techniques and major investment criteria applied in the selection, screening and adoption of both public and private projects are explored.

351 Project Management. 3.0; 3cr. Prerequisite: BADM 229 or equivalent. This course focuses on the planning and implementation aspects of projects. Network approach is emphasized and different productive optimizing techniques such as PERT and CPM are presented to control projects execution.

352 Production and Operations Management..3.0; 3cr.; Prerequisite: BADM 255 or equivalent. A study on the influence of operations planning and management on increasing productivity and quality while minimizing costs. Topics covered include business strategy and competitiveness, quality management, business process re-engineering, resource management processes, inventory management, supply chain management, and agile systems.

398 Project.

CENTER FOR ARAB AND MIDDLE EAST STUDIES (CAMES)

Director: Palmer, M.

The Center for Arab and Middle East Studies (CAMES) offers an interdisciplinary and interdepartmental graduate program providing opportunities for study and research on the modern Middle East. The program draws on the resources of the following Departments in the Faculty of Arts and Sciences: Arabic and Near Eastern Languages, Economics, History and Archaeology, Philosophy, Political Studies and Public Administration, and Social and Behavioral Sciences.

The CAMES' program offers the degree of Master of Arts in the field of Modern Middle Eastern Studies.

The core courses of the program include: a Middle East Area course, two electives, two graduate courses in the department of concentration, and a Middle Eastern language course. A thesis showing competence in methodology and in the candidate's area of concentration is required. A written comprehensive examination covering the first year area course and the field of study of the candidate must be taken upon completion of the course.

All students in the program are expected to attain reading and speaking proficiency in one of the major modern Middle Eastern languages: Arabic, Persian, Turkish, or Modern Hebrew. Students who already have an adequate knowledge of one such language will be required to study another.

Requirements for admission to the M.A. degree, as found in the chapter "Graduate Study" at the end of this catalogue, apply to the CAMES graduate program. Former knowledge or study of the Middle East is not a prerequisite. However, applications will be considered on an individual basis and students may be asked by CAMES to take additional undergraduate and graduate courses.

The Center also sponsors lectures and conferences.

CENTER FOR BEHAVIORAL RESEARCH

Director:	Khalaf, S. G.
Executive Committee:	Imam, A.; Khalidi, M.A.; Khazen, F.; Seikaly, S.
Post-Doctoral Fellow:	Al-Bagdadi, N.; Makdisi, U.

The Center encourages, coordinates and sponsors interdisciplinary research in the behavioral and social sciences, and humanities. It also promotes dissemination of research findings through special workshops, seminars and publications.

Its programs and activities include international lecture series, and visiting and post-doctoral fellowships to expedite contacts with innovative and prominent world scholars. The Center also sponsors summer research grants for faculty and stipends for graduate students.

All full-time members of the Department of Social and Behavioral Sciences are members of the Center. In addition, some members of other departments in the Faculty of Arts and Sciences working on problems related to behavioral sciences may be affiliates of the Center. Scholars not in the University but residing in Lebanon may be appointed Associates of the Center upon the recommendation of an appropriate department.

CENTER FOR ENGLISH LANGUAGE RESEARCH AND TEACHING

Director: Shaaban, K.
Associate Professors: Ghaith, G.; Shaaban, K.
Assistant Professor: Ghaleb, M.

The Center has five main functions:

1. In cooperation with the Departments of English and Education it sponsors a program leading to an M.A. degree in the Teaching of English as a Foreign Language (TEFL).

2. It maintains a state-of-the-art computer-assisted language learning facility and a Materials Center comprised of a collection of textbooks, journals, reports, and visual aids, which are available for inspection.

3. It offers consultation services and assistance in all aspects of English language teaching, curriculum design, material development, assessment, and teacher training throughout the Middle East.

4. It engages in research in language learning problems and produces materials for specialized English language programs.

5. In cooperation with the Office of the Vice-President for Research and External Programs (REP) and the Division of Education (DEP), it sponsors TEFL Workshops for elementary and secondary school teachers.

DEPARTMENT OF CHEMISTRY

Chairperson:	Sultan, R.
Professor:	Haddadin, M.
Visiting Professors:	Schlenoff, J.
Associate Professors:	Kasparian, M.; Salameh, A.; Sleiman, H.; Sultan, R.
Assistant Professors:	Al-Ghoul, M.; Bassin, P.; Halaoui, L.; Kortz, U.
Instructors:	Darwich, L.; Deeb, H.; Farhat, T.; Harakeh, M.; Hammoud, C.; Jaber, R.; Mansour, R.; Sadek, S.; Ubayd, H.
Assistant Instructors:	El-Sabbagh, F.; Muhtar, N.; Mokadem, M.

UNDERGRADUATE PROGRAM

Students are accepted as provisional majors in the sophomore year. In order to be accepted as a regular major in the junior year, a student must have passed Chemistry 201 and 205, with a minimum average of 70 in each, must obtain a 70 average in all other chemistry courses taken, and a minimum average of 70 in all science courses (Mathematics and Physics). As a major, the student must maintain an average of 70 or better in the major courses and must complete the following minimum requirements: Chemistry 211, 212, 213, 215, 216, 217, 218, 219, 220, 225, 228, and 229; Mathematics 201, 202 and 209; Physics 211 and 213.

Freshman students who intend to major in chemistry should complete the sequence Physics 101, 105, or 102, 106 in their freshman and sophomore years.

Premedical physics requirements for chemistry majors are Physics 212 and 214 or 228 and 229.

101 General Chemistry I. 3.3; 4 cr.; each semester. An introductory course covering atomic structure, chemical bonding, gas laws, stoichiometry, solutions, chemical equilibrium, and other basic concepts. Includes laboratory practice.

102 General Chemistry II. 3.3; 4 cr.; each semester. Continuation of Chemistry 101, which is prerequisite. Acid-base and solubility equilibria, introductory thermo-dynamics. A survey of common groups in the periodic table and an introduction to organic chemistry, nuclear chemistry, and electrochemistry. Includes laboratory practice.

200 Basic Chemistry. 3.0; 3 cr.; each semester. Students cannot receive credit for both 200 and 201. A course that stresses the fundamental chemical principles, such as stoichiometry, acids and bases, the phases of matter, basic thermodynamics, and solutions. Designed for students majoring in agriculture, nursing, public health, and medical laboratory technology.

201 Chemical Principles. 3.0; 3 cr.; each semester. Students cannot receive credit for both 200 and 201. Introduction to chemical principles. A theoretical course

stressing atomic structure, bonding, stoichiometry, gases, solutions, gaseous and solution equilibria. Designed for students with a background in chemistry equivalent to Chemistry 101.

202 Introduction to Environmental Chemistry. 3.0; 3 cr.; annually. Prerequisite: 101 or equivalent. *Students can receive credit for 201 and 202.* The course introduces students to the fundamentals of physical, inorganic, and organic chemistry, with applications to environmental problems. The course covers stoichiometry, chemical periodicity, atomic and molecular structure, chemistry of the more common elements, condensed phases and solutions, equilibrium, acids and bases, introductory organic chemistry and biochemistry.

203 Introductory Chemical Techniques. 1.3; 2 cr.; each semester. Pre- or co-requisite: 200. A laboratory course having quantitative experiments, gravimetric, volumetric and gasometric, as well as inorganic semi-micro qualitative analysis.

205 Introductory Chemistry Laboratory. 1.4; 2 cr.; each semester. Pre- or co-requisite: 201. A laboratory course on some of the methods of quantitative analysis as well as inorganic semi-micro qualitative analysis. Open to Chemistry majors.

206 Quantitative Analysis. 3.4; 4 cr.; each semester. Prerequisite: 201. Not open to chemistry majors. *Students cannot receive credit for both 206 and 215-216.* The course covers gravimetric and volumetric techniques; acid/base, complex formation, and redox titrations; electrochemistry and an introduction to instrumental methods of quantitative analysis. The course is designed for biology majors.

208 Brief Survey of Organic Chemistry. 3.0; 3 cr.; each semester. Prerequisite: 102 or equivalent; 209 should be taken concurrently. *Students cannot receive credit for both 208 and 211.* Designed for students majoring in Agriculture, Nursing, and Public Health. A brief survey of the following topics: hydrocarbons, stereoisomerism, organic halogens, oxygen containing groups, carbonyl group, carboxylic acids and their derivatives, amines, carbohydrates and amino-acids.

209 Introductory Organic Laboratory. 1.4; 2 cr.; each semester. Pre- or co-requisite: 208. *Students cannot receive credit for more than one course among 209, 210 and 213.* Basic experiments in organic chemistry including synthesis and techniques of separation and purification of organic compounds.

210 Organic Laboratory for Non-Majors 1.4; 2 cr.; each semester. Pre- or co-requisite: 212. *Students cannot receive credit for more than one course among 209, 210 and 213.* Basic experimental techniques in organic analytical chemistry (melting and boiling point, chromatography, distillation, extraction, recrystallization), performing reactions in synthetic organic chemistry.

211 Organic Chemistry I. 3.0; 3 cr.; each semester. Prerequisite 201. *Students cannot receive credit for both 208 and 211.* Designed for chemistry majors and pre-medical study. An introduction to organic chemistry organized according to functional groups. Synthesis, properties and reactions of aliphatic and aromatic hydrocarbons and alkyl halides, with emphasis on mechanistic and stereochemical aspects of organic reactions.

212 Organic Chemistry II. 3.0; 3 cr.; each semester. Prerequisite 211. Designed for chemistry majors and pre-medical study. Students should take 210 or 213 concurrently. Synthesis, properties and reactions of organic functional groups, including alcohols and ethers, aldehydes and ketones, carboxylic acids and derivatives, amines, phenols and aryl halides; chemistry of difunctional compounds

and of molecules of biological importance, including carbohydrates, proteins and nucleic acids; organic structure determination by spectroscopic methods. Emphasis will be placed on reaction mechanism and stereochemistry, as well as the design of multi-step syntheses.

213 Organic Chemistry Laboratory. 1.8; 4 cr.; annually. Pre- or co-requisite: 212. *Students cannot receive credit for more than one course among 209, 210 and 213.* Experiments in purification, separation, and synthesis of organic compounds. Open to Chemistry majors.

215 Analytical Chemistry. 3.0; 3 cr.; each semester. Pre-requisites: 201, 205; Math 201. *Students cannot receive credit for both 215 and 206.* The course covers fundamental analytical processes, including solution equilibria titrations, electrochemical theory and applications, chromatography and spectrophotometric techniques.

216 Analytical Chemistry Laboratory. 0.4; 2 cr.; annually. Pre- or co-requisite: 215. Experimental work in related areas of chemical analysis and instrumentation.

217 Chemical Dynamics. 3.0; 3 cr.; annually. Prerequisite: 219. Kinetic theory of gases. Maxwell-Boltzmann distribution. Molecular collisions. Transport properties in gases. Ion Transport. Diffusion laws. Chemical kinetics. Rate laws of complex reactions. Collision theory. Activated complex theory. Dynamic electrochemistry. Polarography and voltammetry.

218 Molecular Structure. 3.0; 3 cr.; annually. Prerequisites: 201, Mathematics 201. Failures of classical physics. Quantum theory. Schrodinger equation. Particle in-a-box. Harmonic oscillator. Rotational motion. Hydrogen atom. Atomic orbitals. Spin. Pauli principle. Complex atoms. Term symbols. Molecular structure. Hybridization. Huckel theory. Rotation, vibration and electronic spectra.

219 Chemical Thermodynamics. 3.0; 3 cr.; each semester. Prerequisites: 201, Mathematics 201, or consent of instructor. Zeroth law. Heat, work and energy. First law. Thermochemistry. Entropy. Second law. Carnot cycle. Third law. Chemical potential. Fugacity. Thermodynamics of chemical reactions. Phase changes and phase equilibria. Thermodynamics of solutions. Colligative properties. Debye-Huckel theory. Equilibrium electrochemistry.

220 Physical Chemistry Laboratory. 0.6; 3 cr.; annually. Prerequisite: 219, pre-or- co-requisite 217. Experiments in thermodynamics, kinetics, electrochemistry, spectroscopy, and exercise in computational chemistry.

225 Organic Structure Determination. 1.6; 4 cr.; annually. Prerequisites: 212, 213. The theory of and practice in the analysis of organic compounds by infrared, visible and ultraviolet spectrophotometry, mass spectrometry and nuclear magnetic resonance spectrometry. Identification in the laboratory of pure organic compounds by chemical and spectral methods. Separation and identification of organic mixtures.

228 Inorganic Chemistry. 3.0; 3 cr.; annually. Prerequisite: 201. Atomic structure, molecular structure (VBT, MOT), molecular shape (VSEPR), symmetry and group theory, the structure of solids (metals, ionic), acids and bases (Bronsted, Lewis, HSAB, solvents).

229 Coordination Compounds. 3.0; 3 cr.; annually. Prerequisite: 228. d-metal complexes (structures and symmetries, bonding and electronic structure, reactions of complexes), electronic spectra of complexes, reaction mechanisms of d-block complexes (ligand substitution reactions in square-planar and octahedral complexes, redox reactions, photochemical reactions).

230 Inorganic Chemistry Laboratory. 1.4; 3 cr.; annually. Prerequisite: 228. Experiments in synthesis, separation, purification and characterization of inorganic main-group and transition metal compounds by IR, UV-Vis and ESR spectroscopy.

291 Petrochemicals. 3.0; 3 cr.; alternate years. Prerequisite: 208 or equivalent. Manufacture and properties of chemicals obtained from natural gas, petroleum and cracked hydrocarbons in petroleum refineries. Importance of petrochemicals to the emerging industries of the Middle East.

299 Independent Study. 3-6 cr. Offered to senior students in good standing, by arrangement with the project director. Independent chemical research carried out under direction of a faculty member, including presentation of the results in the form of a senior thesis.

GRADUATE PROGRAM

The Department offers the M.S. degree in Chemistry. Graduate students may specialize in analytical, inorganic, organic, or physical chemistry. Of the minimum of 21 graduate course credits required for the M.S. degree, a minimum of six credits must be graduate courses in the special field of chemistry in which the student concentrates. At least six additional credits must be graduate courses in chemistry outside the student's field of specialization.

The research interests of the chemistry faculty include: electrochemistry of charged polymers; thin films; synthetic heterocyclic chemistry; nitrogen and sulfur heterocycles; reactive intermediates; cage compounds; coordination and organometallic chemistry; chemistry of transition metal-oxygen cluster complexes; synthesis, characterization and applications of polyoxometalates; molecular recognition; molecular self-assembly; supramolecular chemistry; photocatalysis; photoelectrochemistry of semi-conductors; surface chemistry; irreversible nonequilibrium thermodynamics and statistical mechanics; nonlinear dynamics in chemistry; generalized hydrodynamics; precipitate patterns.

301 Structure of Inorganic Compounds. 3.0; 3 cr.; annually. Electronic absorption spectra of complex inorganic molecules. Vibrational, NMR, NQR, EPR and Mössbauer spectroscopy. Physical methods of determination of the structure of inorganic molecules.

302 Chemistry of the Less Common Elements. 3.0; 3 cr.; alternate years. Chemistry of rubidium, cesium, and francium. The second and third transition metal series. The Lanthanides and the actinides. Gallium, indium and thallium. Germanium, Selenium and Tellurium, the rare gases.

303 Chemistry of the Coordination Compounds. 3.0; 3 cr.; annually. Applications of Orgel and Tanabu-Sugano diagrams. Factors affecting stability of coordination compounds. Stereochemistry. Transeffect. Stabilization of oxidation states. Mechanisms of the reactions of coordination compounds. Catalysis by coordination compounds.

304 Mechanisms of Inorganic Reactions. 3.0; 3 cr.; alternate years. Mechanisms of substitution reactions in octahedral and square planar metal complexes. Mechanisms

of oxidation-reduction, metal ion catalysis and photochemistry. Application of symmetry rules to inorganic reactions. Fluxional molecules.

311 Advanced Organic Chemistry. 3.0; 3 cr.; annually. Electronic interpretation of organic reactions. Correlation of inductive, resonance, and steric effects with reactivity of molecules. Characteristic organic reaction mechanisms. H. Sleiman.

312 Organic Stereochemistry. 3.0; 3 cr.; alternate years. Static and dynamic stereo chemistry of organic systems. Conformation analysis.

313 Physical Organic Chemistry. 3.0; 3 cr.; alternate years. Linear free energy relationships. Solvent and reagent correlations. Isotope effects. Catalysis in weak and strong acid and base medium.

314 Heterocyclic Chemistry. 3.0; 3 cr.; alternate years. A general survey of the synthesis and reactions of selected classes of heterocyclic compounds. Spectroscopic properties and structural relationships. P. Bassin.

315 Chemistry and Technology of High Polymers. 3.0; 3 cr.; alternate years. An introduction to the chemistry of high polymers. Types, mechanisms, and kinetics of polymerization. Structure, characterization, and properties of macromolecules. Preparation, processing, and uses of the more common condensation and addition polymers used in plastics, elastomers, and fibers.

321 Quantum Chemistry. 3.0; 3 cr.; alternate years. Wave mechanics; solutions of time-independent Schrodinger equation; particle in a box; harmonic oscillator; angular momentum; H-atom; atomic orbitals; variational theorem; perturbation theory; polyelectronic atoms; Slater determinants; term symbols; Huckel MO theory; electronic wave functions; SCF and CI calculations.

322 Statistical Thermodynamics. 3.0; 3 cr.; alternate years. General statistical mechanics of independent particles. Partition functions for atoms and molecules, and simple chemical equilibria. Heat capacities of solids. Configuration of polymers. Ensembles. Theory of imperfect gases and of mixtures. Lattice statistics. Irreversible processes.

323 Chemical Kinetics. 3.0; 3 cr.; annually. Rate analysis. Modern experimental techniques. Theories of chemical kinetics. Selected topics in gas phase and solution kinetics.

324 Electrochemistry. 3.0; 3 cr.; alternate years. Modern Electrochemistry. The course covers the fundamentals of electrochemsitry and electrochemical techniques, corrosion and protection of metals and electrochemical sensors (ion-selective electrodes).

351 and 352 Special Topics. 3 cr. May be repeated for credit with consent of the Department.

361 and 362 Tutorial. 3 cr. Chemistry 361 is required of all graduate students in the department. It should be taken during a student's second or third semester of graduate studies, but not during a summer session. Students taking 361 are required to submit written reports to their advisers and to present a seminar before the students and faculty of the department. May be repeated (as 362) with consent of the Department.

399 M.S. Thesis.

CIVILIZATION SEQUENCE PROGRAM

Director:	Shebaya, P.
Associate Professors:	Amyuni, M.; Betts, R.; Butcher, K.; Mousalli, A.; Musallam, B. (visiting); Nassar, C.; Shehadeh, L.
Assistant Professors:	Azzam, I.; Bornedal, P.; Dadoyan, S.; Diab, H.; Jarrar, M.; Kassab, E.; Khalidi, M.; Meloy, J.; Schlenoff, Z. (visiting); Smith, R.; Van Ophuijsen, J.
Lecturers:	Abu- Salih, A.; Arabi, U.; Ferguson, K.; Hamadeh, N.; Kurani, D.; Shebaya, P.
Instructor:	Khoury, S.
Assistant Instructor:	Mansour, R.

The Civilization Sequence Program is basically a series of four one-semester courses (201, 202, 203 and 204) which all students are required to take.

The Civilization Sequence Program is a study of major texts in the history of western Asiatic and European civilizations, extending from the third millennium B.C. to the modern age, and ranging over various disciplines within the humanities and the social sciences. By focusing on primary sources and drawing on interdepartmental and interdisciplinary skills, the Program seeks to develop methods of textual analysis that can be instrumental in the student's intellectual growth. Such methods are explored through dialogue over the most fundamental elements in the cultural heritage of the Middle East and the West. The diversity of disciplines from which teachers in the Program originate, exposes students to different perspectives and interpretations, thus supplementing and providing a common core for their otherwise specialized studies at the University.

An elective course (CVSP 295), over and above the four required courses, is designed to offer students the opportunity to explore more intensively, in original texts, some special topic in cultural studies. The course is offered at the discretion of the Program and is open to qualified students who have completed the four prerequisite CVSP courses. The particular focus of the course varies over the semesters so as to allow interested students to take it for credit more than once. In all of the courses, students attend a general lecture and two discussion groups each week. The discussion groups utilize various seminar methods to help students grasp the meaning of the assigned texts and to develop a critical facility for analysis and independent judgment.

201 and 202 Ancient, Medieval, and Renaissance Culture. 3.0; 3 cr.; annually. English 102 and CVSP 201 are prerequisites for 201 and 202 respectively.

203 and 204 Modern and Contemporary Culture. 3.0; 3 cr.; annually. 201 and 202 are prerequisites for 203; all three courses are prerequisites for 204.

295 Special Topics in Cultural Studies. 3.0; 3 cr.; at the discretion of the Program. Prerequisites: an average of 70 or above in 201 and 202 and a grade of 80 or above in either 203 or 204, or by consent of instructor.

COURSES SUPPLEMENTARY TO THE REGULAR OFFERINGS OF THE PROGRAM

230 Introduction to Feminist Theory. 3.0; 3 cr.; annually. The course examines feminism and its historical development through analysis and critique of the different feminist theories that have emerged during the twentieth century.

250 Introduction to Art Appreciation. 3.0; 3 cr.; annually. Prerequisite: English 102. Introduction to the appreciation of art. The course aims at providing the student with a very general yet comprehensive knowledge of the major aesthetic theories, the various branches of art, techniques and media.

251 Civilization Through the Arts. 3.0; 3 cr.; annually. Prerequisite: 250. The purpose of the course is to synthesize the fields of art, philosophy and socio-cultural studies in a panoramic and comprehensive context. It is planned to bring all forms of human activity into a single focus through the use of spontaneity in the aesthetic experience.

Art 220 Basic Drawing I. 0.6; 3 cr.; annually.

Art 222 Basic Painting Procedure I. 0.6; 3 cr.; annually.

Theater 265 Introduction to Theater. 3.0; 3 cr.; annually. An introductory course on various types of theatrical presentations: realism, anti-realism, tragedy, comedy, romance, etc., with a view to helping students appreciate current developments and experimentation in the theater.

Theater 267 Voice and Acting in the Theater. 2.2; 3 cr.; annually. Basics of clear speaking, vocal projection and acting.

Theater 270 Theater History. 3.0; 3 cr.; annually. An overview of the theater buildings and practices starting with ancient times to the beginning of the twentieth century.

Theater 274 Design in Theater. 2.2; 3 cr.; annually. Basics of design and drawing are taught as applied to theater: specifically stage settings, costume design and poster design.

Theater 283 Workshop in Theater Production. 2.2; 3 cr. An introductory course to the art of theater with a survey of the techniques involved in various plays and/or class production.

German 201 Elementary German I. 3.0; 3 cr.; annually.

German 202 Elementary German II. 3.0; 3 cr.; annually. Prerequisite: German 201.

German 211 Intermediate German. 3.0; 3 cr.; annually. Prerequisite: German 202.

French 201 Elementary French I. 3.0; 3 cr.; annually.

French 202 Elementary French II. 3.0; 3 cr.; annually. Prerequisite: French 201.

French 211 Intermediate French. 3.0; 3 cr.; annually. Prerequisite: French 202.

Music 240 Introduction to the Art of Music I. 3.0; 3 cr.; annually. The purpose of the course is to acquaint the student with the basic elements of music through a survey of the first millennium of Western music up to 1750.

Music 241 Introduction to the Art of Music II. 3.0; 3 cr. Prerequisite: Music 240. A survey of Western music from the death of J.S. Bach through the Classical, Romantic and Modern periods (1750 to present).

Music 242 Applied Music (Choir) I. 1 cr.; annually. This course is designed for those who wish to participate in the performances given by the University Choir. Prior to registration students must audition for the Director.

Music 243 Applied Music (Choir) II. 1 cr.; annually. Further study of the various forms of choral work and expansion of the choral repertoire.

Music 246 Elements and Theory of Music I. 3.0; 3 cr.; annually. Introduction to the art and science of music. Reading notes in different keys, ear training, leading to a basic grounding in the component parts of music.

Music 247 Elements and Theory of Music II. 3.0; 3 cr.; annually. Prerequisite: Music 246. The study of 16th century counterpoint to serve as an understanding of the role harmonic analysis plays as a foundation for composition and interpretation.

Fine Arts 213 Introduction to the History of Art I. 3.0; 3 cr.; annually. Ancient and Medieval: A foundation survey course introducing the students to the art and architecture of the ancient and medieval world in Western Europe, Africa, the Middle East and Asia.

Fine Arts 214 Introduction to the History of Art II. 3.0; 3 cr.; annually. Renaissance to Modern: An historical survey of the art and architecture of Western Europe and America from the fifteenth century to the twentieth century. It also includes post-medieval Islamic, Chinese, and African art and architecture.

Fine Arts 217 The Italian Renaissance. 3.0; 3 cr.; annually. Traces the development of the early Renaissance style in Florence at the hands of Cimabue, Giotta, Masaccio, Donatello, and Ghiberti, the patronage of the Medici in Florence and the Papacy in Rome, and the emergence of the High Renaissance style at the hands of great painters and sculptors such as Leonardo, Raphael, Michelangelo, and Titan.

Fine Arts 224 Art and Architecture of the Middle East 650-1250. 3.0; 3 cr.

Fine Arts 225 Art and Architecture of the Middle East 1250 - present. 3.0; 3 cr.

Fine Arts 260 History of Music III. 3.0; 3 cr. A concentrated survey of one of the following periods of music history: Renaissance, Baroque, Classical, Romantic or Modern/Contemporary as determined by the department.

Fine Arts 290 Special Topics in Islamic Art and Architecture. 3.0; 3 cr. The seminar is an inquiry into meaning in the visual arts of Islam. It will introduce the students to the history of Islamic art and the theories developed around the study of Islamic art.

Fine Arts 291 Special Topics in Islamic Art and Architecture. 3.0; 3 cr. The seminar is an investigation of the notion of space in Islamic cities. Investigation will be initiated through thematic analysis of various spatial types, such as ceremonial space, sacred space, domestic space, with reference to the ever-changing political system, religious rituals, and social gestures.

DEPARTMENT OF ECONOMICS

Chairperson:	Sirhan, G.
Professors:	Makdisi, S.
Associate Professors:	Sirhan, G.
Assistant Professors:	Alami, T.; Jabir, I; Paschakis, J.
Lecturers:	El-Khalil, Y.; Ramadan, U.; Youssef, G.
Instructors:	Rizk, R.; Shalak, R.; Turk-Ariss, R.; Zayyst-Saadeh, M.

UNDERGRADUATE PROGRAM

Students wishing to major in Economics are accepted as provisional majors in the sophomore year until they have passed Economics 211, 212, and English 203 with a minimum grade of 70 in each. In addition to these courses, they must obtain an average of at least 70 in Math 201 and 202. Economics majors are expected to take Econ 213 and 214 during their sophomore year and must also complete Math 209 or equivalent Math 211 and Business Administration 201. Holders of the Lebanese Baccalaureate Philo must complete Mathematics 101 and 102 before Mathematics 201.

The program for a B.A. in Economics, which consists of 36 credits of Economics courses numbered 210 or above, includes Economics 211, 212, 213, 214, 217 and 227. Students majoring in Economics must obtain a grade of at least 70 in each of Economics 211, 212, 217 and 227.

103 Introduction to Economics. 3.0; 3 cr.; annually. The course provides an introductory survey of the principles of microeconomics and macroeconomics, designed primarily for freshman students.

203 Survey of Economics. 3.0; 3 cr.; annually. No credit is given for students majoring in economics. *Students cannot receive credit for both 203 and 211-212.* Elementary principles of microeconomics and macroeconomics and applications.

211 Elementary Microeconomic Theory. 3.0; 3 cr.; annually. Prerequisite: English 102. *Students cannot receive credit for both 203 and 211.* The general principles of microeconomics. Includes elements of supply and demand, consumer behavior, costs, market structures, and income distribution. Members of Department.

212 Elementary Macroeconomic Theory. 3.0; 3 cr.; annually. Prerequisite: English 102. *Students cannot receive credit for both 203 and 212.* The general principles of macroeconomics. Aggregate supply and demand framework is used to analyze overall movements in prices and national output; inflation and unemployment; monetary and fiscal policies. Members of Department.

213 Economic Statistics. 3.0; 3 cr.; annually. Prerequisite: Mathematics 203 or its equivalent. *Students cannot receive credit for more than one of the following: Economics 213, Mathematics 207, or Education 227.* Measures of dispersion;

elements of probability theory; sampling, sampling distribution, estimation and hypothesis testing and simple regression. R. Geutcherian, I. Jabir.

214 Economic Statistics and Econometrics. 3.0; 3 cr.; annually. Prerequisites: 211, 212 and 213; mathematics 201 or equivalent. The classical linear regression model and the multiple regression model in matrix form; the criteria for estimators; multicollinearity, serial correlation, heteroscedasticity; identification and estimation of simultaneous equation models and applications.

215 Applied Econometrics and Time Series. 3.0; 3 cr.; annually. Prerequisite: Econ 214. The course provides a comprehensive treatment of econometric techniques applied in time series models; stationary time series models, modeling economic time series; multiequation time series models; cointegration; and applications.

217 Intermediate Price Theory. 3.0; 3 cr.; annually. Prerequisites: 70 or more in Econ. 211 and 212; mathematics 201 or equivalent. The theory of allocation of resources; consumers' choice and classical demand theory, exchange and welfare; theory of production and cost; price and output determination under alternative market structures; game theory and applications to oligopoly. G. Sirhan.

218 Income Distribution and Welfare Economics. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 217. Factor markets and theories of income distribution; general equilibrium and input-output analysis; welfare economics.

221 History of Economic Doctrines. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 217 and 227. A survey of the history of economic thought, both theory and policy to the late nineteenth century.

222 Twentieth Century Economic Thought. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217 and 227. A survey of the history of economic thought, both theory and policy, from the late nineteenth century to the 1990s.

223 and 224 Economics of the Middle East. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 211 and 212. A study of the resource endowment of the Arab Middle Eastern economies; their development experience and the general outlook for growth and development.

226 Intermediate Public Finance. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217. A study of public expenditures, public revenues, and public debts; principles of equity in the distribution of the tax burden.

227 Intermediate Macroeconomics. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 211 and 212. A study of the aggregative approach to economics including the determination of output, employment, the rate of interest and the price level. Inflation and stabilization policies; budget deficits and the national debt; business cycles; theories of consumption and investment behavior. G. Sirhan.

228 Intermediate Monetary Economics. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 227. Central banking and instruments of monetary management. alternative theories of the demand for money, the balance of payments and the processes of its adjustment. S. Neaime.

230 Economic History. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 211 and 212. The economic development of Europe and other areas up to 1914, with special emphasis on a number of distinct problems in different countries and historical periods.

232 Comparative Economic Systems. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217 and 227. An investigation of the structure and operation of different economic

systems. The systems include various forms of market-oriented and centrally planned economies. The course examines issues arising out of transition from centrally managed to market based systems.

235 Intermediate International Trade Theory. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217. The classical trade model; the Heckscher-Ohlin theorem and subsequent theoretical developments; tariffs; domestic distortions; customs union; trade and economic growth. T. Alami.

236 Intermediate International Economic Policy. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217 and 227. Systematic analysis of policies in an open economy; the balance of payments, foreign exchange markets and adjustment under different exchange rate standards; basic policy issues in trade and development.

237 Theory of Economic Development. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 217 and 227. Theories of economic development and growth; development strategies; foreign investment; and the new international economic order.

239 Introduction to Mathematical Economics. 3.0; 3 cr.; annually. Prerequisites: 70 or more in 217 and 227; mathematics 201and 202. Optimization problems, dynamic analysis, difference and differential equations; linear and non-linear programming; dynamic programming and game theory with economic applications.

240 Introduction to the Economics of Planning. 3.0; 3 cr.; annually. Prerequisite: 237. Models of macroplanning and investment criteria; a review of the planning experience in selected less developed countries; project evaluation.

241 Industrial Organization and Public Policy. 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217. Application of microeconomics; analysis of factors affecting market structure, conduct and firm behavior in imperfectly competitive industries; survey of theories relating to intensity of competition and maintenance of market dominance; rationale for antitrust laws.

242 The Economics of Petroleum. 3.0; 3 cr.; annually. Prerequisites: 211, 212, 213, and 217.

295 and 296 Senior Seminar in Economics. 3.0; 3 cr.

GRADUATE PROGRAM

Students wishing to obtain a Master of Arts in Economics are required to complete at least 24 credits, of which at least 21 credits should be graduate level courses, including Economics 317 and 327, plus a thesis. In case of deficiencies in the student's undergraduate record, the Department may require additional credits.

301 and 302 Graduate Tutorial. 3.0; 3 cr. (each).

303 and 304 Graduate Seminar. 3.0; 3 cr. (each).

305 Econometrics I. 3.0; 3 cr.; annually. Prerequisites: 239, Mathematics 218. Simultaneous equation   models, time series analysis in the time and frequency domains.

306 Econometrics II. 3.0; 3 cr.; annually. Prerequisite: 305. Non-linear regression, vector autoregression, simulation and varying parameter models.

308 Urban Economics. 3.0; 3 cr.; annually.

317 **Price Theory I.** 3 cr.; annually. Theory of demand and theory of consumer's choice: choice under uncertainty; theory of production and theory of costs; market equilibrium and market failure; externalities and the public good.

318 **Price Theory II.** 3 cr.; annually. Income distribution concepts; alternative theories of distribution and capital controversy; general equilibrium analysis; and welfare economics.

326 **Public Finance.** 3 cr.; annually. A study of the theories of governmental taxation and spending; budgetary policies and their effects on the level of economic activity; welfare effects of taxation and expenditure policies.

327 **Macroeconomics.** 3 cr.; annually. A study of macroeconomic theory including the classical, Keynesian and Post-Keynesian macroeconomic systems; a static analysis of the structure of income determination models; theories of consumption and investment; dynamic analysis of business cycles and economic growth; theories of inflation and stabilization policies; macrodynamic models.

328 **Monetary Economics.** 3 cr.; annually. A survey of the evolution of monetary theory; an examination of alternative formulations of the demand and supply functions of money; selected topics in monetary policy; business cycles; portfolio models.

335 **International Trade Theory.** 3 cr.; annually. An intensive examination of the theory of comparative advantage: the classical and Heckscher-Ohlin statements; trade and welfare; tariffs; recent contributions to trade theory.

336 **International Economic Policy.** 3 cr.; annually. An intensive examination of the theory of balance of payments and the processes of its automatic adjustment, the international monetary system and the position of the developing countries in it.

337 **The Framework of Economic Development.** 3 cr.; annually. Examination of the major economic and non-economic determinants in developing countries; a survey of the theories of development and models of the development process; planning techniques and development policies.

338 **The Framework of Economic Development: Case Study.** 3 cr.; annually. Application of the theoretical framework of Economics 337 to the contemporary experience of Middle Eastern countries.

339 **Topics in Mathematical Economics.** 3 cr.; annually.

399 **M.A. Thesis.**

DEPARTMENT OF ENGLISH

Chairperson:	Nassar, C.
Associate Professors:	Nassar, C.; Shaaban, K.
Assistant Professors:	Ghaleb, M.; Hout, S.; Wackett, J.
Communication Skills	
Coordinator:	Shalhoub-Khoury, N.
Instructors:	Awdeh, A.; Deeb, R.; Devecchi, M.; Fadda, N.; Fakhry, R.; Iskandarani, R.; Ismael, A.; Khalaf, R.; Khury, M.; Maktabi, S.; Mikati, M.; Shadid, R.; Shalhoub-Khoury, N.; Shibl, S.; Shmaysani-Sheato, H.; Wazzan, N.; Sinno, Z.

The Department of English offers two degree programs: the B.A. and M.A. in English Literature, and the B.A. and M.A. in English Language. The Department also offers communication skills courses which are part of the general University requirements.

Students wishing to major in English are accepted provisionally until they have met the following requirements: a grade of 70 or more in each of the following courses: English 203, 204, 205 and 207, and Civilization Sequence 201 and 202. Students must also take English 237 and 238, normally in their junior year, and must have a cumulative average of 70 in these courses. Normally the courses may be repeated only once.

The requirements for literature majors are as follows: English 210 or 216, 211 or 213, 214 or 215, 217 or 221, 219 or 220, 222 or 223, 224 or 225, 212, 226, 229, 237, 238, and two additional courses chosen from among the total offerings of the Department.

The requirements for language majors are as follows: in language, English 227, 228, 229, 231, 237, 238 and 294; in literature, English 212, 217 or 221, 219 or 220, 224 or 225, and one additional course from among those numbered 210 to 246.

Both literature and language majors may also take courses leading to the Teaching Diploma. The requirements for the Teaching Diploma are specified under the Department of Education, in the chapter on "Division of Education Programs."

COMMUNICATION SKILLS

The Communication Skills Program consists of a series of four progressively more advanced courses (English 101, 102, 203, 204) and two specialized courses (English 206 and 208).

Entry into the program (except for the specialized courses, English 206 and 208) is only through the English Placement Test, which a student takes once he or she has been

admitted to the University. All students (including those with TOEFL scores and those transferring from other universities) must take the placement test to enter the sequence.

The program itself provides training in communication, both oral and written, with emphasis on the reading, writing and research skills required of university students.

101 **English Communication Skills I.** 5.0; 5 cr.; each semester. Prerequisite: English Placement Test placing. The course consists of a comprehensive review of grammar and sentence structure leading to the guided writing of single paragraphs. Emphasis will be also placed on reading comprehension and oral skills.

102 **English Communication Skills II.** 5.0; 5 cr.; each semester. Prerequisite: English Placement Test placing or 101. The course offers training in reading comprehension strategies, and in writing skills. Students write short essays of various expository types, outlines, and summaries.

203 **English Communication Skills III.** 3.0; 3 cr.; each semester. Prerequisite: English Placement Test placing or 102. The course continues to develop the four communication skills (reading, writing, listening and speaking), integrating them and presenting them in an academic context. Instruction is offered in oral presentation, analytical reading, and writing of informative and argumentative essays.

204 **English Communication Skills IV.** 3.0; 3 cr.; each semester. Prerequisite: English Placement Test placing or 203. Intensive and extensive reading of a variety of literary, scientific and journalistic texts. Practice in advanced essay writing and critique writing is introduced. The student writes a 1,800 to 2,250 word research paper and presents it orally in class.

206 **English for Engineering and Architecture.** 3.0; 3 cr.; each semester. Prerequisite: English 203; for Engineering and Architecture students only. The purpose of this course is to introduce engineering and architecture students to English used for communication in their fields. This course focuses on reading, writing, and oral communication activities.

208 **English for International Business.** 3.0; 3 cr.; each semester. Prerequisite: English 204; for business majors only. The course is designed to increase the proficiency of students in English within the context of business affairs and needs. The focus of the course is on business and management data, utilizing varied forms of communication for the purpose of transmitting information.

LITERATURE

The *Literature Program* in the Department of English has a dual purpose. It provides the humanistic discipline and training necessary for those who wish to obtain an education based upon wide reading and literary study, and at the same time it provides a structure of courses likely to be useful to those who intend to go on to graduate school. The Literature Program, while exposing the student to the major authors, works, and movements of English and American literature, also, through extensive class discussion and the writing of critical essays in each course, seeks to teach the students to become perceptive critical and analytical readers.

103 Introduction to English Drama. 3.0; 3 cr.; annually. Prerequisite: A grade of 70 or more in English 102, or exemption from 102. The course introduces Freshman students to English drama. The focus will be on a selection of major playwrights from different periods. Eight to twelve plays will be read. The plays selected may vary from year to year.

104 Introduction to English Poetry. 3.0; 3 cr.; annually. Prerequisite: A grade of 70 or more in English 102, or exemption from 102. The course introduces Freshman students to English poetry. The focus will be on major poets from various periods. The course may vary in content depending on the interests and expertise of the faculty available.

105 Introduction to American Literature. 3 .0; 3 cr.; annually. Prerequisite: A grade of 70 or more in English 102 , or exemption from 102. This course introduces selections of American writing from the first colonization in the 16th Century to modern times. Students will be exposed to some major writings of various American authors. The course may vary in content depending on the interests and expertise of the faculty available.

106 Introduction to World Literature. 3.0; 3 cr.; annually. Prerequisite: A grade of 70 or more in English 102, or exemption from 102. This course introduces students to selected texts in world literature with an emphasis on fictional prose. The course may vary in content depending on the interests and expertise of the faculty available.

205 Introduction to English Literature I. 3.0; 3 cr.; annually. English literature from Anglo-Saxon times up to the poetry of Blake. Special emphasis will be placed on the study of specific texts of the principal writers, which will be examined against the social, historical, and philosophical background of the period.

207 Introduction to English Literature II. 3.0; 3 cr.; annually. Continues the survey of English literature begun in English 205, moving from Blake to Eliot, through the examination of specific texts against the social, historical, and philosophical background of the period.

210 Introduction to English Medieval Literature. 3.0; 3 cr. The study of selected texts from Old and Middle English beginning with *Beowulf* and ending with *Sir Gawain and the Green Knight* and a number of Chaucer's *Canterbury Tales*. All texts will be read in modern English translation. Attention will be given to the social, cultural, religious, and intellectual history of the period.

211 Elizabethan and Jacobean Drama. 3.0; 3 cr. This course studies the development of Elizabethan and Jacobean drama through the examination of representative comedies and tragedies by playwrights other than Shakespeare.

212 Shakespeare. 3.0; 3 cr.; annually. Students will read six to eight selected plays, to be discussed as intensively as time allows. Attention will be given to the social, cultural, religious, and intellectual history of the period.

213 World Drama in English. 3.0; 3 cr. Students will study six to eight selected plays drawn from the classics of world drama, from its earliest beginning in Greece through modern times. Intensive reading and discussion will accompany each play.

214 Poetry and Prose of the English Renaissance. 3.0; 3 cr. The course explores the development of the English lyric and shorter narrative verse from Skelton to Jonson. Students will also read some representative prose narratives and consider the development of both the formal and colloquial prose style in English.

215 Literature of the 17th Century. 3.0; 3 cr. The seventeenth century is studied as an age of transition from a traditional to a technological culture. The clash of pre-scientific thought with rationalism is followed in the work of Donne, Jonson, Marvell, Vaughan, Browne, Milton and others.

216 Restoration and 18th Century Literature. 3.0; 3 cr. The progress of the "Enlightenment" in the late seventeenth century and most of the eighteenth century is examined through study of prescribed texts and background reading. Attention is given to the prevailing climates of opinion as they affected poetry and prose. Pope, Swift, and Johnson are the main authors studied.

217 The Foundation of the Novel. 3.0; 3 cr. This course provides an introduction to the development of the novel as a new literary form through a close reading of seven or eight significant texts against a background of social and philosophical currents of the seventeenth and eighteenth centuries.

219 The Romantic Movement. 3.0; 3 cr. This course examines Romanticism in England. The first part of the course stresses Romantic literary theory in order to acquaint students with the salient characteristics of the movement, followed by a survey of the Romantic poetry of the first and second generations.

220 Victorian Literature Excluding the Novel. 3.0; 3 cr. The emphasis in this course will be on the major poets of the period: Tennyson, Browning, Arnold, Rossetti, Swinburne; and selections from the prose writings of two or three writers such as Arnold, Mill, Newman, and Darwin.

221 The 19th Century English Novel. 3.0; 3 cr. Seven or eight novels are studied in detail through close reading and discussion, set against a background of major social change during this period.

222 English Literature from 1900. 3.0; 3 cr. This course varies in content from year to year, but will concentrate on a close reading of selected and representative major texts of the modern period. The exact topic will be announced during the semester preceding the one in which it is offered.

223 Contemporary Literature in English. 3.0; 3 cr. This course varies in content, but will concentrate on recent developments in commonwealth and third world literature. The exact topic (e.g., poetry, fiction, drama, political novel, novel of intercultural conflict, etc.) will be announced during the semester preceding the one in which it is given.

224 American Literature to 1900. 3.0; 3 cr. Major American works of the period, with emphasis on the chief writings of Hawthorne, Melville, Thoreau, Whitman, Twain, Dickinson, and James, which are examined in the historical context.

225 American Literature from 1900. 3.0; 3 cr. Twentieth-century trends in the development of American literature are studied in their historical context through close readings of major texts.

226 Literary Criticism. 3.0; 3 cr.; annually. Designed as a broad synchronic and diachronic survey of central areas, problems, and methods of contemporary literary theory. The following topics may be discussed: the nature and components of a text, the basic patterns of poetic narrative texts, and the activities of reception and interpretation.

236 Art of Creative Writing. 3.0; 3 cr.; annually. Prerequisite: a grade of 75 or more in English 203. The course aims at teaching the principles and practice of effective

writing in English in a variety of genres and fields. Students write an average of one 500 word essay per week. Models of good writing are read critically.

239 **Advanced Creative Writing.** 3.0; 3 cr.; Prerequisite: A grade of 80 or more in English 236. This course offers Creative Writing students the opportunity to refine their skill by exposure to relevant texts and to develop individual projects in genres of their own choosing, fiction, drama or poetry, under close supervision. The course will consist of three sections, each concentrating on a different genre.

246 **Selected Topics in English Literature.** 3.0; 3 cr. This course varies in content and focuses on varied topics such as women writers, black writers, the epic, Arabic literature in translation and other similar topics.

290 **Tutorial.** 3-6 cr.; offered on demand. Prerequisite: Normally an average of 80 or above in the major. Reading and discussion in a selected period or genre or on a selected topic, with the writing of assigned papers.

292 **Seminar for English Majors (in Literature).** 3-6 cr. (restricted to seniors).

LANGUAGE

The *Language Program* consists of seven courses in language and five in literature.

The language courses are intended to provide an appropriate linguistic background for prospective teachers of English and a preparation for those planning to pursue graduate work in linguistics.

227 **Introduction to Language.** 3.0; 3 cr.; annually. A survey of current areas in theoretical and applied linguistics including the different levels of structure, the nature of language acquisition, language variation and evolution, and language teaching.

228 **Phonology.** 3.2; 3 cr.; annually. Articulatory, auditory, and acoustic description of English. Description of the sounds of other languages, chiefly colloquial Arabic of the eastern variety. Comparison of sounds and sound systems with those of English. Practice in transcription and production.

229 **History of the English Language.** 3.0; 3 cr.; annually. An introductory survey of the history of the English language from its earliest Indo-European origins to the present day. The nature and changes of the language are presented by reviewing the shifts that have occurred from Indo-European, Germanic, Old English, Middle English, up to Early Modern English

231 **Modern English Grammar.** 3.0; 3 cr.; annually. The course includes a brief study of word formation and inflection and a more detailed study of constituent structure syntax: patterns of predication, complementation modification, and coordination.

237 **Advanced Composition in English I.** 3.0; 3 cr.; annually. Prerequisite: English 203 and English 204 with grades of 70. Fluency and productivity in writing will be encouraged through critical reading, frequent writing exercises, and work on vocabulary enrichment. Students will be taught to develop style and proficiency in a variety of writing techniques.

238 **Advanced Composition in English II.** 3.0; 3 cr.; annually. Prerequisite: 237 with a minimum grade of 70. This course continues work on the development of writing

techniques and an individual style, but at a higher level than in English 237. The course focuses more specifically on the development of the ability to write critical and analytical essays.

247 Selected Topics in English Language. 3.0; 3 cr. This course changes in content from year to year and focuses on varied topics in English language.

291 Tutorial. 3-6 cr.; offered on demand. Prerequisite: Normally an average of 80 or more in the major. Reading and discussion of selected topics in linguistics.

293 Seminar for English Majors (in Language). 3-6 cr. (Restricted to seniors).

294 Advanced English Grammar. 3-6 cr.; annually. Prerequisite: 231. The aim of the course is to provide a linguistic perspective that can penetrate the surface differences of the major English grammars and reveal their most basic features: traditional, descriptive, and transformational grammars will be examined.

GRADUATE PROGRAM

The Department offers two graduate programs, one in literature and one in language. General requirements for graduate study are found in the chapter "Graduate Study" at the end of this catalogue. The course requirements for an M.A. degree in English consist of 21 credit hours in courses numbered 300 or above, together with any additional prerequisite courses determined by the Department to make up for deficiencies in undergraduate preparation. Students whose undergraduate work was completed outside AUB must normally take English 237 and English 238 as non-credit prerequisites.

Students wishing to take an M.A. degree in the Teaching of English as a Foreign Language (TEFL) should refer to the chapter on "Division of Education Programs" later in this catalogue.

301 Introduction to Bibliography and Methods of Research. 3.0; 3 cr.; annually. This course, required of all student, introduces them to methods of research and bibliographical study, while exploring recent advances in computer technology in the field of bibliography and research.

302 Selected Topics in English Literature before 1800. 3.0; 3 cr.; annually.

303 Selected Topics in English Literature after 1800. 3.0; 3 cr.; annually.

304 Selected Topics in American Literature. 3.0; 3 cr.; annually.

305 Graduate Tutorial in English or American Literature. 3.0: 3 cr.

326 Advanced Translation Theory and Practice; Arabic into English. 3.0; 3 cr.; annually. Close examination of major translation theories, both traditional and linguistic, and application of these theories to the practice of translation, both literary and technical, in Arabic and English.

329 Studies in Old and Middle English Literature. 3.0; 3 cr. Close reading and grammatical examination of selected texts in the original. Exact content to be determined by the instructor.

341 Advanced Phonology. 3.0; 3 cr.; annually. Prerequisite: 228. A survey of theories of phonological description including phonemics, distinctive features, and generative phonology. The application of these theories to actual linguistic data from various languages with concentration by each student on one specific problem.

342 Theoretical Linguistics. 3.0; 3 cr.; annually. Prerequisites: 231, 294. Readings in advanced grammar which have contributed to the formulation of theories of language description; e.g. transformational grammar, stratificational grammar, generative semantics, pragmatics, government and binding, etc.

344 Graduate Tutorial in Linguistics. 3 cr.

345 Language Acquisition. 3.0; 3 cr.; annually. Prerequisites: 227, 231. A survey of studies in first and second language acquisition. Emphasis will be placed on stages of acquisition and the strategies used by children in acquiring their native language. Comparisons between first and second language acquisition will be drawn with implication for language teaching.

346 Selected Topics in Applied Linguistics. 3.0; 3 cr.

399 M.A. Thesis.

DEPARTMENT OF GEOLOGY

Chairperson:	Abdel-Rahman, A.
Associate Professor:	Abdel-Rahman, A.
Assistant Professors:	Amin, I.; Spencer, S.
Lecturers:	Aker, N.; Haidar, A.; Khair, K.

The Department of Geology offers programs leading to the degrees of Bachelor of Science in Geology, and Master of Science in certain areas of the Geological Sciences. It also offers a more broadly based program leading to a Bachelor of Science in Petroleum Studies. Students wishing to major in Geology or Petroleum Studies must secure the approval of the department. In addition, they must have a strong background in sciences and have taken the Freshman Science program or its equivalent.

The department also offers the following undergraduate elective courses, Geol. 101, Geol 102, and Geol. 201 in the area of general geology, and Geol. 205 in environmental geology.

Field trips form required parts of most geology courses.

UNDERGRADUATE PROGRAM

Geology majors must attain a grade of 70 or more in Geology 201 and 203 and pass their next three Geology courses with a grade of 70 or more. They must complete the following courses, in which a general average of 70 or more must be maintained: 202, 207, 210, 211, 212, 213, 214, 215, 219, 221, 222, 224 and 229, making a total of 45 credits. No course may be taken without its prerequisite, unless authorized by the departmental faculty. Advanced students in their final year are encouraged to take additional geology courses such as 205 or 225 and also courses from the graduate level, provided other requirements permit.

The core courses of the **Petroleum Studies program** (totaling 64 credits) are Geology 201, 202, 203, 205, 207, 213, 214, 222, 225, 226; Chemistry 201, 208; Business 201, 220, 231, 241, and another business elective; Economics 211, 212, 213, and 242 (or equivalent) and SBHS 201.

Petroleum Studies majors must attain a grade of 70 or more in Geology 201, 203 and 205 and also pass the next two Geology courses with a grade of 70 or more.

101 The Earth, Present and Past. 3.0, 3 cr.; each semester. A Freshman level survey of the present day processes that shape the earth we live on, such as plate tectonic activity, rock formation and erosion, coupled with an overview of the origin and history of the Earth and Life.

102 Environmental Physical Geography. 3.0; 3 cr.; each semester. Introduction to the structure, classification, physical processes and characteristics of the Earth's atmosphere, hydroshpere and bioshpere, dynamics of change, and associated environmental impacts.

201 Physical Geology. 3.0; 3 cr.; each semester. Introduction to minerals, rocks and earth structures. Internal and external earth processes, plate tectonic theory.

202 Historical Geology. 3.0; 3 cr.; annually. Prerequisites: 201, 203 or consent of instructor. Introduction to earth history. Principles of interpreting the past, origin and development of the solar system. Evolution of the earth and life through geologic time.

203 Physical Geology Laboratory. 0.2; 1 cr.; each semester. Introduction to the identification of rocks and minerals in hand specimen, geographic and geological maps and basic interpretation of geological data.

204 Earth Science Processes. 2.2; 3 cr., annually. Open to students of both Arts and Sciences. *Students cannot receive credit for both 201 and 204.* Overview of those basics of Earth Science systems which are essential to understand environmental issues, with special emphasis on regional issues.

205 Earth Resources and Energy. 3.0; 3 cr., annually. Open to students of both Arts and Sciences. The study of the main economic mineral resources and traditional and alternate energy resources with an emphasis on the environmental impacts of their use and misuse. A special emphasis on regional issues.

207 Map Interpretation. 1.4; 3 cr.; annually. Prerequisites: 201, 203 or consent of instructor. Description, reading and interpretation of topographic and geological maps. Introduction to stereographic projections. Construction of cross sections across geologic structures. Basic field mapping techniques.

210 Geomorphology. 3.0; 3 cr.; annually. Prerequisites: 201, 203, or concurrently, with consent of instructor. Introduction to the study of land forms and the interaction of external geological forces and erosion agents with the structure and composition of their surface rocks. Examination of the interaction between the internal and external earth processes responsible for the development of land forms.

211 Crystallography and Physical Mineralogy. 2.3; 3 cr.; annually. Introduction to the study and classification of crystals; properties of minerals as related to their crystal structure; identification, description and classification of minerals. Practical work with crystal models and hand specimens of common minerals.

212 Optical Mineralogy. 2.3; 3 cr.; annually. Prerequisite: 211. Introduction to the theory of crystal optics, the polarizing microscope, and methods of mineral identification based on their optical properties. A systematic study of the common rock forming minerals in thin section.

213 Structural Geology. 2.2; 3 cr.; annually. Prerequisite: 207. Introduction to the study of rock deformation. Relationship between stress and strain. Interpretation of structures and their significance to regional and global tectonics.

214 Stratigraphy. 2.2; 3 cr.; annually. Prerequisite: 202. Principles of interpretation of the stratified rocks. Introduction to sedimentary structures, facies concepts, methods of correlation and tectonic and eustatic controls on deposition.

215 Invertebrate Paleontology. 2.2; 3 cr.; annually. Prerequisite: 202. Introduction to the systematic study of invertebrate fossils, their classification and identification using macro-specimens and thin sections.

219 Geologic Field Methods. 0.6; 2 cr.; annually. Prerequisites: 207, 213, 214. Introduction to applied methods used in field geological mapping.

221 Petrology. 2.3; 3 cr.; annually. Prerequisite: 212. Origin, composition, occurrence and classification of igneous and metamorphic rocks; their systematic identification in hand specimens and in thin section.

222 Sedimentology. 2.2; 3 cr.; annually. Prerequisites: 212, 214. The study of sedimentary rocks using petrographic and field study methods. Diagenetic processes, depositional environments, elementary basin analysis.

224 Regional Geology. 3.0; 3 cr.; annually. Prerequisites: 213, 214. The geology of the Middle East region with emphasis on its stratigraphy, structure, economic geology and geological history.

225 Petroleum Geology. 3.0; 3 cr.; annually. Prerequisites: 213, 214. Hydrocarbon formation and occurrence as oil and gas fields. Exploration and extraction methods.

226 Alternate Energy Sources. 3.0; 3 cr.; annually. Prerequisite: 201. The general characteristics of energy sources other than hydrocarbons, and their environmental importance and significance to society.

229 Individual Field Work Project. 0.18; 6 cr.; annually, for graduating seniors. Pre- or co-requisite: 219. A complete and independent geological investigation of a designated area and preparation of a detailed geological map, sections and report.

271 and 272 Senior Tutorial Course. 1-3 cr.; may be repeated for credit or may replace a required course.

GRADUATE PROGRAM

Candidates pursuing the Master of Science program in Geology may select courses from the graduate courses offered in the Department depending on their fields of interest.

303 Geochemistry. 3.0; 3 cr. Prerequisite: 211. Application of chemical concepts to the evolution of the earth, particularly its weathering, magmatic and metamorphic cycles and the distribution of elements; cosmochemistry, crystal chemistry and aqueous geochemistry.

304 Geophysics I. 3.0; 3 cr. Introduction to seismic, gravity and magnetic methods. Their interpretation procedures and applications in the exploration for petroleum and other resources.

305 Geophysics II. 3.0; 3 cr. Prerequisites: 221, 222. Electrical, radiometric, and thermal geophysical methods, and well logging for general geophysical applications and their methods of interpretation.

306 Economic Minerals Geology. 3.0; 3 cr. Prerequisite: 211. The occurrence, and classification of mineral ore deposits and theories of their formation. Ore forming

processes and ore deposit models; advanced techniques to evaluate ore genesis. Mineral exploration techniques.

307 Petroleum Geology. 3.0; 3 cr. Origin, migration and accumulation of petroleum, surface and subsurface geological and geophysical exploration methods and production and development processes. Middle East hydrocarbon exploration and development.

308 Alternate Energy Sources. 3.0; 3 cr. Energy and energy use, detailed treatment of non fossil fuel energy options including nuclear, biomass, hydro, wind, solar and geothermal methods, with practical applications.

313 Photogeology. 2.2; 3 cr. Principles of air photo interpretation and remote sensing. The construction of planimetric geological maps, profiles and mosaics from vertical photographs using pocket and mirror stereoscopes. Introduction to analysis of satellite imagery.

317 Micropaleontology. 1.4; 3 cr. An introduction to the study of the main groups of microfossils and their application, with emphasis on the foraminifera, and techniques in their preparation for examination.

318 Hydrogeology. 3.0; 3 cr. Fundamentals of hydrogeology. Groundwater occurrence, movement, development and management. Pumping tests. Groundwater chemistry, quality and contamination.

320 Graduate Seminar. 3.0; 3 cr.

323 Geological Oceanography. 3.0; 3 cr. A general introduction to climatic and oceanographic interactions, characteristics of oceans, and a detailed analysis of near shore and coastal environments.

324 Engineering Geology I. 2.2; 3 cr. Engineering geology and earth materials. Focuses on the interaction between engineering and geology in relation to the geotechnical properties of soil and rocks mechanics and site investigations.

325 Engineering Geology II. 3.0; 3 cr. Environmental and applied engineering geology. Deals with environmental planning, natural disasters and terrain evaluation with special applications to mass movements, geology of man-made structures and the urban environment.

329 and 330 Selected Topics in Advanced Geology. 3 cr.; may be repeated for credit.

399 M.S. Thesis.

DEPARTMENT OF HISTORY AND ARCHAEOLOGY

Chairperson:	Abu-Husayn, A.
Professors:	Musallam, B. (visiting); Seeden, H.; Seikaly, S.
Associate Professors:	Abu Husayn, A.; Butcher, K.; Sader, H.
Assistant Professors:	El-Cheikh, N.; Meloy, J.
Instructor:	Abi-Shakra, Z.

The Department offers a program leading to the B.A. and M.A. degrees in Arab and Near Eastern History and in Archaeology. In Arab history, a program leading to the Ph.D. degree is also available. Requirements for transfer to the Department include the approval of the Department and a grade of 70 or more in any two of the Civilization Sequence Program courses. Students expecting to work in Arab history must also have a knowledge of Arabic.

HISTORY

Undergraduate Program

Students majoring in History must complete a minimum of 42 credit hours in the Department, including History 286, 287, 291, and 292. Detailed programs will be determined by subcommittees of the Department which will advise each student on courses in his or her major, related departments, and electives.

101 and 102 Survey of Modern Europe. 3.0; 3 cr. (each). The political and socio-economic forces that have shaped modern Europe and the rest of the world are examined chronologically and by topic. Attention is given to teaching students how to tackle historical problems and how to initiate and conduct research.

201 Introduction to the Study of History. 3.0; 3 cr. An introduction to some of the main themes and problems of the study of history such as the structures, aims and methods of historical writing and related questions such as causation, periodization and style. The readings are drawn mostly from modern texts in the methodology of history.

202 Introduction to the Modern History of the Arab East. 3.0; 3 cr. An introduction to the modern history of the Arab East from the Ottoman conquest until the outbreak of the Arab revolt. Also involved are case studies relating to the rise of local Arab rule and to Arab-Turkish relations in the late Ottoman period.

215 and 216 The Rise and Development of Islam. 3.0; 3 cr. (each). An introduction to the history of pre-Islamic Arabia and to the advent and evolution of Islam as religion and polity. The course examines certain aspects of the Muslim sciences such as *hadith*, Quranic exegesis, theology, and law.

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227 History of the Arab East, 632-1098. 3.0; 3 cr. A focused history of *bilad al-sham*, a province which tends to be neglected in the historical accounts of the Islamic Caliphate. The course examines various aspects of the history of *bilad al-sham*, stretching from the Islamic conquests in 632 until the appearance of the Crusaders in 1097.

229 and 230 History of the Arabs. 3.0; 3 cr. (each). A survey of Arab history from the period of the Southern Arabian kingdoms to, approximately, the middle Abbasid period. It combines political, social, economic and cultural history, and uses translations of original sources when available.

231 The Byzantine Empire and Civilization until 1081 A.D. 3.0; 3 cr. The emergence of the Byzantine state and civilization from the reign of Constantine I until the end of the Macedonian period with emphasis on the relations between Byzantium and Islam.

232 Byzantium and the Crusades 3.0; 3 cr. The Byzantine state and civilization, in the political and economic context of the Mediterranean world, from the onset of the Crusades until the fall of Constantinople to the Ottomans.

233 History of the Arabs to 632 A.D. 3.0; 3 cr. (in Arabic). Arabia before the coming of Islam, explaining in some detail the history of the various Arabian kingdoms of both Southern and Western Arabia. Particular importance is attached to the study of surviving epigraphy and the historical dimensions of Jahili poetry.

234 History of the Arabs 632-750 A.D. 3.0; 3 cr. (in Arabic). A survey of the Rashidun and Umayyad period, with special emphasis on the politics and society of the Umayyad Caliphate and its place in early Arab Islamic civilization. Original texts are used in addition to modern studies.

235 History of the Arabs 750-950 A.D. 3.0; 3 cr. (in Arabic). The first two centuries of the Abbasid empire until the arrival of the Buyids, who were the first dynasty openly to take the Abbasids under their wing. The course places particular emphasis on the culture of the period as well as on Abbasid institutions of government and society.

236 History of the Arabs 950 to 1258 A.D. 3.0; 3 cr. (in Arabic). Arab history from the Buyids to the Mamluks, taking in other major dynasties such as the Seljuks, Zengids, and Ayyubids.

237 Persia and Turkey to 1800 A.D. 3.0; 3 cr. The origins, development and expansion of the Ottoman and Savafid states from the late thirteenth century to the eighteenth. Special attention is given to state building and state institutions as well as to economic and social structures and their transformation.

238 History of Persia and Turkey in the 19th and 20th Centuries. 3.0; 3 cr. The course emphasizes the development of an Eastern question and traces internal transformations and the responses of the two states to the challenge posed by an ascendant West.

239 History of the Arab East and North Africa from 1516 to 1798. 3.0; 3 cr. The expansion of Ottoman rule into the Arab East and North Africa, the nature of Ottoman domination and its consequences. Select case studies investigate the emergence of local Arab autonomies in the seventeenth and eighteenth centuries.

240 History of the Arab East and North Africa from 1798 to 1920. 3.0; 3 cr. The Arab provinces of the Ottoman Empire in the age of the *Tanzimat*, foreign intrusion into the region and its progressive incorporation into a developing global economy.

Egypt's bid for autonomy and the emergence of national sentiment in the Arab provinces of the Fertile Crescent get special attention.

243 History of the Arab East and North Africa from 1914 to 1939. 3.0; 3 cr. The Arab provinces of the Ottoman Empire during World War I and their subsequent partition into mandates. The course considers the gradual emergence of modern state structures and the Arab struggle to achieve independence.

244 History of the Arab East and North Africa since 1939. 3.0; 3 cr. The achievement of Arab independence, regional co-operation and the struggle to confront internal and external challenges at the political, socio-economic and intellectual planes.

245 History of Lebanon from 634 to 1920 A.D. 3.0; 3 cr. The history of the regions which came to constitute Greater Lebanon. The course analyses the factors which contributed to the development of a distinctive Lebanese identity.

251 History of North Africa and Spain in the Middle Ages. 3.0; 3 cr. This course surveys the North African and Andalusian zone from the Arab conquest until the eclipse of Umayyad power in al-Andalus.

252 The Middle Ages in Europe. 3.0; 3 cr. The history of the Western half of the Roman Empire during the crisis of the third century until the rise of the earliest nation states in Europe in the tenth and eleventh centuries.

253 History of Europe from 1350 to 1618. 3.0; 3 cr. The transformation of Europe under the twin influences of the Renaissance and the Reformation. Attention is given to the political and socio-economic reorientations provoked by the voyages of discovery and the rise of European colonial Empires.

254 History of Europe from 1618 to 1815. 3.0; 3 cr. A survey of the political and socio-economic evolution of Europe from the outbreak of the Thirty Years War to the Congress of Vienna. Special attention is devoted to the rise of England and France to primacy and to the revolutionary transformations which the latter experienced.

255 History of Europe from 1815 to 1871. 3.0; 3 cr. A survey of the failure of the Vienna Settlement to preserve the European political status quo, the transformation of Europe under the impact of industrialization and the emergence of new dynamic states in Italy and Germany.

256 World History from 1871 to 1914. 3.0; 3 cr. An examination of the socio-political and economic transformations which culminated in World War I. Attention is paid to the phenomenon of European imperialism and to the failure of the European state system and diplomacy to maintain peaceful co-existence.

257 The Contemporary World since 1914. 3.0; 3 cr. A survey of the attempts to reconstruct a new world order at Versailles, the revolutionary overturn of existing orders in Russia, Italy, Germany and China and the slide to World War II and its aftermath.

258 Main Currents in the History of a Particular Nation. 3.0; 3 cr. An in-depth course involving a detailed and systematic historical analysis of a particular nation, region or topic. Examples of courses already offered include Biblical History, the Fatimids, the Mamluks, Rural Syria in the Ottoman period, Arabia, and Egypt under Nasser.

259 Main Currents in the History of the United States. 3.0; 3 cr. Presently not offered.

286 Historical Interpretation. 3.0; 3 cr. An introduction to some of the more influential definitions of history in both East and West. Students are exposed to some of the modern interpretations of historical methodology.

287 Historical Writing. 3,0; 3 cr. An applied course focusing on the craft of historical research and writing. Emphasis centers on historical methodology in the identification and utilization of sources, analysis, synthesis and exposition.

291 and 292 Senior Seminar in Arab and Near East History. 3.0; 3 cr. (each). Students work in association on a select topic, report on their progress in class and incorporate their findings in a detailed paper in line with historical methodology.

Graduate Program

303 and 304 Graduate Seminar in Arab and Near East History. 3.0; 3 cr. (each). Collaborative investigation of select topics in Arab and Near East History viewed from multiple perspectives. Periodic progress reports and the incorporation of findings in an interpretive term paper are required.

305 and 306 Graduate Seminar in European History. 3.0; 3 cr. (each). In-depth analysis of a select topic entailing intensive research and the submission of a final analytical term paper.

321 and 322 The Arab Historians, I and II. 3.0; 3 cr. (each). A systematic analysis of a select Arab historian in the context of his time, employing primary sources and recent secondary literature on the subject.

323 and 324 Advanced Documentation and Research, I and II. 3.0; 3 cr. (each). Applied training in the identification, critical evaluation and utilization of primary sources and the techniques for their retrieval and modes of incorporation into a historical account.

325 and 326 Social and Intellectual History of the Arabs, I and II. 3.0; 3 cr. (each) Systematic study of social and intellectual trends in Arab history. Primary sources and recent theories and interpretations are emphasized.

327 and 328 Social and Economic History of the Middle East, I and II. 3.0; 3 cr. (each). Detailed analysis of socio-economic transformations in the Modern Middle East based upon primary sources, considered in view of recent theories of development and modernization.

330 Advanced Historical Interpretation. 3.0; 3 cr. Systematic examination of select modern interpretations of history and their impact upon historical methodology and historiography.

331 and 334 Tutorial Topics in Modern Middle East History. 3.0; 3 cr. (each). Directed individual examination of a select topic entailing an intensive reading program, research, and the submission of a model term paper.

399 M.A. Thesis.

499 Ph.D. Thesis.

Archaeology

Undergraduate Program

Students majoring in Archaeology must complete a minimum of 42 credit hours in the department, including History 286, 287, Archaeology 233, 291, 292.

101 Introduction to Archaeology. 3.0; 3 cr. The world's archaeological resources are threatened and need rescue, protection and management. Archaeology studies this cultural heritage, and rediscovers human experience from its origins to the present. What is the nature of archaeological evidence and how can it be saved?

201 Archaeology in Lebanon. 3.0; 3 cr. Presenting the archaeology of Lebanon: its history, institutional organization, the state of the evidence, and the problems Lebanon's archaeological heritage is facing. Reports of the country's main excavated sites and standing monuments are studied in combination with required site visits.

211 and 212 Methodology. 3.0; 3 cr. (each). Study of the methods of recovery, systematic description, integration and presentation of archaeological material for the preservation and reconstruction of information from the human past. Special emphasis on cultural heritage preservation and education in Lebanon and the Near East.

213 The Human Story I: The Old Stone Age (up to ca. 10,000 BC). 3.0; 3 cr. The physical and cultural evolution of hominids and early humans subsisting on food gathering, hunting and fishing in a Pleistocene environment. The cultural and functional significance of artifacts and lifestyles are investigated with the help of information gained from the palaeoenvironment, experimental technology and ethnography.

214 The Human Story II: The New Stone Age or Neolithic Period (10th to 4th millennium BC). 3.0; 3 cr. The gradual domestication of plants and animals leading to food production, and the development of socio-cultural systems with increasing differentiation oof activities. Neolithic village communities are investigated containing evidence for new technologies, arts and crafts, including exotic raw materials and luxury goods.

215 and 216 The Near East in the Bronze Ages (3500-1200 BC). 3.0; 3 cr. (each). The growth of small towns and larger urban centers in an essentially agricultural environment. The changes that occurred during the later second millennium and the breakdown of the Bronze Age urban palace culture are investigated.

217 The Syro-Lebanese Coast in the Iron Age. 3.0; 3 cr. The Levant from 1200 to 300 BC: Aramaeans, Phoenicians, and Israelites. Problems of the emergence of new linguistic and geo-political entities in the area, and investigation of the settlement and material culture remains of this period.

218 The Phoenician Expansion in the Mediterranean. 3.0; 3 cr. Study of the Phoenician, mainly Tyrian and Sidonian, expansion in the Mediterranean, its origins and means by which it was achieved. Material culture of first mill. BC. Phoenician settlements in Cyprus, North Africa, Italy, and Spain. Culture and economic interaction with local population.

219 and 220 Ancient Mesopotamia. 3.0; 3 cr. (each). Study of the major political, cultural and technological achievements of Mesopotamian civilization from the 4th millennium BC to the fall of the Neo-Babylonian empire. Specific archaeological

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sites are chosen to illustrate the material culture of the successive historical periods from Late Uruk to Neo-Babylonian times.

221 and 222 Archaeology of the Greek World. 3.0; 3 cr. (each). The Greek Bronze and "Dark Ages" (221), covering the archaeology of Minoan Crete, the Cyclades and Helladic and Mycenaean Greece, and the development of the early Greek city states. Archaic and Classical Greece (222), exploring the history and archaeology of Greece, western Asia Minor, and the Greek colonies in the Black Sea, southern Italy, and Sicily from the eighth to the fourth centuries BC.

223 Archaeology of the Hellenistic World. 3.0; 3cr. History and archaeology of the empire of Alexander the Great and his successors, in Greece, Asia Minor, the Near East, and Iran, from the fourth to first centuries BC. The spread of Greek culture and institutions and their interaction with local cultures.

224 Introduction to the Roman World. 3.0; 3 cr. Society and culture of the Roman empire. The focus is on Rome and the provinces, imperial history, everyday life and material culture between the second century BC and the fourth century AD, with special emphasis on the first and second centuries, when the Roman empire was at its height.

225 The Roman and Byzantine Near East. 3.0; 3 cr. Study of the history and material culture of the Near East from the first century BC to the seventh century AD, including archaeological sites, religion, art and architecture. The emphasis is on local traditions and responses to Roman rule.

231 Ancient Near Eastern Religions. 3.0; 3 cr. Study of ancient Mesopotamian, Canaanite and biblical religious texts with emphasis on creation myths, divine beings, death and the afterlife, cults and rituals. Complementary investigation of archaeological evidence for religious beliefs and practices.

233 and 234 Fieldwork in Archaeology. 3.0, 3 cr. Participation in archaeological fieldwork to acquire practical experience of methods and techniques used in area surveys, excavation, or ethnographic data collection related to archaeological fieldwork.

235 and 236 Special Topics in Archaeology. 3.0; 3 cr. (each). Archaeology of a particular area or region (ex.: Anatolia, the Arabian Peninsula, Egypt, Iran, etc) or subject. Such courses will be offered by resident or visiting specialists in the respective fields.

291 and 292 Senior Seminar. 3.0; 3 cr. (each). Research methods in Archaeology. Subjects will include the study and identification of material culture and theoretical frameworks, or explanation in Archaeology. Students are expected to research specific topics, present the results for discussion at workshop sessions, and submit their final analysis in research papers.

293 and 294 Ancient Texts. 3.0; 3 cr. (each); can be repeated for credit. Introduction to West Semitic epigraphy. Origin of the alphabet and development of alphabetic scripts. Presentation of the various Semitic dialects. Palaeography and selected texts for illustration.

Graduate Program

301 and 302 Graduate Seminar in Current Approaches to Archaeology. 3.0; 3 cr. (each); can be repeated for credit. Current key theories and debates in Archaeology,

such as center/periphery, economics and world systems analysis, power and hierarchy, cognitive archaeology, critiques of ideology or the politics of interpretation and presentation of the past, native peoples and gender issues.

303 and 304 Readings in Ancient Texts. 3.0; 3 cr. (each); can be repeated for credit. Introduction to ancient Semitic epigraphy in general, and to one of the ancient East or West Semitic languages in particular. Alternately, Akkadian, Phoenician or Aramaic texts are studied.

305 and 306 Artifact Technology and Representation. 3.0; 3 cr. (each). Technical analysis and representation of archaeological artifacts, including composition, production technique, description and drawing for publication of ceramic, metal, stone and bone artifacts.

321 and 322 Graduate Tutorial on Special Topics in Near Eastern Archaeology. 3.0; 3 cr. (each); can be repeated for credit. Study of particular sites and materials to train students in archaeological research and analysis.

323 and 324 Advanced Fieldwork and Data Collection. 3.0; 3 cr. (each). Advanced training in archaeological surveys, excavation, artifact recording or ethnographic data collection related to archaeological fieldwork.

325 and 326 Advanced Archaeological Research. 3.0; 3 cr. (each). Analytical investigation of published and unpublished material, as in post-excavation analysis of archaeological data and information, for the purpose of presenting archaeological results to the scientific and general public.

399 M.A. Thesis.

INSTITUTE OF MONEY AND BANKING

Director:	Makdisi, S.
Professors:	Makdisi, S.
Assistant Professors:	Neaime, S.
Lecturers:	Azour, J.; Dabbagh, S.; Hobeika, L.; Itani, I.

The Institute of Money and Banking was established in late 1983. Its primary functions are to

1. Offer a graduate program leading to a Master's degree in Money and Banking.
2. Organize research work and policy studies in the area of money and banking (national and international) and financial institutions with particular emphasis on the Arab world.
3. Hold seminars on various topics pertaining to this area in which academicians, policy makers, bankers and financial managers will participate.
4. Assist, whenever possible, in carrying out training programs for banking and other financial institutions.

A major objective of the Institute is to develop academic excellence in the field of banking and finance and to contribute to the development of this field in Lebanon and the Arab world. Noted scholars and experts are invited to participate in the Institute's seminars, lecture program and symposia.

The **Degree Program** leads to a Master's degree in Money and Banking. This program comprises two alternative options:
      1. Program with no thesis requirement.
      2. Program with thesis requirement (see below).

The **Research Program** pertains to various aspects of financial intermediation with special emphasis on the Arab world. The Institute sponsors individual research projects and carries out joint research programs with other institutions and organizations.

MASTER'S DEGREE IN MONEY AND BANKING (MMB)[*]

Candidates for the Master's degree should complete the following undergraduate courses: Economics 211, 212, 213, 214 and 227 or Business equivalent; Mathematics 203 and 204 for holders of the Lebanese Bacc. Philo. (with an average of 70 or more in each) or Math 201 for holders of the Lebanese Bacc. Sc. Ex. or Math. Elem.; Business 201, and 224; Mathematics 200 or its equivalent.

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[*] The MMB curriculum was revised in January 1999 (with effect in October 1999) with the objective of rendering it an up to date and state of the art program in banking and finance.

Program with no Thesis Requirement

The program comprises 33 credits of course work (eleven 3-credit courses) plus a project. All majors in the program are required to take the following eight courses:

301 Financial Theory. 3.0; 3 cr. The objective of this course is to review and develop the major theoretical themes underlying modern finance in a rigorous way, yet with the constant vision of the uses made of these theoretical developments in applied finance. The main themes to be covered are : Individual decision making and market equilibrium under uncertainty, efficiency of capital markets and the firm's capital structure.

302 Corporate Finance (equivalent to MBA 335, and may be taken at the Graduate School of Business Administration). 3.0; 3 cr. This course focuses on large corporate investment decisions and on designing, analyzing, and managing the elements of a comprehensive financial strategy. It will provide a sophisticated theoretical and empirical overview of major topics in a corporate finance.

303 Monetary analysis. 3.0; 3 cr. Examines the role of the Central Bank in the national economy and assesses the targets and instruments of monetary policy. Format is lecture with assigned presentations by students of monetary policy applications in individual countries.

304 International Finance. 3.0; 3 cr. This course develops a working knowledge of the institutional features of the international financial system and its evolution and of international markets and the evolution of the international monetary system. It examines the concept of balance of payment imbalances, adjustment processes and policies to cope with imbalances; it also explores financial management decisions, involving more than one currency, that require an understanding of the interactions among international variables such as exchange rates, interest rates, and inflation rates.

305 Bank Management and applications. 3.0; 3 cr. Discusses key issues in commercial banking management; applies asset-liability, interest-rate risk, and liquidity management strategies to case studies; provides an overview of placements, credit extension policies, letters of credits and guarantees, and management of off-balance sheet exposures.

306 Security markets: risk management and institutions. 3.0; 3 cr. Surveys the behavior of securities markets. Topics covered include value and risk analysis, equity and bond markets, valuation of securities, the investment process, and portfolio management. Lecture format with computer applications utilizing real time and historical data from the Institute's Telerate monitor.

307 Credit Analysis and project evaluation. 3.0; 3 cr. Examines the nature of the borrower's business in the context of its industry , and applies cash flow analysis to financial statements to estimate future sources and uses, and analyzes the borrower's credit-worthiness.

308 Derivative instruments. 3.0; 3 cr. This course introduces derivative securities. Basic derivative contracts such as forwards, futures, options and swaps are examined. Contract characteristics, payoffs from various strategies, as well as hedging, arbitrage and speculation activities using derivatives are analyzed. The

focus is on understanding derivatives as users. Pricing formulae are introduced although not derived.

This course is recommended for those students who want to, and need to, be familiar with the workings of derivatives but do not necessarily wish to be exposed to the procedures for pricing and designing them.

Three elective courses will be chosen from the following list in consultation with the advisor. Other electives may be also chosen from available university courses with the approval of the advisor.

Two additional courses will be chosen from the following list of courses:

309 Comparative Financial Legislation . 3.0; 3 cr.
310 International and Arab Emerging Financial Markets. 3.0; 3 cr.
311 Advanced Futures and Options. 3.0; 3 cr.
312 Financial Management – Case Studies.
313 Treasury Management. 3.0; 3 cr.
314 Investment Banking. 3.0; 3 cr.
315 Advanced Macroeconomics. (equivalent to Econ. 327, and may be taken at the Economics Department). 3.0; 3 cr.
316 Econometrics of Financial Markets. 3.0; 3cr.
317 Industrial Organization. 3.0; 3 cr.
318 Business Ethics. 3.0; 3 cr.
319 International Banking. 3.0; 3cr.
320 Selected topics in Banking and Finance. 3.0; 3cr.

Other electives from the available university courses may be chosen with the approval of the advisor.

MMB 398 Project
MMB 399 Thesis

Program with Thesis Requirement

A graduate program with a thesis requirement is open to majors. Preference is given to students who have already had some preparation in the field of finance and banking at the graduate level or wish to concentrate further on a particular aspect in this field under the supervision of a faculty advisor. In this program the student is required to complete seven 3 credit courses to be chosen from MMB 301-308 in consultation with the advisor, plus a thesis (MMB 399) equivalent to 9 credits of course work.

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Chairperson:	Jureidini, W.
Professors:	Abi Khuzam, F.; Hanna, A.; Lyzzaik, A.; Shamsuddin, A.
Associate Professors:	Abu-Khuzam, H.; Haidar, N.; Jureidini, W.; Nahlus, N.*; Nasri, A.; Nikiel, J.
Assistant Professors:	Haddad, J.; Jalloul, G.; Mansour, M.; Shayya, B.
Visiting Assistant Professor:	Al-Jadir, L.
Lecturer:	Fares, F.
Instructors:	Itani-Hatab, M.; Jaber,R.; Jurdak, M.; Tabsh,A.; Khachadourian, Z., Sidani-Bohsali, H.

The Department of Mathematics offers programs leading to the degrees of Bachelor of Science (B.S.) and Bachelor of Arts (B.A.) in Mathematics and in Statistics, and the degree of Bachelor of Science (B.S.) in Computer Science. It also offers programs leading to the degree of Master of Science (M.S.) and Master of Arts (M.A.) in Mathematics and Statistics[1]. A program leading to an M.S. degree in Computer Science is anticipated at a future date.

UNDERGRADUATE PROGRAM

B.A. or B.S. in Mathematics

In addition to the general requirements of the School of Arts and Sciences the Department requires nine credits in courses numbered 200 or above from natural sciences for the B.S. degree, and nine credits in courses numbered 200 or above from humanities and/or social sciences for the B.A. degree. The departmental requirements are as follows:

Mathematics 200, 201, 210, 211, 214, 219, 223, 224, 227, 233, 241, 242 or 220, and six more credits in mathematics courses numbered 210 or above.

All prospective mathematics majors are expected to complete Mathematics 201, 210, 211, and 219 in the sophomore year, with a cumulative grade of at least 70. They are also urged to take Mathematics 200 in the sophomore year. Mathematics majors must maintain an average grade of at least 70 in the mathematics courses to qualify for promotion from the junior year to the senior year.

B.S. Degree in Computer Science

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* On sabbatical leave

[1] The graduate program in Statistics is currently frozen.

In addition to the general requirements of the School of Arts and Sciences the Department requires the following:

Mathematics 200, 201, 202 or 210, 211, 218 or 219, 230 or 233, 251, 255, 256, 257, 258, 272, 274, 277 and six additional credits in computer science courses numbered 210 or above; Physics 211, 213, 228 and 229.

All prospective computer science majors are expected to complete Mathematics 200, 201, 202 or 210, 211, and 212 in their sophomore year, with a cumulative average of at least 70 in these courses. They are also urged to take Mathematics 218 or 219 in the sophomore year. Computer science majors are expected to complete Mathematics 255, 256, 257, and 258 in the junior year and maintain an average grade of at least 70 in the computer science courses to qualify for promotion from the junior to the senior year. Students who want to pursue graduate work in computer science are advised to take Mathematics 241.

B.A. or B.S. Degree in Statistics

In addition to the general requirements of the School of Arts and Sciences the Department requires nine credits in courses numbered 200 or above from natural sciences for the B.S. degree, and nine credits in courses numbered 200 or above from humanities and/or social sciences for the B.A. degree. The departmental requirements are as follows:

Mathematics 200, 201, 208, 210, 211, 219, 233, 234, 235, 236, 238, 251 and six more credits from Mathematics courses numbered 210 or above, or EB courses (Department of Health Sciences).

UNDERGRADUATE COURSES

Mathematics

101 Calculus and Analytic Geometry I. 3.0; 3 cr.; annually. Straight line, differentiation with application to curve plotting, Rolle's Theorem. Integration with application to area, distance, volume and arc length. The fundamental theorem of calculus. Transcendental functions.

102 Calculus and Analytic Geometry II. 3.0; 3 cr.; annually. Prerequisite: 101. Methods of integration; improper integrals. The circle, parabola and hyperbola. Hyperbolic functions. Vectors and parametric equations. Vector functions and their derivatives.

201 Calculus and Analytic Geometry III. 3.0; 3 cr.; annually. Prerequisite: 102. Polar coordinates, partial differentiation with applications. Multiple integrals with applications. Infinite series.

202 Differential Equations. 3.0; 3 cr.; annually. Prerequisite: 201. First order differential equations. Linear differential equations, homogenous and non-homogenous equations with constant coefficients. Power series solutions, Bessel functions, Legendre polynomials, Laplace transforms, initial value problems.

203 Mathematics for Social Sciences I. 3.0; 3 cr.; annually. *Not open to holders of Lebanese Bacc. II Exp. Sc. or Math. Elem. nor to students with prior credit in Mathematics 101.* Sets, relations and functions, rectangular coordinates, the straight lines, the circle, the ellipse, the parabola, the hyperbola; trigonometric, exponential and logarithmic functions. Implicit Differentiation. Members of Department.

204 Mathematics for Social Sciences II. 3.0; 3 cr.; annually. Prerequisite: 102 or 203. *No credit is given to students who take 201.* Sequences and series, power series. Functions of more than one variable; partial differentiation, maxima and minima of functions of two variables. Indefinite and definite integrals. Methods of integration. Multiple integrals, matrix algebra.

210 Introduction to Analysis. 3.0; 3 cr.; annually. Prerequisite: 201. Topology of real numbers, bounded sets, compact sets, countable sets; limit points; real sequences and series, convergence, absolute convergence; tests for convergence. Differentiation, the Mean Value Theorem, Taylor's Theorem; Taylor's series, power series.

213 Higher Geometry. 3.0; 3 cr.; annually. Isometry and similarity in Euclidean plane; groups of symmetries, introduction to ordered geometry and affine geometry.

214 Topology I. 3.0; 3 cr.; annually. Prerequisite: 211. Topological spaces. Open and closed sets, bases. Connectedness, compactness, continuos functions; separation axioms; metric, product, and quotient spaces.

216 Topology II. 3.0; 3 cr.; annually. Prerequisite: 214.

218 Linear Algebra with Applications. 3.0; 3 cr.; annually. Prerequisite: 211. *Students will not get credit for both 218 and 219.* Not open to mathematics majors. This course deals with vector spaces over the field of real numbers; System of linear equations and matrices, vector spaces, subspaces, dimension of a vector space, linear transformations and their representation by matrices, eigenvalues and eigenvectors, inner product spaces.

219 Linear Algebra I. 3.0; 3 cr.; annually. Prerequisite: 211. *Students will not get credit for both 218 and 219.* Vector spaces over fields; definition and examples. Bases and invariance of their cardinality. Linear transformations and matrices. Rank and nullity. Similarity and equivalence of matrices. Systems of linear equations.

220 Linear Algebra II. 3.0; 3 cr.; annually. Prerequisite: 219. Row and column spaces. Determinants, eigenvalue theory. Inner product spaces. Adjoint of a linear transformation.

223 Advanced Calculus I. 3.0; 3 cr.; annually. Prerequisite: 210. Real and complex number systems, metric spaces, compact sets, connected sets, sequences and series, continuity, differentiation, Riemann Stieltjes integrals.

224 Advanced Calculus II. 3.0; 3 cr.; annually. Prerequisite: 223. Sequences and series of functions, Stone Weierstrass' theorem, exponential, logarithmic and Gamma functions. Functions of several variables, inverse and implicit function theorem, integration of differentiable forms.

225 Introduction to the Theory of Ordinary Differential Equations. 3.0; 3 cr. Prerequisites: 202. Existence theorems and the method of successive approximations. Linear differential equations. Self-adjoint differential operators. Asymptotic formula for solutions and Liouville's transformation, eigenvalue theory and eigen function expansions.

227 Introduction to Complex Variables. 3.0; 3 cr.; annually. Prerequisite: 210. Complex numbers and their elementary properties; analytic functions; continuity and

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differentiability; Cauchy-Riemann conditions; contour integration; line integrals; Morera's Theorem; the fundamental theorem of algebra; power series; Taylor and Laurent series; residues and poles.

241 Abstract Algebra. 3.0; 3 cr.; annually. Prerequisite: 219. Groups, normal subgroups, isomorphism theorems. Permutation groups and Cayley's Theorem. Automorphism, rings, ideals, and integral domains. Polynomial rings.

242 Topics in Algebra. 3.0; 3 cr.; Prerequisite: 241. Topics chosen from the following: module over a ring, the fundamental theorem on finitely generated modules over a Euclidean ring; algebras over a field, vector spaces, the dual space, linear transformations, characteristic roots, diagonable linear transformations, the triangular form theorem, Jordan and rational canonical forms. Group theory, Galois theory.

261 Number Theory: 3.0; 3 cr.; annually. Prerequisite: 219. General introduction to the theory of numbers. Theorems of divisibilty and congruence. The Euclidean algorithm. Quadratic residues and the reciprocity law. Some Diophantine equations. Binary quadratic forms. Simple continued fractions. Some number theoretic functions.

271 Set Theory. 3.0; 3 cr.; biennially. Introduction to metric spaces with emphasis on the real line. Baire's category. Cardinality and ordinality. The axiom of choice. Transfinite induction. Well-ordering principle.

293 and 294 Senior Tutorial Courses. 3.0; 3 cr.

Statistics

Note: Students can receive credit for only one of Math 207, Math 208, Economics 213, Education 227.

207 Elementary Statistics for the Social Sciences. 3.0; 3 cr.; annually. *Open only to Arts students, whose mathematical preparation does not allow them to follow Math 208.* Includes data organization, frequency distributions, measures of central tendency and dispersion, normal distribution; random sampling and probability, binomial distribution hypothesis testing, Chi-Square tests.

208 Elementary Statistics for the Sciences. 3.0; 3 cr.; annually. *Not open to students with prior credit in 233.* Populations and samples. Random sampling errors. Types of data. Frequency distributions, empirical definition of probability. Probability distributions. Elements of point and interval estimation and hypothesis testing. Applications, using the binomial, normal, Chi-Square and t distributions. Relationship between categorical variables and numerical variables (regression).

230 Introduction to Random Variables and Statistical Inference with Computing. 3.0; 3 cr.; annually. Prerequisites: 200 and 201.

233 Introduction to Probability and Random Variables. 3.0; 3 cr.; annually. Prerequisite: 201. Axiomatic definition of probability, random variables, univariate and multivariate p.d.f. and c.d.f. Expectation and moment generating functions. Conditional distributions, families of random variables. Distribution of functions of random variables. Stochastic convergence and convergence of distribution functions. The law of large numbers and the central limit theorem.

234 Introduction to Statistical Inference. 3.0; 3 cr.; annually. Prerequisite: 233. Sampling distributions. Point estimation, interval estimation. Neuman-Pearson

theory of hypothesis testing. Likelihood ratio test. Sequential analysis. Elementary decision theory.

235 Topics in Statistics. 3.0; 3 cr. Prerequisite: 234. Multivariate distributions. Simple regression models. Nonparametric statistics; order and rank test. Sequential analysis. Elementary decision theory.

236 Sampling Techniques. 2.2; 3 cr.; annually. Pre- or co-requisite: 234. *Equivalent to EB 222.* Simple random, systematic, startified, cluster and two-stage sampling. Estimation of parameters and properties of estimates. Ratio and regression estimates. Problem of non-response.

238 Probability Theory. 3.0; 3 cr.; annually. Prerequisite: 233.

Computer Science

200 Introduction to Programming. 3.3; 4 cr.; annually. Introduces a disciplined approach to computer programming and problem solving, utilizing a block-structured high level language like Java. Emphasizes procedural abstraction, and good programming style. Covers the basic repetition and selection constructs; procedures and functions, parameter passing and scope of variables. Members of Department.

206 Computers and Programming for the Arts. 2.3; 3 cr.; annually. Open to Arts students only. *No credit for computer science majors. Students can get credit for only one of Math 206, Math 209, BADM 256, and Education 219.* Introduces computers and illustrates their use. Common applications are considered in word-processing, spreadsheets and database systems. The Internet and the use of the World Wide Web are covered. The course is meant to be a computer literacy course.

209 Computers and Programming for the Sciences. 2.3; 3 cr.; annually. *No credit for computer science majors. Students can get credit for only one of Math 206, Math 209, BADM 256, and Education 219.* Introduces computers and illustrates their use. Common applications are considered in word-processing, spreadsheets and database systems. The internet and the use of the World Wide Web are covered. The course is meant to be a computer literacy course.

211 Discrete Structures. 3.0; 3 cr.; annually. Introduces logical reasoning, sets, relations and functions; mathematical induction, counting and simple finite probability theory; modular arithmetic and arithmetic in different bases; recurrence relations and difference equations; truth tables; and switching circuits, graphs and trees; strings and languages.

212 Intermediate Programming with Data Structure. 3.3; 4 cr.; annually. Prerequisite: Math 200. Continuation of Math 200. Consolidates algorithm design and programming techniques, emphasizing large programs, giving a detailed study of data structures and data abstraction, and introducing complexity considerations and program verification.

230 Introduction to Random Variables and Statistical Inference with Computing. 3.0; 3 cr.; annually. Prerequisites: 200, 201. Random variables, mathematical expectations, probability, density functions, moment generating functions. Overview of probability theory. Selected probability distributions: binomial, normal, exponential, T, C2, F-Point and interval estimation. Hypothesis testing and use of computer packages.

251 Numerical Computing. 3.0; 3 cr.; annually. Prerequisites: 200, and 202 or 210. Introduces techniques of numerical analysis: number representations and round-off errors; root finding; approximation of functions; integration; solving initial value problems; Monte-Carlo methods. Implementations and analysis of the algorithms used will be stressed.

255 Computer Architecture and Assembly Language. 3.0; 3 cr.; annually. Prerequisite: 212. Gives a structured overview of the architecture of digital computers. Students will be exposed to one or more micro/mini architectures, and will be expected to complete a number of programs in assembly language.

256 Advanced Algorithms and Data Structures. 3.0; 3 cr.; annually. Prerequisite: 212. Systematic study of algorithms and their complexity. Topics includes advanced searching and sorting algorithms, graph and matrix algorithms, and intractable problems.

257 Theory of Computation. 3.0; 3 cr.; annually. Prerequisite: 211. Covers basic theoretical principles embodied in automata and grammars. Turing machines, and complexity theory. Topics include regular expressions, finite automata, context-free grammars, pushdown automata, closure properties, parsing; Turing enumerability; TIME classes, P and NP problems, P-time reductions and NP-Completeness.

258 Programming Languages 3.0; 3 cr; annually. Prerequisite: 212. Emphasizes the principles and programming styles that govern the design and implementation of contemporary programming languages. Focuses on the functional, the object oriented, and the rule-based paradigms, using languages such as Lisp, Smalltalk, and Prolog. Students are assumed to be familiar with the procedural paradigms.

272 Operating Systems. 3.0; 3 cr; annually. Prerequisites: 255, 256. Presents an overview of the structure and the different functions of operating systems. Topics include: processes and CPU scheduling, memory management, virtual memory, disk and drum scheduling, file systems, concurrent processing and synchronization, and general resource allocation.

274 Compiler Construction. 3.0; 3 cr; annually. Prerequisites: 255, 257. Syntax specifications of programming languages, parsing theory, top-down and bottom-up parsing, parser generators, syntax-directed code generation, symbol table organization and management, dynamic storage allocation, code optimization, dataflow analysis, register allocation.

277 Database Systems. 3.0; 3 cr.; annually. Prerequisites: 256 and preferably 272. Presents an overview of the nature and purposes of database systems. Introduces data modeling: The Entity Relationship Model, the Relational Model with relational algebra, relational calculus and SQL; file organization index files; Normalization . Students will be exposed to other relational query languages such as QUEL, and QBE.

281 Numerical Linear Algebra. 3.0; 3 cr.; biennially. Prerequisites: 219, 251. Direct and interactive methods for solving general and special systems of linear equations. Covers LU decomposition, Choleski decomposition, nested dissection, marching algorithms; Jacobi, Gauss-Seidel, successive over-relaxation, Alternating directions, and conjugate gradient iterative methods.

282 System Design and Analysis. 3.0; 3 cr.; biennially. Prerequisite: 277. Project management, systems requirements. Data flow concepts, decision tables. Conditions and decision variables. Design of output and input forms. Files and database

development. On-line and distributed environments. System documentation. System implementation.

283 The Logic of Programming. 3.0; 3 cr.; biennially. Prerequisites: 212, Philosophy 211. Presents computer programming as a rigorous mathematical discipline. Topics include: sentential logic; predicate logic; expressions and commands; pre/post-conditions; assignment, alteration, repetition, invariant predicate, function predicate; modules; data structures; concurrency.

285 Computer Graphics. 3.0; 3 cr.; annually. Prerequisite: 212. Covers the practice of, and underlying mathematical foundation for, interactive graphics programming. Topics include segmentation, windows and viewports, clipping, hidden, lines, geometric transforms, data structures for memory management, and device independent graphics specifications.

287 Artificial Intelligence. 3.0; 3 cr.; annually. Prerequisites: 256. Introduces the principles and techniques that enable computers to behave intelligently. Covers basic problem solving methods; knowledge representation; memory organizations and deduction; abduction, reasoning under uncertainty, and expert systems; language processing; learning from samples and from experience. Several projects will be given using Lisp and/or Prolog.

297 Selected Topics in Computer Science. 3.0; 3 cr. Prerequisite: Senior standing. Contents change according to the interests of the instructor. Topics will be chosen from: distributed computer systems, concurrent processing and parallel algorithms, theory of relational databases, and others.

GRADUATE PROGRAM

The departmental requirements are as follows:

M.A. or M.S. in Mathematics

A minimum of 24 credits in mathematics courses plus thesis. 21 of the 24 credits must be at the graduate level and must include Mathematics 303, 314 and 341.

M.A. or M.S. in Statistics

A minimum of 24 credits plus thesis. 18 of the 24 credits must be taken in the Department of Mathematics, and must include Mathematics 303, 331, 332, 333 and 334. Students interested in taking courses outside the Department of Mathematics can do so after obtaining the approval of the Department. A minimum of 21 credits must be at the graduate level.

GRADUATE COURSES

Mathematics

301 and 302 Graduate Tutorial Courses. 1-3 cr.; Prerequisite: Graduate standing or consent of instructor.

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303 Measure and Integration. 3.0; 3 cr.; annually. Prerequisite: 224 or Consent of Instructor. Abstract integration, positive Borel measures and Riesz representation theorem. LP spaces, complex measures, Radon-Nikodym theorem, integration product spaces and Fubini's theorem. Derivatives of measures and differentiable transformations.

304 Complex Analysis. 3.0; 3 cr.; annually. Prerequisites: 224, 227. Elementary properties of holomorphic functions, open mapping theorem and applications, Harmonic functions, Poisson integral, the maximum modulus principle, conformal mapping and Riemann mapping theorem, analytic continuation, monodromy theorem, Picard's theorem.

305 Functional Analysis. 3.0; 3 cr.; annually. Prerequisite: 224. Vector spaces, Hamel basis, Schuder basis, Hahn-Banach theorem, Banach-Steinhaus theorem, open mapping and closed graph theorem with applications.

306 Calculus and Manifolds. 3.0; 3 cr. Prerequisite: 224.

307 Topics in Analysis. 3.0; 3 cr.

314 Algebraic Topology I. 3.0; 3 cr.; annually. Prerequisites: 214, 241. Categories and functors; homotopy; covering projections and fibrations; simplicity complexes; simplicial and singular homology.

315 Algebraic Topology II. 3.0; 3 cr.; annually. Prerequisite: 314.

316 Topics in Topology. 3.0; 3 cr.

341 Modules and Rings I. 3.0; 3 cr.; annually. Prerequisite: 241. Fundamental concepts of modern ring theory; injective and projective modules, generating and congenerators, tensor products and flat modules. Finiteness conditions; Artinian and Neotherian modules and rings, modules with composition series.

342 Modules and Rings II. 3.0; 3 cr.; annually. Prerequisite: 341. Topics may include any of the following: ring theory, homological algebra or lattice theory.

343 Field Theory. 3.0; 3 cr.; annually. Prerequisite: 242.

344 Commutative Algebra. 3.0; 3 cr. Prerequisites: 242, 341.

345 Topics in Algebra. 3.0; 3 cr.

351 Topics in Applied Mathematics. 3.0; 3 cr.; annually. Prerequisites: 223 and 251. Topics chosen from approximation theory, numerical methods for ordinary and partial differential equations, numerical linear algebra.

399 M.A. or M.S. Thesis.

Statistics

The graduate program in Statistics is currently frozen. It is expected to be unfrozen in the near future.

331 Advanced Probability Theory. 3.0; 3 cr.; annually. Prerequisites: 227, 238, 303. Characteristic functions; types of convergence; limiting properties of distribution and characteristic functions; limit theorems; multivariant functions.

332 Advanced Mathematical Statistics. 3.0; 3 cr.; annually. Prerequisites: 235, 238. Distribution theory; decision theory; advanced topics in estimation and inference.

333 Multivariate Analysis. 3.0; 3 cr.; annually. Prerequisites: 238. Multivariant distributions; correlation coefficients; classification and discrimination; Hotelling's T2; tests of hypotheses for multivariate distributions; canonical variables.

334 Advanced Topics in Statistics. 3.0; 3 cr.; annually.

335 Selected Topics from Probability and Statistics. 3.0; 3 cr.; annually.

399 M.A. or M.S. Thesis.

DEPARTMENT OF PHILOSOPHY

Chairperson:	Khalidi, M.A.
Associate Professors:	Nasr, W.N.
Assistant Professors:	Conolly, O.; Haydar, B.; Kassab, E.S.; Khalidi, M.A.
Lecturer:	Agha, S.; Arabi, O.; Ferguson, K.

The Department of Philosophy offers programs leading to the degrees of Bachelor of Arts and Master of Arts in Philosophy.

UNDERGRADUATE COURSES

Students majoring in Philosophy are required to take a total of at-least 36 credits of Philosophy courses, which must include the following required courses: Philosophy 210. 211, 213, and 214. Students should also choose under the supervision of the Department a balanced program of systematic and historical courses and maintain a cumulative average of 70 or more in the Civilization Sequence courses: 201 and 202.

101 Applied Philosophy. 3.0; 3 cr.; annually. This course deals with philosophical questions which have practical import; it aims to introduce students to the philosophical mode of analysis by way of a few exemplars of philosophical writing.

102 Philosophical Classics. 3.0; 3 cr.; annually. An introduction to the thought of some major figures in the history of philosophy.

201 Introduction to Philosophy. 3.0; 3 cr.; each semester. An introduction to philosophy and its methods through an analysis of traditional issues in ethics, epistemology. metaphysics and the philosophy of religion.

209 Environmental Ethics. 3.0; 3 cr.; annually. An attempt to identify and discuss the major ethical and philosophical aspects of issues related to the environment and to determine the environment-related responsibilities and obligations incurred by people at the individual and collective levels.

210 Ethics. 3.0; 3 cr.; annually. An introduction to some of the major normative ethical theories based on the study of the original writings of selected philosophers, and including a part on applied ethics.

211 Introduction to Logic. 3.0; 3 cr.; each semester. A first introduction to formal and informal logic, including argument analysis, informal fallacies, natural deduction methods in propositional and first-order predicate logic.

212 Introduction to Philosophical Logic and Method. 3.0; 3 cr.; alternate years. An introduction to the basic concepts and tools employed in various branches of philosophy.

213 History of Ancient and Medieval Philosophy. 3.0; 3 cr.; annually. A survey of ancient and medieval philosophy from the pre-Socratics to Aquinas.

214 History of Modern Philosophy. 3.0; 3 cr.; annually. A survey of early modern philosophy, from Descartes to Kant.

215 Nineteenth Century Philosophy. 3.0: 3 cr.; alternate years. An introductory survey of post-Kantian philosophy, with emphasis on Fichte, Schelling, Hegel, Schopenhauer, Kierkegaard, and Nietzsche.

216 Political Philosophy. 3.0; 3 cr.; alternate years. *Students cannot receive credit for both Philosophy 216 and PSPA 210.* An examination of various theories of political obligation from the time of Plato to the present.

217 Aesthetics. 3.0; 3 cr.; alternate years. An examination of the central problems and issues which arise in the interpretation, analysis and evaluation of works of art.

218 Metaphysics and Epistemology. 3.0; 3 cr.; annually. An investigation of the most fundamental concepts involved in our thought about the world, including the nature of truth, knowledge, causality, substance, space and time.

219 Existentialism. 3.0; 3 cr.; alternate years. An introduction to Existentialist philosophy, within the context of nineteenth-century and early twentieth-century philosophy.

220 Symbolic Logic. 3.0; 3 cr.; alternate years. Prerequisite: 211. A study of the axiomatization and the meta-theory of classical propositional and predicate logic, first-order theories, as well as related philosophical issues.

221 The Philosophy of Mind. 3.0; 3 cr.; alternate years. An introductory examination of contemporary accounts of the nature of the mental, and of psychological explanation.

222 Philosophy of Science. 3.0; 3 cr.; alternate years. An introduction to the philosophical problems and issues which arise in trying to understand the nature of science.

223 The Philosophy of Language. 3.0; 3 cr.; alternate years. An introductory examination of various contemporary accounts of the nature of language and meaning.

230 Philosophy of Plato. 3.0; 3 cr.; alternate years. An introduction to some of Plato's major dialogues.

231 Philosophy of Aristotle. 3.0; 3 cr.; alternate years. An introductory examination of the physics, metaphysics, logic, ethics and politics of Aristotle.

232 Islamic Philosophy. 3.0; 3 cr.; alternate years. Offered either in Arabic or in English. Prerequisite: 231. An examination of the philosophical and religious thought of the major philosophers of Islam.

233 The Medieval Synthesis. 3.0; 3 cr.; alternate years. Prerequisite: 231. A presentation of medieval thought as a synthesis between *faith* and *reason.*

245 Contemporary Philosophical Movements. 3.0; 3 cr.; alternate years. Prerequisite: 211. A discussion of selected topics or figures in contemporary philosophy.

291 and 292 Special Topics Seminars. 3.0; 3 cr. Given from time to time as need and opportunity arise.

293 and 294 Special Authors Seminars. 3.0, 3 cr. Given from time to time as need and opportunity arise.

GRADUATE PROGRAM

General requirements for graduate study are found in the chapter "Graduate Study" at the end of this catalogue. The course requirements for an M.A. in Philosophy consist of 21 credit hours in philosophy courses numbered 300 or above, together with any additional prerequisite courses required by the Department to make up for deficiencies in undergraduate preparation.

302 Selected Problems in the Theory of Value. 3.0; 3 cr.; alternate years. Prerequisite: 215. An investigation of selected problems in ethics or aesthetics. Problems chosen may vary from year to year.

303 Selected Problems in Logic. 3.0; 3 cr.; alternate years. Prerequisite: 220. An investigation of one or more selected problems in logic. Problems chosen may vary from year to year.

305 Topics in Classical Islamic Philosophy. 3.0; 3 cr.; alternate years. Prerequisite: 232. An investigation of the work of one or more major Islamic philosophers, or of a major theme in Islamic philosophy. Problems chosen may vary from year to year.

306 Recent Arab and Islamic Thought. 3.0; 3 cr.; alternate years. Prerequisite: 232. An evaluative survey of the major trends in contemporary Arabic-Islamic thought.

311 Kant. 3.0; 3 cr.; alternate years. An examination of one or more aspects of Kant's philosophy.

312 Hegel and the Hegelian Traditions. 3.0; 3 cr.; alternate years. An investigation of the impact of Hegelian thought on nineteenth- and twentieth-century philosophy of history, social philosophy, aesthetics, and epistemology.

315 Contemporary Philosophy. 3.0; 3 cr.;. alternate years. Prerequisite: 245. An intensive study of recent trends, developments or issues in contemporary philosophy. Topics will vary from year to year.

321 and 322 Special Topics Seminars. 3.0; 3 cr.. Given from time to time as need and opportunity arise.

323 and 324 Special Authors Seminars. 3.0; 3 cr. Given from time to time as need and opportunity arise.

325 and 326 Graduate Tutorial. 3.0; 3 cr. Given from time to time as need and opportunity arise.

399 M.A. Thesis.

DEPARTMENT OF PHYSICS

Chairperson:	Christidis, T.
Professors:	Chamseddine, A.; El-Eid, M.
Associate Professors:	Abou Ghantous, M.; Christidis, T.; Haidar, N.
Assistant Professors:	Isber, S.; Klushin, L.; Sabra, W.; Tabbal, M.
Lecturers:	Bodakian, B.; Katul, J; Korek, M.
Instructors:	Zableet, T.
Assistant Instructors:	El-Zoghet, F.

UNDERGRADUATE PROGRAM

The Department of Physics offers courses at the undergraduate level leading to a B.S. degree in Physics.

The program for the physics major includes the following courses: Physics 101, 102, 105, 106, 211, 212, 213, 214, 217, 218, 219, 220, 235, 241, 242, 247, and 248. Moreover three elective courses must be selected from Physics: 223, 226, 228/229, 231, 232, and 249, and Chemistry 211 and 212. Also required are Mathematics 101, 102, 200, 201, and 202.

Physics majors must obtain a cumulative average of at least 70 in the physics courses normally taken in the Sophomore year (211, 212, 213 and 214) and a cumulative average of at least 70 in Mathematics 201 and 202 before they are allowed to proceed to junior level courses. Students who wish to transfer to Physics must fulfill the above mentioned criteria.

No physics major is allowed to register in physics courses numbered 217 and above for a third time. Physics majors whose physics average falls below 70 will be placed on departmental probation. If this probation is not removed within two semesters the student will be dropped from the Department.

Physics 101, 102, 105, 106, 211, 212, 213 and 214 are introductory courses for students of Physics, Chemistry, Computer Science, or Engineering. Physics 103, 107, 204, 205, 206, and 207 are mainly for students of Nursing, Public Health, Biology, Petroleum Studies, and for students wishing to enter the Medical School and who are not physics or chemistry majors.

Students shall receive credit for only *one* course out of each of the following pairs of Physics courses: 101-103; 102-204; 105-107; 106-206.

Physics 204, 205, 206 and 207 are not equivalent totally, or in part, to Physics 211, 212, 213, and 214. On the other hand, students shall receive credit only for courses in *one* of the preceding two sets.

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101 Introductory Physics I. 4.0; 4 cr.; annually. An introductory mechanics course for students of science and engineering: Motion in one and two dimensions, Newton's laws, friction, kinetic, potential and mechanical energies. Rotational, kinetics and dynamics. Simple harmonic motion.

102 Introductory Physics II. 4.0; 4 cr.; annually. The second introductory course for students of science and engineering: Waves, sound and light, geometrical and physical optics. Thermodynamics: Temperature, heat, work, entropy, the first and second laws.

103 Physics for the Life Sciences. 3.0; 3 cr.; annually. Units and dimensions, scalars and vectors. Kinematics, dynamics, energy, gravitation, and rotational motion.

105 Introductory Physics Laboratory I. 0.2; 1 cr.; annually. Pre- or co-requisite: 101. A selected set of experiments in mechanics with emphasis on errors of measurements and their treatment.

106 Introductory Physics Laboratory II. 0.2; 1 cr.; annually. Pre- or co-requisite: 102. A selected set of experiments on thermodynamics, waves and optics with emphasis on errors of measurement and their treatment.

107 Physics for the Life Sciences Laboratory. 0.2; 1 cr.; annually. Pre- or co-requisite: 103. A selected set of experiments in mechanics and the principles of systematic recording and analysis of data, graphical analysis and the estimation of error in physical measurements.

200 Understanding the Universe. 3.0; 3 cr.; annually. Restricted to undergraduate **arts** students. An introductory course for non-science students. Basic astronomical discoveries. Properties of the earth, planets and electromagnetic radiation. Stars and their end stages, galaxies, and the universe.

204 Classical Physics for Life Sciences. 3.0; 3 cr.; annually. Prerequisite: 103. Fluids, thermodynamics. wave phenomena, geometrical and physical optics.

205 Modern Physics for Life Sciences. 3.0; 3 cr.. Prerequisite: 103. Electricity and magnetism, the basis of special relativity, origin of the quantum theory, x-rays; Compton scattering, De Broglie waves and the Bohr model, uncertainty principle, and elementary particles.

206 Classical Physics for Life Sciences Laboratory. 0.2; 1 cr.; annually. Pre- or co-requisite: 204. Techniques of laboratory work: Treatment of random errors, graphical representation of data. Experiments on: thermodynamics, waves, optics, surface tension and viscosity.

207 Modern Physics for Life Sciences Laboratory. 0.2; 1 cr.; annually. Pre- or co-requisite: 205. The use and calibration of a milliammeter and a voltmeter, wheatstone bridge, potentiometer. Rate of charge and discharge of a capacitor. Basic oscilloscope operations. RC and RLC circuits, operational amplifier; classical scattering; determination of Planck's constant; atomic spectroscopy.

211 Electricity and Magnetism. 3.0; 3 cr.; annually. Prerequisites: 101 and 105, or 102 and 106, and pre- or co-requisite: Mathematics 201. Electrostatics, current, resistance, Ohm's law, Kirchhoff's laws, RC circuits. Magnetostatic theory, Ampere's law, Faraday's law, LR circuit, RLC circuits and a qualitative discussion of Maxwell's equations.

212 Modern Physics. 3.0; 3 cr.; annually. Prerequisites: 101 and 105, or 102 and 106; pre- or co-requisite: Mathematics 201. The course introduces simple aspects of the special theory of relativity, the quantum effects up to the Schr.dinger equation with

simple applications. It includes notions of atomic physics and an elementary introduction to nuclear and elementary particles physics.

213 Electricity and Magnetism Laboratory. 0.2; 1 cr.; annually. Pre- or co-requisite: 211. A number of selected electricity and magnetism experiments. Emphasis is on the fundamental principles of electric and magnetic experimental techniques and instrumentation, also on planning, data analysis, and error estimation.

214 Modern Physics Laboratory. 0.2; 1 cr.; annually. Pre- or co-requisite: 212. A number of experiments covering many aspects of modern physics as well as measurement of some fundamental constants: Random motion, operational amplifiers, light polarization, atomic spectroscopy, Michelson interferometer, photo-electric effect, Bragg's and electron diffraction.

217 Mechanics. 3.0; 3 cr.; annually. Prerequisite: Mathematics 202. Motion of particles in one and three dimensions, harmonic oscillations, constrained motion, rotating frames of references, central forces, dynamics of system of particles, mechanics of rigid bodies and Lagrangian mechanics.

218 Quantum Mechanics I. 3.0; 3 cr.; annually. Prerequisite: 241. Wave packets and the postulates of quantum theory, operators, eigenvalues and eigenfunctions, one-dimensional problems and the harmonic oscillator. The Schr.dinger equation in three dimensions, angular momentum and the hydrogen atom.

219 Quantum Mechanics II. 3.0; 3 cr.; annually. Prerequisite: 218. Operators, matrices, spin, addition of angular momenta, time-independent perturbation theory, relativistic correction, spin-orbit coupling and external magnetic fields. Helium and other atoms, interaction of radiation with matter.

220 Electromagnetic Theory. 3.0; 3 cr.; annually. Electrostatics, electric currents, magnetostatics, induction, Maxwell's equations and wave propagation.

223 Physical Optics. 3.0; 3 cr. Maxwell's equations, the wave model and the superposition of coherent waves to account for the classical phenomena of interference, diffraction, polarization, imagery, lasers and holography.

226 Solid State Physics. 3.0; 3 cr. Prerequisite: 218. Crystal structure, x-ray diffraction, lattice dynamics and transport properties, electron states and energy bands, semi-conductors, dielectrics, optical, magnetic, super-conducting properties of solids.

228 Electronics. 3.0; 3 cr.; annually. Prerequisites: 211 and 213. Students may not get credit for this course unless they take 229. Test equipment and measurements, direct, transient and alternating current circuits, power supplies, diodes and transistors, transducers and time counting measurements, operational amplifiers, digital basics and circuitry, analog meets digital.

229 Electronics Laboratory. 0.3; 1 cr.; annually. Pre- or co-requisite: 228. Includes both analogue and digital electronics applicable to experimental science. Topics selected cover: DC and AC circuits, measurements and the use of electronic laboratory instruments, diodes, transistors, rectification filters, logic circuits and operational amplifiers.

231 Selected Topics. 3.0; 3 cr. May be repeated for credit.

232 Selected Topics. 3.0; 3 cr. May be repeated for credit.

235 Thermal and Statistical Physics. 3.0; 3 cr.; annually. Concepts in microscopic physics leading to macroscopic formulation of thermal physics. Study of statistical ensembles, covering both classical and quantum gases, phase transformation and kinetic theory, and irreversible thermodynamics.

241 Mathematical Methods of Physics. 4.0; 4 cr.; annually. Prerequisite: Mathematics 202. Vector analysis, tensors, determinants and matrices, complex variables, Sturm-Liouville problems, Fourier analysis, partial differential equations and special functions.

242 Computational Physics Laboratory. 0.2, 1 cr.; annually. Prerequisite: 241. Two-hour weekly laboratory on "Mathematica."

247 Junior Physics Laboratory. 1.6; 4 cr.; annually. A weekly lecture on instrumentation and a selection of experiments on atomic and molecular physics, electric circuits, ultrasonics, optics, mechanical oscillations, magnetic susceptibility, and the speed of light.

248 Undergraduate Seminar. 1.0; 1 cr.; annually. Prerequisite: Senior standing.

249 Nuclear and Elementary Particle Physics. 3.0; 3 cr.; annually. Prerequisite: 218. Scattering theory, nuclear models, radiation and instrumentation. Properties of elementary particles, symmetries and transformations. The standard model.

GRADUATE PROGRAM

The Department provides facilities for graduate work leading to the M.S. degree. The research activities of the Department include: Condensed matter physics, electron paramagnetic resonance, non-linear dynamics, astrophysics, and high energy physics.

The M.S. program consists of four basic courses: 301, 302, 303, and 305, after which the student must pass the qualifying exam. In addition, students must take a number of electives (normally nine credits), set at admission. After passing the qualifying exam, the student must select a thesis advisor who will present a thesis proposal to the physics faculty for approval. The M.S. degree is granted after the student defends his/her thesis successfully.

301 Classical Mechanics. 3.0; 3 cr.; annually. D'Alembert's principle, variational principles and Lagrange's equations, central forces, rigid bodies and small oscillations, Hamilton's equations, canonical transformations and Hamilton-Jacobi theory, stability, integrable systems and chaotic motion.

302 Thermodynamics and Statistical Mechanics. 3.0; 3 cr.; annually. Statistical ensembles, equilibrium ensembles, quantum statistics. Interacting systems and correlation functions, magnetics and mean-field approach, critical phenomena, non-equilibrium phenomena and fluctuations.

303 Electromagnetic Theory I. 3.0; 3 cr.; annually. This course covers both electrostatic and magnetostatic theory up to Maxwell equations. It includes techniques used with different boundary problems, multipoles and electromagnetic waves.

304 Electromagnetic Theory II. 3.0; 3 cr. Prerequisite: 303. The course treats several topics in electrodynamics: waveguides and resonant cavities, electromagnetic radiation with sources, covariant formulation of electrodynamics, magneto-hydrodynamics, plasma physics and multipole fields.

305 Quantum Mechanics I. 3.0; 3 cr.; annually. Hilbert space, matrix representation of operators, similarity transformations of representations, eigenvalue problem of angular momentum, uncertainty relation, spin-1/2 and spin-1 systems, the

Hamiltonian and the Schr.dinger equation, quantized harmonic oscillators, path integrals, radial wave equation, and time-independent perturbation theory.

306 Quantum Mechanics II. 3.0; 3 cr. Prerequisite: 305. Quantum theory of angular momentum, Dirac equation and theory of electron spin, quantization of the electromagnetic field, approximation methods, time-dependent perturbation theory, scattering theory, many-body systems and second quantization.

307 Solid State Physics. 3.0; 3 cr. Prerequisite: 305. This course introduces the technique of Green's functions and their general approximations to be used in the study of transport coefficients of meta Coulomb gas, Fermi liquid, electrons and phonons, superconductivity, superfluidity, magnetism, disordered systems and critical phenomena.

309 and 310 Selected Topics. 3.0; 3 cr. (each). May be repeated for credit.

312 Advanced Laboratory. 0.6; 3 cr.; annually. A choice of experiments from: NMR, EPR, Zeeman effect, Kerr effect, lasers and holography, mass spectrometer, optical pumping and Stern-Gerlach.

391 and 392 Graduate Tutorial. 1-3 cr. (each). May be repeated for credit.

399 M.S. Thesis.

DEPARTMENT OF POLITICAL STUDIES AND PUBLIC ADMINISTRATION

Chairperson:	Hamzeh, N.
Professors:	Palmer, M.; Waterbury, J.
Associate Professors:	Hamzeh, N.; Harik, J.; Khashan, H.; Khazen, F.; Kisirwani, M.; Moussalli, A.; Nehme, M.; Salem, P.
Lecturers:	Antoun, R.; Krayem, H.
Instructor:	Bitar-Ghanem, G.

The Department of Political Studies and Public Administration (PSPA) offers courses covering four sub-disciplines and two major programs: one leading to a Bachelor of Arts and a Master of Arts in Political Studies, and one leading to a Bachelor of Arts and a Master of Arts in Public Administration. Students wishing to major in PSPA must secure and maintain the approval of the Department and must satisfy the conditions detailed below. In any case, acceptance in the Department is subject to the availability of places.

UNDERGRADUATE PROGRAM

Graduation as a major for PS students requires a grade of 75 in PSPA 201, 70 in PSPA 203 and a passing grade in PSPA 202; for PA students, a grade of 75 in PSPA 202, 70 in PSPA 203 and a passing grade in PSPA 201. Transfers to the PSPA major need to fulfill the above requirements of PSPA 201 and 202, plus a minimum grade of 70 in English 203 and 204. Transfers will not normally be accepted in the senior year.

For purposes of meeting departmental requirements, students are not permitted to take PSPA 201, 202, and 203 more than twice. Prospective majors are urged to complete PSPA 201, 202, and 203 by the end of their sophomore year.

Students majoring in **Political Studies** are required to complete 39 credits in the Department, which must include PSPA 201, 202, 203, 210, 211, 212 and 213. An additional six courses are required, three from each of the two sub-disciplines in which the student chooses to concentrate, including at least one senior seminar. These sub-disciplines include: Political Theory (PSPA 214, 215, 216, 217, 218, 223, 291 and 292); International Politics (PSPA 225, 233, 234, 236, 237, 238, 293 and 295); and Comparative Politics (PSPA 250, 251, 252, 253, 254, 255, 256, 294, and 296).

Students majoring in **Public Administration** are required to complete 39 credits in the Department, which must include PSPA 201, 202, 203, 210, 211, 212, and 213. An additional six courses are required, three must be from category one (PSPA 273, 275, 277, 278); and three, including at least one senior seminar, must be from category two (PSPA 257, 258, 259, 297, 298).

PSPA majors are required to take the following courses outside the Department: Economics 203 or AED 212, SBHS 201 or 202, Mathematics 206, and an introductory course in statistics from among Mathematics 207, Education 227, and Economics 213. Majors are expected to choose, in consultation with their advisor, a number of electives from the humanities and social sciences.

The completion of PSPA 201, 202 and 203 as specified above, is required as a prerequisite for all PSPA undergraduate courses. In addition, senior standing is a prerequisite for senior seminars in PSPA.

101 Issues in Contemporary Politics. 3.0; 3 cr. This course examines the global context of politics focusing on the changing world order in the twentieth century. Special attention will be given to themes like democratization, civil society, ethnic conflict, human rights and globalization will be discussed.

201 Introduction to Political Science. 3.0; 3 cr. This course is an introduction to the study of political science with emphasis on the basic concepts, ideas and issues relating to the process of government in the modern state.

202 Introduction to Public Administration. 3.0; 3 cr. The nature of public administration. Basic concepts, processes, approaches and fields of public administration are introduced so that the student will develop a sense of appreciation of the role of public administration in modern society.

203 Research Methodology. 3.0; 3 cr. *Students cannot receive credit for both SBHS 210 and PSPA 203.* This course focuses on the problems involved in asking and answering questions about political science and public administration. It presents the various analytical frameworks and methodological tools used for this purpose with emphasis on empirical approach, data collection, and analysis.

210 Survey of Political Theory. 3.0; 3 cr. *Students cannot receive credit for both PSPA 210 and Philosophy 216.* Main issues in the political theory of government, authority, and citizenship, from the philosophy of the ancient Greeks to the thought of twentieth-century Western political thinkers. An attempt will be made to recapture the dimensions of these problems as understood by some great political thinkers and relate them to our experience and historical context.

211 Survey of Comparative Politics. 3.0; 3 cr. This is a survey of concepts and issues in comparative politics. It acquaints the student with basic theoretical frameworks for the study and analysis of political phenomena, and establishes criteria for comparing political systems. It examines closely the application of these concepts, frameworks and criteria in selected countries.

212 Survey of Current Trends in Public Administration. 3.0; 3 cr. Deals with contemporary concepts, approaches and practices in public administration such as public policy analysis, social responsibility and ethics of public agencies, non-bureaucratic organizations, privatization and decentralization in public services deliveries.

213 Survey of International Relations. 3.0; 3 cr. A survey of the basic forces and factors determining relations among states, with special emphasis on the international system, foreign policy, national power, the restraints on determinants of

state action, contemporary problems and major issues faced by states, and the patterns of interaction which prevail among states.

214 Islamic Political Thought I. 3.0; 3 cr. A survey of Islamic political thought from the time of the Prophet Muhammad to the fourteenth century, with special reference to the historical experience of Islamic society.

215 Islamic Political Thought II. 3.0; 3 cr. A survey of Islamic political thought from Ibn Khaldun to the nineteenth century with special reference to institutional growth.

216 Western Political Thought I. 3.0; 3 cr. A survey of Greco-Roman political thought with special reference to social developments.

217 Western Political Thought II. 3.0; 3 cr. A survey of Western political thought from the Renaissance to the present.

218 Asian Political Thought. 3.0; 3 cr. A survey of Asian political thought from Confucius to modern times with special reference to the cultural and institutional growth of countries such as China, Korea and Japan.

223 Jurisprudence. 3.0; 3 cr. A survey of the kinds, nature and sources of law; the administration of civil and criminal justice; the nature of legal rights and duties, and the schools of jurisprudence.

225 Public International Law. 3.0; 3 cr. Survey of the fundamentals and principles of the International Law of Peace. It emphasizes the origins, the subjects, and the sources of international law and its relations to state law. Recognition; territorial sovereignty; jurisdiction; state responsibility; succession to rights and obligations; diplomatic envoys and consuls; the law and practice of treaties.

233 International and Regional Organization. 3.0; 3 cr. Survey of the structure, process and role of international and regional organizations in theoretical terms, and an appraisal of these organizations on the global and regional level.

234 Arab Relations with Non-Western Powers. 3.0; 3 cr. Focuses on Arab relations with major non-Western powers such as the former Soviet Union, as well as China and Japan. Historical development and future political and strategic implications will be emphasized.

236 The Origins and Evolution of the Arab-Israeli Conflict. 3.0; 3 cr. A survey of the development of Arab Western relations since the first World War. It focuses on the origins and evolution of the Arab-Israeli conflict both in its regional and international dimensions.

237 The Middle East in International Politics since World I. 3.0; 3 cr. This course examines the place of the Middle East system of states in the international system. It covers issues such as Western colonialism, Cold War politics, the oil factor in Arab-Western relations. and the rising factor of Islam in international politics. Focus on selected Arab (Maghreb-Mashrek) countries, Iran, Turkey, and Israel.

238 International Political Economy. 3.0; 3 cr. This is a survey of the political economy of major powers as they affect the making of foreign policy. Emphasis will be placed on theories dealing with imperialism, the international market and the world economic system.

250 Governments of Post Industrial Societies. 3.0; 3 cr. This is a survey of post-industrial governments and politics in selected countries such as Great Britain, France, Germany and Japan against the background of their socio-economic and cultural environment. Their institutional environment is studied with emphasis on the policy-making process and important issues faced by those governments today.

251 Politics and Government: United States of America. 3.0; 3 cr. A survey of the main features of the American political system.

252 Politics and Government: Russia and the former Soviet Republics. 3.0; 3 cr. This course examines and analyzes the process of change and transformation that led to the disintegration of the former Soviet Union. It focuses on broad theoretical and historical issues as well as on the future implications of these changes.

253 Politics and Government: Middle East. 3.0; 3 cr. This is a survey of political institutions and processes in selected Middle East countries.

254 Political Development and Modernization. 3.0; 3 cr. A survey of major issues and controversies in political development and their relevance to nation building in developing countries. Various components of this course include the impact of military rule, political parties and elites on political change and modernization.

255 Islamic Political Institutions. 3.0; 3 cr. A survey of the Shari'a in contemporary political practice, against the background of its historical evolution.

256 Politics in Lebanon. 3.0; 3 cr. This course provides an overview of Lebanese politics from the mid-nineteenth century to the present. It deals with the origins, evolution, and workings of the confessional system with emphasis on the period after independence. Focus is placed on issues of consensus and conflict in Lebanese society.

257 Regional and Local Administration. 3.0; 3 cr. This is a course on the organization, structures, functions and theories of regional and local administration. It examines issues of centralization-decentralization, central-regional-local government relations, and issues of balanced development at the national level.

258 Comparative Public Administration. 3.0; 3 cr. A survey of the theories of comparative public administration followed by a cross-national comparison of public administration in different cultural and socio-economic settings.

259 Public Administration in Lebanon. 3.0; 3 cr. A survey of the environment, scope, structure, behavior and problems of public administration in Lebanon with special emphasis on the attempts at administrative reform and their institutional products.

273 Public Personnel Administration. 3.0; 3 cr. A survey of the basic concepts, processes and problems of personnel administration in the public service with special emphasis on Middle Eastern experience.

275 Organization and Management. 3.0: 3 cr. *Business students cannot receive credit for both BADM 231 & PSPA 275.* A survey of the concepts, principles, and techniques of organization and management with special emphasis on questions of applicability. It is hoped that the student will develop attitudes and acquire skills that should enable him or her to administer organizations effectively and efficiently.

277 Public Budgeting. 3.0; 3 cr. A survey of the principles and problems of financial organization and management in the public service with emphasis on fiscal planning, formulation and execution of the budget, financial accountability, control and other aspects related to the role of the budget in development.

278 Controls over Public Administration. 3.0; 3 cr. A comparative analysis of formal and informal means aiming at promoting responsiveness and responsibility in public administration. The course covers the importance of administrative ethics, and the tools and techniques of administrative, legislative and judicial controls. It will also emphasize the controls exercised by the mass media, interest groups and individuals.

288 and 289 Special Topics. 3.0; 3 cr. (each).

291 Senior Seminar in Western Political Theory. 3.0; 3 cr. A specific topic of Western political theory selected for intensive examination.

292 Senior Seminar in Islamic Political Theory. 3.0; 3 cr. A specific topic of Islamic political theory selected for intensive examination.

293 Senior Seminar on the Foreign Policies of the Great Powers since World War II. 3.0; 3 cr. Concentrates principally on the five permanent members of the Security Council. The current foreign policies of these powers are examined on selected issues for each power against the background of a general assessment of the major determinants of their policies since the end of World War II.

294 Senior Seminar in Contemporary Issues in Comparative Politics. 3.0; 3 cr. Examines selected critical issues in the field of comparative politics related to the state, political parties and interest groups, political socialization, leadership and elites, in developed and developing countries.

295 Senior Seminar in Human Rights and International Politics. 3.0; 3 cr. Examines the development and relevance of institutions and instruments concerned with human rights, and then considers problems of human rights issues in selected countries and their impact on regional and global actors.

296 Senior Seminar in Arab Politics. 3.0; 3 cr. Deals with the political systems and ideological currents that emerged in the Arab world after the breakup of the Ottoman Empire. Emphasis is placed on the various nationalist trends that characterized Arab politics, notably Arab nationalism, both within selected Arab countries and in the broader context of inter-Arab relations.

297 Senior Seminar in Organization Theory. 3.0; 3 cr. The goal is to provide an introductory theoretical framework through which empirical behavior in public organizations might be analyzed. It considers that body of theory which has had an impact on modern public administration thought and practice.

298 Senior Seminar in Public Bureaucracy. 3.0; 3 cr. This is designed to introduce participants to the study of public bureaucracies and their role in political, administrative, and economic development.

GRADUATE PROGRAM

Graduate students in PSPA are required to complete at least 24 credits plus a thesis.

Students majoring in **Political Studies** are required to take core courses, which must include PSPA 300, 301, 310 and 320. An additional two graduate courses are required from their chosen sub-discipline of specialization. The sub-disciplines include: Political Theory (PSPA 301, 302, 303, 304, 305, 306); International Politics (PSPA 310, 311, 312, 313, 314, 315); and Comparative Politics (PSPA 320, 321, 322, 323, 324).

Students majoring in **Public Administration** are required to take core courses, which must include PSPA 300, 350, 360, and 370. An additional two graduate courses are required from their chosen sub-discipline of specialization. The sub-disciplines include: Administrative Theories (PSPA 350, 351, 352, 353, 354, 363); Financial Administration (PSPA 360, 361, 362); and Personnel Administration (PSPA 363, 370, 371, 372, 373, 374).

An introductory course in statistics (or its equivalent) is a prerequisite for graduate work in the Department. Students admitted to graduate work who have not completed this prerequisite will be required to take the course in addition to the normal program. Majors are expected to choose, in consultation with their advisor, no more than two electives from the humanities and social sciences.

300 Research Design and Techniques. 3.0; 3 cr.; core course. This is a graduate seminar with two major objectives: 1) to develop an acquaintance with research methods, such as experimentation and stimulation, survey analysis, participant observations and unobtrusive methods, 2) to familiarize the student with the fundamentals of research design, execution and reporting.

301 Graduate Seminar in Political Theory. 3.0; 3 cr.; core course. Designed to provide students with a critical examination and analysis of the theoretical bases and perennial issues of political theory and ideologies.

302 Modern Western Political Theory. 3.0; 3 cr. This course examines intensively and analytically major issues of nineteenth and twentieth century Western political theory such as democracy, socialism and fascism.

303 Modern Islamic and Arab Thought. 3.0; 3 cr. This course examines intensively and analytically major issues of nineteenth and twentieth century Islamic and Arab political thought such as modernism and fundamentalism.

304 Theories of Political Economy. 3.0; 3 cr. Designed to provide students with a critical examination and analysis of theoretical issues in political economy. It deals with diverse schools of political economy such as the mercantilists, the classicists, and the Marxists.

305 Political Trends in the Arab World. 3.0; 3 cr. This course centers on the major political and ideological trends that have characterized the Arab World since the turn of the twentieth century. It also examines in-depth the components of these trends and their relation to existing Arab political culture as well as their effects on political systems.

306 Graduate Seminar in Legal Issues. 3.0; 3 cr. Deals with the intensive examination of selected issues in law and jurisprudence.

310 Theories of International Relations. 3.0; 3 cr.; core course. This course deals with major theoretical trends in the field of international relations, especially trends which developed after World War II.

311 International Politics and the Arab World. 3.0; 3 cr. This course deals with issues related to the Arab state system in contemporary international politics. Issues include the Arab-Israeli conflict, inter-Arab relations, and major powers relations with the Arab World.

312 International Law and Diplomacy. 3.0; 3 cr. An intensive study of selected issues in diplomacy with emphasis on its origins, development, and contemporary practices.

313 Issues in Cold War and Post-Cold War Politics. 3.0; 3 cr. Examines the impact of nuclear technology on international politics with reference to the prospects of war and peace and the containment of conflict. Issues include the defense policy and strategies of the major powers, the implications of nuclear proliferation, and conventional arms control in Cold War as well as in post-Cold War politics.

314 Graduate Seminar in International and Regional Organizations. 3.0; 3 cr. This seminar examines the process of inter-state organizations and integration. It focuses on the evolution and future patterns in international and regional cooperation.

315 Graduate Seminar in International Relations. 3.0; 3 cr. Intensive examination of specific topics in international relations such as international political economy, international trade policy, and changes in the international system.

320 Theories of Comparative Politics. 3.0; 3 cr.; core course. An overview of different theories and approaches to comparative politics. The emphasis is upon different theoretical approaches, such as pluralism, elitism, class analysis, structuralism and system analysis, the state, political culture, development and under development. These theories will be applied to developed and developing societies.

321 Graduate Seminar in the Modern Governments of the Middle East. 3.0; 3 cr. A seminar that aims at examining intensively the main features of the political system and its social underpinnings in one or two Arab countries such as Saudi Arabia, Egypt, Iraq, or Syria.

322 Modern Governments of Non-Middle Eastern Developing Countries. 3.0; 3 cr. In this seminar different issues will be emphasized from one semester to the next. In one semester emphasis will be on military institutions and decision making, in others it will be on political parties and models of development, etc.

323 Minorities and Politics in the Middle East. 3.0; 3 cr. The political culture and behavior of groups in divided societies within the general framework of various theories explaining minority/majority, and minority/central government relationships. It will cover specific problems and issues faced by groups in selected countries and various approaches in dealing with these problems.

324 Government and Politics in Lebanon. 3.0; 3 cr. A research course on Lebanon. It examines the evolution of the political system and the different approaches to the study of Lebanese government and politics. It focuses on internal factors such as the social and sectarian divisions, economic development and political institutions, as well as external developments affecting Lebanon.

350 Organization Theory. 3.0; 3 cr.; core course. Major approaches to the study of organization with a comparative analysis of selected areas. Current developments concerning behavior in organizations and the different variables that affect such behavior will be emphasized.

351 Organization Development. 3.0; 3 cr. This course deals with theories, skills and methods related to three aspects of the organization development process: organizational effectiveness, intervention techniques, and follow up techniques.

352 Legal Aspects in Public Administration. 3.0; 3 cr. This course discusses the legal basis of administrative authority and the ways in which the exercise of administrative powers is authorized and limited by law.

353 Management Science for Public Administration. 3.0; 3 cr. An introduction to quantitative techniques that help decision makers in analyzing public problems and deriving solutions for them. The course will cover such techniques as linear and non linear programming, network analysis, simulation process, decision theory and the use of the computer as an aid in the decision making process.

354 Islamic Public Administration. 3.0; 3 cr. This is a survey of Islamic public administration in the Muslim World from the inception of the Islamic state till the collapse of the Ottoman Empire. The course covers a wide range of topics including

al-Hisbah, ministries and diwans, with special emphasis on Muslim administrative thought.

360 Budgeting and Financial Management. 3.0; 3 cr.; core course. Deals with the use of public budget as an instrument of fiscal policy and the management of public resources. Issues such as budgetary systems, the elements of budget review and execution, and various strategies and tactics employed by participants in the budgetary process will be highlighted.

361 Government and the Economy. 3.0; 3 cr. A review of the theories regarding the role of government in the economy and an analysis of governmental policies aiming at promoting the economy.

362 Program Analysis and Evaluation. 3.0; 3 cr. A discussion of the elements of policy and program analysis for the development of public programs, and an analysis of the strategies and techniques used for assessing the extent of the fulfillment of program objectives.

363 Problems and Issues in Public Administration. 3.0; 3 cr. An examination of selected issues and problems in the theory and practice of public administration. Topics may vary but the course concentrates on research and critical analysis of works dealing with current issues and problems with particular emphasis on public administration in developing countries.

370 Human Resources Management. 3.0; 3 cr.; core course. Theories and models of human resource management, including programs and processes by which skills and motivation are examined and analyzed. Activities related to human resource management range from education and environment to mobility, training and work team.

371 Public Administration in Developing Countries. 3.0; 3 cr. A study of public administrative systems in developing countries as sub-systems of the social and political systems. Emphasis is on the issues and problems facing public administration in selected countries in the light of historical, cultural and international factors.

372 Politics and Administration. 3.0; 3 cr. An intensive examination of the relationships between the political and administrative process in the context of the contemporary state, and a study of the political role of higher levels of public administration.

373 Leadership and Motivation. 3.0; 3 cr. This course starts with an analytical review of major theories of leadership and motivation that have influenced current policies in the management of human resources, followed by an assessment of the impact of these theories on group and individual behavior in the light of cultural and personality differences.

374 Issues and Problems in Local and Regional Administration. 3.0; 3 cr. This course examines the various models of local and regional administration in developed and developing administration. The form, structure, finance and policies of the different systems are analyzed with reference to the problems that they face, such as political nature, administrative, manpower and resources.

380 Graduate Tutorial in Public Administration. 3.0; 3 cr. This is a graduate seminar in which selected topics are arranged on an individual basis where existing courses do not offer necessary subject matter.

381 Graduate Tutorial in Political Science. 3.0; 3 cr. This is a graduate seminar in which selected topics are arranged on an individual basis where existing courses do not offer necessary subject matter.

399 M.A. Thesis.

DEPARTMENT OF SOCIAL AND BEHAVIORAL SCIENCES

Chairperson:	Faour, M.
Professors:	Dajani, N.; Khalaf, S.
Associate Professors:	Faour, M.
Assistant Professors:	Azzam, I.; Diab, H.; Imam, A; Witticombe, S. (visiting)
Lecturers:	Awaida, M.; Habbal, D.; Osseiran, N. (visiting senior); Sukariyah, B.; Taylor, N.
Instructors:	Abdel-Malak, H.; Dabbagh, S.; Ghannoum, H.; Mirhij, R.; Serhan, R.

The Department of Social and Behavioral Sciences (SBHS) offers programs leading to the B.A. degree in either Psychology or Sociology-Anthropology and to the M.A. degree in Psychology, or in Sociology or Anthropology.

UNDERGRADUATE PROGRAMS

Psychology

Admission to the Psychology Program requires a grade of 70 or more in SBHS 202, and a minimum grade of 70 in English 203 and in English 204. For purposes of meeting departmental admission requirements, students are not permitted to take SBHS 202 more than twice. Prospective majors who obtain a grade below 60 in SBHS 202 will not be permitted to take the course for a second time for the purpose of meeting the departmental admission requirements. Requirements for majors include SBHS 202, 211, 217 or 225, 219, 221, 223, and 233. In addition to these required courses, the student must elect at least 18 credits from the remaining departmental undergraduate program, of which at most six credits may be chosen from the Sociology-Anthropology offerings, as well as a course in statistics such as Education 227, Mathematics 207, or SBHS 218.

202 General Psychology. 3.0; 3 cr.; annually. Principles and findings of modern psychology with attention to their experimental foundations, utilizing reports of original research and other materials geared to prepare the student for majoring in psychology.

211 Social Psychology. 3.0; 3 cr.; annually. Prerequisite: 202. The study of the behavior of the individual in relation to social stimulus situations.

215 Personality and Culture. 3.0; 3 cr.; alternate years. Prerequisite: 202. Compares and contrasts personality characteristics from different cultures and examines the extent to which differences may be culturally determined. Special attention is given to Middle Eastern personality patterns.

217 Abnormal Psychology. 3.0; 3 cr.; alternate years. Prerequisite: 202. Examination of normal and abnormal reaction patterns, with detailed study of such behavior disorders as psychoneuroses, psychoses and mental deficiency.

201

219 Sensation and Perception. 3.0; 3 cr.; annually. Prerequisite: 202. Examines the physiological mechanisms of the primary sensory systems and explores their relationships to higher cognitive functions.

221 Psychology of Learning. 3.0; 3 cr.; annually. Prerequisite: 202. Examines neurological, behavioral and other current approaches to human learning.

223 Experimental Methods. 2.3; 3 cr.; annually. Prerequisites: 202, and a course in statistics. Design and conduct of psychological experiments, and analysis and interpretation of their results. Special emphasis is given to the preparation and writing of research reports.

225 Psychology of Personality. 3.0; 3 cr.; alternate years. Prerequisite: 202. Examination of methods of measuring personality, theories of personality, biological and sociological factors which influence personality.

227 History and Systems of Psychology. 3.0; 3 cr. Prerequisites: 219, 221. Historical development of scientific conceptions of human behavior; examination of contemporary psychological systems.

229 Psychology of Development. 3.0; 3 cr. Psychological development from before birth to adulthood.

231 Psychological Measurement and Scaling. 3.0; 3 cr. Prerequisites: 202 and a course in statistics. Principles and methods of measurement and scaling in psychology.

233 Cognitive Psychology. 3.0; 3 cr. Prerequisite: 202. This course will focus on two broad areas of cognitive psychology, memory and language. Special emphasis will be placed on language comprehension.

235 Special Topics in Psychology. 3.0; 3 cr. This course will provide a general overview of an area of psychology that is not normally covered by the department's offerings. The content areas may change and the course may be repeated for credit.

291 Senior Tutorial. 3.0; 3 cr.; annually. Prerequisites: 223 for psychology majors, 210 for sociology-anthropology majors, minimum average of 80 in major; may be repeated for credit.

293 Undergraduate Seminar in General Psychology. 3.0; 3 cr.; annually. Prerequisites: 223 and senior standing. Review of significant research in major areas in psychology, including learning, perception, and motivation.

Sociology-Anthropology

Admission to the Sociology-Anthropology program requires a grade of 70 or more in SBHS 201, a minimum grade of 70 in English 203 and in English 204. For purposes of meeting department admission requirements, students are not permitted to take SBHS 201 more than twice. Prospective majors who obtain a grade below 60 in SBHS 201 will not be permitted to take the course for a second time for the purpose of meeting the departmental admission requirements. Requirements for the B.A. program include SBHS 201, 210, 212, 214, 216, 220 or 244, 222 or 224, and 15 additional credit hours, of which at most six may be chosen from the psychology offerings, as well as a course in statistics such as Education 227, Mathematics 207, or SBHS 218.

201 Introduction to the Study of Society. 3.0; 3 cr.; each semester. An introduction to the study of social phenomena. Basic concepts, principles, and methods common to sociology and anthropology are employed for the analysis of structure and change in

society. It includes the structure and origin of some basic human institutions such as family, kinship, religion, language.

210 Research Methods. 3.0; 3 cr.; alternate years. Prerequisite: 201. Students cannot receive credit for both SBHS 210 and PSPA 203. A survey of the basic techniques and designs of social research, including quantitative methods, the relationship between micro and macro approaches to society, the interplay between theory and research.

212 Social Anthropology. 3.0; 3 cr.; alternate years. A general introduction to the theories and methods of anthropology with special attention to the transformation of traditional society. Analysis of the primary institutions of family, economy, religion and politics in relation to technological change and modernization.

214 Sociological Theory. 3.0; 3 cr.; alternate years. Prerequisite: 201. A survey of some of the major theoretical perspectives and critical issues of classical and contemporary sociological theory.

216 Arab Culture and Society. 3.0; 3 cr.; alternate years. A study of contemporary Arab society: its complexity, diversity, and internal dynamics. Considers social structures, social groups, cultural patterns, processes and agents of social and cultural change. Examines current debates on major issues in Arab culture and society.

218 Analysis of Social and Behavioral Data. 3.0; 3 cr. A survey of basic statistical techniques used in analyzing social and behavioral data. Students participate in the analysis of research data by applying various analytical techniques using computer packages. Students also interpret research findings and write a research report.

220 Introduction to the Communication Process. 3.0; 3 cr.; annually. Introduction to the study of human communication processes. The course draws upon relevant concepts in social psychology, and depends heavily on class group projects, usually in the form of simulations of communication situations.

222 Urbanization. 3.0; 3 cr.; alternate years. Prerequisite: 201. Evolution of urban settlements from antiquity to present times. Industrial cities, metropolis and megapolis, third world and some Arab cities will be considered. Cultural and social patterns of organization will be emphasized.

224 Population Studies. 3.0; 3 cr.; alternate years. Introduction to the field of population studies; basic techniques and methods of demographic analysis; issues in population policy and planning.

226 Political Anthropology. 3.0; 3 cr.; alternate years. Prerequisite: 201 or 212. An analysis of the concepts of power and authority and the evolution of the state from a comparative point of view. A study of leadership, law, bureaucracy and state formation in both traditional and modern systems.

228 Family and Kinship. 3.0; 3 cr.; alternate years. Prerequisite: 201 or 212. Relationship between kinship systems and family organization; the interplay between marriage and divorce, family and household; comparative analysis of family institutions, roles and statuses; the family and other social institutions; economy, polity, religion.

230 Social Stratification. 3.0; 3 cr.; alternate years. Prerequisite: 201 or 212. Principles and theories of social stratification, forms of social inequality, social strata and mobility, in selected societies; differential class behavior, consequences of social stratification; class conflict.

232 Sociology of Organization. 3.0; 3 cr.; alternate years. The course deals with bureaucracy, non-oligarchic professional and non-bureaucratic organizations. It examines surveillance and discipline in organizations, as well as the role of several philanthropic, private and public organizations.

234 Deviance. 3.0; 3 cr.; alternate years. Prerequisite: 6 credits in social sciences. An analysis of processes of social disorganization and deviant behavior in a variety of socio-cultural settings. Problems such as crime and delinquency, drug addiction, prostitution, suicide, family disorganization, and alienation are treated within a comparative framework.

236 Social and Cultural Change. 3.0; 3 cr.; alternate years. Prerequisite: 201. Theories and patterns of change; the role of innovation and acculturation in change; social conditions that promote or hinder change; problems of development. Emphasis on developing countries. S. Khalaf.

238 Religion and Society. 3.0; 3 cr.; alternate years. Prerequisite: 201 or 212. An analysis of the relationship between society and religion, including both the formal institution and informal processes which deal with the supernatural. A study of the origin and development of ritual and religion and functions for both the individual and society.

240 Social Development and Policy Analysis. 3.0; 3 cr.; alternate years. Prerequisite: 201. The analysis of specific problems and case studies dealing with change in the Third World and the Middle East; the study of conflicting perceptions of problems and solutions, the decision-making processes, and the formulation of policy in the area of social development.

242 Comparative Study of Ethnicity. 3.0; 3 cr.; alternate years. Prerequisite: 201 or 212. The analysis of minority cultures and changing boundaries between ethnic groups. A comparative study of institutions and value orientations of minorities, with emphasis on cultures of the Middle East.

244 Mass Media and Society. 3.0; 3 cr.; alternate years. A survey of mass media institutions and examination of the role of the mass media in society. Introduction to basic principles and concepts as developed in the west and as applied in the Middle East.

246 Communication Theory. 3.0, 3 cr.; alternate years. An overview of the ways in which mass communication has been viewed by social scientists and by practitioners. Focus on the range of issues studied and questions raised; the schools, approaches and tendencies in the field.

248 Public Opinion. 3.0; 3 cr.; alternate years. Prerequisite: 201. A general study of the nature of public opinion, psychological processes and opinion, culture and public opinion, public opinion media, measurement of public opinion, and opinion and change.

250 Intercultural Communications. 3.0; 3 cr.; alternate years. Prerequisite: 201. A study of the cultural dimensions of the intercultural communication process. An analysis of those aspects of culture which determine the "differences" encountered in intercultural communication: values and value systems, beliefs, modes of behavior (non-verbal communication), language and patterns of thinking.

256 Urban Sociology. 3.0; 3 cr.; alternate years. Prerequisite: 201. A review of major schools in urban sociology and ethnology with special focus on practical and methodological issues. The course examines urban ecology, landscape and

institutions. It involves empirical work in problems and conflicts of everyday urban life.

258 Conflict Analysis and Resolution. 3.0; 3 cr. An undergraduate course open to all departments in the Faculty of Arts and Sciences and in the Division of Education. Provides an overview of the field of conflict analysis and resolution. Covers the history of conflict studies, theories of conflict and methods of dispute resolution.

292 Undergraduate Seminar in Communication. 3.0; 3 cr. Prerequisite: Senior standing. An undergraduate seminar on the role of communication in society and on communication planning for national development.

294 Special Topics Seminar. 3.0; 3 cr.

GRADUATE PROGRAMS

M.A. in Psychology

A regular candidate for the M.A. degree in psychology is required to complete 21 graduate credit hours plus a thesis. He or she has to complete SBHS 301 (or SBHS 300) plus at least four graduate courses in the field of specialization. The rest of the requirements can be chosen from other graduate-level offerings in the Department or in the Faculty of Arts and Sciences, following the consent of the advisor and the interest of the graduate student.

301 Research Design. 3.0; 3 cr.; annually. Prerequisites: 223 and a course in statistics. Restricted to Psychology majors only. An advanced course in all aspects of the design of psychological research, including methods of statistical analysis.

303 Contemporary Systems in Psychology. 3.0; 3 cr.; annually. Prerequisite: 221. Restricted to Psychology majors only. A critical appraisal of contemporary systems of psychology. Theoretical and empirical work in learning will be viewed as representing a central contribution.

305 Advanced Social Psychology. 3.0; 3 cr.; alternate years. Prerequisite: 211. A critical survey of social-psychological theory and research, with special emphasis on attitude measurement, attitude change, intragroup and intergroup relations, social perception, and group conformity processes.

307 Clinical Assessment. 3.0; 3 cr.; annually. Prerequisite: 217. History and method of assessment, and specific diagnostic techniques.

309 Counseling and Psychotherapy. 3.0; 3 cr.; alternate years. Theories and practices of psychological counseling.

311 Seminar in Social Psychology. 3.0; 3 cr.; annually. Topic varies from semester to semester; course may be repeated for credit.

313 Seminar in Clinical Psychology. 3.0; 3 cr.; alternate years. Prerequisite: consent of instructor. Topic varies from semester to semester; course may be repeated for credit

315 and 317 Seminar in General Psychology. 3.0; 3 cr.; annually. Prerequisite: consent of instructor. Topic varies from semester to semester; course may be repeated for credit.

319 Graduate Tutorial in Psychology. 3.0; 3 cr.; annually. Prerequisites: graduate standing and consent of instructor.

399 M.A. Thesis. 6 cr.; annually.

Courses offered in sociology-anthropology or by other Departments may, with approval of the psychology faculty, be applied toward a concentration in psychology.

M.A. in Sociology or Anthropology

A regular candidate for the M.A. degree in Sociology or Anthropology is required to complete 21 graduate credit hours plus a thesis. He or she has to complete SBHS 300 and 312, plus at least three graduate courses in the field of specialization. The rest of the requirements can be chosen from other offerings in the Department or in the Faculty of Arts and Sciences, following the consent of the advisor and the interest of the graduate student.

300 Graduate Research Methods. 3.0; 3 cr.; annually. An advanced course in the formulation of research problems, research designs and techniques of data collection including quantitative and qualitative methods and micro versus macro approaches to social reality. Students participate in actual research projects and apply various techniques of data collection and analysis to interpret research findings.

310 History of Anthropological Theory. 3.0; 3 cr.; annually. Prerequisite: graduate standing. A survey of the development of anthropology as a science vis-a-vis historical and processive change; an analysis of the intellectual environment in which anthropology emerged as a separate discipline; new developments in cultural ecology, evolution, structuralism, and social anthropology.

312 Advanced Sociological Theory. 3.0; 3 cr.; alternate years. Prerequisite: Graduate standing. A survey in-depth of the major theoretical developments in current sociology. The seminar focuses on both systematic treatment of issues and theories as well as the contributions of leading theorists.

314 Seminar in Middle Eastern Culture and Society. 3.0; 3 cr.; annually. Prerequisite: Graduate standing. Special aspects of research with emphasis upon the cultural mechanisms and processes of change in pastoral, rural or urban communities. Presentation and analysis of field data on the Middle East.

316 Problems of Social Change and Development. 3.0; 3 cr.; alternate years. Prerequisite: Graduate standing. An exploration of the various theoretical perspectives for the analysis of social change and development. Emphasis on the special problems of social change and development in developing countries.

318 Seminar in General Ethnology. 3.0; 3 cr.; annually. Prerequisite: Graduate standing. Current problems in cultural and social anthropology with emphasis upon new developments in anthropological research.

320 Graduate Tutorial in Anthropology. 3.0; 3 cr.; annually. Prerequisite: Graduate standing. Individual research and reading programs.

322 Graduate Tutorial in Sociology. 3.0; 3 cr.; annually. Prerequisite: Graduate standing. Individual research and reading programs.

324 Special Topics in Anthropology. 3.0; 3 cr.; annually. Prerequisite: Graduate standing.

326 Special Topics in Sociology. 3.0; 3 cr.; annually. Prerequisite: Graduate standing.

328 Communication and Development. 3.0; 3 cr.; alternate years. Prerequisite: Graduate standing. A seminar on the role of communication in developing societies, with a focus on the media as modernizing agents, and on questions that are relevant for the understanding of the socioeconomic developmental process in less developed cultures.

330 Seminar in Mass Media in the Modern Arab Society. 3.0; 3 cr.; alternate years. A seminar on the political, social and economic effects of the new communication technologies on modern Arab society. Special attention is given to the effects of cultural deviance in the media on children and the effects of the communication media on social and cultural change.

332 Special Topics in Mass Communication. 3.0; 3 cr.; annually. Prerequisite: Graduate standing.

334 Arab Urban World. 3.0; 3 cr.; annually. Prerequisite: Graduate standing. This seminar provides an analysis of Middle Eastern cities, patterns of urban growth, culture of cities and urban policies. It deals with new cities in the Gulf area, renewed cities in the Machrek and transitory cities in the Maghreb. Renewal of city centers and urban crises are emphasized.

336 Seminar in Urban Planning and Society. 3.0; 3 cr.; alternate years. This seminar deals with the relation between urban planning and neglected dimensions of society such as illegal housing, territoriality, reorganization of urban networks, and reinterpretation of master plans. Examples of urban planning from developed and developing countries are discussed.

338 Seminar in Dispute Resolution in Arab Society. 3.0; 3 cr.; alternate years. Covers a brief historical background, a survey of methods recommended in the Sharia and practiced in Islamic history, and more recent ways of conflict management in a variety of Arab contexts: the family, business and politics.

340 Human Migration. 3.0; 3 cr.; alternate years. Provides a comparative study of the causes and effects of human migration worldwide. Covers issues concerned with voluntary and forced migration as well as temporary labor migration and voluntary migration and resettlement, with an emphasis on the Lebanese experience.

342 Sociology of Population. 3.0; 3 cr.; alternate years. A graduate course that examines the sociological and social-psychological approaches to mortality, fertility and population movements. Considers case studies from developed and developing countries with special emphasis on the Middle East.

399 Thesis. 6 cr.; annually.

Faculty of Medicine

FACULTY OF MEDICINE

FACULTY LIST 1998-99

Officers of the Faculty

John Waterbury	President of the University
Samir S. Najjar	Dean of the Faculty and Medical Center
Joseph A. Simaan	Associate Dean for Academic Affairs
Nadim E. Cortas	Associate Dean for Research and Development
Mounir Obeid	Acting Chief of Medical Staff
Deiter Kuntz	Director, University Hospital
Ghassan N. Hamadeh	Director, University Health Service
Waddah N. Nasr	Registrar
Hilda T. Nassar	Medical Librarian
Tannous A.Touma	Executive Officer
Salim Kanaan	Director of Admissions

Professors Emeriti

Abu Haydar, Najeeb, M.D. A.U.B., Internal Medicine, Endocrinology

Azar, Joseph, M.D., A.U.B.; Internal Medicine

Fawwaz, George, Ph.D., University of Gratz; M.D., University of Heidelberg; M.S., AUB; Pharmacology;

Issa, Philip, M.D., Université Saint Joseph, Beirut; Radiation Oncology

Khouri, Farid, M.D., A.U.B.; Laboratory Medicine

Manougian, Antranik, M.D., A.U.B.; Psychiatry

Mufarrij, Afif, M.D., A.U.B.; Human Morphology

Nabbut, Nassim, Ph.D., University of Texas; Microbiology & Immunology

Nachman, Henry, M.D., A.U.B.; Pediatrics, Clinical

Nassif, Raif, M.D., A.U.B.; M.P.H., Yale University; Laboratory Medicine

Obeid, Sami, M.D., A.U.B.; Surgery, General, Clinical

Sabra, Fuad, M.D., A.U.B.; Internal Medicine, Neurology

Shehadi, Samir, M.D., A.U.B.; Surgery, Plastic & Reconstructive

Shwayri, Edmond, M.D., A.U.B.; Internal Medicine, Nephrology

Tabbara, Riad, M.D., A.U.B.; Internal Medicine, Cardiology

Professors

Abdelnoor, Alexander, Ph.D., University of Michigan; Microbiology and Immunology

Alam, Samir, M.D., A.U.B.; Internal Medicine, Cardiology

Al-Kutoubi, Aghiad, M.D., Damascus University; Diagnostic Radiology

Araj, George, Ph.D., A.U.B.; Laboratory Medicine

Atweh, Samir, M.D., M.Sc., A.U.B.; Internal Medicine, Neurology

Baraka, Anis, M.B.B.Ch., D.A., D.M., University of Cairo; Anesthesiology

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* On tenure appointment

Bekaily,Ghassan, Ph.D., Université de Sherbrooke; Pharmacology and Therapeutics (Adjunct)

Bikhazi, Anwar, Ph.D., University of Michigan; Physiology

* Birbari, Adil, M.D., A.U.B.; Physiology, Internal Medicine, Nephrology

Comair, Youssef, M.D., Université Saint Joseph, Beirut, Surgery

Cortas, Nadim, M.D., A.U.B.; Pharmacology and Therapeutics, Internal Medicine

Dagher, Ibrahim, M.D., A.U.B.; Surgery, Cardiothoracic, Clinical

Durr, Ibrahim, Ph.D., Case Western Reserve University; Biochemistry

Firzli, Salim, M.D., A.U.B.; Pediatrics, Clinical

Fuleihan, Nabil, M.D., A.U.B.; Otolaryngology & Head & Neck Surgery

Habbal, Zuhair, Ph.D., A.U.B.; Laboratory Medicine

Haddad. Fuad Sami, M.D., A.U.B.; F.R.C.S., Canada; Surgery, Neurosurgery, Clinical

Hemady, Kamal, M.D., A.U.B.; Surgery, Urology

* Jabbur, Suhayl, M.D., A.U.B.; Ph.D., University of Washington; Physiology

Karam, Karam, M.D., A.U.B.; Obstetrics and Gynecology, Clinical

Khalil, Ismail, M.D., A.U.B.; Surgery, Vascular

Khauli, Raja, M.D., A.U.B.; Surgery, Urology

Khogali, Mustafa, M.B.B.S., D.M., University of Khartoum; Family Medicine

Kibbi, Abdul Ghani, M.D., A.U.B.; Dermatology

Melhem, Rafic, M.D., A.U.B.; Diagnostic Radiology (Visiting)

Mikati, Mohammad, M.D., A.U.B.; Pediatrics

Mroueh, Adnan, M.D., A.U.B.; Obstetrics & Gynecology, Clinical

Muallem, Musa, M.D., A.U.B.; Anesthesiology

Mufarrij, Amjad, M.D., A.U.B.; Pathology

Najjar, Samir, M.D., A.U.B.; Pediatrics

Nassar, Camille, Ph.D., A.U.B.; Physiology

Nassar, Nabil, M.D., A.U.B.; M.P.H., Johns Hopkins University; Internal Medicine, Infectious Diseases

Nasser, Michel, M.D., University of Geneva; Physiology, Internal Medicine, Cardiology

Nsouli, Afif, M.D., A.U.B.; Surgery, Orthopedic, Clinical

* Rebeiz, Jean, M.D., A.U.B.; Pathology, Internal Medicine, Neurology

Rizk, Ghassan, M.D., A.U.B.; Diagnostic Radiology

Saadé, Nayef, Doctorat d'Etat ès Sciences, University of Paris; Human Morphology, Physiology

Saadeh, Faysal, Ph.D., A.U.B.; Human Morphology

* Salti, Ibrahim, M.D., A.U.B.; Ph.D., University of Toronto; Internal Medicine, Endocrinology

Shammaa, Munir, M.D., A.U.B.; Internal Medicine, Gastroenterology, Clinical

* Simaan, Joseph, M.D., A.U.B.; Pharmacology and Therapeutics

Uthman, Suhayl, M.D., A.U.B.; Internal Medicine, Gastroenterology, Clinical

Uwaydah, Marwan, M.D., A.U.B.; Internal Medicine, Infectious Diseases, Microbiology

Zaatari, Ghazi, M.D., A.U.B.; Pathology

Zaynoun, Shukrallah, M.D., A.U.B.; Dermatology, Clinical

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* On tenure appointment

Associate Professor Emeriti

Rubeiz, George, M.D., A.U.B.; Internal Medicine, Cardiology

Associate Professors

Abbas, Jaber, M.D., A.U.B.; Surgery, General, Clinical
Abu Haydar, Fadlo, M.D., A.U.B.; Internal Medicine, Gastroenterology, Clinical
Akel, Samir, M.D., A.U.B.; Surgery, Pediatric, Clinical
Atiyeh, Bishara, M.D., A.U.B.; Surgery, Plastic, Clinical
Barada, Kassem, M.D., A.U.B.; Internal Medicine, Gastroenterology
Baroudi, Maurice, M.D., A.U.B.; Anesthesiology
Bikhazi, Kamal, M.D., A.U.B.; Surgery, General, Clinical
Bulbul, Mohammad, M.D., A.U.B.; Surgery, Urology, Clinical
Bulos, Suhayl, M.D., A.U.B.; Surgery, Orthopedic, Clinical
Dabbous, Ibrahim, M.D., A.U.B.; Pediatrics, Clinical
Damluji, Namir, M.B.B.Ch., Baghdad University, Psychiatry, (Visiting)
Daouk, Majida, M.B.B.Ch., Ain Shams University; Internal Medicine, Nephrology
El-Hajj Fuleihan, Ghada, M.D., A.U.B.; Internal Medicine, Endocrinology
Geara, Fadi, M.D., Paris Medical School; Radiation Oncology
Haddad, Maurice, M.D., Université Saint Joseph, Beirut; Diagnostic Radiology
Haddad, Raja, M.D., A.U.B.; Surgery, Cardiothoracic, Clinical
Hamadeh, Ghassan, M.D., A.U.B.; Family Medicine
Haroun-Bizri, Sania, M.D., Université Saint Joseph, Beirut; Anesthesiology
Houmeidan, Fadia, Ph. D., University of Birmingham; Physiology
Hourani, Mukbil, M.D., A.U.B.; Diagnostic Radiology
Hubaytar, Rafic, M.D., A.U.B.; Internal Medicine, Respiratory, Clinical
Hubballah, Malek, M.D., A.U.B.; Surgery, Neurosurgery, Clinical
Jabbour - Khoury, Samar, M.D., University of Damascus; Anesthesiology
Jurjus, Abdo, Ph.D., A.U.B.; Human Morphology
Kaid Bey, Sami, M.D., A.U.B.; Internal Medicine, Cardiology, Clinical
Khalifeh, Riad, M.D., A.U.B.; Internal Medicine, Neurology, Clinical
Khalil, Ali, M.D., A.U.B.; Obstetrics and Gynecology, Clinical
Khaouam, Edward, M.D., Université Saint Joseph, Beirut; Ophthalmology, Clinical
Khoury, Ghattas, M.D., Madrid University; Surgery, General & Vascular, Clinical
Louis, Faek, M.D., Université Saint Joseph, Beirut; Anesthesiology
Malak, Johnie, M.D., A.U.B.; Dermatology, Clinical
Mansour, Ahmad, M.D., A.U.B.; Ophthalmology, Clinical
Matar, Ghassan, Ph.D., A.U.B.; Microbiology and Immunology
Matta-Muallem, Mona, M.D., A.U.B.; Dermatology, Clinical
Mroueh, Salman, M.D., A.U.B.; Pediatrics
Musallam, Salim, M.D., A.U.B.; Pediatrics, Clinical
Musharafieh, Ramzi, M.D., A.U.B.; Surgery, Orthopedic
Najjar, Faysal, M.D., A.U.B.; Surgery, General, Clinical
Nasr, Fuad, M.D., A.U.B.; Internal Medicine, Rheumatology, Clinical
Nasrallah, Antoine, M.D., A.U.B.; Internal Medicine, Cardiology, Clinical
Nassar, Sami, M.D., A.U.B.; Surgery, Neurosurgery, Clinical

Noureddin, Baha, M.D., A.U.B.; Ophthalmology
Nuwayri-Salti, Nuha, M.D., A.U.B.; Human Morphology
Obeid, Mounir, M.D., A.U.B.; Surgery, Cardiothoracic
Rubeiz, Michel, M.D., A.U.B.; Surgery, Plastic, Clinical
Saba, Maurice, M.D., A.U.B.; Surgery, Neurosurgery, Clinical
Sabra, Ramzi, M.D., A.U.B.; Pharmacology and Therapeutics
Saghir, Naji, M.D., Free University of Brussels; Internal Medicine, Hematology-Oncology, Clinical
Salamoun, Samir, M.D., A.U.B.; Ophthalmology, Clinical
Salem, Antoun, M.D., A.U.B.; Internal Medicine, Gastroenterology, Clinical
Salem, Ziad, M.D., A.U.B.; Internal Medicine, Hematology-Oncology, Clinical
Salem-Shabb, Nina, M.D., A.U.B.; Pathology
Sanjad, Sami, M.D., A.U.B.; Pediatrics, Nephrology
Sawaya, Jabir, M.D., A.U.B.; Internal Medicine, Cardiology, Clinical
Seoud, Muhieddine, M.D., A.U.B.; Obstetrics & Gynecology
Sfeir, Roger, M.D., A.U.B.; Surgery, Vascular, Clinical
Shabb, Bassim, M.D., A.U.B.; Surgery, Cardiothoracic
Sibai, Abdel-Nour, M.B.B.Ch., Ain Shams; D.A., London; Anesthesiology
Suidan, Fayez, M.D., A.U.B.; Obstetrics and Gynecology, Clinical
Tabbarah, Zuhayr, M.D., A.U.B.; Internal Medicine, Infectious Diseases, Clinical
Taha, Assaad Mohieddine, M.D., A.U.B.; Ph.D., Medical College of Ohio; Surgery, General, Physiology
Taha, Assad Mohammad, M.D., A.U.B.; Surgery, Orthopedic, Clinical
Usta, Julnar, Ph.D., A.U.B.; Biochemistry
Yamout, Bassem, M.D., A.U.B.; Internal Medicine, Neurology, Clinical
Zahed, Leila, Ph.D., University of London; Laboratory Medicine, Genetics
Zaytoun, George, M.D., A.U.B.; Otolaryngology & Head & Neck Surgery, Clinical

Assistant Professors

Abchee, Antoine, M.D., A.U.B.; Internal Medicine, Cardiology
Abi-Saad, George, M.D., A.U.B.; Surgery, General, Clinical
Abu-Musa, Antoine, M.D., A.U.B.; Obstetrics & Gynecology
Abouchacra, Kim, Ph.D., Pennsylvania State University, U.S.A.; Otolaryngology & Head & Neck Surgery
Al-Amin, Hassan, M.D., A.U.B.; Psychiatry
Al-Awar, Ghassan, M.D., A.U.B.; Internal Medicine, Infectious Diseases
Arayssi, Thurayya, M.D., A.U.B.; Internal Medicine, Rheumatology
Arnaout, Samir, M.D., Craiova University, Romania; Internal Medicine, Cardiology
Awwad, Jonny, M.D., A.U.B.; Obstetrics and Gynecology
Awwad-Maroun, Marie, M.D., Université Saint Joseph, Beirut; Anesthesiology
Ayoub, Chakib, M.D., Université Saint Joseph, Beirut; Anesthesiology
Azar, Sami, M.D., A.U.B.; Internal Medicine, Endocrinology
Baroudi, Hisham, M.D., Université Saint Joseph, Beirut; Surgery, Physical Medicine
Bazarbachi, Ali, M.D., University of Paris 7; Internal Medicine, Hematology-Oncology
Bitar, Fadi, M.D., A.U.B.; Pediatrics
Dabbous, Aliya, M.D., A.U.B.; Anesthesiology

Daher, Rose, Ph.D., Cleveland State University; Laboratory Medicine
Dakik, Habib, M.D., A.U.B.; Internal Medicine, Cardiology
Dandan, Imad, M.D., A.U.B.; Surgery, General
Dbaibo, Ghassan, M.D., A.U.B.; Pediatrics
Fayyad, Michel, M.D., A.U.B.; Pediatrics

Haddad, George E., Ph.D., University of Sherbrooke; Pharmacology, Physiology[1]
Haddad, George F., M.D., A.U.B.; Surgery, Neurosurgery, Clinical
Haddad, Randa, M.D., A.U.B.; Ophthalmology
Hadi, Usama, M.D., A.U.B.; Otolaryngology & Head & Neck Surgery, Clinical
Haidar, Joud, M.D., Damascus University; Laboratory Medicine
Haidar, Rashid, M.D., A.U.B.; Surgery, Orthopedic
Hamdan, Abdullatif, M.D., A.U.B.; Otolaryngology & Head & Neck Surgery, Clinical
Hannoun, Antoine, M.D., A.U.B.; Obstetrics and Gynecology
Jamaluddine, Ghassan, M.D., A.U.B.; Internal Medicine, Respiratory
Kanaan, Nabil, M.D., A.U.B.; Family Medicine
Kanj-Shararah, Suha, M.D., Université Saint Joseph, Beirut; Internal Medicine, Infectious Diseases
Kaspar, Hanna, M.D., A.U.B.; Obstetrics & Gynecology, Pathology
Khalife, Mohamad, M.D., University of Bucharest; Surgery
Khani, Munir, M.D., A.U.B.; Psychiatry
Khatib, Mohammad, Ph.D., Case Western Reserve University; Anesthesiology
Khoury, Maurice, M.D., A.U.B.; Internal Medicine, Cardiology
Khoury, Nabil, M.D., Université Saint Joseph, Beirut; Diagnostic Radiology
Lakkis, Suhayl, M.D., A.U.B.; Surgery, Orthopedic, Clinical
Lteif, Antoine, M.D., Université Saint Joseph, Beirut; Anesthesiology
Maalouf, Riad, M.D., A.U.B.; Ophthalmology, Clinical
Major, Stella, B.M.B.S., University of London; Family Medicine
Makhlouf-Akel, Madelaine, M.D., A.U.B.; Family Medicine
Medawar, Walid, M.D., A.U.B.; Internal Medicine, Nephrology
Murad, Fadi, M.D., A.U.B.; Internal Medicine, Gastroenterology
Muwakkit, Samar, M.D., A.U.B.; Pediatrics[2]
Nabulsi-Khalil, Mona, M.D., A.U.B.; Pediatrics
Nasr, Elie, M.D., Université Saint Joseph, Beirut; Radiation Oncology
Natout, Mohammad Ali, M.D., A.U.B.; Otolaryngology & Head & Neck Surgery, Clinical
Nauphal, Maud, M.D., Université Saint Joseph, Beirut; Anesthesiology
Ramadan, Fuad, M.D., Royal College of Surgeons, Ireland; Internal Medicine, Respiratory, Clinical
Rebeiz, Nelly, M.D., A.U.B.; Dermatology
Saab, Basim, M.D., A.U.B.; Family Medicine
Sabban, Marwan, Ph., D., Oxford University; Human Morphology
Salman, Salah, M.D., A.U.B.; Dermatology
Sawaya, Raja, M.D., A.U.B.; Internal Medicine, Neurology

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[1] Until February 28, 1999

[2] Until January 26, 1999

Shamsuddin, Ali, M.B.B.Ch., Alexandria University; Internal Medicine, Hematology-Oncology

Sharara, Nabil, M.D., A.U.B.; Family Medicine

Shararah, Ala'a, M.D., A.U.B.; Internal Medicine, Gastroenterology

Shbaklo, Zuheir, M.D., A.U.B.; Dermatology, Clinical

Shucair, Mahmoud, M.D., University of Madrid; Internal Medicine, Endocrinology, Clinical

Sidani, Mustafa, M.D., A.U.B.; Surgery, General, Clinical

Siddik-Sayyid, Sahar, M.D., Université Saint Joseph, Beirut; Anesthesiology

Skaf, Ghassan, M.D., Université Saint Joseph, Beirut; Surgery, Neurosurgery

Slim, Rima, Ph.D., Institut Pasteur, Paris; Biochemistry

Taha, Samar, M.D., A.U.B.; Anesthesiology

Taher, Ali, M.D., A.U.B.; Internal Medicine, Hematology-Oncology; Laboratory Medicine

Tawil, Ayman, M.D., A.U.B.; Pathology

Tayyim, Ahmad, M.D., A.U.B.; Surgery, Orthopedic

Usta, Ihab, M.D., A.U.B.; Obstetrics & Gynecology

Usta, Jinan, M.D., A.U.B.; Family Medicine

Uthman, Imad, M.D., A.U.B.; Internal Medicine, Rheumatology

Younis, Khaled, M.D., A.U.B.; Pediatrics

Senior Lecturers

Afeich, Nadim, M.D., A.U.B.; Surgery, Orthopedic, Clinical

Ayyoub, Charles, M.B.B.S., University of Adelaide, South Australia; Pediatrics, Clinical

Lecturers

Achram, Mitri, M.D., Université Saint Joseph, Beirut; Diagnostic Radiology

Ariss, Timani - Majd, Université Saint Joseph, Beirut; Pediatrics

Baddoura, Omar, M.D., Université Saint Joseph, Beirut; Surgery, Orthopedic, Clinical

Bakri, Musbah, M.D., Université Saint Joseph, Beirut; Ophthalmology, Clinical

Bizri, Abdul-Rahman, M.D., University of Damascus; Internal Medicine, Infectious Diseases

Farah, Nadim, M.D., A.U.B.; Ophthalmology, Clinical

Gharzuddine, Walid, M.B.B.Ch., Cairo University; Internal Medicine, Cardiology

Hussein, Maher, M.D., A.U.B.; Surgery, General and Vascular, Clinical

Jabir, Raif, M.D., A.U.B.; Internal Medicine, Endocrinology, Clinical

Kaddoura, Imad, M.B.B.Ch., Alexandria University; Surgery, Plastic, Clinical

Kanj, Nadim, M.D., A.U.B.; Internal Medicine, Respiratory

Karam, Nadim, M.D., A.U.B.; Family Medicine, Clinical

Kreidieh, Ibrahim, M.D., A.U.B.; Surgery, General, Clinical

Masri, Abdul-Fattah, M.D., A.U.B.; Internal Medicine, Rheumatology, Clinical.

Mokhbat, Jack, M.D., Université Saint Joseph, Beirut; Internal Medicine, Infectious Diseases, Clinical

Mufarrij, Nazih, M.D., A.U.B.; Surgery, Neurosurgery, Clinical

Munla, Nabil, M.D., Université Saint Joseph, Beirut; Pediatrics, Clinical

Soubra, Maher, M.D., A.U.B.; Surgery, Pediatrics, Clinical

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Wazzan, Wasim, M.B.B.Ch., Alexandria University; Surgery, Urology, Clinical
Zarwi, Ahmad, M.D., University of Geneve; Psychiatry, Clinical

Instructors

Kfoury-Baz,Elizabeth, M.D., A.U.B.; Pathology and Laboratory Medicine
Khoury, Brigitte, Ph.D., Pacific Graduate School of Psychology, Psychiatry, Family
    Medicine
Musharafieh, Umaya, M.D., A.U.B.; Family Medicine
Osman, Mona, M.D., A.U.B.; Family Medicine
Sukkarieh, Ismail, M.B.B.Ch., Cairo University; Internal Medicine, Gastroenterology,
    Clinical

Research Associate

Khater, Nabil, B.S., M.S. Medical Physics/Health Physics, M.S. Mechanical Engineering,
    Georgia Institute of Technology, U.S.A.; Radiation Oncology

Clinical Associates

Abdallah, Sawsan, M.D., A.U.B.; Pediatrics
Abdelnoor, Alexander, Ph.D., University of Michigan; Laboratory Medicine
Abi Fakher Saab, Faysal, M.D., University of Zuria, Venezuela; Diagnostic Radiology
Abou Jaoude, Ramzi, M.D., Université Saint Joseph, Beirut; Pediatrics
Abu-Raslan, Walid, M.B.B.Ch., Baghdad University; Pediatrics
Adra, Abdallah, M.D., A.U.B.; Obstetrics & Gynecology
Aghadjanian-Karam, Anne Marie; M.D., Université Saint Joseph, Beirut; Anesthesiology
Araj, Alia, M.D., A.U.B.; Pediatrics
Ashkar, Khalil, M.D., A.U.B.; Family Medicine
Aswad, Naji, M.D., A.U.B.; Obstetrics & Gynecology
Awada, Ali, B.D.S., Cairo University; Otolaryngology & Head and Neck Surgery
Bazi, Tony, M.D., A.U.B.; Obstetrics & Gynecology
Bitar, Elias, M.D., A.U.B.;Surgery, Neurosurgery
Choueiri, Roula, M.D., Université Saint Joseph, Beirut; Pediatrics
El-Imad, Zuhair, M.D., Rostov Medical Institute, USSR; Internal Medicine, Nephrology
El-Jisr, Tamima, M.D., Université Saint Joseph, Beirut; Pathology & Laboratory
    Medicine
El-Saad-Debahy, Nada, M.D., Université Saint Joseph, Beirut; Dermatology
Farah, Antoun, M.D., Université Saint Joseph, Beirut; Pediatrics
Gergess-Tamer, Joumana, M.D., Université Saint Joseph, Beirut; Anesthesiology
Haddad, Fouad, M.D., Istanbul University; Anesthesiology
Haddad-Abu-Faysal, Nadra, M.D., A.U.B.; Pediatrics
Halabi, Jamil, M.D., Université Saint Joseph, Beirut; Surgery, General Surgery
Halabi, Mohammad, M.D., State University of New York, U.S.A.; Psychiatry
Halabi, Nadim, M.D., A.U.B.; Internal Medicine, Neurology
Halabi, Nizar, M.D., Université Saint Joseph, Beirut; Psychiatry
Hallal, Mahmoud, M.B.Ch.B., Baghdad University, Internal Medicine, Gastroenterology
Hammoud, Maarouf, M.D., A.U.B.; Surgery, Neurosurgery
Harake, Ayman, M.D., A.U.B.; Surgery, General Surgery

Hout, Jamal, M.D., A.U.B.; Pediatrics
Houcheimi, Ibrahim, M.D., A.U.B.; Surgery, Neurosurgery
Itani, Mohammad, M.D., A.U.B.; Pediatrics
Jurdi-Noueihed, Fadi, M.D., A.U.B.; Ophthalmology
Kabalan, Salim, M.D., University of Milan; Internal Medicine
Kenaan, Salim, M.D., A.U.B.; Surgery, Neurosurgery
Khoury, Albert, M.D., A.U.B.; Ophthalmology
Kibbi, Abdul Ghani, M.D., A.U.B.; Human Morphology
Maalouf, Issam, M.D., A.U.B.; Pediatrics
Mahfoud, Caroline, M.D., A.U.B.; Pediatrics
Makarem, Malek, M.D., University of Seville; Family Medicine, Clinical
Mansour, Amer, M.D., A.U.B., Surgery, Orthopedics
Mikati, Nabil, M.D., A.U.B.; Psychiatry
Moallem, Shahrazad, M.D., Université Saint Joseph, Beirut; Anesthesiology
Mouradian, Emma, M.D., Russia; Anesthesiology
Muallem, Abdallah, M.D., A.U.B.; Surgery, General Surgery
Nabbout, Ghassan, M.D., A.U.B.; Surgery, General Surgery
Nassar, Anwar, M.D. A.U.B.; Obstetrics & Gynecology
Nassar, Nabil, M.D., A.U.B.; M.P.H., Johns Hopkins University; Internal Medicine, Infectious Diseases
Nattout, Nizar, M.D., A.U.B.; Surgery, Orthopedic
Omari, Ibrahim, M.D., A.U.B.; Family Medicine
Rouhana, Corine, M.D., Université Saint Joseph, Beirut; Anesthesiology
Saleh, Munzer, M.B.B.Ch., Alexandria University; Internal Medicine, Endocrinology
Sayyed, Khalid, M.D., A.U.B.; Surgery, Urology
Shahin, Hassan, M.D., A.U.B.; Ophthalmology
Siblini, Ghassan, M.D., A.U.B.; Pediatrics
Simaan, Eliane, M.D., Université Saint Joseph, Beirut; Pediatrics
Sinno, Hassana, M.D., A.U.B.; Anesthesiology
Sinnu, Khalil, M.D., A.U.B.; Surgery, Urology
Soweid, Asaad, M.D., A.U.B.; Internal Medicine, Gastroenterology
Takkoush, Muhammad, M.D., A.U.B.; Anesthesiology.
Torbey, Naji, M.D., A.U.B.; Internal Medicine, Endocrinology
Yaghi, Yasser, M.D., Damascus University; Surgery, Orthopedic
Yazbek-Karam, Vanda, M.D., Université Saint Joseph, Beirut; Anesthesiology
Yunis, Muhammad, M.D., A.U.B.; Ophthalmology
Zaatar, Rabih, M.D., A.U.B., Pediatrics
Zaatari, Ahmad, M.D., A.U.B.; Surgery
Zein, Camille, M.D., University of Studies of Rome; Internal Medicine, Endocrinology
Zoubair, Samir, M.D., A.U.B.; Surgery, Urology

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Associates in the Basic Medical Science Departments

Al-Awar, Ghassan, M.D., A.U.B.; Microbiology & Immunology
Azar, Sami, M.D., A.U.B.; Physiology
Barada, Kassem, M.D., A.U.B.; Physiology
Bazarbachi, Ali, M.D., University of Paris 7; Biochemistry
Darwich, Nadine, Ph.D., George Washington, U.S.A.; Biochemistry
Dbaibo, Ghassan, M.D., A.U.B.; Biochemistry
Mikati, Mohamad, M.D. A.U.B.; Biochemistry, Pharmacology and Therapeutics
Salti, Ibrahim, M.D., A.U.B.; Ph.D., University of Toronto; Biochemistry

GENERAL INFORMATION

The Faculty of Medicine is subject to the regulations of the Board of Regents of the State of New York, under which the University is chartered. The entrance requirements and the program leading to the degree of Doctor of Medicine are similar to those of medical schools in the United States. Graduates are qualified for the licensing examination in Lebanon.

The Faculty of Medicine endeavors to provide opportunities for its undergraduate students to develop individual initiative, creative ability, and professional leadership through participation in extracurricular seminars, discussion groups, research projects, and student organizations. Although the primary function of the Faculty is to give students a basic training in medicine, the Faculty also offers a number of special undergraduate and postdoctoral programs including an MS (Basic Science) - MD combined program; an MS (Basic Science) - Ph.D.[1] (Basic Science) - MD combined program; internship; residency, and fellowship training programs. The residency training program, inaugurated in 1946, consists of a two to four-year residency in the University Medical Center, involving training in the main medical specialties.

A program of continuing medical education provides refresher courses and conferences in the medical specialties to physicians in Lebanon and the region. These courses and conferences are conducted jointly by members of the faculty and prominent specialists from abroad.

The physical facilities of the Faculty of Medicine include the University Medical Center, which houses the academic offices and research laboratories of the departments of Anesthesiology, Dermatology, Diagnostic Radiology, Internal Medicine, Family Medicine, Laboratory Medicine, Psychiatry, Microbiology and Immunology, Obstetrics and Gynecology, Ophthalmology, Otolaryngology & Head and Neck Surgery, Pathology, Pediatrics, Radiotherapy, and Surgery; the Diana Tamari Sabbagh Basic Medical Sciences building which houses the departments of Biochemistry, Human Morphology, Pharmacology and Therapeutics, and Physiology, with their teaching and research laboratories and classrooms; the Saab Memorial Medical Library; and the Postgraduate Medical Education Building, which includes the Issam Fares Auditorium.

Clinical teaching is carried out in the Outpatient Department, in the University Hospital, which has a capacity of 421 beds, in the Family Medicine Practice Center and in the affiliated hospitals.

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[1] Temporarily frozen.

ADMISSION

The Faculty of Medicine was established to give properly qualified candidates from Lebanon and the Near East the opportunity for sound education in both the art and science of medicine. Normally, admission is limited to those students who have completed their premedical requirements at A.U.B. An applicant from outside A.U.B. who holds at least the Bachelor's degree and who has completed the premedical requirements may be accepted on the basis of outstanding academic performance. In addition, those applicants must have acceptable Medical College Admission Test (MCAT) scores and an interview may be required. Acceptance is limited to students with a minimum general average of 75% or equivalent, chosen on the basis of academic qualifications, the MCAT and a personal interview.

The premedical requirements are summarized in the following (for further details, refer to the section on "Premedical Study" under the chapter on the Faculty of Arts and Sciences, page 103):

1. A Bachelor's Degree (B.S. or B.A. from any Faculty of the University).

2. Required courses include: Biology with laboratory (eight credits); Chemistry with laboratory (including four credits of Organic Chemistry) (fifteen credits); Physics and Basic Electronics with laboratory (eight credits); Mathematics (three credits, Math 102 or exemption); English (six credits), English 203, 204 (or exemption); Social Sciences and Humanities (six credits).

3. A competitive score in the MCAT. The MCAT can be taken only twice.

Applicants who are holders of an M.S. degree in the Basic Medical Sciences should complete at least 10 graduate, non-medical, course credits.

GRADUATION REQUIREMENTS

To be eligible for the degree of Doctor of Medicine a student must satisfactorily complete the curriculum of the Faculty of Medicine and must be recommended by the Academic Committee. The degree may be granted with distinction to students who attain a grade of Excellent in at least 50 percent of credits, with a grade of Pass in no more than 20 percent of credits in the four years of the program.

DEAN'S HONOR LIST

To be placed on the Dean's Honor List the student must be full-time and must not be repeating the year. The Dean's Honor List is limited to the upper 15 percent of the class.

ACADEMIC REGULATIONS

A. ATTENDANCE

Regular attendance is required at lectures, laboratories, clerkships, examinations and other assigned duties. No credit is given for work not performed. Students absent on account of illness or other valid reasons are requested to confer with chairmen of the departments concerned. Prolonged or repeated absences are reviewed by the committees concerned, which decide on appropriate action.

B. LANGUAGE REQUIREMENT

Students must have a speaking knowledge of Arabic before entering the third year. This requirement may be waived by special vote of the Academic Committee.

C. PROMOTIONS AND DEFICIENCIES

A Student's performance is evaluated as Excellent (E), Good (G), Pass (P), or Fail (F). The distribution of grades in a class is as follows: about 15% E, the next 35% G, the remaining 50% (less any failures) P. The evaluation of the student in each subject is based upon total performance and not solely upon the results of examinations.

The performance of students is evaluated by appropriate class teaching committees, which make recommendations to the Academic Committee. The action of the Academic Committee is final. The class teaching committees and the Academic Committee give due consideration to a general evaluation of fitness for a career in medicine. Only those who in the opinion of the committees give promise of being a credit to themselves, the Faculty and the medical profession will be advanced.

To be promoted, a student must attain a grade of pass or better in all courses or clerkships, and must be recommended by the committees concerned. However, a student with a grade of pass in all courses or clerkships may, at the discretion of the committees, be promoted on probation or be asked to do remedial work and pass re-examinations in designated courses or clerkships or repeat the year.

A student in the first or second year, who fails 25 percent or more of credits in that year, may be asked to repeat the year or withdraw from the Faculty. A student who fails less than 25 percent of credits may be asked to do remedial work and pass re-examinations, repeat the year, or leave the Faculty. At the discretion of the committees concerned, and in exceptional cases, a student repeating the year may be asked to repeat all or some of the courses.

A student in the third or fourth year who fails 50 percent or more of clerkship hours may be asked to repeat the year or withdraw from the Faculty. A student who fails less than 50 percent of clerkship hours may be asked either to do remedial work and pass re-examinations, repeat a clerkship, repeat the year, or leave the Faculty. At the discretion of the committees concerned, a student repeating the year may be asked to repeat all or some of the clerkships.

A student repeating a year who fails any course or does not attain a grade of Good or better in 50 percent of credits will be asked to withdraw from the Faculty.

A student who is placed on probation cannot graduate unless probation has been removed.

GRADUATE STUDY

Full information and general requirements for graduate study are found in the chapter "Graduate Study" at the end of this catalogue.

COURSES

NUMBERS PRECEDING COURSE TITLES

1. Courses required for the Doctor of Medicine degree are numbered 200 to 299 as follows:
   200 to 219 indicate courses given in first year medicine;
   222 to 239 indicate courses given in second year medicine;
   240 to 259 indicate courses given in third year medicine;
   260 to 279 indicate courses given in fourth year medicine;
   280 to 299 are reserved for clinical clerkships during the year of internship.

For first and second years, odd numbers refer to first semester courses and even numbers to second semester courses. Year courses are indicated by a hyphen between the two numbers.

2. Graduate courses leading to Master's and Doctor of Philosophy degrees are numbered 300 to 399.

3. Regular medical courses approved for graduate work (M.S. and Ph.D. program) have two numbers.

4. Numbers preceded by the letters 'ID' (Interdepartmental) or 'FM' (Faculty of Medicine) indicate integrated courses taught by two or more departments together.

NUMBERS FOLLOWING COURSE TITLES

The first number following the title of a course indicates the total number of lecture, conference, and discussion hours given, except where otherwise stated.

The second number indicates the total laboratory or clinical practice hours, except where otherwise stated.

The third number indicates the number of semester credit hours. Credit hours are used in conjunction with first and second year courses only.

COURSE DESCRIPTIONS

All the following courses, except those listed as electives, are required of students working toward the degree of Doctor of Medicine. Courses so designated may be elected with consent of the instructor. Detailed course descriptions are available in the sections on individual departments.

CURRICULUM

	No. of Weeks or months[1]	Lecture & Clinical Recitation	Lab. or Clerkship Hours	Total Hours	Credits
First Year[2]					
Biochemistry 211 Basic Biochemistry	16	70	52	122	6
Human Morphology 207 Gross Anatomy	18	24	198	222	7
Human Morphology 209 Basic Histology	18	58	69	127	6
Physiology 200 Homeostasis	4	36	16	52	2
Physiology 202 Cardiovascular system	4	31	21	52	2
Physiology 204 Metabolism	4	32	24	56	3
IDTH 206-207 Social and Preventive Medicine	16	34	46	80	4
IDTH 208 Nervous System	5	62	54	116	6
Epidemiology and Biostatistics 209Medical Statistics	16	16	32	48	2
Physiology 210 General Physiology and Introductory Biophysics	16	48	16	64	3
			Total	**939**	**41**
Second Year[2]					
Microbiology 227	18	108	72	180	9
IDTH 221-222 Introduction to Medicine	36	108	72	180	9
Psychiatry 227 Psychopathology	18	32	36	68	3
Pathology 229 General Pathology	36	108	72	180	9
Pharmacology 228 Pharmacology and Toxicology	18	108	72	180	9
Public Health EDBS 226 Epidemiology	18	32	36	68	3
IDTH 223-224 Physical Diagnosis	36	36	72	108	3
			Total	**964**	**45**

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[1]Weeks for First and Second years; months for Third, Fourth and Internship years.

[2]For courses given in other faculties, see Faculty concerned.

	No. of Weeks or months[1]	Lecture & Clinical Recitation	Lab. or Clerkship Hours	Total Hours	Credits
Third Year[2]					
Clinical Conferences	11	240	--	240	--
Internal Medicine 246 Clinical Clerkship	3	120	540	660	--
Family Medicine 242 Medical Ethics	--	11	13	24	--
Internal Medicine 254 Infection Control	--	6	34	40	--
Internal Medicine 250 Forensic Medicine	--	--	12	12	--
Psychiatry 252 Clinical Clerkship	1	25	180	205	--
Obstetrics and Gynecology 247 Clinical Clerkship	2	47	360	407	--
Pediatrics 246 Clinical Clerkship	2	35	360	395	--
Surgery 246 Clinical Clerkship	3	44	540	584	--
			Total	**2567**	
Fourth Year[2]					
Anesthesiology 267 Clinical Clerkship	0.7	15	120	135	--
Clinical Conferences	11	--	240	240	--
Internal Medicine 262 Clinical Clerkship	3.5	--	630	630	--
Ophthalmology 267 Clinical Clerkship	0.7	--	120	120	--
Otolaryngology 267 Clinical Clerkship	0.7	11	120	131	--
Pediatrics 267 Clinical Clerkship	2	--	360	360	--
Elective in any Department	2	--	360	360	--
Public Health IDTH Clerkship in Preventive Medicine and Public Health	0.5	10	80	90	--
Family Medicine 262 Clinical Clerkship	1	30	150	180	--
			Total	**2246**	

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[1]Weeks for First and Second Years; months for Third, Fourth and Internship years.

[2]For courses given in other Faculties, see Faculty concerned.

Internship Year (Post-MD)

Graduates are given the option to choose one of the following:

	No. of Months	Total Hours

1. Straight Internship

	No. of Months	Total Hours
Internal Medicine 288, Pediatrics 288, Obstetrics and Gynecology 288, or Surgery 288	11	2882
Clinical Conferences		300
	Total	**3182**

2. Mixed Internship

	No. of Months	Total Hours
Internal Medicine 287 or Pediatrics 287	4	1048
Surgery 287	2	524
Obstetrics and Gynecology	2	524
Elective in any Department	3	786
Clinical Conferences		300
	Total	**3182**

INTERDEPARTMENTAL TEACHING

FIRST YEAR

IDTH 206-207 Social and Preventive Medicine. 34.46; 4 cr.; annually. An integrated course stressing psychological and sociological aspects of medicine. N. Karam

IDTH 208 Nervous System. 62.54; 6 cr.; annually. This covers the study of structure and function of the human nervous system and lasts 6 weeks. S. Jabbur, S. Atweh, N. Saade, G. Tomey.

IDTH 308A Neuroanatomy. 31.27; 3cr. Similar to the first part of 208, offered to graduate students, covering normal structure of the human nervous system. It lasts 3 weeks. See Dept. of Human Morphology.

IDTH 308B Neurophysiology. 31.27; 3 cr. Similar to the second part of 208, offered to graduate students; covering function of the human nervous system. It lasts 3 weeks. See Dept. of Physiology.

SECOND YEAR

IDTH 221-222 Introduction to Medicine. 108.72; 9 cr.; annually. See Department of Internal Medicine.

IDTH 223-224 Physical Diagnosis. 36.108; 3 cr.; annually. See Department of Internal Medicine.

GRADUATE

IDTH 301 Introduction to Medical Science Literature. 16.32; 2 cr. A multidisciplinary approach to the use of medical science publications (open to beginning graduate students Faculty of Medicine). C. Nassar.

IDTH 302 Methods. 16.64; 3 cr. Theory and practice of techniques used in the various disciplines of medical sciences. Basic Science Faculty.

IDTH 303, 304, 305, 306 Integrated Graduate Course I-IV. 32.0; 2 cr. each, four semesters, one 2-hour session a week each. Integrated lecture seminar course introducing the graduate students to the thinking in various medical science disciplines (required of all Ph.D. students in Faculty of Medicine). Basic Science Faculty.

IDTH 307 Biomedical Electronics. 32.16; 3 cr.; alternate years. Introductory course in electricity and electronics as applied to biology and medicine. Members of faculty.

IDTH 309 Biology of Nerve and Muscle. 48.0; 3 cr.; alternate years. A multidisciplinary study of anatomy, physiology, biochemistry, pharmacology and pathology of nerve and muscle. S. Jabbur, N. Saade.

IDTH 317 Perspectives in Medical Sciences. 32.0; 2 cr. Selected readings and seminars in the history, philosophy and methodology of medical and related sciences. Basic Science Faculty.

IDTH 319-320 Integrated Research Seminars. 16.0; 1 cr.; each. Participation of all Ph.D. students and professors. Basic Science Faculty.

IDTH 330 Medical Pedagogy. 3 cr. Tutorial in teaching methods and practical experience under supervision (open to Ph.D. candidates only). Basic Science Faculty.

IDTH 333-334 Projects. 2 cr.; each. Two months half time in a department other than the student's major towards the end of the Ph.D. candidate's residency. Basic Science Faculty.

DEPARTMENT OF ANESTHESIOLOGY

Chairperson:	Baraka, A.
Professors:	Baraka, A.; Muallem, M.
Associate Professors:	Baroudi, M.; Haroun- Bizri, S.; Jabbour-Khoury, S.; Louis, F.; Sibai, A.
Assistant Professors:	Awwad-Maroun, M; Ayoub, C.; Dabbous, A.; Khatib, M.; Lteif, A.; Nauphal, M.; Siddik-Sayyid, S.; Taha, S.
Associates:	Aghadjanian-Karam, A.; Gergess-Tamer, J.; Haddad, F.; Moallem, S.; Mouradian, E.; Rouhana, C.; Sinno, H.; Takkush, M.; Yazbeck-Karam, V.

The Department of Anesthesiology offers a clinical clerkship to Fourth Year Students. At the graduate level, it offers a 4-year residency program, and a 1 to 2-year clinical fellowship in cardiovascular anesthesia.

ANES 267 Clinical Clerkship. 15.120; 3 weeks. Clinical clerkship offered to Fourth Year students, consisting of 15 seminars on practical aspects of anesthesiology and cardiopulmonary resuscitation, as well as training in the care of the unconscious patient and administration of anesthesia under supervision. Members of Department.

ANES 268 Elective in the Subspecialties of Anesthesia. 0.180-360; 1-2 months. Students rotate in one or more of the subspecialties of anesthesia. Members of Department.

ANES 269 Elective in Respiratory Therapy. 0.180; 1 month. Rotation through the various fields covered by respiratory therapy. Members of Department.

DEPARTMENT OF BIOCHEMISTRY

Chairperson:	Durr, I.
Professor:	Durr, I.
Associate Professor:	Usta, J.
Assistant Professor:	Slim, R.
Associates:	Bazarbachi, A.; Darwiche, N.; Dbaibo, G.; Mikati, M.; Salti, I.

The Department of Biochemistry offers graduate courses to medical students and graduate courses in the Graduate Program leading to M.S. and Ph.D. degrees.

The requirements for admission to the graduate program are a B.A. or B.S. degree from a university and an academic record with a cumulative average of 80 and above in major courses. Students are expected to have completed the following courses or their equivalent:

Chemistry: 201, 206 or 215-216, 211, 212, 210 or 213.
Biology: 201, 202, 243.
Mathematics: 201, 202.
Physics: 211, 213 or 204, 205, 206, 207.

In addition to the above it is highly recommended that students take Chemistry 217, 218, 225 and Biology 221, 261, 274.

The requirements for an M.S. degree in Biochemistry are: a minimum of 21 credits of graduate courses, passing a comprehensive examination, and submitting a thesis based on independent research.

BIOC 211 Basic Biochemistry. 70.44; 6 cr. Offered to medical students. Describes the living cell as a physiochemical, highly organized system that is precisely controlled, self-reproducing and energy-generating. Homeostatic mechanisms, steady state and molecular biology are fully described. I. Durr, J. Usta, R. Slim, I. Salti.

BIOC 260 Electives in Biochemistry. 0.180 – 360. One to two months. The student can participate in an ongoing research project under supervision of an advisor selected by the student. The course is offered to medical students and trainees as well as others with a special permission from the chairperson of Biochemistry.

BIOC 300 Basic Biochemistry. Similar to 211; offered to graduate students.

BIOC 313 Advanced Biochemistry. 48.0; 3 cr. Prerequisite: 300. Presents the latest developments in molecular biology, and the topics of the hour relevant to metabolism as well as control of cellular constituents. J. Usta, R. Slim.

BIOC 305 Metabolism. 32.64; 3 cr.; alternate years. Prerequisite: 300. Presents recent advances in the enzymology of lipids, carbohydrates or proteins. I. Durr, J. Usta.

BIOC 307-308 Biochemical Methods. 0.128; 4 cr. (each). Prerequisite: 300. Basic principles and applications of the techniques of molecular biology, spectrophotometry and chromatography. J. Usta, R. Slim.

BIOC 309-310 Projects in Biochemistry. 0.128; 4 cr. (each). Prerequisite: Completion of or enrollment in 300. The student is assigned a laboratory project to carry out in the areas of glucocorticoids, human disorders and enzyme assays. I. Durr, R. Slim, J. Usta.

BIOC 311-312 Biochemistry Tutorial. 32.0; 2 cr. (each). Special topics that are of current interest are assigned to students to write a report and evaluate the current status of the subject. Members of Department.

BIOC 317-318 Biochemical Literature Survey. 0.32; 1 cr. (each). The student learns to use the latest electronic systems of communication to retrieve data and reference relevant to a topic of interest. Members of Department.

BIOC 319-320 M.S. Thesis. Original research under staff supervision. The projects center around enzymology of ATPases, molecular mechanisms of inflammation and genetics of human diseases. Members of Department.

DEPARTMENT OF DERMATOLOGY

Chairperson:	Kibbi, A.G.
Professors:	Kibbi, A.G.; Zaynoun, Sh.
Associate Professors:	Malak, J. (Clinical); Matta – Muallem, M. (Clinical)
Assistant Professors:	Rebeiz, N.; Salman, S.; Shbaklo, Z. (Clinical)
Associates:	El-Saad-Debahy, N.

The Department of Dermatology participates in the undergraduate courses of Basic Histology (course 209) given to Medicine I students, and Introduction to Medicine (course 221-222) given to Medicine II students. Elective clerkships are also available to Medicine IV students and interns. A three-year residency training program in Dermatology, accredited by the Arab Board of Medical Specializations and its Scientific Council of Dermatology and Venereology, is offered to MD students following one year of internship. The goal of the training program is to produce competent dermatologists capable of providing a broad spectrum of quality care to patients. Residents in training are involved in daily general and specialty clinics including phototherapy, contact dermatitis, dermatologic surgery, and connective tissue clinics.

DERM 267 Elective in Dermatology. 0.90-180; 1 month. Students participate in the morning clinics (general dermatology) and afternoon clinics (specialty clinics) as well as the seminars, conferences, journal club and assignments of audio-visual teaching material. Students can participate in on-going clinical research programs. At the end of the clerkship, a final examination is required of students. Members of Department.

DERM 287 Internship. 0.131-262; 1 month. Same as 267, offered to straight and rotating interns on an elective basis. Members of Department.

Weekly Conferences. Journal club, journal club for electives, grand rounds/case discussion, basic science seminar, clinical slides/differential diagnosis, Dermatopathology conference, Fitzpatrick's book review, dermatologic surgery conference

Monthly Conferences. Consultation review, attending staff lecture, basic science journal club

DEPARTMENT OF DIAGNOSTIC RADIOLOGY

Chairperson:	Al-Kutoubi, A.
Professors:	Al-Kutoubi, A.; Melhem, R. (Visiting); Rizk, G.
Associate Professors:	Haddad, M.; Hourani, M.
Assistant Professor:	Khoury, N.
Lecturer:	Achram, M.
Associate:	Abi Fakhr, F.

The Department of Diagnostic Radiology offers elective clerkships to undergraduate students and a 4-year residency training program.

DGRG 267 Introduction to Diagnostic Radiology. 22.158; 1 month. Elective open to fourth year medical students. Members of Department.

DGRG 268 Advanced Elective in Diagnostic Radiology. 0.180; 1 month. Pre-requisite: 267. Elective open to fourth year medical students. It deals with special disciplines within Diagnostic Radiology. Members of Department.

DGRG 287 Student Internship. 0.262-1048. Elective Clerkship for 1-4 months. Open for interns. Weekly seminars and group discussion. Members of Department.

Weekly Conferences. Clinico-Pathological, Radiological, Neuro-Surgical-Radiological, Medical, Surgical and gasrtointestinal grand rounds; medical, pediatric X-Ray, Radiology-Pathology Correlation, tumor clinic, ENT, epilepsy, Family Medicine, Vascular; orthopedic-Radiology-pathology.

DEPARTMENT OF FAMILY MEDICINE

Chairperson:	Khogali, M.
Professor:	Khogali, M.
Associate Professor:	Hamadeh, G.
Assistant Professors:	Kanaan, N. (Clinical); Major, S.; Makhlouf-Akel, M.; Saab, B.; Sharara, N. (Clinical); Usta, J. (Clinical).
Lecturer:	Karam, N. (Clinical)
Instructors:	Khoury, B.; Musharafieh, U.; Osman, M.
Associates:	Ashkar, K.; Makarem, M.; Omari, I.

The Department of Family Medicine offers clinical clerkship and specialty electives to medical students. It also offers clinical postgraduate training to MD graduates including internship, and residency training. The internship program is one year rotating internship. The residency program is a three-year program for specialty training in Family Medicine. The goal of the training program is to produce fully competent, community-oriented family physicians, capable of providing high quality care to their patients. The program consists of rotations in the different clinical departments of the Faculty of Medicine, as well as ambulatory primary health care experience in the Family Medicine Practice Center, in the University Health Services Center, and other satellite centers outside the A.U.B. campus. Residents sit yearly for the In-training Examination of the American Board of Family Practice.

The Department is responsible for providing comprehensive primary care services to the A.U.B. community, through the University Health Service.

FMMD 242 Medical Ethics. 11.13. Course offered to third year medical students. It aims to clarify the meaning and significance of key ethical concepts and to increase awareness of ethical issues. It offers a conceptual framework suitable for ethical analysis of medico-moral problems in a variety of professional contexts. Members of Department.

FMMD 262 Clinical Clerkship. 0.180. One month clerkship in Family Medicine offered to fourth year students. The purpose of the clerkship is to expose the students to the philosophy, principles and practice of family medicine, emphasizing the bio-psychosocial as well as the comprehensive approach. It upgrades the medical students' knowledge of common problems and their skills in the application of preventative clinical medicine in the ambulatory care setting. Students are assigned cases under supervision in the Family Medicine Practice Center and other centers inside and outside A.U.B..

FMMD 267 Elective. 0.180. One month elective in Family Medicine offered to fourth year students and other foreign medical students, who wish to have more experience in this discipline.

Weekly Activities: Topic Conferences, Journal Club, Audio-digest, Chairpersons Research, Research Forum, and guest lectures.

DEPARTMENT OF HUMAN MORPHOLOGY

Chairperson:	Saadé, N.
Professors:	Saadé, N.; Saadeh, F.
Associate Professors:	Jurjus, A.; Nuwayri-Salti, N.
Assistant Professor:	Sabban, M.
Emeritus Professor:	Mufarrij, A.
Associate:	Kibbi, A.G.

The Department of Human Morphology offers undergraduate courses to students in the Faculty of Medicine and the School of Nursing, in addition to graduate courses in the Graduate Program leading to the M.S. and Ph.D. degrees.

Students applying to the graduate program should hold a Bachelor of Science degree or its equivalent. The department may ask for specific prerequisites in certain disciplines such as biology, chemistry, etc., as deemed necessary.

HUMR 207 Gross Anatomy. 24.198; 7 cr. Required of all medical students. A regional dissection of the entire human body supplemented by embryology and clinical lectures. The student is also introduced to sectional anatomy based on the various imaging modalities. A. Jurjus, F. Saadeh.

HUMR 209 Basic Histology. 58.69; 6 cr. Required of all medical students. Study of the cell, tissues and organs of the human body at the level of the light and electron microscopes, utilizing traditional and modern methodologies. Structure is related to basic composition and function with some clinical application. A. Jurjus, N. Nuwayri-Salti, M. El-Sabban, F. Saadeh, N. Saadé.

HUMR 246 Human Morphology for Nurses. 32.32; 3 cr. Required of all nurses in the B.S. program. Introduction to basic gross anatomy and histology. A. Jurjus, F. Saaadeh, N. Saadé.

HUMR 305 General Histology. 30.33; 3 cr. Open to graduate students outside the Department. This course consists of the first half of the Basic Histology course 209, concerned with the cells and tissues. A. Jurjus, N. Nuwayri-Salti, M. El-Sabban, F. Saadeh, N. Saadé.

HUMR 307 Gross Anatomy. The same as 207. Offered to graduate students in the Department.

HUMR 308 Neuroanatomy. 28.39; 3 cr. Offered to graduate students. The neuroanatomy component of ID 208 Neuroscience. S. Atweh, S. Jabbur, N. Saadé.

HUMR 309 Basic Histology. Similar to 209, required of all graduate students of the Department.

HUMR 310 Methods in Morphology. 0.64; 2 cr., Open to graduate students. A guided laboratory course in methods used in the Department as aids in morphologic research. A. Jurjus, M. El-Sabban.

HUMR 312 Anatomy Tutorial. 0.64; 2 cr. A guided literature review with special research problems. F. Saadeh, A. Jurjus.

HUMR 312 Anatomy Tutorial. 0.64; 2 cr. A guided literature review with special research problems. F. Saadeh, A. Jurjus.

HUMR 313 Directed Reading and Research. Credit hours variable. At the discretion of the thesis supervisor. Specific reading and research assignments under supervision of an advisor. Members of Department.

HUMR 314-315 Seminar. 0.32; 1 cr. Presentation and discussion of topics designated by members of the Department.

HUMR 316 Principles of Electron Microscopy. 32.0; 2 cr.; alternate years. Lectures on, and demonstration of, basic techniques of electron microscopy. Members of Department.

HUMR 317 Advanced Electron Microscopy. 16.48; 3 cr. Prerequisites: 316. Laboratory work for, and discussion of, a research project not necessarily related to the subject of the thesis; conducted by graduate students whose thesis research involves electron microscopy. Members of Department.

HUMR 318 Principles of Histochemistry. 16.48; 3 cr. Prerequisites: 305 or 309, Biochemistry 300. Lectures, demonstration and laboratory work dealing with the principal techniques of histochemistry including immunohistochemistry and in situ hybridization. Members of Department.

HUMR 320 Introduction to Immunology. 16.32; 3 cr. Prerequisite: Consent of the course director. Discussions and laboratory work related to basic topics of immunology. A. Jurjus, N. Nuwayri-Salti.

HUMR 346 Human Morphology. 48.32; 4 cr. Offered to graduate students. The course includes the embryology component of 207, the whole of 246 and an experimental anatomy part.. A. Jurjus, F. Saadeh.

HUMR 397-398 M.S. Thesis. Credit hours variable. Original research under staff supervision leading to the M.S. degree. Members of Department.

IDTH 309 Biology of Nerve and Muscle. See "Interdepartmental Teaching."

HUMR 260 Elective in Human Morphology. 0.180-360; 1-2 months. The student can select one or more disciplines within human morphology including: applied immunology, general surgical anatomy, experimental neuroanatomy, neuromuscular disorders, techniques for study of cells and tissues, experimental neuropathology. Members of Department.

DEPARTMENT OF INTERNAL MEDICINE

Chairperson:	Atweh, S.[1]; Bibari, A.[2]
Professors:	Alam, S.; Atweh, S.; Birbari, A.; Cortas, N.; Nassar, N.; Nasser, M.; Rebeiz, J.; Salti, I.; Shammaa, M. (Clinical); Uthman, S. (Clinical); Uwaydah, M.
Associate Professors:	Abu Haydar, F. (Clinical); Barada, K.; Daouk, M.; El Hajj-Fuleihan, G.; Hubayter, R. (Clinical); Kaidbey, S. (Clinical); Khalifeh, R.; (Clinical); Nasr, F. (Clinical); Nasrallah, A.(Clinical); Saghir, N.(Clinical) Salem, A. (Clinical); Salem, Z. (Clinical); Sawaya, J. (Clinical); Tabbarah, Z. (Clinical); Yamout, B. (Clinical)
Assistant Professors:	Abchee, A.; Al-Awar, G.; Arayssi, Th.; Arnaout, S.; Azar, S.; Bazarbachi, A.; Dakik, H.; Jamaluddine, G.; Kanj-Shararah, S.; Khoury, M.; Medawar, W.; Murad, F.; Ramadan, F. (Clinical); Sawaya, R.; Shamseddine, A.; Sharara, A.; Shoucair, M.; Taher, A.; Uthman, I.
Lecturers:	Bizri, A.R.; Gharzuddine, W.; Jaber, R.(Clinical); Kanj, N.; Masri, A.F. (Clinical); Mokhbat, J. (Clinical)
Instructors:	Sukkariyeh, I. (Clinical)
Associates:	El-Imad, Z.; Halabi, N.; Hallal, M.; Kabalan, S.; Saleh, M.; Soweid, A.; Torbey, N.; Zein, C.
Emeritus Professors:	Abu Haydar, N.; Azar, J.; Shwayri, E.; Sabra, F.; Tabbara, R.
Emeritus Associate Professors:	Rubeiz, G.

The Department of Internal Medicine offers undergraduate courses, clinical clerkships and specialty electives to medical students. It also offers clinical post-graduate training to M.D. graduates including internship, residency and subspecialty fellowships. The internship program is offered either as a one-year straight internship in Internal Medicine or a four-month clerkship to rotating interns. The residency program is offered for a two-year period for specialty training in Internal Medicine. Fellowship training in the following subspecialties is also offered following the residency period: Cardiology, Endocrinology, Neurology, Gastroenterology, Nephrology-Hypertension, Hematology-Oncology, Infectious Diseases, Rheumatology and Respiratory Diseases.

IDTH 221-222 Introduction to Medicine. 108.72; 9 cr. The course is given to Med. II students annually over a 36-week period. A multidisciplinary and integrated approach to mechanisms of disease based on the organ systems, stressing pathophysiology and introducing the clinical presentation of diseases. The course is

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[1] Until February 15, 1999

[2] As of March 1, 199

given in the form of lectures and discussion sessions, where students are introduced to clinical cases in the light of pathophysiology. Members of faculty.

IDTH   223-224 Physical Diagnosis. 36.72; 3 cr. This course is an introduction to the principles of history taking and physical examination. The course is given over a 36-week period to Med. II students in the form of one lecture a week and a practical session where the history and examination are demonstrated on actual patients. Members of faculty.

INMD 246 Clinical Clerkship in Internal Medicine. 120.540; Three months. Third year medical students spend two months on the ward and one month in the outpatient department (OPD). On the ward, students work-up and follow patients under the supervision of senior residents and faculty. They are responsible for taking the history, performing the physical examination, following laboratory work and writing supervised notes in the charts on assigned hospital patients. Throughout their rotations students are required to attend clinical conferences and to prepare and participate in clinical discussions. Members of Department.

INMD 254 Infection Control. 6.34; 1 cr. A course given to Med. III students to increase their awareness and expertise in infection control as it relates to the protection of patients as well as the health-care worker from iatrogenic infection. The course aims to assure that the students understand their responsibility in infection control and apply scientifically acceptable infection control principles. This course is given in 16 lectures and a project in infection control. Students receive a certificate after passing an examination. Members of faculty.

INMD 262 Clinical Clerkship in Internal Medicine. 0.540; 3.5 months. Fourth year medical students work in their capacity as junior interns on the private medical floor of the hospital and in the Emergency Room. They are
responsible for admission work-up of patients and their follow-up under supervision by the attending physician and a junior resident. They also attend and participate in a daily clinical conference on the service in the different subspecialties of Internal Medicine. Members of Department.

INMD 267   Elective in Internal Medicine Subspecialties. 0.180-360; one month. Offered to fourth year medical students in one or more of the subspecialties of Internal Medicine including: Cardiology and EKG, Endocrinology and Metabolism, Nephrology, Neurology, Respiratory Diseases, Rheumatology, Intensive Care, and Gastroenterology. Members of Department.

Weekly   Conferences. The Department organizes weekly general Internal Medicine conferences including Medical Grand Rounds, Mortality and Morbidity conference and a lecture in Pathophysiology in Internal Medicine. In addition, each division runs a weekly or bi-weekly conferences and Journal Review sessions in their subspecialty.

Emergency Medicine. A lecture course of topics in emergency medicine given in 32 lectures to residents and interns.

Core Curriculum Lecture Course. A lecture course is given to residents and interns covering topics in general internal medicine throughout the year – two lectures per week.

DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

Chairperson:	Abdelnoor, A.
Professors:	Abdelnoor, A.; Uwaydah, M.
Associate Professor:	Matar, G.
Emeritus Professor:	Nabbut, N.
Associate:	Al-Awar, G.; Nassar, N.

The Department of Microbiology and Immunology offers courses to medical laboratory technology (MLT), nursing, medical and graduate students. It has a graduate program leading to the M.S. degree in Microbiology and Immunology. It is also one of the departments in the Faculty of Medicine that is actively involved in the Ph.D. program in basic medical sciences. The requirements or dmission o he raduate rogram re stated in the chapter "Graduate Study" at the end of this catalogue.

MBIM 221-222 Parasitology I and II. 32.32; 3 cr. (each). For MLT students. An introductory course on the laboratory techniques used in the diagnosis of parasitic infections of man. G. Matar.

MBIM 227 Microbiology and Immunology for Medicine II. 108.72; 9 cr.; annually. Fundamental aspects of basic and clinical microbiology and immunology presented in four separate but interrelated divisions: Immunology, bacteriology, parasitology-mycology, and virology. A. Abdelnoor, M. Uwaydah, S. Chamat, G. Matar and G. Al-Awar, N. Nassar and invited lecturers.

MBIM 237 Microbiology for Nursing Degree Students. 32.64; 3 cr. Fundamental aspects of medical microbiology for nursing students. A. Abdelnoor, G. Matar, N. Nassar, M. Uwaydah.

MBIM 260 Elective in Infectious Diseases. 0.180, 1 month. Basic evaluation, diagnosis and management of infectious diseases. M. Uwayada.

MBIM 261 Elective in Immunology. 0.180, 1 month. Introduction to immunological research and its application to clinical practice. A. Abdelnoor.

MBIM 301 Microbiology and Immunology. Similar to 227; offered to graduate students.

MBIM 310 Basic Immunology. 32.32; 3 cr. Covers section I (Immunology) of course 227 (301) and includes additional laboratory sessions. Offered selectively to graduate students. Starts September 1, annually in the first semester. A. Abdelnoor.

MBIM 311 Bacteriology. 32.32; 3 cr. Covers section II of course 227 (301). Offered selectively to graduate students. G. Matar, M. Uwaydah.

MBIM 312 Parasitology-Mycology. 16.32; 2 cr. Covers section III of course 227 (301). Offered selectively to graduate students. Members of Department.

MBIM 313 Virology. 16.32; 2 cr. Covers section IV of course 227 (301). Offered selectively to graduate students. Members of Department and invited lecturers.

MBIM 314 Tutorial in Immunology. 32.0; 2 cr. A. Abdelnoor.

MBIM 315 Tutorial in Bacteriology. 32.0; 2 cr. G. Matar, M. Uwaydah.

MBIM 316 Tutorial in Virology. 32.0; 2 cr. S. Members of Department

MBIM 317 Tutorial in Parasitology-Mycology. 32.0; 2 cr. Members of Department.

MBIM 326 Applied and Advanced Immunology. 32.64; 3 cr.; alternate years. Prerequisite: 227 (301) or 310. Immunological diseases and their laboratory diagnosis. A. Abdelnoor.

MBIM 327 Applied and Advanced Medical Bacteriology. 32.64; 3 cr.; alternate years. The epidemiology, pathogenesis, immune response, diagnosis and prevention of bacterial infections. G. Matar, M. Uwaydah.

MBIM 328 Applied and Advanced Parasitology. 32.64; 3 cr. A treatise on epidemiology, pathogenesis, immune response, diagnosis and prevention of parasitic infections. Members of Department.

MBIM 329 Applied and Advanced Virology. 32.64; 3 cr. A treatise on epidemiology, pathogenesis, immune response, diagnosis and prevention of viral infections. Members of department.

MBIM 330 Molecular Microbiology. 32.64; 3 cr. Molecular applications on the identification of infectious agents. G. Matar.

MBIM 331 Infection Control. 16.0; 1 cr. A treatise on the prevention of infections in the laboratory. Members of Department.

MBIM 390 Seminar. Yearly. 0.32; 1 cr. Members of Department.

MBIM 394 Journal Club. Yearly. 0.32; 1 cr. Members of Department.

MBIM 399 M.S. Thesis. Variable credit hours. Members of Department.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Chairperson:	Karam, K.
Professors:	Karam, K. (Clinical); Mroueh, A. (Clinical)
Associate Professors:	Khalil, A.(Clinical); Seoud, M.; Suidan, F. (Clinical);
Assistant Professors:	Abu-Musa , A.; Awwad, J.; Hannoun, A.; Kaspar, H.; Usta, I.
Associates:	Adra, A.; Aswad, N.; Bazi, T.; Nassar, N.

The Department of Obstetrics and Gynecology offers clinical clerkships and specialty electives to medical students. It also offers clinical postgraduate training to MD graduates including internship, residency and subspecialty fellowships. The internship program is either a one-year straight Internship in Obstetrics and Gynecology or a rotation to rotating interns. The residency program is a three-year specialty training in Obstetrics and Gynecology, including rotations in Pathology and abroad at the Union Memorial Hospital in Baltimore, Maryland, U.S.A. during the second year of residency. Straight interns and residents sit for a yearly examination of the Council for Resident Education in Obstetrics and Gynecology, administered by the American College of Obstetrics and Gynecology. The residency training in the Department is recognized by the Royal College of Obstetrics and Gynecology. After the second year of residency, trainees are eligible for the first part of the Royal College Examination. The second part recognizes their training and requires a period of 12 months of training in the British Isles towards the MRCOG. The training is also recognized by the Arab Board of Medical Specialties.

OBGY 247 Clinical Clerkship. 47-360; 2 months. A clerkship offered to third year students consisting of daily seminars in normal and abnormal Obstetrics and Gynecology, weekly grand rounds, monthly pathology conference and clinical clerkship in the Delivery Suite, Hospital Wards and Outpatient Clinics. Other activities include specialty clinics in Reproductive Endocrinology, Assisted Reproductive Technology, amily lanning, ynecologic ncology, etal aternal Medicine and Gynecologic Urology. Members of Department.

OBGY 248 Elective in Obstetrics and Gynecology. 0.180-360; 1-2 months. Exposure to selected sub-disciplines, offered to fourth year students. Members of Department.

OBGY 287 Internship. 0.524; 2 months. Training in Clinical Obstetrics and Gynecology and in research, offered to rotating interns. Members of Department.

OBGY 288 Straight Internship. 0.2882; 11 months. Includes rotations in Internal Medicine, Nursery and Makassed General Hospital. Interns prepare weekly seminars. Members of Faculty.

Weekly Conferences. Ward rounds, Chairperson's round, chart review, specialty conference, journal club, grand rounds, pathology conference, joint Obstetrics/ Pediatric conference.

DEPARTMENT OF OPHTHALMOLOGY

Acting Chairperson:	Noureddin, B.
Associate Professors:	Khaouam, E (Clinical); Mansour, A. (Clinical); Noureddin, B.; Salamoun, S. (Clinical)
Assistant Professors:	Haddad, R.; Maalouf, R. (Clinical)
Lecturers:	Bakri, M. (Clinical); Farah, N. (Clinical)
Associates:	Jurdi-Nuwayhid, F.; Khoury, A.; Shahin, H.; Younis. M.

The Department of Ophthalmology offers clinical clerkships and specialty electives to medical students. It also offers clinical postgraduate training to M.D. graduates, including internship and residency. The Internship Program is a 1 or 2 months rotation offered to straight interns in other disciplines, or to Family Medicine Residents. The Residency Program is a three-year specialty training in Ophthalmology, including rotations in glaucoma, neuro-ophthalmology, retina, cornea, pediatrics, oculoplastics and intra-ocular surgery. The residency training in ophthalmology is recognized by the Royal College of Ophthalmologists. The primary part of the Royal College Examination can be taken at the beginning of the second year of residency, while the final part can be taken any time after that.

OPHT 267 Clinical Clerkship. 0.120; 3 weeks. Clinical training and seminars given to fourth year medical students. The latter are clinically required to master the use of the direct ophthalmoscope and identify optic nerve abnormalities through the pupillary light reflex, identifying problems which need a referral for ophthalmic assessment. Members of Department.

OPHT 268 Elective in Ophthalmology. 0.180; 1 month. Exposure to ophthalmology, open to interns and fourth year medical students. (Same as 267). Students and interns will be required to get acquainted with the use of the different diagnostic opthalmic tests. Members of Department.

OPHT 287 Internship. 0.262-524; 1-2 months elective, in the Outpatient Department (OPD), hospital wards, and seminars. Same as 268. Members of Department.

DEPARTMENT OF OTOLARYNGOLOGY & HEAD AND NECK SURGERY

Chairperson:	Fuleihan, N.
Professor:	Fuleihan, N.
Associate Professor:	Zaytoun, G. (Clinical)
Assistant Professors:	Abouchacra, K.; Hadi, U. (Clinical); Hamdan, A. (Clinical); Natout, M. (Clinical)
Associate:	Awada, A.

The Department offers clerkships to undergraduate students and a 4-year residency program.

ORLG 267 Clinical Clerkship. 11.120; 3 weeks in the Department. Mornings in the Outpatient Department (OPD); 2-3 mornings in the operating rooms, the rest of the time in the hospital. Members of Department.

ORLG 268 Elective in Otolaryngology. 0.180; 1 month. Exposure to otolaryngology and its allied fields. Members of Department.

ORLG 287 Internship. 0.262; 1 month, elective. Work divided between Outpatient Department (OPD), operating rooms and hospital. Members of Department.

DEPARTMENT OF PATHOLOGY & LABORATORY MEDICINE

Chairperson:	Zaatari, G.
Professors:	Araj, G.; Habbal, M.Z.; Mufarrij, A.; Rebeiz, J.; Zaatari, G.
Associate Professors:	Salem-Shabb, N.; Zahed, L.
Assistant Professors:	Daher, R.; Haider, J.; Kaspar, H.; Tawil, A.
Instructor:	Kfoury-Baz, E.
Associates:	Abdelnoor, A.; El-Jisr, T.; Taher, A.
Emeritus Professors:	Khouri, F.; Nassif, R.

The Department of Pathology and Laboratory Medicine offers undergraduate courses to medical students and students in the Medical Technology Program (Faculty of Health Sciences). The Department offers 3-4 year residency training programs in pathology and laboratory medicine.

PATH 229 Pathology. 108.72; 9 cr. Undergraduate teaching of mechanisms of diseases (general pathology) and morphological and pathophysiological aspects of organ diseases (systemic pathology). Members of Department.

IDTH 221-222 Introduction to Medicine. See Department of Internal Medicine.

PATH 260 Elective in Pathology. 0.180, 1-2 month. Open to clinical students. Th purpose of this clerkship is the learning of the principles of anatomic pathology mostly in surgical pathology and cytopathology. The student participates in the daily teaching activities of the Department, learns general dissection skills, and sits on the sign-out sessions. During the rotation, the student is encouraged to make a presentation on a topic of interest.

LABM 262 Elective in Laboratory Medicine. 0.180-360; 1-2 months. The clerkship is offered year round to Med IV students. It consists of daily practical training, supplemented by lectures and seminars to cover the disciplines of Clinical Chemistry, Clinical Microbiology and Immunology, Clinical Hematology, Blood Banking and transfusion Medicine and Cytogenetics. The elective is available in these various disciplines of Laboratory Medicine and may be oriented according to the interest of the candidate.

LABM 287 Internship. 0.180-360; 1-2 months. Same as 262. Offered to rotating interns. Members of Department.

Clinico-Pathology Conferences. Med III, IV, and Staff in collaboration with the departments of Surgery, Internal Medicine, Pediatrics, Obstetrics and Gynecology, Diagnostic Radiology, Ophthalmology and Otolaryngology & Head and Neck Surgery.

The following courses are offered for Medical Technology students:

LABM 201-202 Clinical Chemistry I and II. 32.0; 2 cr. (each). Basic quantitative, manual, volumetric, and instrumental analyses are applied to body fluids with clinical interpretation of normal and abnormal values. M. Habbal, N. Cortas, R. Daher.

LABM 205-206 Clinical Pathology I and II. 64.0; 4 cr. (each). The courses consist of lectures and demonstrations in hematology, serology and blood banking, as well as a series of lectures on basic immunology. Members of Department.

LABM 210 Cytology and Histological Techniques. 32.0; 2 cr. The course includes a series of lectures and demonstrations on cell biology, a review of normal histology of various human organs, a description of examples of pathological changes, and lectures on techniques of tissue handling, preparation and staining of sections and smears for cytological material. Members of Department.

LABM 220 Clinical Chemistry Practical Training and Special Procedures. 0.128; 4 cr. Practical experience in clinical chemistry and special procedures of 7 weeks duration. Members of Department.

LABM 230 Clinical Hematology. 0.128; 4 cr. Practical experience in clinical hematology and phlebotomy of 7 weeks duration. Members of Department.

LABM 240 Clinical Microbiology. 0.128; 4 cr. Practical experience in clinical microbiology (Aerobic and Anaerobic Bacteriology, Mycobacteriology, Mycology and susceptibility testing) of 7 weeks duration. G. Araj.

LABM 250 Clinical Parasitology and Urinalysis. 0.64; 2 cr. Practical experience in clinical microscopy pertaining to parasitology, urinalysis and spermogram of 4 weeks duration. G. Araj.

LABM 260 Serology. 0.64; 2 cr. Practical experience in clinical immunology and serodiagnostic techniques of 4 weeks duration. G. Araj.

LABM 270 Blood Banking. 0.64; 2 cr. Practical experience in blood banking of 4 weeks duration. E. Baz.

LABM 280 Endocrinology, Cytogenetics and Histotechniques. 0.64; 2 cr. Practical experience in endocrinology, cytogenetics and histotechniques of 4 weeks duration. Members of Department.

LABM 231 and 232 Selected Topics in Laboratory Medicine. 32.0; 2 cr. Recent advances or special topics in the various disciplines of Laboratory Medicine, e.g. endocrinology, coagulation, chromatography, cytogenetics, hematology and clinical microbiology. Members of Department.

LABM 333 Topics in Basic Hematology. 32.0; 2 cr. Lectures on recent advances in hematology, offered to graduate students. Members of Department.

DEPARTMENT OF PEDIATRICS

Chairperson:	Mikati, M.
Professors:	Firzli, S. (Clinical); Mikati, M.; Najjar, S.
Associate Professors:	Dabbous, I. (Clinical); Mroueh, S.; Musallam, S. (Clinical)
Assistant Professors:	Bitar, F.; Dbaibo, G.; Fayyad, M.; Muwakkit, S.; Nabulsi-Khalil, M.; Younis, K.
Lecturers:	Ariss-Timani, M.; Ayyoub, C. (Clinical); Munla, N. (Clinical)
Associates:	Abdallah, S.; Abou Jaoude, R.; Abu Reslan, W.; Araj, A.; Choueiri R.; Farah, A.; Haddad-Abu-Faysal, N.; Hout, J.; Itani, M.; Maalouf, I.; Mahfoud, C.; Siblini, G.; Simaan, E.; Zaatar, R.
Emeritus Professors:	Nachman, H. (Clinical)

The Department of Pediatrics offers clerkships to undergraduate students, stressing those aspects of the care of children considered to be important to any physician, including the management of the healthy and sick child, peculiarities of disease in infancy, childhood, and adolescence; nutrition growth and development and the importance of combining preventive with curative medicine. Graduate training is offered to physicians leading to specialization (residency) in pediatrics over a 2-year period. Postgraduate fellowship in Neurology is offered.

PEDT 246 Clinical Clerkship. 35.360; 2 months. Clerkship offered to third year students. It consists of daily work in the hospital. Members of Department.

PEDT 267 Clinical Clerkship. 0.360; 2 months. Given to fourth year students. Daily work in Outpatient Department (OPD) and rotation on the private service and in the emergency room. Members of Department.

PEDT 268 Elective in Pediatrics. 0.180-360; 1-2 months. Clinical electives are open to fourth year medical students. Laboratory research electives are open to students at all levels. Exposure of students to laboratory research in developmental neuropharmacology, molecular biology and in epilepsy or to a special area of clinical pediatrics of their choice, including pediatric cardiology, neurology and hematology-oncology, and neonatal intensive care. Members of Department.

PEDT 287 Internship. 0.786; 2-3 month rotation each in the hospital wards, ambulatory services or newborn nursery. Members of Department.

PEDT 288 Straight Internship. 0.2882. Interns spend 11 months in the Department of Pediatrics of the University Hospital. Members of Department.

Weekly Conferences. Ward rounds, X-ray conferences, journal club, grand rounds, chairperson's rounds, and specialty conferences, (morbidity and mortality conference).

DEPARTMENT OF PHARMACOLOGY AND THERAPEUTICS

Chairperson:	Simaan, J.;
Professors:	Cortas, N; Simaan, J.; Bekaily, G. (Adjunct)
Associate Professor:	Sabra, R
Assistant Professor:	Haddad, G.E.[1]
Associate:	Mikati, M.
Emeritus Professor:	Fawwaz, G.

The field of pharmacology embraces the knowledge of the history, source, physical and chemical properties, compounding, biochemical and physiological effects, mechanisms of action, absorption, distribution, biotransformation and excretion, and therapeutic and other uses of drugs. The department of Pharmacology offers undergraduate and graduate programs. The undergraduate program is designed to meet the needs of medical students and is offered during the second semester of the second year. The graduate program consists of a minimum of two years of didactic and practical training leading to the degree of Master of Science. The Department offers courses in the Graduate Program leading to the degrees of M.S. and Ph.D.

PHRM 240 Pharmacology and Therapeutics. 48.0; 3 cr. Presentation of the chemistry, pharmacological effects, therapeutic usefulness and toxicity of drugs, designed to meet the requirements of the B.S. Nursing Program. R. Sabra, J. Simaan.

PHRM 228 Pharmacology and Toxicology. 108.72; 9 cr. General course dealing with the chemistry, general properties, pharmacological effects on the various systems, therapeutic usefulness and toxicity of drugs. A separate section deals with prescription writing and toxicology. The course is designed to meet the requirements of the second year medical program. J. Simaan, R. Sabra, N. Cortas.

PHRM 300 Pharmacology and Toxicology. Similar to 228; offered to graduate students.

PHRM 303-304 Pharmacological Methods. 0.96; 3 cr. (each). Prerequisite: 300. Methods of animal surgery, bioassay, and biochemistry. J. Simaan, R. Sabra, N. Cortas.

PHRM 305-306 Enzymological Bioassays. 0.96; 3 cr. (each). Prerequisite: Biochemistry 211. J. Simaan, R. Sabra, N. Cortas.

PHRM 307-308 Tutorial in Pharmacology. 0.96; 3 cr. (each).. Introduction to research. J. Simaan, R. Sabra, N. Cortas.

PHRM 309-310 Pharmacology Seminar. 0.32; 1 cr. (each).

PHRM 311-312 M.S. Thesis. Credit variable. Original research under supervision, leading to M.S. degree. J. Simaan, R. Sabra, N. Cortas.

PHRM 260 Elective in Pharmacology. 0.180-360; 1-2 months. Introduction to biochemical and physiological methods in use in pharmacology. J. Simaan, R. Sabra, N. Cortas.

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[1] Until February 23, 1999

DEPARTMENT OF PHYSIOLOGY

Chairperson:	Nassar, C. F.
Professors:	Bikhazi, A.; Birbari, A.; Jabbur, S.; Nassar, C. F.; Nasser, M.; Saadé, N.;
Associate Professors:	Homeidan, F.; Taha, A.M.
Assistant Professor:	Haddad, G.
Associates:	Azar, S.; Barada, K.

The Department of Physiology offers three programs of study: medical physiology; graduate physiology; and physiology for nursing students and undergraduates.

The medical physiology program provides the medical student with a core of physiological knowledge and skill over a period of one academic year. The graduate program is a broad one leading to the M.S. degree in Physiology and Ph.D. degree in Basic Medical Sciences. Students with a B.S. degree or its equivalent are eligible. These programs include basic undergraduate courses in mathematics, biology, physics, and chemistry in the Faculty of Arts and Sciences as well as advanced courses in Physiology and in other medical science disciplines.

PHYL 200 Homeostasis. 36.16; 2 cr.; annually. Study of the internal environment and its physiological regulation by two homeostatic organs, the lungs and the kidneys. Didactic lectures cover the physiology of the topic, treating internal environment, homeostasis and feedback mechanisms, the lung, the kidney, and electrolytes. A. Bikhazi, A. Birbari, M. Daouk, W. Medawar.

PHYL 202 Cardiovascular Physiology. 31.21; 2 cr.; annually. The cardiovascular system is presented with clear reference to pathophysiological and clinical events. Didactic lectures and seminar sessions define physiological concepts and emphasize structure-function relationships. Laboratory sessions familiarize the student with instrumentation and techniques in the cardiovascular field. S. Alam, A. Birbari, W. Gharzuddine, M. Khoury. M. Nasser.

PHYL 204 Metabolism. 32.24; 3 cr.; annually. Study of the physiology of the gastrointestinal tract, metabolism and its regulation by the endocrine system, and reproduction. The course consists of lectures, laboratories and conferences. K. Barada, A. Mroueh, C.F. Nassar, I. Salti.

PHYL 210 General Physiology: Cellular Mechanisms. 48.16; 3 cr.; annually. Study of aspects of membrane transport processes across symmetrical and asymmetrical cell membranes, electrophysiology, membrane potentials, action potentials in excitable cells, synaptic transmissions, and excitation-contraction coupling in muscles. A.Bikhazi, G. Haddad, F. Homeidan, S. Jabbur.

PHYL 246 Physiology for Nursing Degree Students and Undergraduates. 64.32; 5 cr.; annually. Prerequisite: Biology 201 or Biology 210. Fundamental principles of

human physiology and the mechanisms governing the function of different body organs. Members of faculty.

PHYL 300 Homeostasis. Similar to 200, offered to graduate students.

PHYL 302 Cardiovascular Physiology. Similar to 202, offered to graduate students.

PHYL 304 Metabolism. Similar to 204, offered to graduate students.

PHYL 310 General Physiology: Cellular Mechanisms. Similar to 210, offered to graduate students.

PHYL 311-312 Advanced Physiology. 32.0; 2 cr.; annually. A guided study (experimental and theoretical) of the literature of the major topics in physiology. Course conducted as a seminar. Members of Department.

PHYL 313-314 Physical Methods in Physiological Research. 0.64; 2 cr.; alternate years. A guided laboratory course of the physical methods used in the major branches of physiology. Members of Department.

PHYL 317 Perspectives in the Physiological Sciences. 32.0; 2 cr.; annually. Selected readings and seminars in the history, philosophy, and methodology of the physio-logical sciences to give the student a broad view of the field of biology and its implications in every day life. Members of Department.

PHYL 320 Membrane Transport. 32.0; 2 cr.; alternate years. A study of membrane phenomena, covering membrane structure, solubility-diffusion, and mediated and active transport in both symmetrical and asymmetrical biological systems. Members of Department.

PHYL 324 Electrophysiology of Excitable Cells. 12.9; 1 cr.; annually. A study of the basic mechanisms of membrane cable property and resting potentials in all cells, action potential initiation and propagation in excitable cells, receptor physiology, central synaptic transmission, neuromuscular transmission and muscular contraction. S. Jabbur.

PHYL 390 Directed Reading and Research. Credit hours variable; annually. Assignments based on the research interests of the graduate student and the advisor, aimed at formulating an original research project. Members of Department.

PHYL 391-392 Projects in Physiology. 0.64; 2 cr. A physiological literature survey covering a given subject in the field. Members of Department.

PHYL 397-398 M.S. Thesis. Credit hours variable. Original research under staff supervision, leading to the M.S. degree. Members of Department.

IDTH 309 Biology of Nerve and Muscle. See "Interdepartmental Teaching."

IDTH 208 Nervous System. See "Interdepartmental Teaching."

PHYL 260 Elective in Physiology. 0.180-360; 1-2 months. Covers one or more areas of physiology such as special physiologic techniques, general physiology, experimental gastroenterology, experimental neuroscience, physiology of cardiac and vascular smooth muscles. Members of Department.

DEPARTMENT OF PSYCHIATRY

Chairperson:	Khani, M.
Associate Professor:	Damluji, N. (Visiting)
Assistant Professors:	Al-Amin, H.; Khani, M.
Lecturers:	Karam, E.; Zarwi, A. (Clinical)
Instructor:	Khoury, B.
Associates:	Halabi M; Halabi, N.; Mikati, N.
Emeritus Professor:	Manougian, A.

The Department of Psychiatry offers an undergraduate course to Medicine II students and a clinical clerkship to Med. III students as well as clinical electives to interns and residents.

PSYT 227 Psychopathology. 32.36; 3 cr.; annually. Medicine II students are introduced
   to normal and abnormal psychological mechanisms as well as the classification and
   pathophysiology of psychiatric illness.
PSYT 252 Clinical Clerkship in Psychiatry. 0.180; one month. Third year medical
   students spend one month working up psychiatric patients and attending morning
   rounds on a psychiatric service where they are supervised by an attending
   psychiatrist. They also attend the psychiatry clinic in the outpatient department
   where they see new cases and prepare seminars. The rotation also includes seminars
   dealing   with psychopathology, case presentation and discussions, interview
   techniques and basic psychotherapy as well as psychpharmacology. Seminars are
   held daily and are supervised by the full time faculty.

DEPARTMENT OF RADIATION ONCOLOGY

Chairperson:	Geara, F.
Associate Professor:	Geara, F.
Assistant Professor:	Nasr, E.
Emeritus Professor:	Issa, P.
Research Associate	Khater, N.

RADO 260 Introduction to Radiation Oncology. 0.180; 1 month. Elective clerkship to introduce the student to the basic principles, techniques and application of radiation oncology. F. Geara

RADO 287 Internship. Elective in radiotherapy. 0.262-1.048; 1-4 months. Open to interns. F. Geara

Weekly Conferences. Tumor Conference, Neurooncology Conferences Oncology Conferences in Otorhinolaryngology, Pediatrics, and Gynecology. The Department participates in the activities of the Oncology Section of the Department of Internal Medicine.

Biweekly Conference. Head and Neck Multidisciplinary Conference.

DEPARTMENT OF SURGERY

Chairperson:	Hemady, K.
Professors:	Comair, Y.; Dagher, I. (Clinical); Haddad, F.S. (Clinical); Hemady, K. ; Khalil, I.; Khauli, R.; Nsouli A. (Clinical).
Associate Professors:	Abbas, J. (Clinical); Akel S. (Clinical); Atiyeh B. (Clinical); Bikhazi, K. (Clinical); Bulbul, M. (Clinical); Bulos, S. (Clinical) ; Haddad, R. (Clinical); Hubballah, M. (Clinical); Khoury, G. (Clinical); Musharrafiyyeh R.; Najjar, F. (Clinical) ; Nassar, S. (Clinical); Obeid, M.; Rubeiz, M.(Clinical); Saba, M. (Clinical); Sfeir, R. (Clinical); Shabb, B. Taha, A. Mohammad (Clinical); Taha, A. Muhieddine
Assistant Professors:	Abi Saad, G. (Clinical); Baroudi, H.; Dandan. I.; Haddad, G.F. (Clinical); Haydar, R.; Khalifeh M.; Lakkis, S.(Clinical); Sidani, M. (Clinical); Skaf, G.; Tayim, A.
Lecturers:	Afeich, N.(Clinical);Baddoura, O.(Clinical); Hussein M. (Clinical); Kaddoura, I. (Clinical) ;Kreidieh, I. (Clinical); Mufarrij, N. (Clinical); Soubra, M. (Clinical); Wazzan, W. (Clinical).
Associates:	Bitar, E.; Halabi, J.; Hammoud, M.; Harake, A.; Houcheimi I.; Kenaan, S.; Mansour, A.; Muallem, A.; Nabbout, G.; Natout, N.; Sayyed, K.; Sinnu, K.; Yaghi, Y.; Zaatari, A.; Zubeir, S.
Emeritus Professor:	Obeid, S. (Clinical); Shehadi, S.

The Department of Surgery offers undergraduate clerkships to medical students. It also offers a year of internship which is required for any further specialization.

A four year residency program in General Surgery is structured to conform with the requirements of the American Board of Surgery, the Royal College of Surgeons and the Arab Board of Surgery. This program is approved by the Arab Board. The trainees are allowed on individual basis to sit for parts I and II of the examination of the Royal College of Surgeons.

The Department of Surgery offers a four year training program in Neurosurgery. The requirements are an internship and one year of residency training in General Surgery. It also offers a three-year training program in each of Orthopedic Surgery, Plastic surgery and Urology. A year of internship and two years of General Surgery are prerequisites to join the Orthopedic and Urology training programs and an internship and three years of General Surgery for Plastic Surgery. All of these training programs are approved by the Arab Board of Surgery.

SURG 246 Clinical Clerkship. 44.540; 3 months. Third year students are exposed to the basic principles of surgery. Duties are distributed between the ambulatory patients (Outpatient Department and Emergency Room) and in-patient services. Operating Room and minor surgery assignments are provided. The students spend 12 weeks in surgery, four weeks in general surgery, two weeks in the Emergency Room and three weeks in two of the following specialties: Orthopedics, Neurosurgery, Plastic or Urology. They participate in the patient workup and learn, under supervision, the principles of pre-operative preparation, operative management and post-operative care. They are required to attend the conferences listed hereafter. Special rounds and seminars are also held to supplement the clinical activities. They are required to prepare and present short talks and seminars. Members of Department.

SURG 268 Elective in Surgery. 0.180-360; 1-2 months. Open to A.U.B. and non A.U.B. fourth year medical students. Knowledge of English is necessary. Fourth year students may elect to rotate through one or more of the following disciplines; General Surgery and Peripheral Vascular Surgery, Cardiothoracic Surgery, Neurosurgery, Orthopedic Surgery, Intensive Care Unit, Pediatric Surgery, Plastic Surgery and Urology. Non A.U.B. students act as observers only. Members of Department.

SURG 287 Mixed Internship. 0.524; 2 months. This position is open for A.U.B. and any graduate of a regional medical school. Positions are limited and selection depends on letters of recommendation as well as the result of an entrance examination. The duties are similar to those of the straight internship except that they are non considered as first-year postgraduate residents.

SURG 288 Straight Internship. 0.2882; 11 months. Straight interns are considered post-graduate first year trainees and are accepted by the Department of Surgery on a competitive basis. Workup and general care of patients are the major responsibilities of the intern who functions as an integral part of the resident staff. The intern performs surgical procedures under supervision and actively participates in the various bedside rounds and teaching conferences of the Department. The intern rotates through the Emergency Room and through other subspecialties. Straight internship is considered as the first year in the surgical training program.

Conferences. A grand round and a mortality morbidity conference are held once a month. Bedside teaching rounds are held at least once or twice a week. There is a trend to bedside teaching rather than didactic teaching. At least one and in some cases up to three weekly conferences are held per specialty division including a Radiology Conference.

Pathology and Journal Club Reviews. Are held on a monthly or bimonthly basis. Special lectures are delivered as the occasions arise. Two or three in-service and two oral exams are given yearly.

Affiliation: an affiliation between Makassed General Hospital and the Division of General Surgery was established in July 1996. First year residents and interns from Makassed General Hospital rotate and perform surgery at A.U.B. under supervision while second and third year residents from A.U.B. rotate and perform operations at Makassed General Hospital.

SCHOOL OF NURSING

FACULTY LIST 1998-99

Officers of the School

Samir S. Najjar	Dean of the Faculty of Medicine and Medical Center
Joseph A. Simaan	Associate Dean of the Faculty and Medical Center
Selwa H. Makarem	Director of the School of Nursing
Waddah N. Nasr	Registrar
Salim Kanaan	Director of Admissions

Associate Professor Emeritus
Khalaf, B. Wadad, R.N., M.S.N., Medical Surgical Nursing, Boston University

Professors
Farhood, Laila, Ph.D., R.N., C.S., Psychiatric and Mental Health Nursing, University of Maryland, Baltimore

Makarem, Selwa, R.N., Ed.D., Curriculum and Instruction, Teacher's College, Columbia University

Assistant Professors
Adra, Marina, R.N., B.S.N., M.S. Physiology, AUB
Arevian, Mary, R.N., B.S.N., M.P.H., AUB
Azouri, Laure, R.N., B.S.N., Vanderbilt University; M.S. Public Health Nursing, University of North Carolina; Midwifery, Oxford University
Azoury, Nuhad, R.N., M.S.N., Medical-Surgical Nursing, Wayne State University
Balian, Sossy, R.N., B.S.N., M.P.H., AUB
Doumit Abi-Abdallah, Myrna, R.N., B.S.N., M.P.H., AUB
Dumit Yazbik, Nuhad, R.N., B.S.N., AUB; D.T. Health Education, MA, AUB
Khoury Naifeh, May, R.N., M.S.N., Maternal Child Nursing, Pennsylvania State University
Marini Dayyeh, Sana, R.N., B.S., B.S.N., M.P.H., AUB
Noureddine, Samar, R.N. M.N., C.N.S., Cardiopulmonary Nursing, University of California Los Angeles
Yaktin, Umayma S., Ph.D., Psychology, University of London; Institute of Psychiatry,

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* Educational leave.

Chartered Clinical Psychology

Instructors

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GENERAL INFORMATION

The School of Nursing, founded in 1905, was the first nursing school in the Middle East. The five-year Bachelor of Science in Nursing program, established in 1936, was replaced in 1964 by a four-year program leading to the Bachelor of Science in Nursing degree. A two-year Associate Degree in Nursing program was established in 1980 and discontinued in 1984. Until 1978, the School was one of the components of the Faculties of Medical Sciences. In 1978, it became a division in the Faculty of Health Sciences. In 1982, its status as a school was restored and placed within the Faculty of Medicine. The Bachelor of Science in Nursing program (BSN) is registered by the Department of Education of New York State, HEGIS code 1203.00.

The main objective of the School is to provide learning opportunities which will enable the student to develop into a highly qualified professional as well as a civic-minded and concerned citizen. Consequently, emphasis in the program is on academic development and also on nurturing personal attributes such as character, responsibility, maturity, cooperativeness and self-reliance. Nursing represents a dynamic relationship with patients who need preventive, curative and rehabilitative services. This nurse-patient relationship is based upon utilization of principles from the natural, behavioral, medical and nursing sciences. It involves the ability of the nurse to identify needs, plan and administer nursing care independently and/or cooperatively as a member of the health team. Health promotion, being the primary level of intervention, focuses on the family, its individual members, and the community as a whole.

ADMISSION REQUIREMENTS

A. BACHELOR OF SCIENCE IN NURSING

The School of Nursing will follow the admission policies and criteria that are adopted by the University. For further details, see the section "Admissions" on page 29 of this catalogue.

B. RN-BSN REVISED PROGRAM

The curriculum is designed to permit the graduates of a technical program in nursing to pursue a Bachelor of Science in Nursing provided they meet the University entrance requirements. The time limit for completion of the program should not exceed six calendar years.

C. SECOND DEGREE IN NURSING

A candidate with a Bachelor degree wishing to obtain a second degree in nursing will be

required to take prerequisites and all nursing courses with a minimum residency period of four semesters.

GRADUATION REQUIREMENTS

All recommendations for graduation are made by vote of the Faculty, upon the recommendation of the Academic Committee.

To be eligible for graduation with the degree of Bachelor of Science in Nursing, the requirements include:

1. Completion of the prescribed program of study with a minimum of 115 credits after the Freshman class or equivalent, 93 credits for those entering as Registered Nurses.

2. An overall average of 70, excluding Freshman courses.

3. The maximum time allowed for the completion of the degree program should be within the following specified periods:
    - BSN I, eight calendar years.
    - BSN II, six calendar years.
    - BSN III, four calendar years.
    - BSN IV, two calendar years.

    Students must petition the Academic Committee for an extension of time if needed.

4. All undergraduate transfer students from AUB or from other recognized institutions of higher learning to the School of Nursing need to complete the required prerequisites and all required nursing courses. A minimum residency period of one year or 34 credits must be completed at AUB.

Course credits pertinent to the nursing curriculum may be transferred according to criteria set by the admission/academic committees.

Graduation with Distinction
The requirements for graduation with honors or high honors, are as stated by the University.

Licensing
Graduates are qualified for the licensing examination in Lebanon (Colloquium).

ENROLLMENT, RETENTION, PLACEMENT

Enrollment of students for the past three academic years has been as follows: 67, 87, 90 with retention rates of 84%, 98% and 95%, respectively. The School of Nursing is seeking additional financial aid and scholarships to increase enrollment.

In terms of placement, our BSN graduates are well sought after, not only by the American University Medical Center, but by other health institutions in Lebanon and the Gulf regions, and in the United States of America.

ACADEMIC RULES AND REGULATIONS

A. ATTENDANCE

1. Classes and Laboratories

i) Students are expected to attend all classes, laboratories, and any other required activities. Absence of students, whether excused or not, from any class or laboratory session does not excuse them from their responsibility for the work done or for any announcements made during their absence.

ii) Students who absent themselves during a semester for more than one fifth of the number of lectures of any course lose all credit for the course. They shall be graded as W (Withdrew) if they have a valid excuse and W-F if they do not. For the purpose of averaging, W-F shall be considered as 40.

iii) No students may be excused from laboratory and field requirements. All missed laboratory and field requirements must be made up.

2. Examination and Quizzes

i) Students may not absent themselves from announced final examinations and quizzes unless they present an excuse considered valid by the coordinator of the course. The course coordinator may then require the student to take a make-up examination.

ii) A student missing a quiz or a final examination with no excuse considered valid by the coordinator will automatically receive a zero grade for that quiz or examination.

iii) Students taking non-nursing courses from Faculty of Medicine and other Faculties of the University are required to follow the attendance regulations of that Faculty.

B. GRADING SYSTEM

1. Evaluation of the students' achievement will include their work in theory, practice, and professional attitudes and behavior.

2. The following grading system is used: 90-100 Excellent, 80-89 Good, 70-79 Fair, 60-69 Weak, and below 60 Failing. **The passing grade in all nursing courses is 70, with the exception of NURS 203, which has a passing grade of 60.**

C. WITHDRAWAL FROM A PROGRAM

To maintain student status, a student must register every semester, excluding the summer session, unless required by the program. Students who do not register can be readmitted provided they can complete the requirements within the time limit of the program.

D. TRANSFER

Students registered at the School of Nursing have to take the nursing curriculum for two consecutive semesters (not less than 24 credits) before transferring to other departments.

E. PROMOTION

Students shall be promoted at the end of the Summer session after completion of 30 or more credits beyond the requirements from the previous level. However, students who register in October, lacking 6 or fewer credits for completion of a class, will be registered in the next higher class at the discretion of the Academic Committee. In order to be promoted, they must attain a minimum average of 65 in the sophomore year and 70 in the following years.

F. PLACEMENT ON THE DEAN'S HONOR LIST

To be placed on the Dean's Honor List at the end of a semester a student must:

1. Carry at least twelve credits of courses other than those repeated.

2. Not be on probation.

3. Have passed all the courses of the semester and attained in all courses an overall average of 80 and ranking approximately in the top 15% of the class.

4. Not have been subjected to any disciplinary action within the University.

G. FAILURES AND DEFICIENCIES

1. Placement on Probation

A student will be placed on probation for any one of the following reasons:

i)   If at the end of a semester or summer session the student fails in two or more

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courses.
ii)   If the student does not attain the minimum required semester average:
- 65 for BSN II
- 70 for the following years

Students in their freshman and sophomore years will be placed on probation at the end of their first semester only if they fail in one half or more of the credit hours carried.

These regulations do not apply to part-time students until they have completed at least 12 credits. For part-time students, a semester is defined as the consecutive courses totaling 12 credits

2. Removal from Probation

Action to remove probation at the end of a semester or summer session will be taken provided the full-time student:

i)   passes all courses taken during the semester or summer session; and
ii)   achieves the minimum required average for that semester; and
iii)   achieves the minimum yearly average required if the semester or summer session in question is the last one of a student's year.

3. Repeating Courses

i)   A student may repeat any course with the consent of the advisor and course coordinator.
ii)   All required courses which a student fails must be repeated.
iii)   When a course is repeated, the highest grade obtained will be considered in the calculation of the cumulative average.
iv)   In exceptional cases a student may be allowed to take a make-up exam for a course failed, before the end of the following academic term. He/she must have the approval of the course coordinator and the Academic Committee. A pass or fail grade will be given to students taking make-up examinations. The original failing grade obtained will remain on the transcript and will be used in the computation of the cumulative average.

4. Repeating the Year

The Academic Committee may require a student to repeat the year if he/she:

i)   fails in one third or more of credits load attempted during that year; or
ii)   fails to remove probation within two semesters; or
iii)   fails to attain the minimum yearly average.

A student repeating the year must register for a full load and repeat all courses in which he/she has scored below the minimum required for that year.

H. DISMISSAL FROM THE SCHOOL OF NURSING

A student may be dismissed by vote of the Faculty upon the recommendation of the Academic Committee if he/she:

1. Fails to remove probation within two semesters; or

2. Fails in one-third or more of the load attempted during that year and fails to attain the minimum yearly average; or

3. Fails to satisfy the requirements of a repeated year; or

4. In the judgment of the Academic Committee is not making satisfactory academic progress, has not shown sufficient professional promise, or has behaved in a manner below the norms expected in the School.

I. APPLICATION FOR READMISSION

When, in accordance with University regulations, a student is dropped, the implication is that the student is not qualified to continue his/her education. Consideration of readmission is given for one of the following reasons:

1. If the student was not able to do his/her work efficiently because of health reasons (in such cases, the University will depend on a medical report from the University Physician).

2. If the advisor of the student or a faculty member or administrative official of the University knows of certain family problems which may have influenced the academic achievement of the student.

3. If, after spending one or two years at another institution, the student is able to present a satisfactory record and recommendation.

Ordinarily, supporting documents for (1.) and (2.) must be presented within 30 days after the student is dropped from the University, but in exceptional cases this presentation ay be made at the beginning of the following regular semester.

If a student is on probation and leaves the University after the 10th week of the semester, the Academic Committee will decide whether he/she may be allowed to return to the University.

J. INCOMPLETE

Each student must complete incomplete grades within the first five weeks of the following academic semester. A student who fails to complete a course in time, without reasons considered valid by the course coordinator, will receive a grade of 40 for that course.

K. DISCIPLINARY ACTION

A student engaging in academic misconduct, such as cheating in examinations or plagiarism, will be referred to the Director and the Advisory Committee.

AWARDS

Penrose Award

Non-cash honorary Award made on the basis of scholarship, character, leadership and contribution to University life, and for an the outstanding graduate of the School.

Women's Auxiliary Awards

1.	Mary Crawford (Florence Nightingale).
2.	Ann Smith.
3.	Poppy Haddad.
4.	Henriette Sabra.
5.	Hanneh Shahine.

Cash and certificate awards are granted to senior students who meet the following criteria: academic achievement, professional integrity, seriousness of purpose, contribution to professional and university life and willingness to join AUBMC after graduation.

Women's Auxiliary Contracted Scholarship

Annette Hajjar Scholarship. Recipient should work at AUBMC for a period of two years.

Alumni Award

Non-cash award, granted to a senior student who has attained the highest grade point average of his/her class for the last two academic years.

Lions Award.

Non-cash award, granted to a student who has been commendable for his/her academic achievement and professional attitude.

CURRICULUM FOR THE BACHELOR OF SCIENCE IN NURSING

Semester	No. of Weeks	Lecture Hrs	Lab or Clinical Hrs[1]	Total Clock Hrs	Credit Hrs
FIRST YEAR					
First Semester					
BIOL 103 Introductory Biology I[2]	16	48	48	96	4
ENLG 101 English Communication Skill I[3]	16	80	--	80	5
MATH 101 Calculus & Analytic Geometry[3]	16	48	--	48	3
Elective	16	48	--	48	3
			Total	272	15
Second Semester					
CHEM 101 General Chemistry I	16	48	48	96	4
ENLG 102 English Communication Skills II[3]	16	80	--	80	5
MATH 102 Calculus and Analytic Geometry II	16	48	--	48	3
Elective	16	48	--	48	3
			Total	272	15
SECOND YEAR*					
First Semester					
CHEM 208 Brief Survey of Organic Chemistry	16	48	--	48	3
CHEM. 209 Introductory Organic Laboratory	16	16	64	80	2
ENLG. 203 English Communication Skills III[3]	16	48	--	48	3
SBHS 201 Introduction to the Study of Society	16	48	--	48	3
SBHS 202 General Psychology	16	48	--	48	3
			Total	272	14
Second Semester					
ANAT 246 Anatomy	16	32	32	64	3
PHYL 246 Physiology	16	64	32	96	5
MBIM 237 Microbiology	16	32	32	64	3
NURS 200 Introduction to Nursing	16	48	--	48	3
ENLG 204 English Communication Skills IV[3]	16	48	--	48	3
			Total	320	17
Summer Session					
NURS 201 Introduction to Nursing Practice, Theory	8	48	--	48	3
NURS202 Introduction to Nursing Practice, Practicum	8	--	144	144	3
NURS203 Human Growth and Development	8	48	--	48	3
			Total	240	9

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[1] One credit hour of laboratory is the equivalent of two clock hours weekly per semester, one nursing laboratory hour is the equivalent of three clock hours.

[2] **Biology 210 is required from Math students in the second year.**

[3] Level is decided by placement test in the English Department Faculty of Arts & Sciences.

*Students exempted from ENLG. 203 do not need to replace the 3 credits for graduation.

Semester	No. of Weeks	Lecture Hrs	Lab or Clinical Hrs[1]	Total Clock Hrs	Credit Hours
THIRD YEAR					
First Semester					
NURS300 Nursing Care of Adults I, Theory	16	48	--	48	3
NURS301 Nursing Care of Adults I, Practicum	16	--	144	144	3
NURS304 Nursing Care of the Expectant Family, Theory	16	48	--	48	3
NURS305 Nursing Care of the Expectant Family, Practicum	16	--	144	144	3
NURS310 Pathophysiology	16	32	--	32	2
PHRM. 240 Pharmacology	16	48	--	48	3
			Total	464	17
Second Semester					
NURS302 Nursing care of Adults II, Theory	16	48	--	48	3
NURS303 Nursing Care of Adults II, Practicum	16	--	144	144	3
NURS306 Nursing Care of Children, Theory	16	48	--	48	3
NURS307 Nursing Care of Children, Practicum	16	--	144	144	3
EDBS 204 Introductory Biostatistics	16	16	32	48	2
Educ 230 Instructional Procedures	16	48	--	48	3
			Total	480	17
Summer Session					
NURS204 Nursing Informatics	8	48	--	48	3
CVSP 201 Ancient, Medieval and Renaissance Culture[2]	8	48	--	48	3
Elective	8	48	--	48	3
			Total	144	9
FOURTH YEAR					
First Semester					
NURS400 Critical Care Nursing, Theory	16	48	--	48	3
NURS401 Critical Care Nursing, Practicum	16	--	144	144	3
NURS402 Mental Health and Psychiatric Nursing, Theory	16	48	--	48	3
NURS403 Mental Health and Psychiatric Nursing, Practicum	16	--	144	144	3
NURS406 Nursing Research	16	48	--	48	3
			Total	432	15

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[1] One credit hour of laboratory is the equivalent of two clock hours weekly per semester; one nursing laboratory hour is the equivalent of three clock hours.
2 If offered.
3 Students who enter at the Sophomore level graduate with a total number of 115 credits only. Students exempted from ENLG. 203 will graduate with 112 credits.

Second Semester

NURS407 Community Health Nursing, Theory	16	48	--	48	3
NURS408 Community Health Nursing, Practicum	16	--	144	144	3
NURS409 Professional Nursing, Theory	16	48	--	48	3
NURS410 Professional Nursing, Practicum	16	--	144	144	3
CVSP 202 Ancient, Medieval and Renaissance Culture	16	48	--	48	3
EDBS 208 Essentials of Epidemiology	16	32	--	32	2
			Total	464	17
			Grand Total	**3360**	**145[3]**

CURRICULUM FOR RN-BSN (REVISED)

Semester	No of Weeks	Lecture Hrs	Lab or Clinical Hrs[1]	Total Clock Hrs	Credit Hrs
FIRST YEAR					
First Semester					
CHEM 208 Brief Survey of Organic Chemistry	16	48	--	48	3
CHEM 209 Introductory Organic Laboratory	16	16	64	80	2
ENLG 203 English Communications Skills III[2]	16	48	--	48	3
SBHS 201 Introduction to the Study of Society	16	48	--	48	3
SBHS 202 General Psychology	16	48	--	48	3
			Total	272	14
Second Semester					
ANAT 246 Anatomy	16	32	32	64	3
PHYL 246 Physiology	16	64	32	96	5
MBIM. 237 Microbiology or validate	16	32	32	64	3
ENLG. 204 English Communication Skills IV[2]	16	48	--	48	3
NURS205 Foundation of Professional Nursing	16	16	--	16	1
			Total	288	15
Summer Session					
NURS 203 Human Growth and Development	8	48	--	48	3
NURS 204 Nursing Informatics	8	48	--	48	3
			Total	96	6
SECOND YEAR					
First Semester					
NURS 308 Maternal-Child Nursing, Theory	16	48	--	48	3
NURS 309 Maternal Child Nursing, Practicum	16	--	144	144	3
NURS 310 Pathophysiology	16	32	--	32	2
PHRM. 240 Pharmacology or validate	16	48	--	48	3
CVSP 201 Ancient, Medieval and Renaissance Culture[3]	16	48	--	48	3
			Total	320	14

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[1] One credit hour of laboratory is the equivalent of two clock hours weekly per semester; one nursing laboratory hour is the equivalent of three clock hours.

[2] Level is decided by placement test in the English Department, Faculty of Arts & Sciences.

[3] If offered

Semester	No of Weeks	Lecture Hours	Lab or Clinical Hrs[1]	Total Clock Hrs	Credit Hours
SECOND YEAR (CONT'D)					
Second Semester					
NURS 311 Nursing Care of Adults II, Theory	16	48	--	48	3
NURS 312 Nursing Care of Adults II, Practicum	16	--	144	144	3
EDBS 204 Introductory Biostatistics	16	16	32	48	2
EDUC 230 Instructional Procedures	16	48	--	48	3
			Total	288	11
Summer Session					
CVSP 202 Ancient Medieval Renaissance Culture	8	48	--	48	3
Elective	8	48	--	48	3
			Total	96	6
THIRD YEAR					
First Semester					
NURS402 Mental Health & Psychiatric Nursing, Theory	16	48	--	48	3
NURS403 Mental Health & Psychiatric Nursing, Practicum	16	--	144	144	3
NURS404 Critical Care Nursing, Theory	16	48	--	32	2
NURS405 Critical Care Nursing, Practicum	16	--	95	95	2
NURS406 Nursing Research	16	48	--	48	3
			Total	368	13
Semester					
Second Semester (Cont.)					
NURS 407 Community Health Nursing, Theory	16	48	--	48	3
NURS 408 Community Health Nursing, Practicum	16	--	144	144	3
NURS 409 Professional Nursing, Theory	16	48	--	48	3
NURS 410 Professional Nursing, Practicum	16	144	--	144	3
EDBS 208 Essentials of Epidemiology	16	32	--	32	2
			Total	416	14
			Grand Total	2144	93[2]

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[1] One credit hour of laboratory is the equivalent of two clock hours weekly per semester; one nursing laboratory hour is the equivalent of three clock hours.

[2] Students exempted from ENLG 203 will graduate with 90 credits only.

COURSE DESCRIPTIONS

NURS 200 Introduction to Nursing. 3 cr. Pre- or co-requisites: ENLG 203, CHEM 208, CHEM 209. This course introduces concepts basic to the nursing profession. The nature of nursing as a profession, past present and future, are studied with a focus on the role of nurses in meeting health needs of man throughout the health-illness continuum.

NURS 201 Introduction to Nursing Practice, Theory. 3 cr. Prerequisites: NURS 200, ANAT 246, PHYL 246, MBIM 237. This course builds upon the framework of human beings emphasized in Nursing 200. Emphasis is placed on the nursing process, particularly health assessment of clients, their adaptive mechanisms and environmental status. Theoretical components include psychosocial concerns, nutritional needs and interpersonal processes.

NURS 202 Introduction to Nursing Practice, Practicum. 3 cr. Co-requisite: NURS 201. The clinical component provides an introduction to a selected hospital environment in which the application of the nursing process is studied. As part of the nursing process, beginning assessment incorporates physiological, functional and psychosocial needs of men/women as clients.

NURS 203 or SBHS 229 Human Growth and Development. 3 cr. Prerequisite: SBHS 202. Genetical and environmental determinants of development from the prenatal period are emphasized. Theories of development are studied. Content includes discussion of factors that affect development at various age levels. Emphasis is placed upon the relationship between the physical, cognitive, emotional, and growth and behavior.

NURS 204 Nursing Informatics. 3 cr. An introduction to computer literacy in nursing. The course is designed to enhance the learner's understanding of the nature, development, and use of computers.

NURS 300 Nursing Care of Adults I, Theory. 3 cr. Prerequisites: NURS 201, NURS 202; pre- or co-requisites: NURS 310, PHRM 240. This course is planned to facilitate development of knowledge and application of scientific principles in the care of clients representing medical-surgical problems of the adult population. The course builds on the framework of man, environment, health status and nursing.

NURS 301 Nursing Care of Adults I, Practicum. 3 cr. Co-requisites: NURS 300, PHRM 240. Provides opportunity for clinical application of concepts stated in Nursing 300 in support to clients and their families.

NURS 302 Nursing Care of Adults II, Theory. 3 cr. Prerequisites: NURS 300, NURS 301. This course is a continuation of NURS 301 and is based on the framework previously outlined in NURS 300. Emphasis is placed on the following dysfunctions: metabolic and endocrine, neurologic, EENT, renal and urinary, integumentary, hepatic and biliary, rheumatic and the infectious process.

NURS 303 Nursing Care of Adults II, Practicum. 3 cr. Co-requisite: NURS 302. Provides opportunity for the clinical application of the knowledge of concepts stated in NURS 302 in a variety of settings utilizing the nursing process.

NURS 304 Nursing Care of the Expectant Family, Theory. 3 cr. Pre- or co-requisites: NURS 300, NURS 301, NURS 310 and PHRM 240. This course focuses on the reproductive health of the family, from conception to the neonatal period. Theoretical content stresses the nurse's role in reproductive health and reproductive risk.

NURS 305 Nursing Care of the Expectant Family, Practicum. 3 cr. Co-requisite: NURS 304. Clinical application of knowledge acquired in NURS 304, focusing on women in the child-bearing cycle, newborns and families as clients in the hospital and outpatient settings. Using the nursing process the student provides acute care and promotes reproductive health.

NURS 306 Nursing Care of Children, Theory. 3 cr. Prerequisites: NURS 203, NURS 304, NURS 305. This course focuses on the individual within the family setting from infancy through adolescence. Coverage includes ambulatory as well as in-patient care, and focuses on primary as well as secondary and tertiary care. Care is based on the nursing process. The role of the nurse as an advocate, health teacher and nurturer is stressed.

NURS 307 Nursing Care of Children, Practicum. 3 cr. Co-requisite: NURS 306. Nursing students will be able to assess health needs of patient(s) and child(ren) based on knowledge of normal growth and development, and on evidence of health and disease; and to implement indicated nursing care. Hence students will be able to function effectively in the health care delivery system.

NURS 310 Pathophysiology. 2 cr. Prerequisites: ANAT 246, PHYL 246, MBIM 237. Focuses on the alterations in biologic process that affect body dynamic equilibrium or homeostasis. The content is organized into three areas of focus based on the health-illness continuum: 1) Control of normal body function; 2) pathophysiology or alteration in body function; and 3) system or organ failure.

NURS 400 Critical Care Nursing, Theory. 3 cr. Prerequisite: Senior Standing. This course focuses on the development of knowledge in the care of clients with critical care problems. Emphasis is placed on: cardiovascular and respiratory problems, neurologic disturbances, shock, sepsis, metabolic and endocrine imbalances, altered nutrition, renal failure, emergency and disaster nursing.

NURS 401 Critical Care Nursing, Practicum. 3 cr. Co-requisite: NURS 400. Focuses on the application of the theoretical content of NURS 400 in a variety of acute care settings.

NURS 402 Mental Health and Psychiatric Nursing, Theory. 3 cr. Prerequisites: SBHS 201, SBHS 202, Senior Standing. Provides the mental health setting for self-awareness and therapeutic use of self in effective communication. The holistic philosophy of clients as bio-psycho-social entities is stressed in both mental health and mental illness. General theories of psychiatry and mental health therapies are presented.

NURS 403 Mental Health and Psychiatric Nursing, Practicum. 3 cr. Co-requisite: NURS 402. Provides clinical experience in psychiatric-mental health settings. Emphasis is placed on the quality of coping abilities of clients in varying degrees of stress and crisis. Opportunities are provided for students to work collaboratively with multi-disciplinary health teams to assess, plan and implement relevant nursing interventions.

NURS 406 Nursing Research. 3 cr. Prerequisites: EDBS 204, Senior Standing. Focuses on the rationale underlying the scientific approach in general and its application to nursing, with special emphasis on basic research steps, research design, and physiological and behavioral measures relevant to the different areas of nursing.

NURS 407 Community Health Nursing, Theory. 3 cr. Prerequisites: EDUC 230, Senior Standing. Co-requisite: NURS 406. Provides knowledge in the broad area of the field of nursing, public health and primary health care. The levels of prime concern are the small group, including the family and its individual members, and the large group, including the community.

NURS 408 Community Health Nursing, Practicum. 3 cr. Co-requisite: NURS 407. Field practice is provided through team relationships with other health professionals. Its primary focus of practice is on the promotion and maintenance of high levels of health and well being and prevention of illness and disability.

NURS 409 Professional Nursing, Theory. 3 cr. Prerequisites: NURS 400, NURS 401, NURS 406, Senior Standing. Professional nursing incorporates the concepts of leadership, management, creativity, analysis, power, change and evaluation. In this course, students will investigate, analyze and conceptualize the different modalities of leadership, utilizing nursing and management theories.

NURS 410 Professional Nursing, Practicum. 3 cr. Co-requisite: NURS 409. This course allows the student to explore his/her role as a potential leader. The learner observes and assists in the practice of different modalities of leadership and managerial skills in a variety of health care settings.

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RADIOLOGIC TECHNOLOGY TRAINING PROGRAM

Program Coordinator

Mansour, Z.

GENERAL INFORMATION

The Program in Radiologic Technology offers a theoretical and clinical training of two years in all diagnostic imaging modalities. The theoretical training is provided in the facilities of the Program in the Sub-basement of the Medical Center and the Clinical Training in the Diagnostic Radiology Department of the Faculty of Medicine.

The Program also offers post-certificate courses in specialized imaging modalities.

ADMISSION REQUIREMENTS

The minimum requirement for admission to the first year is the Lebanese Baccalaureate, Part II, or its equivalent. Applicants must take the SAT I tests and the University's English Entrance Examination or TOEFL as specified in the section on "Admissions" on page 27 of this catalogue.

CURRICULUM

FIRST YEAR	Credits
First Semester	
XR 101 Orientation	3
XR 103 Physics	8
XR 105 Anatomy and Physiology	6
XR 107 Radiographic Photography	6
XR 109 Radiographic Technique	8
Second Semester	
XR 104 Physics	8
XR 106 Anatomy and Physiology	6
XR 108 Radiographic Photography	6
XR 110 Radiographic Technique	8
XR 112 Fundamentals of Nursing and Patient Care	3
Summer Session	
XR 114 Clinical	6
Total	68

SECOND YEAR
First Semester
XR 201 Special Procedures   6
XR 203 Radiologic Equipment   8
XR 205 Introduction to Principles of Diseases   6
XR 207 Sectional Anatomy   2

Second Semester
XR 202 Special Procedures   6
XR 204 Radiologic Equipment   8
XR 206 Introduction to Principles of Diseases   6
XR 208 Sectional Anatomy   2
XR 210 Projects   2

Summer Session
XR 214 Clinical   6
                                        Total   52

Post-Certificate (Optional)

                                                  Credits
XR 220 Mammography   10
XR 222 Ultrasonography   12
XR 224 Computed Tomography   12
XR 226 Magnetic Resonance I   14
XR 228 Magnetic Resonance II   14
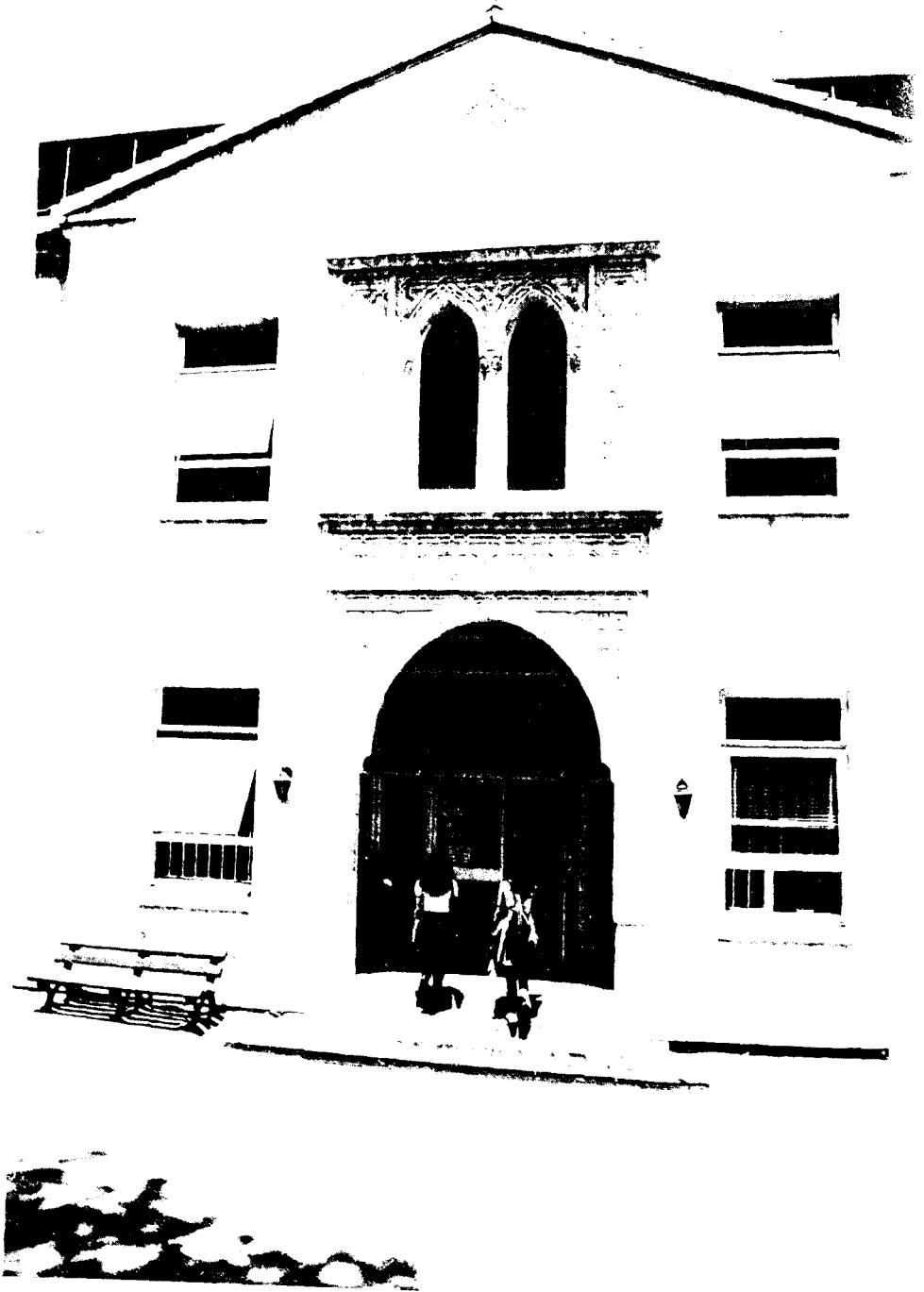
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Faculty of Engineering and Architecture

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FACULTY OF ENGINEERING AND ARCHITECTURE

FACULTY LIST 1998-99

Officers of the Faculty

John Waterbury   President of the University
Peter Heath   Provost of the University
Nassir Sabah   Dean of the Faculty
George M. Ayoub   Associate Dean of the Faculty
Moueen Salameh   Assistant Dean of the Faculty
Waddah N. Nasr   Registrar
Salim Kanaan   Director of Admissions
Ghada Najm   Executive Officer

Professors Emeriti

Abboud-Klink, Sami, Ph.D., Rensselear Polytechnic Institute; Civil and Environmental
    Engineering
Hope, Edward, M.S., Massachusetts Institute of Technology; Ed.D., Columbia
    University; Civil and Environmental Engineering
Iliya, Raja, Ph.D., University of Texas, Austin; Civil and Environmental Engineering
Sakkal, Fateh, Ph.D., University of Manchester; Mechanical Engineering

Professors

Al-Alaoui, M. Adnan, Ph.D., Georgia Institute of Technology; Electrical and Computer
    Engineering
Ayoub, George, Ph.D., University of London; Civil and Environmental Engineering
Azoury, Pierre, Ph.D., University of London; Mechanical Engineering
Diab, Hassan, Ph.D., University of Bath; Electrical and Computer Engineering
El-Hajj, Ali, Docteur Ingenieur, University of Rennes I; Electrical and Computer
    Engineering
Ghaddar, Nesreen, Ph.D., Massachusetts Institute of Technology; Mechanical
    Engineering
Harajli, Mohammad, Ph.D., University of Michigan, Ann Arbor; Civil and Environmental
    Engineering
Kabalan, Karim, Ph.D., Syracuse University; Electrical and Computer Engineering
Moukalled, Fadl, Ph.D., Louisiana State University; Mechanical Engineering
Sabah, Nassir, Ph.D., State University of New York, Buffalo; Electrical and Computer
    Engineering
Salameh, Moueen, Ph.D., Virginia Polytechnic Institute and State University; Engineering
    Management

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* On tenure appointment

Associate Professors

Abboud, Nadim, Ph.D., Virginia Polytechnic Institute and State University; Engineering Management

Abdul Malak, M. Assem, Ph.D., University of Texas, Austin; Engineering Management

Abed, Jamal, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design

Baaj, Hadi, Ph.D., University of Texas, Austin; Civil and Environmental Engineering

Basha, Habib, Ph.D., University of California, Berkley; Civil and Environmental Engineering

Chaaban, Farid, Ph.D., University of Liverpool; Electrical and Computer Engineering

Chedid, Riad, Ph.D., University of London; Electrical and Computer Engineering

Darwish, Marwan, Ph.D., Brunel University; Mechanical Engineering

El-Fadel, Mutasem, Ph.D., Stanford University; Civil and Environmental Engineering

Hamad, Bilal, Ph.D., University of Texas, Austin; Civil and Environmental Engineering

Inglessis, Constantine, M.S., Colorado State University; Civil and Environmental Engineering

Karaki, Sami, Ph.D., University of Manchester; Electrical and Computer Engineering

Kaysi, Isam, Ph.D., Massachusetts Institute of Technology; Civil and Environmental Engineering

Kayssi, Ayman, Ph.D., University of Michigan, Ann Arbor; Electrical and Computer Engineering

Kazzaz, Tarek, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design

Khoury, Shahwan, Ph.D., Carnegie Institute of Technology; Electrical and Computer Engineering

* Kuran, Albert, M.E., Yale University; Mechanical Engineering

Mabsout, Munir, Ph.D., University of Texas, Austin; Civil and Environmental Engineering

Mezher, Toufic, D.Sc., George Washington University; Engineering Management

Mrad, Fuad, Ph.D., Purdue University; Electrical and Computer Engineering

Musfy, Leila, MFA Design, Cranbrook Academy of Art; Architecture and Design

Nuwayhid, Rida, Ph.D., University of London; Mechanical Engineering

Rawas, Mohammad, Higher Diploma of Fine Arts, University of London; Architecture and Design

Saade, Jean, Ph.D., Syracuse University; Electrical and Computer Engineering

Sinno, Nabih, B.Arch., AUB; Architecture and Design

Yehia, Mounir, Ph.D., Moscow Power Engineering Institute; Electrical and Computer Engineering

Assistant Professors

El-Harithy, Howayda, PhD., Harvard University; Architecture and Design

Sadek, Salah, Ph.D., University of California, Berkley; Civil and Environmental Engineering

Visiting Assistant Professor

Abi-Fares, Huda, M.F.A., Yale University; Architecture and Design
Mashmoushy, Hisham, Ph.D., University of Birmingham; Mechanical Engineering
Salam, Rana, M.A., Royal College of Art; Architecture and Design

Senior Lecturers

p Abi-Said, Chafik, B.E., AUB; Mechanical Engineering
p Chahine, Hazem, Diploma, Loughborough College of Technology; Electrical and
      Computer Engineering
p Farhat, Khaldoun, Ph.D., Sheffield University; Electrical and Computer Engineering
p Ghannam, Jihad, Ph.D., South Dakota School of Mines and Technology; Civil and
      Environmental Engineering
p Haddad, Walid, M.Sc., Georgia Institute of Technology; Architecture and Design, and
      Civil and Environmental Engineering
p Jaber, Mohamed, Ph.D., University of Nottingham; Engineering Management
p Mayyasi, Adel, Ph.D., University of Oklahoma; Mechanical Engineering
p Mougharbil, Imad, Ph.D., Aix-Marseille University; Electrical and Computer Engineering
p Noueihed, Nazim, M.S., Mathematics, Hunter College; Associated Studies
p Tabet, Atef, M.Arch., Harvard University; Architecture and Design
p Trabulsi, Samir, M.E., M.B.A., AUB; Architecture and Design

Lecturers

p Abou Faraj, Ziad, Ph.D., Marquette University; Electrical and Computer Engineering
p Abu Ghali, Kamel, Ph.D., Kansas State University; Mechanical Engineering
p Alameddine, Hana, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and
      Design
p Amadouni, Zareh, M.Arch., McGill University; Architecture and Design
p Atweh, Mohammad, Ph.D., University of Maryland; Electrical and Computer Engineering
p Azar, Carol, Ph.D., Syracuse University; Mechanical Engineering
p Azar, Kamal, Ph.D., Massachusetts Institute of Technology; Associated Studies
p Bazzi, Youssef, Ph.D., Wayne State University; Electrical and Computer Engineering
p Chaar, Lana, Ph.D., University of Minnesota; Electrical and Computer Engineering
p Eid, Florence, M.A., University of California; Architecture and Design
p Fardoun, Farouk, Ph.D., Ecole Central de Lille; Mechanical Engineering
p Farhat, Nadia, MBA., Lebanese American University; Electrical and Computer
      Engineering
p Feghali, Antoine, Ph.D., Purdue University; Associated Studies
   Ghandour Marwan, M.S.Arch.B.D., Columbia University; Architecture and Design

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p Part-time.

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p Jabr, Abdul Halim, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design

Kasamani, Jihad, M.E., AUB; Mechanical Engineering

p Kassar, Abdul Nasser, Ph.D., University of Southwestern Louisiana; Associated.Studies

p Khatib, Ibrahim, Ph.D., University of California, Berkley; Civil and Environmental Engineering

p Khoury, Bassam, Ph.D., University of Florida; Engineering Management

p Khoury, Matilda, M.A., Architectural Association, The Open University; Architecture and Design

p Mohtar, Taan, M.S., University of Prague; Electrical and Computer Engineering

p Mouzannar, Bechara, Diplome, Institute Superior des Affaires; Architecture and Design

p Murkus, Sami, B. Arch., AUB; Architecture and Design

p Musfi, Karim, M.Arch., Colombia University; Architecture and Design

p Nader, Halim, B.E., AUB; Civil and Environmental Engineering

p Nader, Marc, Diplome, Ecole Superieur de Commerce de Paris; Architecture and Design

p Najm, Wajih, M.E., AUB; Mechanical Engineering

Nasri, Mohammad, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design

p Nazzal, Faten, Ph.D.; Rice University; Civil and Environmental Engineering

p Othman, Ziad, Ph.D., University of Florida; Electrical and Computer Engineering

p Ouayda, Nachaat, C.E.A.A., Ecole d'Architecture de Versailles; Architecture and Design

p Yamani, Hossam, Ph.D., Century University; Associated Studies

Instructors

p Abdul-Sater, Mohammad, B.E., AUB; Electrical and Computer Engineering

p Abdel-Samad, Rayane, M.E., AUB; Electrical and Computer Engineering

p Baladi, Victor, AA DIP., Architectural Association, London; Architecture and Design

p Barake, Taha, M.Sc., Virginia Tech.; Electrical and Computer Engineering

p Chebaro, May, B.Arch., AUB; Architecture and Design

p El-Hout, Nasser, B.Sc., Iowa State University; Electrical and Computer Engineering

p Ghaibeh, Lina, M.A., Texas Women's University; Architecture and Design

p Hakim, Saadi, Master, Rochester Institute of Photography; Architecture and Design

p Hayek, Pascale, M.E., AUB; Electrical and Computer Engineering

p Iliya, Ibrahim, M.S., Southern Illinois University at Edwardsville; Electrical and Computer Engineering

p Jaber, Ziad, B.E., AUB; Electrical and Computer Engineering

p Kanafani, Zaher, B.E., AUB; Electrical and Computer Engineering

p Karam, Helen, DES, Lebanese University; Architecture and Design

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p Part-time.

p Kassem, Abdallah, M.S., Ecole Polytechnic de Montreal; Electrical and Computer Engineering

p Kevorkian, Avedis, Diploma, Institute for Aerial Survey and Earth Sciences, Delft, Holland; Civil and Environmental Engineering

p Khattar, Nadim, AA Diploma, Architectural Association School, London, Architecture and Design

p Labban, Mazen, B.Arch., AUB; Architecture and Design.

p Majzoub, Mustafa, B.Arch., AUB; Mechanical Engineering

p Mehdi, Mahmoud, M.S., Marquette University; Electrical and Computer Engineering

p Mikati, Wajih, M.S., AUB; Associated Studies

p Moukhaiber, Nabil, License, Lyon University; Electrical and Computer Engineering

p Nahed, Eddy, B.E., AUB; Electrical and Computer Engineering

Assistant Instructors

p Abbas, Fadi, B.E., AUB; Mechanical Engineering

p Abu-Ayash, Zaher, B.Arch., AUB; Architecture and Design

p Awwad, Elie, B.E., AUB; Mechanical Engineering

p Bassil, Ziad, B.E., AUB; Associated Studies

p Daouk, Rania, B.G.D., AUB; Architecture and Design

p Daouk, Souraya, B.G.D., AUB; Architecture and Design

p Ghaddar, Zouheir, B.E., AUB; Mechanical engineering

p Hajj, Rahif, B.E., AUB; Associated Studies

p Kadri, Ziad, B.G.D., AUB; Architecture and Design

p Sharro, Karl, B. Arch., AUB; Architecture and Design

p Shoucair, Farid, B.Arch., AUB; Architecture and Design

p Sidani, Obeida, B.GD., AUB; Architecture and Design

p Yamak, Lana, B.Arch., AUB; Architecture and Design

Research Assistants

Hanna, Saba, B.E., AUB; Geographic Information Systems Laboratory

Associate

Acra, Aftim, M.P.H., University of North Carolina; Environmental Sciences

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GENERAL INFORMATION

Historical Background

As early as 1913, the University recognized the need for engineering education and training in the Arab East, and courses in this field were offered in the School of Arts and Sciences. By 1944, sufficient additional courses had been added to permit the granting of the degree of Bachelor of Science in Civil Engineering. The last class in this program graduated in June 1954. In 1951, a separate School of Engineering was established and curricula were initiated in civil engineering, mechanical engineering, electrical engineering and architectural engineering. The years from 1951 to 1954 were a transitional period of continuous development toward the new curricula, established in 1954. In 1963, a program leading to the degree of Bachelor of Architecture was introduced, replacing the Bachelor of Architectural Engineering program, the last class of which graduated in June 1966. In that year, the School was renamed the Faculty of Engineering and Architecture. Since then, curricula have been under constant review, with changes introduced as necessary to keep pace with modern technology, conform to sound developments in engineering and architecture education and meet the evolving needs of the region. In 1986, a new undergraduate major in Computer and Communications Engineering was added within the Electrical and Computer Engineering Department. In 1992, a new major in Graphic Design was added within the Architecture and Design Department.

The first programs leading to a Master's degree were introduced in 1962, and other programs have been added to help meet the growing demand for advanced engineering education. Between October 1990 and October 1994, six new Master's degree program were introduced in Engineering. These were: in 1990, the degree of Master of Engineering Management; between 1991 to 1993 four programs leading to the degree of Master of Engineering, with majors in Computer and Communications Engineering; Electric Power Engineering; Electronics, Devices and Systems, and Environmental and Water Resources Engineering; in 1994, the degree of Master of Mechanical Engineering (major, Applied Energy, or Materials and Manufacturing, or Thermal and Fluid Sciences); in 1998, the degree of Master of Urban Design and the degree of Master of Urban Planning.

Vision

The Faculty of Engineering and Architecture (FEA) will enhance its status as a world-class professional school that attracts eminently qualified faculty of international caliber and outstanding students from the region. The FEA will contribute to the development of Lebanon and the region by providing education of the highest quality, promoting basic and applied research of international standing by its faculty and students, and rendering educational and professional services.

Mission

The Faculty of Engineering and Architecture (FEA) is a leading professional school in the Middle East. Its mission is to offer American-style educational programs of the highest standard, to promote research, scholarly, and creative activities by its faculty and students, and to provide services to the community at large, with special consideration to the needs and circumstances of Lebanon and the region. The FEA prepares its students, in a challenging and intellectually stimulating environment that undergoes continuous improvement, for life-long learning, innovation, and leadership in their chosen careers and empowers them for a richer personal and professional life.

UNDERGRADUATE PROGRAMS

The Faculty of Engineering and Architecture offers programs of study leading to the degree of Bachelor of Architecture (B.Arch.), Bachelor of Graphic Design (B.G.D.), and the degree of Bachelor of Engineering (B.E.), with majors in Civil Engineering, Computer and Communications Engineering, Electrical Engineering, and Mechanical Engineering. The curriculum of the B.Arch. degree extends over 14 terms (ten 16-week semesters and four 8-week summer terms), totaling 192 weeks. Although the program is completed in five calendar years, it is equivalent to a program of six academic years that does not include summers. The curriculum of the B.E. degree and that of the B.G.D. degree is each divided into 11 terms (eight 16-week semesters and three 8-week summer terms), totaling 152 weeks. This duration is equivalent to five academic years, without summers, but the program is completed in four calendar years. Civil and Mechanical Engineering majors have the first two terms in common, while Computer and Communications and Electrical Engineering majors have the first three terms in common. There is a short break after each term and a one-month vacation between summer and fall terms.

The Faculty reserves the right to make such changes in the curriculum, course contents, and regulations as it may deem appropriate, and without prior notice.

ADMISSION TO FIRST YEAR

Admission is by selection of the most promising, eligible applicants. All candidates for admission to the Faculty of Engineering and Architecture must have completed the pre-professional educational requirements of the candidate's country and the approved Freshman program in the Faculty of Arts and Sciences of this University described in this catalogue, or a program recognized as equivalent. The certificates recognized for admission to the First Year in the Faculty of Engineering and Architecture are listed under Secondary Certificates in the section on "Admissions" in this catalogue. Holders of Baccalaureate Technique (BT) are eligible for admission only to the same major as that of the BT.

More specifically, to be eligible for admission to the First Year in the Faculty of Engineering and Architecture, a candidate must:

1. Demonstrate an acceptable level of proficiency in English, as specified under Admissions in this catalogue.

2. Sit for the required SAT I tests as specified in the relevant section on "Admissions" in this catalogue.

3. Satisfy the Faculty of Engineering and Architecture on personal as well as academic grounds.

Students admitted to the First Year are required to take all the major Engineering, Architecture, or Graphic Design courses specified in their respective programs.

ADMISSION TO ADVANCED STANDING

Since the Faculty of Engineering and Architecture offers a block program, admission to the Faculty is normally restricted to applicants to First Year Engineering, Architecture, or Graphic Design. However, in exceptional cases, an applicant may be eligible for consideration for admission to the Faculty, with an advanced standing status, to either Term III, or Term VI, in Engineering, Architecture, or Graphic Design, provided the following requirements are satisfied:

1. The applicant must have attended a reputable university and obtained a minimum cumulative general average of 3.0 out of 4.0, or its equivalent.

2. The applicant's high school record would have qualified him/her for admission to First Year Engineering, Architecture, or Graphic Design had he/she applied for admission to the Faculty at that time.

3. The applicant must satisfy the University admission requirements concerning English as specified under Admissions in this catalogue.

GRADUATION REQUIREMENTS

To be eligible for graduation with the B.E., B.Arch. or B.G.D. degree, a student must have:

1. Satisfied promotion requirements throughout the program.
2. Passed all the required courses and Approved Experience.
3. Attained a minimum cumulative major course average of 70 in Terms VI, VII, VIII, X, XI in Engineering, and the minimum averages stipulated under Architecture and Graphic Design.

4. Met the residence requirements.
5. Satisfied the Faculty as to the adequacy of the student's professional development and conduct.

Residence requirements

In order to meet the residence requirements of the Faculty of Engineering and Architecture, a student must:

1. Register in residence at the Faculty of Engineering and Architecture for Terms VI through XI for Engineering and Graphic Design students, or terms VI through XIV for Architecture students.

2. Complete at least 50 credits during the student's period of residence, to include the full program of the last two semesters for Engineering and Graphic Design students, or the last five terms for Architecture students.

Graduation with High Distinction

A student who has completed Terms VI through XI in the Engineering or Graphic Design majors, or Terms IX through XIV in Architecture, with an overall average in all courses, including repeated courses, of 90.00 or more, may be recommended by the Faculty for graduation with High Distinction.

Graduation with Distinction

A student who has completed Terms VI through XI in the Engineering or Graphic Design majors, or Terms IX through XIV in Architecture, with an overall average in all courses, including repeated courses, of 85.00 or more, may be recommended by the Faculty for graduation with Distinction.

Dean's Honor List

The list of requirements for a student to be placed on the Dean's Honor List can be found on page 89 of this catalogue.

SPECIAL STUDENTS NOT WORKING FOR A DEGREE

Students who plan to take courses as "Special Students Not Working for a degree" must submit their applications to the Office of the Registrar by the announced deadline and must meet the admission requirements stipulated in the Admissions to Advanced Standing section.

1. For the purpose of transferring credits to another university, applicants shall submit with their applications:

    i) An updated official transcript of academic record.
    ii) A letter from the applicant's university accepting the transfer of credits for specified courses to be taken at the FEA. The prerequisites for the required courses should be satisfied.

2. For the purpose of continuing education in the FEA, applicants must hold a degree from a reputable university. Such applicants shall submit with their applications:

    i) An updated official transcript of academic record.
    ii) A schedule of the courses to be taken. A maximum total of four courses are allowed, not including any required prerequisites.

The grades of final year courses, excluding any prerequisite courses taken by FEA graduates under the category "Special Students not working for a degree," may be included in the course average of the student's last two undergraduate years. If such students apply to the graduate program, they will have to go through the regular admissions procedure for graduate study.

ACADEMIC RULES AND REGULATIONS

The following rules and regulations apply to all the undergraduate programs of the Faculty, except for Sections D, E, and G, which are superseded for the Architecture and Graphic Design programs, by the appropriate regulations stipulated under the Department of Architecture and Design.

A. Grading System

All final course grades are expressed within the range 40-100, according to the following grading system:

90-100, Excellent	60-69, Weak
80-89, Good	Below 60, Failing
70-79, Fair	I, Incomplete
F, Fail	WF, Withdrew-Failed
X, No grade reported	P, Pass
W, Withdrew	

A WF is considered as 40 for averaging purposes.

B. Absences from Classes, Quizzes, Projects, and Final Examinations

1. A student who, for any reason, attends less than two-thirds of the lectures, design or laboratory sessions of a course, will receive a WF grade for that course.

2. Absences from quizzes will be handled exclusively by the instructor(s) concerned, who may, however, request the student to petition the Administrative Committee.

3. A student who has failed to submit a project or paper on time will automatically receive a grade of zero for that project or paper. The student may then petition directly the instructor(s) of the course within seven days from the date of submission of the project or paper. The instructor(s) of the course will then act on the petition. If no decision can be made on the petition by the time the grade is to be submitted, a grade of WF should be reported.

4. A student who has missed a final examination in a course, or has failed to submit a final project, will automatically receive a grade of WF for that course. The student may then petition the Administrative Committee within seven days from the date of the final examination or submission of the final project, stating the reasons for the absence or delay. If the Administrative Committee finds the excuse acceptable, it will inform the instructor concerned, who will replace the WF by an 'I' for the course. An 'I' in a course can only be given upon the approval of the Administrative Committee.

5. A student who is given an 'I' in a course must clear the 'I' within the first five weeks of the following term. A student registering for Approved Experience must clear the 'I' incurred during the previous Spring Term within the first five weeks of the following Fall Term.

6. A student who fails to clear an 'I' for a course on time will receive a grade of WF for that course.

C. Course Load

1. A student is not allowed to register for more than 21 credit hours in a Fall or a Spring Term, or for more than 10 credit hours in a Summer Term, and may not take more than two major courses from a higher term.

2. A student is allowed to take major courses over and above the regular full load of a term provided that the student's major course average in the preceding two terms is at least 80.

3. A student is not allowed to register for more than 3 credit hours of courses with Approved Experience.

4. A final year student is allowed to take additional electives as an overload in the Fall or Spring Term without reducing the regular load of the other term.

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D. Withdrawal From Courses

1. Selective withdrawal from any required course(s) is not permitted.

2. A student may petition the Administrative Committee to withdraw from the complete program of a given term not later than two weeks before the start of the reading period. Beyond this date, petitions will be considered for medical reasons only. If the petition is approved, the student will receive a W grade for the courses of that term.

3. A student who withdraws from a given term will not be allowed to take any courses in the Faculty during that term. If the student wishes to re-enroll in the Faculty at a later date, the student must petition the Administrative Committee. If allowed to re-enroll, the student must repeat the term from which he/she withdrew.

E. Evaluation of Academic Performance

Students are evaluated annually at the end of an evaluation period as follows:
For Terms I and II, at the end of Term II.
For Terms III, IV, and V, at the end of Term V.
For Terms VI, VII, and VIII, at the end of Term VIII.
For Terms IX, X, and XI, at the end of Term XI.

Evaluation of academic performance is based on the average of the major courses taken during the evaluation period. Major courses are all courses other than cultural and English courses. Courses of zero credit hours are not included in the evaluation.

Students admitted in the Spring Semester as special students, will be evaluated at the end of the following Summer Term based on any major non-engineering courses taken. If the grade average of these courses is less than 68, the student will be required to repeat all such courses in which a grade of less than 68 was obtained.

Students required to repeat Terms I and II, and who opt to take major non-engineering courses during the Summer Term, will have the grades of these courses included in the repeated evaluation period (Terms I and II).

1. Clear Promotion

A student is promoted clear to Term III, VI, or IX, if the student attains a major course average of 68 or more by the end of Term II, and 70 or more by the end of Term V or VIII, and does not have an outstanding failure.

2. Promotion on Probation

A student is promoted on probation under either of the following conditions:

i) If the student attains the average stipulated in Section E.1 and has failed in less than five credit hours per term, but in not more than a total of seven credit hours during the evaluation period.

ii) If the major course average is 67 or more but less than 68 by the end of Term II, or 69 or more but less than 70 by the end of Term V or VIII, without incurring any failure during the evaluation period.

3. Removal of Probation

i) In the case of probation due to course failure(s) as stipulated in Section E.2.a, probation will be removed at the time of evaluation if the failed course(s) have been successfully completed.

ii) In the case of probation due to a low average as stipulated in Section E.2.b, probation will be removed when the student attains the major course average required for clear promotion at the next evaluation and does not have any outstanding failure.

iii) In the case of probation due to repetition as stipulated in Section F.5 or due to re-admission after being dropped as stipulated in Section H.3.b, probation will be removed when the student attains the major course average required for clear promotion at the next evaluation and does not have any outstanding failure. If the student attains the major course average required for clear promotion at the next evaluation but with course failure(s) as stipulated in Section E.2.a, the student will be promoted on probation due to course failure(s).

F. Repetition

1. A student must repeat the terms of the evaluation period if, by the end of that period, the student:

i) has failed in five credit hours or more in a term or has failed in more than a total of seven credit hours during the evaluation period; or,

ii) has attained a major course average of less than 67 by the end of Term II, or less than 69 by the end of Term V or VIII, or less than 70 by the end of Term XI; or,

iii) has incurred a failure with a major course average of 67 or more but less than 68 by the end of Term II, or 69 or more but less than 70 by the end of Term V or VIII; or,

iv) has failed to remove a probation due to major course average. The student will then be required to repeat courses from the preceding two evaluation periods. Section F.2 applies to the two evaluation periods, except that the major courses that must be repeated from the first evaluation period are those in which the student had attained a grade of less than 70.

2. When repeating a term, a student will be exempted from repeating courses in which the student had attained a grade of:

   i) 60 or more in cultural and English courses.
   ii) 70 or more in major non-Engineering courses.
   iii) 75 or more in major Engineering courses.
   iv) 60 or more in all repeated courses relevant to the terms of the previous evaluation period(s).

3. When repeating the terms of an evaluation period, a student is not allowed to take more than two major courses from a higher term (one course during the Summer Term) provided that the total number of registered credit hours is not more than 16 in a Fall or a Spring Term, or not more than 8 in a Summer Term, or not more than the regular number of credit hours in that term.

4. When courses are repeated, the following shall apply:

   i) A failed course must be repeated when next offered during the following evaluation period.
   ii) The last grade in a repeated course is used in calculating averages.
   iii) In exceptional cases, when a course is repeated during the same evaluation period, both grades will be counted in the major course average. If the course is passed, the failure will not be counted in the failed number of credit hours.
   iv) Repetition for the purpose of improving a course grade is not permitted.

5. A student who is required to repeat the terms of the evaluation period is automatically placed on probation. The probation is considered to be due to major course average.

G. Fulfillment of English Requirements

1. In addition to the rules and regulations stipulated in Sections E.1 and E.2, a student cannot be promoted to Term VI unless the following English requirements are met:

   i) Pass or exemption from English 102.
   ii) A minimum grade of 70 in English 203 or exemption from the course.

2. If a student does not satisfy the English requirements stipulated in Section G.1, then to become eligible for promotion to Term VI, the student must register for the required English courses to satisfy the above-stated requirements.

3. A student, whose status becomes as stipulated in Section G.2, is not allowed to register for any Engineering courses from Term VI or beyond. The student may, however, register for cultural courses and/or Engineering courses that must be repeated from Terms I-V, provided the approval of the Department concerned is obtained.

H. Dropping From Faculty

1. A student is dropped from the Faculty for any of the following reasons:
    i) A major course is failed three times irrespective of the credits assigned to the course.
    ii) A major course average of less than 60 is attained at the time of evaluation.
    iii) If the student is not promoted after repeating the terms of the evaluation period.
    iv) If the student is not promoted after incurring repetitions of the terms of two evaluation periods.
    v) If the student is deemed unworthy by the Faculty to continue for professional or ethical reasons.

2. A dropped student is not allowed to re-enroll in the Faculty if:
    i) The student has attained a course average below 60.
    ii) The student had been dropped before.

3. Re-enrollment
    i) To be eligible to apply for re-enrollment, a student who had been dropped from the Faculty should take, in a maximum period of one year, a minimum of 12 credit hours of new, approved courses and should attain a minimum average in these courses of 70 at AUB, or its equivalent from other institutions, with no failures. The approved courses are in Mathematics, Physics, and Chemistry, or other courses approved by the Department concerned.

    ii) If the dropped student is re-admitted to the Faculty, the student will be placed on probation and will have to repeat all the courses of the evaluation period from which he/she was dropped.

I. Change of Major Within the Faculty

1. All changes of major are subject to approval by the Department to which the change is requested.

2. Changes of major for Term III apply only for changes between CVEV and MCEG, or CCE and EE.

3. Other changes of major, if approved, will place the student in Term I of the new major. In this case admission requirements to Term I of the new major will have to be satisfied.

GRADUATE PROGRAMS

The Faculty of Engineering and Architecture offers graduate programs of study leading to the degree of Master of Engineering (M.E.), with majors in Civil Engineering; Computer and Communications Engineering; Environmental and Water Resources Engineering; Electronics, Devices and Systems; Electric Power Engineering; and Mechanical Engineering; the degree of Master of Engineering Management (M.E.M.); and the degree of Master of Mechanical Engineering, with majors in Applied Energy, or Materials and Manufacturing, or Thermal and Fluid Sciences. In 1998, the degree of Master of Urban Design (MUD) and the degree of Master of Urban Planning (MUP) were offered.

The requirements for the Master's degrees in the Faculty are those specified for the Master's degree in the chapter on Graduate Study in this catalogue, with the following interpretations and additions:

ADMISSION

1. The average used for admission purposes is the course grade average of the student's last two undergraduate years.

2. A student with an average of 77 or more, but less than 80, may be accepted on probation.

3. Prospective Graduate students, as described in the section on Graduate Study in the Catalogue, are only admitted to the Master of Engineering Management and to the Master of Urban Planning Program, subject to the conditions stipulated for these programs.

4. Students whose highest degree is a Bachelor's degree earned after the completion of a three year program beyond the Lebanese Baccalaureate or its equivalent, as recognized by the University, are not eligible to join any of the Engineering graduate programs.

ACADEMIC EVALUATION

1. A student admitted on probation must register for and complete a minimum of six graduate credit hours in his/her first term in which he/she starts to take graduate courses and must attain an average of 80 in the work of that term. If the student fails to attain the average of 80, the student will be dropped from the graduate program. The first term is the term in which the student registers for graduate courses.

2. A student is placed on probation if he/she attains a cumulative average of 70 or more, but less than 80. This probation must be removed at the end of the following term by

attainment of a cumulative average of at least 80. If the student fails to remove the probation, the student will be dropped from the graduate program.

3. A student is dropped from the graduate program if he/she attains a cumulative average of 70 or more, but less than 80, in any term and fails one course in that term. (This rule does not apply to the first term of study.)

4. A student is dropped from the graduate program if he/she attains a cumulative average of less than 70 or fails two courses in one term.

5. A student who accumulates two consecutive failures in the Seminar Course will be dropped from the Faculty.

6. A student dropped from a graduate program will not be allowed to re-enroll in the same program at any future date.

REGULATIONS FOR GRADUATE STUDENTS TAKING UNDER-GRADUATE COURSES

1. Graduate students required to take undergraduate courses must obtain a grade of at least 70 in each undergraduate course taken.

2. If a student fails to obtain a grade of 70 in any of these undergraduate courses, the student is allowed to repeat that course only once.

3. Failure to meet the above stipulated requirements will result in the student being dropped from the graduate program.

ENGLISH REQUIREMENTS

1. Applicants to the graduate programs, other than AUB graduates, must sit for the English Entrance Examination (EEE) or TOEFL.

2. Applicants required to sit for the EEE must score a minimum of 500 in order to be admitted to the graduate programs. Those scoring a minimum of 550, or its equivalent, will be admitted without any further English requirements, while those scoring in the range 500-549, inclusive, must take the English Placement Test. Applicants placed in English 101 or English 102 will lose their acceptance. Applicants placed in English 203 must obtain a minimum grade of 70 in this course at the end of the first semester of their enrollment in the graduate program, otherwise they will be dropped from the graduate program.

GRADUATION REQUIREMENTS

To be eligible for graduation with a Master's degree from the Faculty of Engineering and Architecture, a graduate student must have:

1. Satisfied promotion requirements throughout the program.
2. Completed a minimum of 24 credit hours of course work.
3. Completed thesis requirements for Engineering, or project requirements for Engineering Management, as appropriate.
4. Met the residence requirements specified for the Master's degree in the chapter on Graduate Study in this catalogue.

CURRICULA AND COURSES

The curricula and courses offered in each department are presented in detail below. In addition to these courses, two Computer Literacy courses, equivalent to 1 credit each, are offered in the Fall and Spring Terms to students of Terms I and II.

All courses offered by a department have the initials of that department or program as prefixes to the course number. Shop courses have the prefix SHOP, and non-departmental courses are designated as Associated Studies with the prefix ASST. Shop and Associated Studies courses are described separately near the end of this chapter, before the section on the Engineering Management Program.

In the Engineering departments, the first two digits of the three-digit number indicate the term and the final digit indicates the course sequence. In the Department of Architecture and Design the first digit indicates the year, the second digit the sequence and the third digit the course in the sequence.

COURSES OPEN TO STUDENTS FROM OTHER FACULTIES

1. Students of other Faculties and DEP are allowed to take for credit the courses listed below that are offered by the Faculty, provided space is available, prerequisites are satisfied, and they have prior approval of their Faculty or Division and the Department offering the course.

2. Except for the courses on the history of art and architecture, first-year courses are not open to students from outside the Faculty.

3. It is normally possible to accommodate students of other Faculties who may have to take a course not mentioned in the list below in order to meet requirements for graduation at the end of the semester in which the course is offered. Such students

must petition the Academic Committee of the Faculty and attach a note from the advisor concerned testifying to the need to take the course for graduation purposes.

Course Number	Course Name	Credit Hours	Term Offered	Prerequisite
ARCH 121	History of Art and Architecture I	4	Fall	None
ARCH 122	History of Art and Architecture II	4	Spring	None
ARCH 223	History of Art and Architecture III	4	Fall	None
ARCH 224	History of Art and Architecture IV	4	Spring	None
ARCH 331	Urbanism	3	Spring	None
ASST110	Technology and Society	3	Fall/Spring	None
ASST509	Computer-Based Instruction	3	Fall	None
ASST510	Advanced Computer-Based Instruction	3	Fall	ASST 509
CVEV037	Surveying and Photogrammetry	4	Summer	None
CVEV055	Fluid Mechanics	3	Spring	None
CVEV064	Engineering Geology	3	Summer	None
CVEV084	Soil Mechanics	3	Spring	None
GRDS131	Drawing I	3	Fall	None
GRDS132	Drawing II	3	Spring	GRDS131
GRDS251	Photography I	3	Spring	None
GRDS335	Etching	3	Fall	None
GRDS336	Silk-Screen printing techniques	3	Spring	None
MCEG051	Physics of Energy Conversion	3	Spring	Math 201, Physics 211
ENMG075	Engineering Economy	3	Fall/Spring	None
ENMG105	Engineering Management I	3	Fall	None
ENMG115	Engineering Management II	3	Spring	None

* These elective courses may be offered in the Fall or Spring Terms depending on student interest and faculty teaching assignments.

DEPARTMENT OF ARCHITECTURE AND DESIGN

Chairperson:	Abed, J.
Associate Professors:	Abed, J.; Kazzaz, T.; Musfy, L.; Rawas, M.; Sinno, N.
Visiting Associate Professor:	Somma, P.
Assistant Professor:	Al-Harithy, H.
Visiting Assistant Professor:	Abi-Fares, H.
Senior Lecturers:	Haddad, W.; Tabet, A.; Trabulsi, S.
Lecturers:	Alameddine, H.; Amadouni, Z.; Ghandour, M.; Jabr, A.H.; Khoury, M.; Murkus, S.; Musfy, K.; Muzannar, B.; Nader, M.; Nasri, M.; Ouayda, N.; Sayegh, S.; Srage, N.; Stevenson, G.
Instructors:	Baladi, V.; Choueiry, H.; El-Charif, D.; El-Hakim, S.; Fawwaz, M.; Ghaibeh, L.; Halabi, B.; Harb-Kak, M.; Kanj, W.; Karam, H.; Khattar, N.; Labban, M.; Mchaourab, D.; Shebaro, M.
Assistant Instructors:	Abillama, R.; Abu Ayyash, Z; Beydoun, M.; Bouyadjian, R.; Daouk, R.; Daouk, S.; Fawwaz, D.; Kadri, Z.; Lazkani, S.; Sharro, K.; Shoucair, F.; Sidani, O.; Yamak Yared, L.; Zahlan, I.; Zahr, M.

The Department of Architecture and Design offers undergraduate programs in Architecture and in Graphic Design and graduate programs in Urban Design and in Urban Planning.

ACADEMIC RULES AND REGULATIONS OF THE DEPARTMENT OF ARCHITECTURE AND DESIGN

A. Evaluation of Academic Performance

Students are evaluated at the end of every Spring semester (the evaluation period includes Fall and Spring semesters and any preceding Summer term). Evaluation of academic performance is based on the average of all courses taken during evaluation period.

1. Promotion

In order to qualify for clear promotion, a student must maintain a minimum average of 70 calculated over all courses taken during the evaluation period.

2. Promotion on Probation

A student is promoted on probation if, by the end of the period of evaluation, the student attains a minimum course average of 70 as stipulated in section A.1 and has not failed more than 1 course per term.

3. Removal of Probation

Probation is removed when the student repeats and passes the failed course(s) stipulated in section A.2.

B. Repetition

1. A student must repeat the terms of the evaluation period if, by the end of that period, the student:
   a) has failed to attain a minimum average of 70 for all courses taken during the evaluation period, or
   b) has failed in more than 5 credit hours in a term, or
   c) has failed in more than a total of 8 credit hours during the evaluation period.
2. When repeating a period of evaluation, a student will be exempted from repeating the courses in which the student has earned a grade of 72 or more.
3. When courses are repeated, the following shall apply:
   a) A failed course must be repeated when next offered.
   b) Not more than 3 credits may be taken with approved experience.
   c) The last grade in a repeated course is used for the purpose of averaging.
   d) Repetition for the purpose of improving a course grade is not permitted.

C. Dropping From Faculty

1. A student is dropped from the Faculty for any of the following reasons:
   i) A course is failed three times.
   ii) An average of less than 60 is attained at the time of evaluation.
   iii) If the student is not promoted after repeating the period of evaluation.
   iv) If the student is deemed unworthy by the Faculty to continue for professional or ethical reasons.
2. A dropped student is not allowed to re-enroll in the Faculty if:
   i) The student has attained a course average below 60.
   ii) The student has been dropped before.
3. Re-enrollment
   i) Under exceptional circumstances, the student may be allowed to re-enroll after a lapse of one year, during which the student has to undergo remedial measures specified by the Department.
   ii) If the dropped student is re-admitted to the same program, the student must repeat all the required courses of the evaluation period from which he/she was dropped, irrespective of the grade previously obtained in any course of the evaluation period.

In all other respects, students of Architecture and Design are subject to the applicable regulations of the Faculty of Engineering and Architecture.

ARCHITECTURE

Program Description

The program in Architecture is comprised of a total of 183 credit hours normally taken over fourteen terms within five calendar years. A student is listed under the class in which the major design course is taken. The degree requirements consist of the following:

1. 147 credit hours of mandatory core program with most courses offered annually. These courses represent the basic structure of the Architecture program, which include the major architectural design studio courses and the essential theoretical and technical requirements.

2. 9 credit hours of approved FEA electives in the areas of presentation techniques, history, theory and method.

3. 9 credit hours of approved FEA electives in the areas of professional applications and techniques, engineering and practice.

4. 9 credit hours of approved FAS electives in the areas of humanities and social sciences.

5. 9 credit hours of FEA or FAS electives in any area chosen in consultation with the academic advisor.

CURRICULUM FOR THE DEGREE OF BACHELOR OF ARCHITECTURE

FIRST YEAR
Term I (Fall) Credit Hours
ASST 010 Computer Literacy I   0
ARCH 100 Basic Design   4
ARCH 111 Technical Drawing   4
ARCH 121 History of Architecture I   4
ARCH 151 Statics and Mechanics of Solid   4
English as required   3 (5)
                                           19 (21)

Term II (Spring)
ASST 020 Computer Literacy II   0
ARCH 101 Architecture Design I   7
ARCH 112 Descriptive Drawing   3
ARCH 122 History of Art & Architecture II 4
ARCH 152 Analysis & Design of Structures I 4
                                           18

SECOND YEAR

Term III (Summer)
ARCH 241 Surveying Regional Architecture 9

Term IV (Fall)
ARCH 202 Architecture Design II   7
ARCH 223 History of Art & Architecture III 4
ARCH 242 Building Construction I   3
ARCH 253 Analysis & Design of Structures II 4
                                           18

Term V (Spring)
ARCH 203 Architecture Design III   7
ARCH 224 History of Art & Architecture IV 4
ARCH 243 Building Construction II   3
ARCH 261 Building Services I   3
                                           17

THIRD YEAR

Term VI (Summer)
ARCH 313 Computer Aided Design   3
ARCH 373 Training in CAD   3
                                           6

Term VII (Fall)
ARCH 304 or A406 Vertical Design Studio   7
ARCH 325 Contemporary Architecture   3
ARCH 332 Architecture Programming   3
ARCH 362 Building Services II   3
                                           16

Term VIII (Spring)

ARCH 305 or A407 Vertical Design Studio	7
ARCH 331 Urbanism	3
2 Electives (Architecture or Associated)	6
	16

FOURTH YEAR

Term IX (Summer)

ARCH 444 Construction Documents	3
ARCH 474 Training in Execution Drawings	3
	6

Term X (Fall)

ARCH 406 or ARCH 304 Vertical Design Studio	7
3 Electives	9
	16

Term XI (Spring)

ARCH 407 or ARCH 305 Vertical Design Studio	7
3 Electives	9
	16

FIFTH YEAR

Term XII (Summer)

ARCH 575 Approved Experience	0

Term XIII (Fall)

ARCH 508 Final Project Design & Research I	7
2 Electives	6
	13

Term XIV (Spring)

ARCH 509 Final Project Design & Research II	7
2 Electives	6
	13

COURSE DESCRIPTIONS

MANDATORY CORE PROGRAM

Each of the following courses is required for the degree in Architecture. Students should pay careful attention to the prerequisite structure, which must be observed. Non-majors must secure the approval of the Department and the instructor concerned in order to enroll in any of the courses listed below.

ARCH 100 Basic Design. 4 cr.; annually. The central aim of the studio is to understand and develop a sensibility in the translation of thought into design. The intuitiveness and artistic temperament of the design student must balance the intellect in valid visual statements. M. Rawas & K. Musfy and other faculty members.

ARCH 101 Architecture Design I. 7 cr.; annually. Prerequisite: ARCH100. Design studio developing analytical and technical skills to perceive, understand and manipulate spatial definition and relationships. M. Ghandour & M. Labban.

ARCH 111 Technical Drawing. 4 cr.; annually. A course in descriptive geometry and graphic communication. Students learn techniques of representation of 3d form and space on 2d surface including orthogonal, paraline, oblique and perspective projections. Applications cover intersections of forms and surface and construction of shades and shadows. M. Nasri & M. Shebaro.

ARCH 112 Descriptive Drawing. 3 cr.; annually. Freehand drawing with application of perspectives and architectural rendering in different media. S. Murkus.

ARCH 121 History of Art and Architecture I. 4 cr.; annually. A survey and analysis of architecture, art and the evolution of the city in Antiquity. M. Ghandour & L. Yamak-Yared.

ARCH 122 History of Art and Architecture II. 4 cr.; annually. Prerequisite: ARCH121 A survey and analysis of architecture, art and the evolution of the city from the fourth to the fourteenth century. H. Al-Harithy.

ARCH 151 Statics and Mechanics of Solids. 4 cr.; annually. Introduction to the mathematical description of structural behavior, with emphasis on graphical analysis, and an introduction to structural properties of various materials. W. Haddad.

ARCH 152 Analysis and Design of Structures I. 4 cr.; Prerequisite: ARCH151 annually. Introduction to the physical properties of various materials used in construction: timber, steel, and aluminum. Behavior and analysis of the basic structural elements under various loads. W. Haddad.

ARCH 202 Architecture Design II. 7 cr.; annually. Prerequisite: ARCH101. Design studio emphasizing construction materials as a major design determinant, manipulation of architectural elements and space, while observing freehand and technical representation. H. Al-Harithy & V. Baladi.

ARCH 203 Architecture Design III. 7 cr.; annually. Prerequisite: ARCH202. Design studio that investigates major parameters shaping design through experimental exercises and conclusive short projects. J. Abed & V. Baladi.

ARCH 223 History of Art and Architecture III. 4 cr.; annually. Prerequisite: ARCH122. A survey and analysis of architecture, art and the evolution of the city from the fifteenth to the mid-eighteenth century. J. Abed.

ARCH 224 History of Art and Architecture IV. 4 cr.; annually. Prerequisite: ARCH223. A survey and analysis of architecture, art and the evolution of the city from the mid-eighteenth century to the beginning of the World War II. J. Abed.

ARCH 241 Surveying Regional Architecture. 9 cr.; annually. Descriptive analysis of the factors contributing to the distinctive aspects of indigenous architecture of the region. Research, field surveys and documentation of architecture of the region. Students learn plane surveying, topographic mapping and route surveying.

ARCH 242 Building Construction I. 3 cr.; annually. Introduction to the behavioral properties of building materials. Fundamentals of stone, timber and steel construction. N. Sinno.

ARCH 243 Building Construction II. 3 cr.; annually. Prerequisite: ARCH242. Concrete construction and recent building technologies. A review of the components needed to complete a building with a stress on all aspects of finishing work and material. N. Sinno.

ARCH 253 Analysis and Design of Structures II. 4 cr.; annually. Prerequisite: ARCH152 Basic Principles of Structural Design applied within the generic constraints of common structural systems and construction materials. Emphasis on concrete structural systems. W. Haddad.

ARCH 261 Building Services I. 3 cr.; annually. Fundamentals of sanitary engineering, water supply and drainage, water purification, sewage treatment and refuse disposal. Introduction to the different systems of heating, ventilation and air conditioning. S. Trabulsi.

ARCH 304 Vertical Design Studio I. 7 cr.; Alternate years. Prerequisite: ARCH203. Several thematic design studios are posted at the beginning of the Fall Semester. Third and fourth year architecture students should select one of the offered studios. Fall 1998-99 studio titles: "Building in the Old City of Aleppo" (M. Ghandour & M. Labban); "Community Hospital" (S. Murkus & N. Ouayda); "High Profile: Exercises for the Design of High-rise Buildings in Beirut" (Z. Amaduni & T. Kazzaz).

ARCH 305 Vertical Design Studio II. 7 cr.; Alternate years. Prerequisite: ARCH203. Several thematic design studios are posted at the beginning of the Spring Semester. Third and fourth year architecture students should select one of the offered studios. Spring 1997-98 studios titles: "Museum" (J. Abed & V. Baladi); "Building for the Public" (H. Alammeddine & M. Ghandour); "Verdun Street Centers" (T. Kazzaz & A. Tabet); "Process, Product and by-product" (M. Lozanovska & K. Musfy).

ARCH 313 Computer Aided Design. 3 cr.; annually. Introduction to the implementation of computers in architecture. Students are provided with digital tools for architectural drafting and project management that can be applied in design courses and which can later be developed in a professional architectural office. M. Nasri.

ARCH 325 Contemporary Architecture. 3 cr.; annually. Prerequisite: ARCH224. A course in which students are exposed to the new architecture language of the end of the century. Lectures include discussions of leading architects' visions and their works. K. Musfy.

ARCH 331 Urbanism. 3 cr.; annually. Prerequisite ARCH224. Basic principles of contemporary urbanism. Special attention will be paid to the relationships among forces acting upon the city, critical and descriptive theories of urbanism, and contemporary approaches to urban design. J. Biln.

ARCH 332 Architecture Programming. 3 cr.; annually. Introduction to program analysis and preparation, including final topic selection by each student. N. Sinno.

ARCH 362 Building Services II. 3 cr.; annually. Introduction to principles of electrical technology, lighting fundamentals and design, electrical distribution in buildings and electrical equipment and materials. H. Shaheen.

ARCH 373 Training in CAD. 3 cr.; annually. Students spend periods of time at offices in which they work on CAD applications. Reports on work completed are evaluated for level of involvement and quality of achievement.

ARCH 406 Vertical Design Studio III. 7 cr.; Alternate years. Prerequisite: ARCH203. Several thematic design studios are posted at the beginning of the Fall Semester. Third and fourth year architecture students should select one of the offered studios. Fall 1998-99 studio titles: "Building in the Old City of Aleppo" (M. Ghandour & M. Labban); "Community Hospital" (S. Murkus & N. Ouayda); "High Profile: Exercises for the Design of High-rise Buildings in Beirut" (Z. Amadouni & T. Kazzaz).

ARCH 407 Vertical Design Studio IV. 7 cr.; Alternate years. Prerequisite: ARCH203. Several thematic design studios are posted at the beginning of the Spring Semester. Third and fourth year architecture students should select one of the offered studios. Spring 1997-98 studios titles: "Museum" (J. Abed & V. Baladi); "Building for the Public" (H. Alammeddine & M. Ghandour); "Verdun Street Centers" (T. Kazzaz & A. Tabet); "Process, Product and by-product" (M. Lozanovska & K. Musfy).

ARCH 444 Construction Documents. 6 cr.; annually. Prerequisites: ARCH243. A course on the methods, contents, and presentation of professional construction documents including: execution drawings, bills of quantity and specifications files. A.H. Jabr & S. Murkus & N. Ouayda.

ARCH 474 Training in Execution Drawings. 3 cr.; annually. Professional training in architecture offices where students develop their knowledge of execution drawings.

ARCH 508 Final Project Design and Research I. 7cr.; annually. Prerequisite: Four Vertical Design Studios. Conceived within a research-oriented studio/workshop model, students are expected to critically explore architectural issues of personal interest and of general importance to the discipline and present their findings in a research report and preliminary design proposal.

ARCH 509 Final Project Design and Research II. 7cr.; annually. Prerequisite: ARCH508. The course is the culmination of the design studio where students are expected to integrate and synthesize the acquired knowledge and skills and develop both the theoretical/critical and practical components of their research and design project proposed in course ARCH508.

ARCH 575 Approved Experience. 0cr.; annually. An eight week professional training at an Architecture design office, students submit a detailed report of work done.

ARCHITECTURE ELECTIVES

The elective courses for the Architecture Program offered in the Department of Architecture and Design fall in six categories: Presentation Skills, History, Theory and Method, professional applications and techniques, Engineering, and Practice. Electives are chosen under the guidance and advice of the assigned advisor and in accordance with the load distribution mentioned earlier under program description. The following list of courses is subject to change as new electives are introduced every year.

1. Presentation Skills

ARCH 10V Painting and Life Drawing. 3 cr.; alternate years. A sequence of media experimentation in painting to develop skills and light perception. N. Sinno.

ARCH 011 Digital Design and Representation Tools. 3 cr.; alternate years. Prerequisite: A313. Within a general framework of addressing the relationship between design and representation as a whole, this workshop explores the role of the computer in articulating design ideas, developing conceptual approaches, and interactively representing design proposals. M. Nasri.

GRDS 082p Arabesque. 3 cr. Refer to Graphic Design Program.

GRDS 251 Photography I. 3 cr. Refer to Graphic Design Program.

GRDS 335 Etching. 3 cr. Refer to Graphic Design Program.

GRDS 336 Silkscreen. 3 cr. Refer to Graphic Design Program.

2. History

ARCH 020 Art & Architecture of the Muslim World. 3 cr.; The course addresses art and architecture of the Muslim world as a cultural product. It, therefore, adopts a thematic approach to the study of history and focuses on a particular period each time the course is offered; Ottoman Turkey, Mamluk Egypt, Nasirid Spain etc. H. Al-Harithy.

ARCH 81C In the Shadow of the Machine. 3 cr.; alternate years. An investigation of the new parameters, paradigms, and attitudes of industrialization that affected the discipline of architecture as a result of the industrial revolution. T. Kazzaz.

ARCH 88C Writing in the Margins. 3 cr.; alternate years. A historical and critical survey of architectural movements and architects between WW2 and the 80's that have shaped the modern discourses in architectural production. J. Abed.

ARCH 84P The Architecture of the High-Rise. 3 cr.; alternate years. It is a professional seminar that studies the typology of high rise building. In so doing it focuses on the aspects of program, design and construction. T. Kazzaz.

ARCH 085 The Major Housing Schemes of Modern Architecture in the 20th Century. 3 cr.; alternate years. A theoretical investigation of the activity of housing in its basic human and societal dimension with the professional analysis of major schemes developed in the 20th Century. T. Kazzaz.

3. Theory & Method

ARCH 25C Aesthetics and Theory of Form and Procedure in 20th Century Art. 3 cr.; alternate years. Study of the developments in techniques and procedure in the field of visual communication in the 20th century, with emphasis on Collage, Assemblage, and Photomontage. T. Kazzaz.

ARCH 032 Theories of Meaning in Architecture: The Semiotic Perspective. 3 cr.; alternate years. This seminar aims at presenting theories of meaning in art and architecture in general and at engaging the students in a debate on the semiotics of architecture in particular. H. Al-Harithy.

ARCH 80C A Critical Investigation of Contemporary Architecture: The Postmodern Condition. 3 cr.; alternate years. Investigation of postmodernity as a cultural condition and the tying of its components to contemporary architectural production. T. Kazzaz.

ARCH 82C Recent Discourse in Architecture. 3 cr.; alternate years. Examination of recent architectural discourse in a broad context. Attention will be paid to relationships among critical theory, cultural criticism, and theories of architecture. It will conclude with a discussion of the problems of defining and accounting for the "objects" and "artifacts" of architecture. J. Biln.

ARCH 83C Ornament. 3 cr.; alternate years. Disjunctive discourse between culture/architecture, technology/tradition, surface/form, permanence /transience, transcendence/materially, symbolism/practice, production/stagnation/consumption intersect at the site of ornament. M. Lozanovska.

ARCH 84C Museology. 3 cr.; alternate years. A cultural seminar that aims at investigating the different museological movements and trends in contemporary culture. Museology is defined as the result of the interaction between the different forces that act in the making of the museum. T. Kazzaz.

ARCH 85C ..on Art. 3 cr.; alternate years. Study of the Visual Arts as an historically persistent form of human production. It does not discuss the Isms but rather the theory/ies that promote them. It is on the nature, use, meaning of the Visual Arts with emphasis on contemporary cultural concerns. M. Ghandour.

ARCH 87C The Body in/of Architecture. 3 cr.; alternate years. Exploration of a contemporary claim that there is a return by the body, as referent and figurative inspiration, in architectural production, both in design and theory practices. M. Lozanovska.

ARCH 89C Architecture and The Modern Project in the Non-Western World. 3cr.; alternate years. The establishment of a critical and theoretical framework delineated by the terms *modernity*, *modernization*, and *modernism* as distinct from each other and as they apply to the production of architecture in the post-colonial world. J. Abed.

4. Professional applications and techniques

ARCH 40T Building Systems. 3 cr.; alternate years. Prerequisite: ARCH243. In-depth examination of the principles, practices, and available technologies related to

prefabricated elements of construction. Emphasis on considerations of cost and available skills and materials.

ARCH 41T Technology in Building Design. 3 cr.; alternate years. Focusing on formal expression through the use and application of new technologies in building design and on the relationship to the problem of emerging identity in countries of the world today.

URPL641 GIS Technology. 3 cr.; Refer to MUP/MUD Programs.

5. Engineering

CVEV 109 Construction Management. 3 cr. Refer to CEE department.

CVEV 115 Specifications and Cost Estimation. 3 cr. Refer to CEE department.

ENMG 075 Engineering Economy. 3 cr. Refer to Engineering Management Program.

6. Practice

ARCH 061 Interior/Exterior. 3 cr.; alternate years. A course that will cover the historical background and the principles of landscape and interior architecture combined with design exercises and investigation of special topics. N. Sinno.

ARCH 063 Building Law. 3cr; alternate years. A study of the laws and codes that concern the built environment with an emphasis on the Lebanese Building Law.

ARCH 065 Architecture of Practice. 3cr; alternate years. This course is concerned with the process of architectural practice to investigate possible readings of the built environment. It aims at reconsidering preconceptions, images, and representations about buildings and their makers. M. Ghandour.

ARCH 82P Designing Experiences. 3 cr.; alternate years. A theory seminar combined with a design workshop in which selected theories of meaning, reception and architecture experience are discussed and experimented in design. T. Kazzaz.

ARCH 98P Exhibit Architecture. 3 cr.; alternate years. Trade shows, public space displays, museums, event exhibits, and in depth knowledge of graphics and signage in the built environment are investigated in assignments and design problems.

GRAPHIC DESIGN

PROGRAM DESCRIPTION

The program in Graphic Design is comprised of a total of 141 credit hours normally taken over eleven terms within four calendar years. A student is listed under the class in which the major design course is taken. The degree requirements consist of the following:

1. 117 credit hours of mandatory core program with most courses offered annually. These courses represent the basic structure of the Graphic Design program, which include the major graphic design studio courses and the essential theoretical and technical requirements.
2. 6 credit hours of approved FEA electives in the areas of history, theory and method.
3. 6 credit hours of approved FEA electives in the areas of presentation skills, media.
4. 6 credit hours of approved FAS electives in the areas of Humanities, Social Sciences, Business.
5. 6 credit hours of FEA or FAS electives in any area chosen in consultation with the academic advisor.

CURRICULUM FOR THE DEGREE OF BACHELOR OF GRAPHIC DESIGN

FIRST YEAR	Credit hours
Term I (Fall)	
ASST 010 Computer Literacy I	0
ARCH 100 Basic Design	4
GRDS 111 Drawing	4
ARCH 121 History of Art and Architecture I	4
GRDS 131 Color I	3
English as required	3 (5)
	18 (20)
Term II (Spring)	
ASST 020 Computer Literacy II	0
GRDS 101 Graphic Design I	6
ARCH 122 History of Art and Architecture II	4
GRDS 132 Color II	3
GRDS 141 Photography	4
	17
SECOND YEAR	
Term III (Summer)	
GRDS 212 Computer Graphics I	4
GRDS 242 Illustration	3
	7
Term IV (Fall)	
GRDS 202 Graphic Design II	6
ARCH 223 History of Art & Architecture III	4
GRDS 233 Typography	4
GRDS 243 Etching	3
	17
Term V (Spring)	
GRDS 203 Graphic Design III	6
GRDS 213 Computer Graphics II	4
ARCH 224 History of Art & Architecture IV	4
GRDS 244 Silkscreen Printing	3
	17

	Credit hours
THIRD YEAR	
Term VI (Summer)	
GRDS 314 Production & Paste-up	3
GRDS 351 Training in Production	3
	6
Term VII (Fall)	
GRDS 304 Graphic Design IV	6
GRDS 334 Advertising Design	3
2 Electives	6
	15
Term VIII (Spring)	
GRDS 305 Graphic Design V	6
GRDS 352 Professional Practice	3
2 Electives	6
	15
FOURTH YEAR	
Term IX (Summer)	
GRDS 453 Approved Experience	0
Term X (Fall)	
GRDS 406 Graphic Design VI	6
GRDS 435 Senior Research	3
2 Electives	6
	15
Term XI (Spring)	
GRDS 407 Senior Study	8
2 Electives	6
	14

COURSE DESCRIPTIONS

MANDATORY CORE COURSES

GRDS 101 Graphic Design I. 6 cr.; annually. Experimentation in design processes. An understanding of the medium of design through the concept, skills, tools and the essential elements involved in developing a design piece through drawing.

GRDS 111 Drawing. 4 cr.; annually. Free hand drawing with emphasis on skills development in perceiving ratios and proportions as well as manual rendering techniques. Course covers still life and life drawing, along with basics in perspective drawing.

GRDS 131 Color I. 3 cr.; annually. Analysis of the dynamic interaction of color and its implications for designers and artists. The physics of color, colored light, colored pigments and the color wheel. The study of Johannes Itten's color theory. M. Rawas.

GRDS 132 Color II. 3 cr.; annually. Prerequisite: GRDS 131. A contiunation of Johannes Itten's color theory. The study of Albert Munsell's color solid, the psychology of color and application of color relations to different design fields. M. Rawas.

GRDS 141 Photography. 4 cr.; annually. A combination of technical information such as darkroom, lighting and camera techniques that are applied through assignements that lead to proper reproduction of material and surfaces into photographic prints. M. Nader

GRDS 202 Graphic Design II. 6 cr.; annually. Prerequisite: GRDS 101. Symbolic communication. This studio focuses on the investigation of corporate identity through the study of logo, symbol design and their basic applications using various illustration techniques and typography.

GRDS 203 Graphic Design III. 6 cr.; annually. Prerequisite: GRDS 202. This studio is a further and an in depth investigation of corporate identity with applications such as direct contact design [posters, menus, covers etc..] using illustration and photography. Methodology and the process of arriving at visual solutions is a strong focus of this course.

GRDS 212 Computer Graphics I. 4 cr.; annually. Introduction to computer graphics. This course covers the basic operation of computers and develops a literacy in desktop programs such as Illustrator, Quark Express and Photoshop.

GRDS 213 Computer Graphics II. 4 cr.; annually. A more advanced course in computer graphics which explores multimedia. Projects involve two dimensional animation and interactivity and three dimensional modeling. L. Ghaibeh.

GRDS 233 Typography. 4 cr.; annually. Study and exploration of different components of type, which are legibility, visual organization, proportion, weight, the way it is used, when and where, procedures and methods. This course covers both latin and arabic type. L. Musfy & S. Sayegh.

GRDS 242 Illustration. 3 cr.; annually. Learning and developing skills and techniques of different illustration styles for advertising and products. Assignments cover a wide range of topics and mediums.

GRDS 243 Etching. 3 cr.; annually. Learning to develop skills in engraving and etching, a printmaking method that introduces the students to a different principle of professional printing. M. Rawas.

GRDS 244 Silkscreen. 3 cr.; annually. Learning to develop skills in silkscreen, a printmaking method that introduces the students to a different principle of professional printing. M. Rawas.

GRDS 304 Graphic Design IV. 6 cr.; annually. Prerequisite: GRDS 203. This studio course focuses on package design and the competition within a given market. It involves the production aspects of packaging such as materials, printing, presentation and color. Projects are both experimental and commercial. L. Musfy.

GRDS 305 Graphic Design V. 6 cr.; annually. Prerequisite: GRDS 304. This studio course focuses on publication design which is the design of catalogues, brochures, books and magazines. Projects are conducted through the innovative use of photography, typography and illustration. Emphasis is on text and the use of Arabic and Latin. L. Musfy.

GRDS 314 Production and Paste-Ups. 3 cr.; annually. This course covers the basic knowledge of pre-press production. Study of printing terms, typesetting, photo retouching, printing presses, papers, inks, special effects and binding. L. Musfy.

GRDS 334 Advertising Design. 3 cr.; annually. The course addresses the principles of advertising campaigns. it deals with the structure of the ad agency, the team involved in producing the concept and its execution, the TV commercial and outdoors advertising. B. Muzannar.

GRDS 351 Training in Production. 3 cr.; annually. An eight week professional training at a production house, such as color houses or printers.

GRDS 352 Professional Practice. 3 cr.; annually. This course prepares students to the professional world through discussions that cover career selection, self-promotion and ways to set up a professional practice and the preparation of a portfolio, a resume and a personal corporate identity. L. Musfy.

GRDS 406 Graphic Design VI. 6 cr.; annually. Prerequisite: GRDS 305. This studio course focuses on retail design. Market research and visual concepts of two dimensional and three dimensional design issues. Exploration and development of visual systems for organizing products space and information are done through projects and an interactive CD ROM.

GRDS 407 Senior Study. 8 cr.; annually. Prerequisite: GRDS 406 & GRDS 435. Application of solutions to problems initiated in the research GRDS420. Students work independently and in consultation with faculty members. Work in progress is presented to a jury during the course of the semester and at the conclusion of the work. Faculty members.

GRDS 435 Senior Research. 3 cr.; annually. Students research, develop and prepare a comprehensive paper of a design topic approved by the faculty. They work independently and in consultation with faculty members and an editor. Work in progress is presented and discussed with a jury over the course of the semester. Faculty members.

GRDS 453 Approved Experience. 0 cr.; annually. An eight week professional training at a design office, an advertising agency, television station or publisher.

GRAPHIC DESIGN ELECTIVES

The elective courses for the Graphic Design Program offered in the Department of Architecture and Design fall in four categories: Presentation Skills, Media, History, Theory and Method. Electives are chosen under the guidance and advice of the assigned advisor and in accordance with the load distribution mentioned earlier under program description. The following list of courses is subject to change as new electives are introduced every year.

1. Presentation Skills

GRDS 82P Arabesque. 3 cr.; annually. This course deals with artistic references and those which inspired Arabic and Islamic arabesque from previous cultures. It investigates its history from the Omayyad to the Ottoman empires and its artistic and aesthetic values. S. Sayegh.

ARCH 031V Apparatus Design. 3 cr.; annually. This course will address contemporary terminologies in various design fields, such as Graphic Design, Architecture, and Environmental Design in relation to narrative. The discourse will be based on terms, cinema, and other tools to produce a process upon which a theoretical design project will be developed. K. Musfy.

For more electives, refer to Architecture Electives (Presentation Skills).

2. Media

GRDS 88P Advanced Photography. 3 cr.; annually. Prerequisite: GRDS151. This course deals with research of images and the creation of moods fit for a particular environment and/or assignment. These 'moods' or 'settings' will be directly applied to the environment or to specific settings as in advertising photography, social photography or press photography.

GRDS 89P Mixed Media. 3 cr.; annually. The course is designed to widen the scope of visual statements by using a variety of materials and by juxtaposing and layering the elements. It allows students to discover the aesthetic values of such combinations whether 2D (as in painting, collage or drawing) or 3D (as in relief or construction in space) or both. M. Rawas.

3. History

GRDS 87P Graphics in the Environment. 3 cr.; annually. The course deals with posters, billboards and signage. It will cover the history of the poster in Lebanon, its beginnings and how it came to the billboard age. The second part of the course deals with signage and adaptation of typography in multilingual situations. L. Musfy.
For more electives, refer to Architecture Electives (History).

4. Theory and Method
Refer to Architecture Electives (Theory and Method).

GRADUATE PROGRAM

MASTER OF URBAN PLANNING AND MASTER OF URBAN DESIGN

General Information

The Department of Architecture & Design offers an integrated graduate program leading to either the degree Master of Urban Planning or the degree Master of Urban Design. The objective of the two-track program is to prepare highly qualified, well-rounded professionals who are prepared to deal with issues of design and planning of the urban environment in Lebanon and the region. The Program is designed to provide a broad professional education in Urban Planning and Urban Design with emphasis on the mastery of the tools necessary for effective practice and development of the skills needed for policy analysis and institutional intervention. Breadth of coverage is provided through a multidisciplinary approach in the courses offered.

Program Structure

The track leading to the degree Master of Urban Planning seeks to provide students with the skills and the specialized knowledge needed to fill traditional and emerging planning roles, while the track leading to the degree Master of Urban Design focuses on studio-based professional education that deals with design considerations related to urban form. The two tracks share a common core and a number of electives.

Urban Planning Track	Credits
Undergraduate prerequisites	Dependent on background
Core Courses	15
Approved Electives	9
Three courses in a chosen area of concentration	9
Thesis	6
Total	**39**

Urban Design Track	Credits
Undergraduate prerequisites	Dependent on background
Core Courses	15
Approved Electives	6
Design Studio	12
Thesis	6
Total	**39**

Course Offerings

Core Courses

The following core courses are required of students in both the Urban Planning and Urban Design tracks:

Course Name	Credits
URPL 621 History & Theory of Urban Planning	3
URPL 623 Economics of Urban Plan. & Development	3
URPL 631 Social Research Methods in Urban Planning	3
URPL 671 Environmental Impact of Urban Growth	3
URPL 681 The Analytic Process & Methods	3
Total	**15**

Design Studio Courses

The following courses are required of students in the Urban Design Track only:

Course Name	Credits
URDS 601 Design Studio I	6
URDS 602 Design Studio II	6
Total	**12**

Planning Concentration Areas

Three courses from one of the following concentration areas are required of students in the Urban Planning track: Engineering Management, Transportation, and Urban Planning.

Seminar Series

All students enrolled in the MUD or MUP Programs will be required to attend a graduate seminar series of zero-credit hour value (URPL 600).

ADMISSION QUALIFICATIONS

Applicants who meet all AUB and FEA requirements governing admission to graduate study (including EEE or TOEFL scores) and who hold the equivalent of a professional Bachelor of Architecture Degree may be admitted to the Master of Urban Design program as regular graduate students. Students who do not have a professional B.Arch. degree will not be admitted to the Master of Urban Design program.

Applicants who meet all AUB and FEA regulations governing admission to graduate study (including EEE or TOEFL scores) and who hold the equivalent of an undergraduate degree in Architecture, Landscape Architecture, Environmental Design, Urban or Regional Planning, Engineering, Economics, Public Administration or Sociology may be admitted to the Master of Urban Planning Program as regular graduate students.

All such applicants (i.e. those admitted as regular graduate students) must have achieved a minimum average of 75 over all courses listed as "undergraduate pre-requisites". Upon entry to the program, applicants who have not already completed the equivalent of these courses as undergraduate students must enroll for these courses within the first two semesters of graduate study and may also enroll for approved graduate courses for which they have satisfied pre-requisite requirements.

Applicants to the Master of Urban Planning program who do not have undergraduate degrees in the fields specified above will be admitted as "Prospective Students". Such students will be subject to all AUB catalogue regulations governing prospective graduate students, specifically the requirement that they achieve an average of at least 80 over a minimum of 18 credits of specified undergraduate course work (normally the courses listed as "undergraduate pre-requisites").

For admission purposes, the cumulative undergraduate average of all students, regardless of undergraduate major, will be computed over all courses taken during the last two years of undergraduate study.

Undergraduate Prerequisites

The following undergraduate courses, or their approved equivalents, are required of students in both the Urban Planning and Urban Design tracks; no credit is given for these courses toward the graduate degree:

ARCH 331	Urbanism	3cr.
ARCH 063P	Building Law	3cr.
ECON 211	Elementary Microeconomic Theory	3cr.
MATH 208	Elementary Statistics for the Sciences	3cr.
PSPA 202	Introduction to Public Administration	3cr.
SBHS 201	Introduction to the Study of Society	3cr.

In addition, students will be required to complete the undergraduate pre-requisites for any graduate course which they include as part of their programs of study.

COURSE DESCRIPTIONS

URPL 600 Seminar. No credits. Various topics in urban design and urban planning.

URDS 601 Design Studio. 6cr. Studio in urban design. Selected problems and case studies. Prerequisite: graduate standing in Urban Design. J. Abed & A.H. Jabr.

URDS 602 Design Studio. 6 cr. Studio in urban design. Selected problems and case studies. Prerequisite: graduate standing in Urban Design.

URDS 603 Design Thesis. 6 cr. Supervised research and design conducted by students individually and constituting a final thesis. Prerequisite: URDS601, URDS602.

URPL 621 History and Theory of Urban Planning. 3cr. Lectures and discussions on the role of planning as a profession that is dedicated to helping society to manage change; the history of planning and its changing structures, scope and objectives. The course investigates, on the one hand, the development of planning theory that focuses

on key systems (such as land use, infrastructure, socioeconomic patterns and politics) affecting the different fields of urban planning, and on the other hand, the way in which market process and social forces function in interaction among these systems. Prerequisite: graduate standing. P. Somma.

URPL 623 Economics of Urban Planning and Development. 3cr. The course discusses real estate markets, economic development and issues in urban economics through the understanding of the national economy, economic institutions, and analysis of the theory of political economy for planners. The course examines and analyzes decisions in property development and investment processes, as well as markets for urban land, housing, commercial and industrial real estate. Models are considered with respect to the private and public sectors. Prerequisite: graduate standing. B. Halabi & D. Mchaurab.

URPL 624 Urban Land Use Planning. 3 cr. The course provides policy context for understanding land use issues, examines various theoretical approaches to urban spatial structure for bringing market oriented influences and public oriented interests into balance through the land use plan and guidance system, and how this structure evolves and changes. The course focuses on the basic framework by which this balance can be achieved. Prerequisite: graduate standing.

URPL 625 Housing Development and Policy Planning and Management. 3cr. The course discusses a variety of services and parameters that sustain housing and the problems and opportunities associated with them, including financial intermediaries, design services, the building industry, infrastructure, community services, building and zoning codes and the intervention of government. The course investigates conventional methods of urban management and locational growth policies by working with community development organizations, private real estate and financial concerns, and local municipality officials. Prerequisite: graduate standing. M. Fawaz.

URPL 626 Negotiations. 3cr. A seminar course on case studies in which students assume roles that represent the various parties that are directly involved in the implementation of a solution to a certain urban planning problem. Discussions highlight political, economic, technical, and sociological aspects or stands and interests affecting decisions and policy making. Students will learn negotiation methodology. Prerequisite: graduate standing. K. Azar & R. Askalan.

URPL 631 Social Research Methods in Urban Planning. 3cr. The course deals with the qualitative and quantitative methods of social research and their application to urban planning. Surveys, selected case studies, spatial and statistical analysis, and comparative research are conducted in the context of specific urban planning problems. M. Harb-Kak.

URPL 641 Geographic Information Systems Technology. 3cr. Students learn GIS technology and its application to urban planning. The course explains the nature of the technology, the type of questions that GIS can answer, its components, and the uses of major GIS and associated software. Prerequisite: graduate standing. K. Azar.

URPL 671 Environmental Impact of Urban Growth. 3cr. The course examines the impact of urban growth on environmental degradation due to pollution and the increased demand on services and facilities and discusses how this impact can be controlled through planning, design, and management of urban growth. Prerequisite: graduate standing.

URPL 681 The Analytic Process and Methods. 3cr. The course focuses on the development of logical, empirically based arguments using the statistical techniques and analytic methods. Covers statistics, probability, and quantitative reasoning for description, simulation, comparison and explanation. Emphasizes the use and limitation of analytic techniques in planning practice. The course will include problem-solving skills using computer-based tools. Prerequisite: graduate standing.

URPL 699 Thesis. 6 cr. Supervised research conducted by the student individually and constituting a final thesis.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Chairperson:	Harajli, M.
Professors:	Ayoub, G.; Harajli, M.
Associate Professors:	Baaj, M.; Basha, H.; El-Fadel, M.; Hamad, B.; Inglessis, C.; Kaysi, I.; Mabsout, M.
Assistant Professor:	Sadek. S.
Senior Lecturers:	Ghannam, J.; Haddad, W.
Lecturers:	Khatib, I.; Nader, H.; Nazzal, F.
Instructor:	Kevorkian, A.
Associate:	Acra, A.

CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING: MAJOR, CIVIL ENGINEERING

Term I (Fall)	**Credit Hours**
ASST 010 Computer Literacy I	0
CVEV 011 Statics	3
ELEG 015 Introduction to Structured Programming	3
Chem 201 Chemical Principles	3
Math 201 Calculus and Analytic Geometry III	3
Phys 211 Electricity and Magnetism	3
	15
Term II (Spring)	
ASST 020 Computer Literacy II	0
ELEG 025 Structured Programming and Data Structures	3
MCEG 011 Engineering Graphics	3
MCEG 022 Dynamics	3
Math 202 Differential Equations	3
SHOP 021 Shop I	2
	14
Term III (Summer)	
ASST 031 Cultural Course	3
CVEV 037 Surveying and Photogrammetry	4
CVEV 033 Science of Materials	2
CVEV 033L Materials Laboratory	1
	10
Term IV (Fall)	
ASST 035 Probability and Statistics in Engineering	2
ASST 045 Application of Analytical Methods in Engineering I	3
CVEV 041 Mechanics of Materials	3
ELEG 041 Electric Circuits I	3
MCEG 044 Thermodynamics	3
Cultural Course	3
	17

Term V (Spring)	Credit Hours
ASST 055 Application of Analytical Methods in Engineering II	3
CVEV 051 Structures I	3
CVEV 055 Fluid Mechanics	3
Basic Science Elective (Phys., Chem., Biol.)	3
Cultural Course	3
	15

Term VI (Summer)	
ASST 036 Application of Numerical Methods in Engineering	3
Enlg 206 English for Engineering & Architecture	3
CVEV 064 Engineering Geology	3
	9

Term VII (Fall)	
CVEV 071 Structures II	3
CVEV 073 Concrete I	3
CVEV 075 Applied Fluid Mechanics	3
CVEV 076 Water and Wastewater Networks	3
CVEV 077 Highway Engineering	3
CVEV 078 Fluid Mechanics Laboratory	1
	16

Term VIII (Spring)	
CVEV 083 Concrete II	3
CVEV 084 Soil Mechanics	3
CVEV 085 Hydrology	3
CVEV 086 Water and Wastewater Treatment	3
CVEV 087 Transportation Engineering	3
CVEV 087L Transportation Laboratory	1
CVEV 088 Soil Mechanics Laboratory	1
	17

Term IX (Summer)	
CVEV 090 Approved Experience	

Term X (Fall)	
ASST 110 Technology and Society	3
CVEV 104 Soil Mechanics and Foundations	3
CVEV 109 Construction Management	3
3 Electives	9
	18

Electives of Term X
Graduate courses (500 series) in Civil Engineering or approved
Courses from other Departments

Term XI (Spring)	
ENMG 075 Engineering Economy	3
CVEV 115 Specifications and Quantity Surveying	3
3 Electives	9
	15

Electives of Term XI	
CVEV 112 Steel	3
CVEV 118 Computer Methods in Civil Engineering	3
CVEV 119 Project	3
Graduate courses (500 series) in Civil Engineering, or approved	
courses from other Departments	

COURSE DESCRIPTIONS

CVEV 011 Statics. 3 cr.; annually. Prerequisite: Math 201. Review of vector algebra. Forces, moments, and couples. Free body diagrams and application to beams, frames, arches, plane trusses, and space trusses. Center of gravity. Friction. Virtual work. Faculty Member.

CVEV 033 Science of Materials. 2 cr.; annually. Atomic structure. Order and Disorder. Elastic, plastic, and viscoelastic behavior. Strengthening processes. Mechanical failures. Service stability. Materials systems. Faculty Member.

CVEV 033L Materials Laboratory. 1 cr.; annually. Concrete aggregate, cement and mix design. Asphalt concrete, asphalt, asphalt and aggregate combination. Steel. Photoelasticity. Coordinator: M. Harajli.

CVEV 033E Science of Materials. (CCE and EE students). 3 cr.; annually. Prerequisite: MCEG 044. Atomic Structure. Crystalline phases and geometry. Structure disorder. Diffusion mechanisms. Growth processes. Elastic behavior. Compound stresses. Analysis of planes including plastic flow, fracture and fatigue. Faculty Member.

CVEV 037 Surveying and Photogrammetry. 4 cr.; annually. Plane surveying: topographic mapping, location surveys, and route surveying. Photogrammetry: stereoscopy, air-photo identification, map making and cartography. Geographical positioning systems. Coordinators: I. Kaysi and M. Baaj.

CVEV 041 Mechanics of Materials. 3 cr.; annually. Prerequisites: CVEV 011, CVEV 033. Stresses, strains, and stress-strain relationship. Tension and compression. Torsion of circular bars. Bending and shear stresses in beams. Combined stresses. Stress transformation and Mohr's circle. M. Mabsout.

CVEV 051 Structures I. 3 cr.; annually. Prerequisites: CVEV 041. Influence lines, trusses, and beams. Cables. Deflection of beams and frames by double integration method, moment-area theorems, and conjugate beam. Introduction to indeterminate structures. Approximate analysis of building frames. M. Mabsout.

CVEV 055 Fluid Mechanics. 3 cr.; annually. Fluid properties. Fluid statics. Kinematics of fluid flow. Energy and momentum considerations in fluid flow. Similitude and dimensional analysis. Fluid resistance. H. Basha.

CVEV 064 Engineering Geology. 3 cr.; annually. Field identification of common rock types. Interpretation of topographic and geological maps and their use in site locations. Application of geology to engineering practice. Faculty Member.

CVEV 071 Structures II. 3 cr.; annually. Prerequisite: CVEV 051. Stability and determinacy of structures. Energy theorems and applications to trusses, beams, and frames. Solution of statically indeterminate structures by flexibility (force) and stiffness methods. Introduction to the direct stiffness method. Influence lines for indeterminate structures. B. Hamad.

CVEV 073 Concrete I. 3 cr.; annually. Prerequisites: CVEV 033L, CVEV 051. Mechanical properties of concrete materials. Ultimate strength theory of flexure and shear. Flexural and shear design of beams. Service load behavior. Bond properties of reinforcing bars. Design of solid and ribbed one-way slabs. M. Harajli.

CVEV 075 Applied Fluid Mechanics. 3 cr.; annually. Prerequisite: CVEV 055. Fluid flow in pipes. Flow in open channels. Fluid measurements. Hydraulic machinery. Unsteady flow. Faculty Member.

CVEV 076 Water and Wastewater Networks. 3 cr.; annually. Prerequisite: CVEV 075. Quantities of public and individual water supplies, with methods of collection, transportation and distribution. Sources, quantities, and collection of sanitary and storm sewage. G. Ayoub.

CVEV 077 Highway Engineering. 3 cr.; annually. Prerequisite: CVEV 037. Road vehicle performance. Principles of geometric design and highways. Horizontal and vertical alignment. Earthwork. Intersections and interchanges. Parking facilities. Basic traffic models. Queuing theory and traffic analysis. Travel demand forecasting. I. Kaysi.

CVEV 078 Fluid Mechanics Laboratory. 1 cr.; annually. Laboratory course intended to illustrate by experimental work the physical phenomena underlying fluid flow. The laboratory work includes experiments on fluid flow in pipes, flow around immersed bodies, flow in open channels, hydraulic machinery and fluid measurements. Faculty Member.

CVEV 083 Concrete II. 3 cr.; annually. Prerequisite: CVEV 073. Continuous beams. Short columns, slender columns, and biaxially bent columns. Wall footings, concentrically and eccentrically loaded single column footings, and combined footings. Staircases. Bearing walls. Cantilever retaining walls. Two-way slabs. B. Hamad.

CVEV 084 Soil Mechanics. 3 cr.; annually. Soil classification; Compaction; Permeability and seepage; Effective stress concepts; Consolidation; Stress-deformation and strength characteristics; Failure theories. S. Sadek.

CVEV 085 Hydrology. 3 cr.; annually. Prerequisite: CVEV 075. The hydrologic cycle. Runoff cycle. Hydrograph analysis. Unit hydrographs. Stream flow routing. H. Basha.

CVEV 086 Water and Wastewater Treatment. 3 cr.; annually. Quality and methods of treatment of water and wastewater. G. Ayoub.

CVEV 087 Transportation Engineering. 3 cr.; annually. Prerequisite: CVEV 077. Fundamentals of transportation engineering. Capacity analysis of freeways and rural highways. Macroscopic and microscopic traffic flow relationships. Intersection control and signal design. M. Baaj.

CVEV 087L Transportation Laboratory. 1 cr.; annually. Real-world experiments involving travel time and delay, spot speed, turning movement counts, intersection delays, gap study at intersections, saturation flow rates, level of service analysis, queuing analysis, parking studies, and public transportation studies. I. Kaysi.

CVEV 088 Soil Mechanics Laboratory. 1 cr.; annually. Laboratory course intended to familiarize students with soil characterization and the engineering behavior of soils, both in the disturbed and undisturbed states. Laboratory tests include physical properties of soils, stress strain relationships, consolidation and shear strength. Coordinator: S. Sadek.

CVEV 104 Soil Mechanics and Foundations. 3 cr.; annually. Prerequisites: CVEV 084, CVEV 088. Site investigations. Bearing capacity and settlement of shallow foundations. Pile foundations; Retaining walls. S. Sadek.

CVEV 109 Construction Management. 3 cr.; annually. Organizing for construction projects. Pre-construction activities. Bidding and contracts. Fundamentals of construction planning, monitoring and control. Application of construction control

tools: CPM, materials management, operations analysis, and quality control. M. AbdulMalak.

CVEV 112 Steel. 3 cr.; alternate years. Prerequisite: CVEV 071. Load on structures. Philosophies of design: LRFD versus ASD. Behavior, analysis, and design (according to AISC) of: tension members, bolted connections, welded connections, compression members, and beams. B. Hamad.

CVEV 115 Specifications and Cost Estimation. 3 cr.; annually. Project documents. Conditions of contracts. Specifications format. Specifications' general requirements. Technical section format. Methods of specifying. Types of cost estimates. Productivity on construction projects. Conceptual and detailed cost estimating. M. AbdulMalak.

CVEV 118 Computer Methods in Civil Engineering. 3 cr.; alternate years. Prerequisites: ELEG 025, ASST 036. Using the computer for analysis, design and decision making in Civil Engineering. Programming, numerical, and CAD methods. Applications. Coordinator: I. Kaysi.

CVEV 119 Project. 3cr. Supervised project in groups of up to 3 students aimed at providing practical design experience in a civil and environmental engineering application.

GRADUATE PROGRAMS

CIVIL ENGINEERING PROGRAM

General Information

The Department of Civil and Environmental Engineering offers a graduate program leading to the degree of Master of Engineering: major, Civil Engineering. The program prepares students through teaching and research for in-depth knowledge in the following fields of civil engineering: structures, transportation, and geotechnical engineering.

In order to fulfill graduation requirements a student must complete a minimum of 24 credit hours of graduate courses and a thesis based on independent research, equivalent to at least 6 credit hours. The required coursework for the degree with a major in Civil Engineering is distributed as follows:

1. A minimum of four courses (12 credit hours) in the field of specialty.
2. A maximum of two courses (6 credit hours) in an allied field.
3. A maximum of two courses (6 credit hours) in free electives.

A minimum of one calendar year of residence is required for graduation.

Requirements

1. To be eligible for admission to the Civil Engineering graduate program, a student must hold a Bachelor's degree in Civil Engineering and must satisfy the requirements

Requirements

1. To be eligible for admission to the Civil Engineering graduate program, a student must hold a Bachelor's degree in Civil Engineering and must satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of the University Catalogue (Refer to Graduate Study section).

2. Graduates of universities other than AUB may be required to take undergraduate prerequisite courses to make up for any deficiencies they may have. A minimum grade of 70, or its equivalent, is required in each of these courses, and no credit is given for these courses towards the graduate degree.

Course Descriptions

Structural Sequence

CVEV 501 Advanced Structural Analysis. 3 cr.; annually. Prerequisite: CVEV 071. Review of matrix algebra. Basic principles of structural analysis: stiffness, flexibility, and energy methods. Direct stiffness method for plane and space trusses and frames. Linear and non-linear problems. Special problems. Computer programming. M. Mabsout.

CVEV 502 Prestressed Concrete. 3 cr.; alternate years. Prerequisite: CVEV 083. Materials characteristics. Prestress losses. Working strength design procedures. Composite construction. Ultimate flexural strength and behavior. Shear design. Continuous prestressed concrete members. M. Harajli.

CVEV 503 Bridges. 3 cr.; alternate years. Prerequisites: CVEV 071, CVEV 083. Types of Bridges. Influence Lines. Loads and their distribution on bridges. Serviceability of bridges. Methods of design of bridge deck, superstructure, and substructure. M. Harajli.

CVEV 504 Special Topics in Concrete. 3 cr.; annually. Prerequisite: CVEV 083. Review of reinforced concrete design. Wind load on structures. Seismic design of structures. Design of shear walls. Brackets, corbels and deep girders. Torsion in concrete members. Circular, rectangular, and elevated water tanks. Spherical, conoidal, and ellipsoidal domes. M. Harajli.

CVEV 505 Plain Concrete. 3 cr.; annually. Prerequisite: Advanced Standing Level. Portland cements. Aggregates. Admixtures for Concrete. Proportioning normal concrete mixtures. Pumping concrete. Consolidation. Finishing and curing. Durability, testing hardened concrete. High-strength concrete. Light and heavy weight concretes. Hot and cold weather concreting. B. Hamad.

CVEV 506 Special Concrete Materials. 3 cr. Prerequisite: Advanced Standing Level. Basic concepts of concrete materials: mix proportioning. Strength and failure mechanism of concrete materials. Polymer concrete. Polymer modified concrete. Fiber reinforced concrete: mechanical and material properties, mixing procedures, and applications. Faculty Member.

CVEV 601 Advanced Mechanics of Solids. 3 cr.; alternate years. Prerequisite: CVEV 041. Theories of stress and strain. Stress-strain relations, generalized Hooke's law. Modes of failure, failure criteria. Energy principles and applications. Torsion. Beams on elastic foundations. Introduction to the theory of plates. Thin-wall and thick-wall cylinders. M. Mabsout.

CVEV 602 Theory of Plates and Shells. 3 cr. Prerequisite: Advanced Standing Level. Pure bending of plates; deflection of plates; symmetrical bending of circular plates; rectangular plates with simply supported and various edge conditions. Theory of cylindrical and spherical shells; deformation of shells. Faculty Member.

CVEV 604 Structural Dynamics. 3 cr. Prerequisite: Advanced Standing Level. Analysis of vibration of single degree, multidegree, and infinite degree of freedom systems. Free and forced vibration response. Analysis of dynamic response by approximate methods. Introduction to earthquake engineering. M. Harajli.

CVEV 605 Earthquake Engineering. 3 cr. Nature of earthquake ground motion. Seismic hazard evaluation in engineering practice. Response analysis of structures and effect of soil conditions on structural response and behavior under earthquake ground motion. Design of structures under earthquake loading. M. Harajli, S. Sadek.

CVEV 606 Experimental Mechanics. 3 cr. Prerequisites: CVEV 033M, CVEV 041. Review of experimental methods and techniques for the analysis of stress, strain, displacement, and their engineering significance. Electric strain gauges circuitry. Photoelastic stress analysis and data acquisition. Statistical aspects of stress-strain relationships. Faculty Member.

CVEV 607 The Finite Element Method. 3 cr.; alternate years. Prerequisite: CVEV 501. Matrix algebra. Energy theorems. Analysis of discrete member systems. Interpolation functions. Numerical integration. Plane stress and plane strain problems. Axisymmetric problems. Problems in three dimensions. Plate bending. M. Mabsout.

CVEV 608 Plastic Design of Structures. 3 cr. Prerequisite: Advanced Standing Level. Plastic analysis of beams, plastic moment. Plastic hinging. Collapse mechanism. Method of plastic design: Theorems of limit analysis. Principles of virtual work. Combination of mechanisms. Applications to framed structures. Limit analysis of plates. Faculty Member.

CVEV 609 Behavior of Reinforced Concrete Members. 3 cr.; alternate years. Prerequisite: CVEV 083. Building codes. Limit state design. Mechanical characteristics of concrete and steel reinforcement. Creep and shrinkage. Flexure: moment-curvature and force-deformation relationships. Columns: axial force-moment-curvature relationships. Shear: mechanisms of shear resistance, truss analogy. Bond and anchorage of reinforcement.. B. Hamad.

CVEV 610 Advanced Steel Design. 3 cr. Prerequisite: CVEV 112. Stability. Column strength. Beam-columns. Composite steel-concrete construction. Plate buckling. Plate girders. Torsion. Combined torsion and bending. Faculty Member.

Geotechnical Sequence

CVEV 541 Rock Mechanics. 3 cr. Prerequisite: Advanced Standing Level. Classification and index properties, rock strength and failure criteria, deformability, initial stresses

in rocks. Applications of rock mechanics to tunneling, slope engineering and foundation engineering. Faculty Member.

CVEV 542 Applied Foundation Engineering. 3 cr.; alternate years. Prerequisite: CVEV 104. Braced excavations, retaining structures, deep foundations, slope stability, computer applications. S. Sadek.

CVEV 641 Shear Strength of Soils. 3 cr. Prerequisite: Advanced Standing Level. Stresses within a soil mass, tests to measure stress strain properties, stress-strain relationships, shear strength, drained conditions, undrained, constitutive models, failure criteria, applications. Faculty Member.

CVEV 642 Soil and Site Improvement. 3 cr.; alternate years. Prerequisite: Advanced Standing Level. Compaction, admixture stabilization, foundation soil treatment, reinforced soil and composite materials, material sites reclamation. S. Sadek.

CVEV 643 Earth Dams. 3 cr. Prerequisite: Advanced Standing Level. Hydraulic dams, rolled earth dams, homogenous dams, thin core dams, filters, causes of dam failures, seepage control, seismic stability of dams. Faculty Member.

CVEV 644 Soil-Structure Interaction. 3 cr. Prerequisite: Advanced Standing Level. Sheet piles, bracing, lateral loads and their distribution, anchors, anchored bulkheads, design and numerical applications. Faculty Member.

CVEV 645 Soil Behavior. 3 cr. Prerequisite: CVEV 104. Soil mineralogy, soil formation and composition. Influence of geological factors on properties. Colloidal phenomena in soils. Soil structure. Analysis of conduction phenomena. Compressibility, strength and deformation properties. S. Sadek.

Transportation Sequence

CVEV 561 Pavement Design. 3 cr.; alternate years. Prerequisites: CVEV 087, CVEV 088. Highway and airport pavement design. Flexible and rigid pavement types and wheel loads. Stresses in flexible and rigid pavements. Pavement behavior under moving loads. Soil stabilization. S. Sadek.

CVEV 562 Urban Transportation Planning I. 3 cr.; alternate years. Prerequisite: CVEV 087. Introduction to methods and models used in transportation planning with emphasis on the urban context. I. Kaysi.

CVEV 563 Traffic Engineering. 3 cr.; Prerequisites: CVEV 087. Traffic engineering studies. Traffic control of signalized and unsignalized intersections. Signal control hardware and maintenance. Arterial performance and operations. Network optimization. Coordinator: M. Baaj.

CVEV 564 Transportation Systems Analysis. 3 cr.; alternate years. Prerequisite: Advanced Standing Level. Transportation and traffic problems in modern society. Travel forecasting problems and methods. Theoretical techniques for traffic flow description and management. Highway, railway, and runway capacity and performance characteristics. Economic considerations. Cost functions. I. Kaysi.

CVEV 565 Design and Management of Transport Operations. 3 cr.; alternate years. Prerequisite: ASST 035 or equivalent. Application of quantitative techniques from operations research and probabilistic analysis to transportation problems.

Applications include: pickup and delivery systems, emergency urban services, facility location, and network problems. I. Kaysi.

CVEV 566 Transportation Economics. 3 cr.; alternate years. Prerequisite: ENMG 075 or equivalent. Application of economic principles to the evaluation of projects and policies in the transport sector. Transport project benefits, costs, and financing. Pricing in the transport sector. I. Kaysi.

CVEV 567 Highway Pavement Materials. 3 cr. Prerequisite: CVEV 033. The use of surficial soils, aggregates, and bituminous materials in highway pavement construction. Characterization of hot mix asphalt (HMA) mixtures. Equipment and construction. Performance and distress of HMA. HMA recycling, maintenance, rehabilitation, and reconstruction. Faculty Member.

CVEV 661 Urban Transportation Planning II. 3 cr. Prerequisite: CVEV 562. Advanced topics in urban transportation planning. Transportation systems management techniques. Travel demand analysis. Discrete choice modeling of travel demand. I. Kaysi.

CVEV 662 Pavement Management Systems. 3 cr. Prerequisite: Advanced Standing Level. Pavement management process. Evaluation of pavement performance, structural capacity, distress, and safety. Economic evaluation of alternative pavement design strategies. Modeling pavement distress and performance. Faculty Member.

CVEV 663 Transportation Networks Analysis. 3 cr. Prerequisite: Undergraduate calculus. Analysis of traffic flows on transportation networks. Network equilibrium assignment. Heuristic approaches. Mathematical programming formulation with solution algorithm. Extensions. Faculty Member.

CVEV 664 Public Transportation. 3 cr.; alternate years. Pre- or co-requisite: CVEV 562. Public transportation modes and services. Single route, network, and strategic planning. Tasks involved in system operations. Management of public transportation. Privatization issues. M. Baaj.

CVEV 665 Airports and Seaports. 3 cr. Prerequisite: CVEV 087 or equivalent. Airport location and planning. Airport operations. Financial and economic considerations. Seaport development and planning. Seaport operations. Financial and economic considerations. Faculty Member.

CVEV 666 Advanced Highway Engineering and Design. 3 cr. Prerequisite: CVEV 563. Advanced topics in highway engineering and design. Highway safety, maintenance, and financing. Computer-aided highway design. Faculty Member.

CVEV 667 Traffic Flow Theory. 3 cr.; alternate years. Prerequisites: CVEV 087 or equivalent. Characteristics of traffic flow, density, and speed. Models describing traffic flows. Hydrodynamic analogue. Computer simulation models. M. Baaj.

Common Courses

CVEV 598 Numerical Modeling. 3 cr.; alternate years. Prerequisite: ASST 036 or equivalent. Ordinary differential equations: initial-, boundary-, and characteristic-value problems. Partial differential equations: steady state, time dependent, and oscillatory problems. Techniques: Runge-Kutta, shooting, iterative, finite difference and finite element methods. H. Basha.

CVEV 696 Special Projects. 3 cr.
CVEV 697 Seminar. 0 cr. Coordinator: Faculty Member.
CVEV 698 Special Topics. 3 cr.
CVEV 699 Thesis.

ENVIRONMENTAL AND WATER RESOURCES ENGINEERING PROGRAM

General Information

The Department of Civil and Environmental Engineering offers a graduate program leading to the degree of Master of Engineering in the major of Environmental and Water Resources Engineering. The program provides graduates with the necessary tools for professional practice and/or the pursuit of higher education.

The Department also offers a graduate program leading to the degree of Master of Science in the major of Environmental Technology. For more details on the program refer to the chapter "Graduate Studies" at the end of this catalogue, under "Interfaculty Programs."

In order to fulfill graduation requirements, a student must complete a minimum of 24 course credit hours as well as a 6 credit hour thesis accomplished on a full, or part-time, basis. A minimum of one calendar year of residence is required for graduation.

The MS program in Environmental and Water Resources Engineering offers two *Tracks* with course requirements as listed below under item 5 of the section **Requirements**:

Track A:	*Track B:*
Major in Environmental Engineering	Major in Water Resources Engineering
Minor in Water Resources Engineering	Minor in Environmental Engineering

Requirements

1. To be eligible for admission to the Environmental and Water Resources Engineering graduate program, a student must hold a Bachelor's Degree in any approved discipline of Engineering and must satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of the University Catalogue.

2. All students admitted to the program are required to take, or have taken, the following courses, or their equivalents, as prerequisites:

Math 202	Differential Equations. 3 cr.
CVEV 055	Fluid Mechanics. 3 cr.
CVEV 076	Water and Wastewater Networks. 3 cr.
CVEV 085	Hydrology. 3 cr.
CVEV 086	Water and Wastewater Treatment. 3 cr.

3. A minimum grade of 70, or its equivalent, is required in each of these courses, and no credit is given for these courses towards the graduate degree. Graduates of universities other than AUB may be required to take undergraduate prerequisite courses to make up for any deficiencies they may have.

4.   All students registered in the program must take *CVEV 690 Seminar in Environmental Sciences (0 credits)* or other seminars offered within the Faculty.

5.   Course requirements:

	Track A			Track B	
Course type	Major: Env. Engrg. Minor: Water Res. Engrg.	Cr.		Major: Water Res. Engrg. Minor: Env. Engrg.	Cr.
Core	Group A1	9		Group B1	6
Electives I	Group A2+AB	9		Group B1+B2+AB	12
Electives II	Group B1+B2	6		Group A1+A2	6
Thesis,CVEV 699		6			6
Total		30			30

Other relevant graduate courses from any Faculty may be taken as Elective I (up to a maximum of two courses) upon consent of the Academic Advisor and approval of the Chairman.

GROUP A1   CORE COURSES IN ENVIRONMENTAL ENGINEERING

CVEV 527   Environmental Chemistry and Microbiology. 3 cr.
CVEV 531   Solid Waste Management I. 3 cr.
CVEV 534   Air Pollution and Control I. 3 cr.

Group A2   Electives in Environmental Engineering

CVEV 523   Water and Sewage Design. 3 cr.
CVEV 535   Air Pollution and Control II. 3 cr.
CVEV 537   Industrial/Hazardous Waste Management. 3 cr.
CVEV 538   Solid Waste Management II. 3 cr.
CVEV 539   Environmental Impact Assessment. 3 cr.
CVEV 540   Methods of Environmental Sampling and Analysis. 3 cr.
CVEV 627   Air Pollution Modeling. 3 cr.
CVEV 634   Physical, Chemical, and Biological ProCVEVsses. 3 cr.
CVEV 639   Environmental Case Studies and Conflict Resolution. 3 cr.

GROUP B1   CORE COURSES IN WATER RESOURCES ENGINEERING

CVEV 521   Ground Water Hydrology. 3 cr.
CVEV 522   Hydraulic Structures. 3 cr.
CVEV 525   Coastal Engineering. 3 cr.

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CVEV 529   Surface Water Hydrology. 3 cr.

GROUP B2   ELECTIVES IN WATER RESOURCES ENGINEERING

CVEV 526   Transport Phenomena in Surface and Subsurface Waters. 3 cr.
CVEV 528   Open Channel Flow. 3 cr.
CVEV 536   Water Resources Systems: Planning and Management. 3 cr.
CVEV 622   Modeling of Hydrologic Systems. 3 cr.
CVEV 623   Computational Methods in Water Resources. 3 cr.
MCEG 805   Advanced Fluid Dynamics. 3 cr.

**GROUP AB   COMMON REQUIREMENTS/ELECTIVES IN
                  ENVIRONMENTAL & WATER RESOURCES ENGINEERING**

CVEV 598   Numerical Modeling. 3 cr.
CVEV 690   Seminar in Environmental Sciences. 0 cr.
CVEV 696   Special Projects. 3 cr.
CVEV 698   Special Topics. 3 cr.
ENMG 503   Introduction to Stochastic Processes. 3 cr.
ENMG 513   System Analysis and Optimization. 3 cr.

CVEV 699   MS THESIS. 6 CR.

Course Descriptions

CVEV 521 Groundwater Hydrology. 3 cr.; annually. Prerequisite: CVEV 085 or CVEV 529 or equivalent. Properties of groundwater. Groundwater movement. General flow equations. Steady-state well hydraulics. Unsteady well hydraulics. Seepage forces. Groundwater modeling. H. Basha.

CVEV 522 Hydraulic Structures. 3 cr.; alternate years. Prerequisite: CVEV 075 or equivalent. Design of lined and stable open channels. Stability consideration in hydraulic structures. Design of hydraulic structures on pervious foundations. Hydraulic design of conveyance, control and terminal structures. Faculty Member.

CVEV 523 Water and Sewage Works Design. 3 cr.; alternate years. Prerequisites: CVEV 076, CVEV 086. Design of wastewater schemes, including design reports and literature search on the development of conventional treatment processes. G. Ayoub.

CVEV 525 Coastal Engineering. 3 cr.; alternate years. Prerequisite: CVEV 075. Small amplitude wave theory. Finite amplitude wave theory. Cnoidal waves. Forces on structures. Morrison's equation. Energy spectrum. H. Basha.

CVEV 526 Transport Phenomena in Surface and Subsurface Waters. 3 cr.; alternate years. Advection, diffusion and dispersion of pollutants. Convection dispersion equation. Transport in rivers and estuaries. Numerical modeling and dispersion. Design of wastewater discharge system. H. Basha.

CVEV 527 Environmental Chemistry and Microbiology. 3 cr.; annually. Prerequisite: Chem 201, Biol 210 or equivalent. Organic, inorganic, and physical chemistry. Chemical equilibria. Reaction kinetics. Acidity, alkalinity. Composition, morphology and classification of microorganisms. Energy, metabolism and synthesis. Growth, decay and kinetics. Biological water quality indicators. Faculty Member.

CVEV 528 Hydraulics of Open Channels. 3 cr.; alternate years. Prerequisite: CVEV 075 or equivalent. Energy and momentum considerations. Critical flows and controls. Uniform flow computation. Gradually varied flow theory and analysis. Spatially varied flow. Faculty Member.

CVEV 529 Surface Water Hydrology. 3 cr.; annually. Prerequisite: CVEV 085 or equivalent. Runoff process. Unit hydrographs. Overland flow. Floods. Applied statistics in hydrology. Reservoir and channel routing. Hydrologic design. Urban hydrology. H. Basha.

CVEV 531 Solid Waste Management I. 3 cr.; annually. Nature and effects of solid wastes including hazardous wastes. Engineering management principles, practices, and techniques for management of solid wastes, administration. Solid waste generation, storage, collection and transport, processing, resource recovery, and disposal. Trip to a local facility. M. El-Fadel.

CVEV 534 Air Pollution and Control I. 3 cr.; annually. Prerequisite: Chem 201 or equivalent. Introduction to air pollutants, sources and effects. Emissions estimates, regulations, and monitoring techniques. Particulate matter characterization. Meteorology and atmospheric dispersion. Air pollution control processes. M. El-Fadel.

CVEV 535 Air Pollution and Control II. 3 cr.; alternate years. Prerequisite: CVEV 534 or consent of instructor. Process analysis, operational limitations, cost and

performance, and evaluation of control process and equipment. Case studies, field visits, and inspection of industrial installations. M. El-Fadel.

CVEV 536 Water Resources Systems: Planning and Management. 3 cr.; alternate years. Planning and management processes as applied to water resources infrastructure. Politics in relation to the planning process; economics and financing; water system modeling, simulation, and optimization; water conveyance and storage; and water management methods and facilities. Faculty Member.

CVEV 537 Industrial/Hazardous Waste Management. 3 cr.; alternate years. Prerequisite: CVEV 086, 527, or consent of instructor. Sources, quantity, and quality of industrial wastes. Basic industrial waste treatment processes. Major industries, types of wastes and existing treatment practices. Disposal and fate of industrial wastes. M. El-Fadel.

CVEV 538 Solid Waste Management II. 3 cr.; alternate years. Prerequisites CVEV 531 or consent of instructor. Design of solid waste disposal schemes, including design reports and literature search on the development of conventional treatment and disposal processes. M. El-Fadel.

CVEV 539 Environmental Impact Assessment. 3 cr.; alternate years. Prerequisite: CVEV 086, 531, 534, or consent of instructor. Theories and procedures of assessing environmental impact. Analysis of the impact of development on various measures of environmental quality. Benefit-cost considerations in environmental impact assessment. M. El-Fadel.

CVEV 540 Methods of Environmental Sampling and Analysis. 3 cr.; alternate years. Sampling techniques and instrumental methods in environmental sciences. Determination of pollutants in water, air, and soil. Analytical techniques. Adaptation of procedures to specific matrices. Case studies. Faculty Member.

CVEV 586 Water and Wastewater Treatment. 3 cr.; annually. Quality and methods of treatment of water and wastewater. Literature search on the development of conventional treatment processes. Students who have taken CVEV 086 cannot register for this course. G. Ayoub.

CVEV 598 Numerical Modeling. 3 cr.; alternate years. Prerequisite: ASST 036 or equivalent. Ordinary differential equations: initial-, boundary-, and characteristic-value problems. Partial differential equations: steady state, time dependent, and oscillatory problems. Techniques: Runge-Kutta, shooting, iterative, finite difference and finite element methods. H. Basha.

CVEV 622 Modeling of Hydrologic Systems. 3 cr.; alternate years. Prerequisite: CVEV 529 or equivalent. Fundamentals of modeling. Statistical modeling of rainfall. Stochastic modeling of stream flow. Watershed runoff modeling. Reservoir flood routing. River flood routing. Kinematic wave approach. H. Basha.

CVEV 623 Computational Methods in Water Resources. 3 cr.; Prerequisite: ASST 036 or equivalent. Matrix methods. Spectral methods. Time series analysis. Method of characteristics. Linear programming. Finite difference method. Application to water resources problems. Faculty Member.

CVEV 624 Advanced Water and Wastewater Reclamation and Reuse. 3 cr.; Prerequisites: CVEV 527, CVEV 586. Processes: equalization, granular media filtration, carbon adsorption, phosphate removal, nitrification, denitrification,

ammonia stripping, ion exchange, reverse osmosis, heavy metal removal, advanced disinfection, and processes for effluent refinement. Faculty Member.

CVEV 627 Air Pollution Modeling. 3 cr.; Prerequisite: CVEV 534 or consent of instructor. Mathematical models. Air pollution meteorology. Plume rise. Dispersion and atmospheric chemistry. Meteorological models. Gaussian, statistical, and other special application models. M. El-Fadel.

CVEV 634 Physical, Chemical and Biological Processes. 3 cr.; alternate years. Prerequisite: CVEV 527 or consent of instructor. Physical-chemical processes: coagulation, flocculation, softening, iron and manganese removal, sedimentation, sand filtration, chlorination, principles of desalination. Biological processes: trickling filter, biological disks, activated sludge, waste stabilization ponds. Sludge treatment. G. Ayoub.

CVEV 638 Residual Waste Management. 3 cr.; Prerequisite: CVEV 527. Important toxic, hazardous and radioactive materials. Source, collection, transport, treatment and disposal of radioactive, toxic and hazardous wastes. Short and long term effects on ecosystem. Kinetics of natural decay and degradation. Management of refractory materials in solid wastes. Faculty Member.

CVEV 639 Environmental Case Studies and Conflict Resolution. 3 cr.; alternate years. Prerequisite: CVEV 086, 531, 534, or consent of instructor. Case studies in environmental management (i.e. pesticide application, air pollution, solid waste landfilling, wastewater treatment, oil exploration, ocean dumping, deep well injection, reservoirs, water resources, etc.). M. El-Fadel, coordinator.

ENSC 690 Seminar in Environmental Sciences. 0 cr.; Current research or applied projects are presented by faculty members, students, or invited speakers. M. El-Fadel, coordinator.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Chairperson:	Diab, H.
Professors:	Al-Alaoui, A.; Diab, H.; El-Hajj, A.; Kabalan, K.; Sabah, N.
Associate Professors:	Chaaban, F.; Chedid, R.; Karaki, S.; Kayssi, A.; Khoury, S.; Mrad, F.; Saade, J.; Yehia, M.
Senior Lecturers:	Chahine, H.; Farhat, K; Mougharbel, I.
Lecturers:	Abou-Faraj, Z.; Atweh, M.; Bazzi, Y.; Chaar, L.; Farhat, N.; Mohtar, T; Othman, Z.
Instructors:	Abdel-Samad, R.; Abdul-Sater, M.; Barake, T.; El-Hout, N; Hayek, P.; Ilya, I.; Jaber, Z.; Kanafani, Z.; Kassem, A.; Mehdi, M.; Moukhaiber, N.; Nahed, E.

The Department of Electrical and Computer Engineering offers two undergraduate programs leading to the degree of Bachelor of Engineering and three graduate programs leading to the degree of Master of Engineering.

UNDERGRADUATE PROGRAM

The Department of Electrical and Computer Engineering offers the degree of Bachelor of Engineering in two majors:

- Computer and Communications Engineering (CCE)
- Electrical Engineering (EE)

CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING: MAJOR, COMPUTER AND COMMUNICATIONS ENGINEERING

Term I (Fall)	Credit Hours
ASST 010 Computer Literacy I	0
ELEG 011 Electric Circuits I	3
ELEG 015 Programming I	3
SHOP 021 Shop I	2
MCEG 017 Engineering Mechanics	3
Math 201 Calculus and Analytic Geometry III	3
	14

Term II (Spring)	
ASST 020 Computer Literacy II	0
ELEG 021 Electric Circuits II	3
ELEG 022 Basic Electronics	3
ELEG 024 Basic Electronics Laboratory	1
ELEG 025 Programming II	3
Math 202 Differential Equations	3
Cultural Course	3
	16

Term III (Summer)	
ASST 036 Application of Numerical Methods in Engineering	3
ASST 037 Probability and Statistics in Electrical Engineering	3
CVEV 033E Science of Materials	3
	9

Term IV (Fall)	
ASST 045 Application of Analytical Methods in Engineering I	3
ELEG 042 Analog Electronics	3
ELEG 043C Discrete Mathematics	3
ELEG 044 Analog Electronics Laboratory	1
ELEG 049 Digital Systems Design	3
MCEG 011 Engineering Graphics	3
	16

Term V (Spring)	
ASST 055 Application of Analytical Methods in Engineering II	3
ELEG 052 Digital Electronics	3
ELEG 054 Digital Electronics Laboratory	1
ELEG 055C Data Structures and Advanced Algorithms	3
ELEG 059 Microprocessor Systems	3
Cultural Course	3
	16

Term VI (Summer)	
ASST 031 Cultural course	3
ELEG 066 Analog Signals and Systems Analysis	3
ELEG 065C Software Applications and Design	3
	9

Term VII (Fall)	Credit Hours
ELEG 073 Feedback Controls	3
ELEG 074C Microprocessor Laboratory	1
ELEG 078 Field Theory	3
ELEG 079C Computer Architecture	3
MCEG 077 Thermodynamics	3
Enlg 206 English for Engineering and Architecture	3
	16

Term VIII (Spring)	
ELEG 083C Electric Machines	3
ELEG 084 Control Systems Laboratory	1
ELEG 085C System Software	3
ELEG 086 Analog Communications	3
ELEG 088 Signal Transmission	3
Science Elective	3
	16

Term IX (Summer)	
ELEG 090 Approved Experience	0

Term X (Fall)	
ELEG 104C Communications Laboratory I	1
ELEG 105C Computer Networks	3
ELEG 106C Digital Communications	3
ELEG 107 Final Year Project	0
ENMG 075 Engineering Economy	3
2 Electives	6
	16

Electives for Term X	
ELEG 109 Telephony I	3
ELEG 111 Microwave Communication Systems	3
ENMG 105 Engineering Management I	3
Graduate courses in Electrical and Computer Engineering, or	
approved courses from other Departments	

Term XI (Spring)	
ASST 110 Technology and Society	3
ELEG 114C Communications Laboratory II	1
ELEG 117 Final Year Project	3
3 Electives	9
	16

Electives for Term XI	
ELEG 113 Digital Control	3
ELEG 115C Design and Application of Information Systems	3
ELEG 118 Telephony	3
ENMG 115 Engineering Management II	3
Graduate courses in Electrical and Computer Engineering, or	
approved courses from other Departments	

CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING: MAJOR, ELECTRICAL ENGINEERING

Term I (Fall)	Credit Hours
ASST 010 Computer Literacy I	0
ELEG 011 Electric Circuits I	3
ELEG 015 Programming I	3
SHOP 021 Shop I	2
MCEG 017 Engineering Mechanics	3
Math 201 Calculus and Analytic Geometry III	3
	14

Term II (Spring)	
ASST 020 Computer Literacy II	0
ELEG 021 Electric Circuits II	3
ELEG 022 Basic Electronics	3
ELEG 024 Basic Electronics Laboratory	1
ELEG 025 Programming II	3
Math 202 Differential Equations	3
Cultural Course	3
	16

Term III (Summer)	
ASST 036 Application of Numerical Methods in Engineering	3
ASST 037 Probability and Statistics in Electrical Engineering	3
CVEV 033E Science of Materials	3
	9

Term IV (Fall)	
ASST 045 Application of Analytical Methods in Engineering I	3
ELEG 042 Analog Electronics	3
ELEG 044 Analog Electronics Laboratory	1
ELEG 049 Digital Systems Design	3
MCEG 011 Engineering Graphics	3
MCEG 044 Thermodynamics	3
	16

Term V (Spring)	
ASST 055 Application of Analytical Methods in Engineering II	3
ELEG 052 Digital Electronics	3
ELEG 053E Electromagnetic Devices	3
ELEG 054 Digital Electronics Laboratory	1
ELEG 059 Microprocessor Systems	3
Cultural Course	3
	16

Term VI (Summer)	
ASST 031 Cultural Course	3
ELEG 063E Rotating Machinery	3
ELEG 066 Analog Signals and Systems Analysis	3
	9

Term VII (Fall)

ELEG 073 Feedback Controls	3
ELEG 074E Electric Machines Laboratory	1
ELEG 078 Field Theory	3
2 Electives	6
Science Elective	3
	16

Electives for Term VII

ELEG 071E Fundamentals of Electric Power Engineering	3
ELEG 072E Theory of Semiconductor Devices	3
ELEG 077E Discrete Signals and Systems Analysis	3
ELEG 079C Computer Architecture	3
CVEV 055 Fluid Mechanics	3
An approved course from another department	

Term VIII (Spring)

ELEG 086 Analog Communications	3
ELEG 088 Signal Transmission	3
ENLG 206 English for Engineering and Architecture	3
2 Electives	6
Elective Laboratory	1
	16

Electives for Term VIII

ELEG 081E Power System Analysis	3
ELEG 082E Power Electronics	3
ELEG 083E Digital Control	3
MCEG 084 Applied Thermodynamics	3
An approved course from another department	3

Elective Laboratories for Term VIII

ELEG 084E Power Electronics and Drives Laboratory	1
ELEG 089E Microprocessor Laboratory	1

Term IX (Summer)

ELEG 090 Approved Experience	0

Term X (Fall)

ELEG 107 Final Year Project	0
ASST 110 Technology and Society	3
ELEG 104 Control Systems Laboratory	1
4 Electives	12
	16

Electives for Term X

ELEG 101E Industrial Electrification	3
ELEG 102E Instrumentation	3
ELEG 103E Electric Drives	3
ELEG 105C Computer Networks	3
ELEG 106C Digital Communications	3
ELEG 107E Fiber Optics	3
ELEG 109 Telephony I	3
ELEG 111 Microwave Communication Systems	3
ENMG 105 Engineering Management I	3
Graduate courses in Electrical and Computer Engineering, or	
approved courses from other Departments	

	Credit hours
Term XI (Spring)	
ENMG 075 Engineering Economy	3
ELEG 117 Final Year Project	3
3 Electives	9
Elective Laboratory	1
	16

Electives for Term XI

ELEG 112E Power System Protection and Switchgear	3
ELEG 113 Digital Control	3
ELEG 115C Design and Application of Information Systems	3
ELEG 118 Telephony II	3
ELEG 119E Microelectronic Systems Design	3
ENMG 115 Engineering Management II	3

Graduate courses in Electrical and Computer Engineering. or
approved courses from other Departments

Elective Laboratories for Term XI

ELEG 114E Power Systems Laboratory	1
ELEG 116 Communications Laboratory	1

COURSE DESCRIPTIONS

ELEG 011 Electric Circuits I. 3 cr.; annually. Circuit elements. DC electric circuits. Circuit laws. Network theorems. Time domain analysis in capacitive and inductive DC circuits. Introduction to the sinusoidal system. Phasors. M. Yehia.

ELEG 015 Programming I. 3 cr.; annually. Internal representation of data. Introduction to structured programming using C++. Problem solving and algorithms. Building abstractions. Procedures and functions. Repetition and selection. Recursion. Files. Enumerated types. Weekly laboratory assignments are an integral part of this course. A. El-Hajj, S. Karaki.

ELEG 021 Electric Circuits II. 3 cr.; annually. Prerequisite: ELEG 011. Network Analysis for AC circuits. Power in a two-wire system with sinusoidal drivers. Resonance. Polyphase systems. Fourier method of waveform analysis. Transformers. Two-port networks. RLC sinusoidal transients. R. Chedid, S. Khoury.

ELEG 022 Basic Electronics. 3 cr.; annually. Prerequisite: ELEG 011; co-requisite: ELEG 021. Introductory concepts. Semiconductor diodes and applications. Bipolar transistor operation and biasing. Field-effect transistor operation and biasing. AC models. A. Al-Alaoui.

ELEG 024 Basic Electronics Laboratory. 1 cr.; annually. Prerequisite: ELEG 011; co-requisites: ELEG 021, ELEG 022. Passive electronic components. Laboratory instruments. Voltage-divider circuits. Sources and Thevenins's theorem. The oscilloscope. RC lead-lag networks. Series resonance. The transformer. Single-phase rectifier circuits. LEDs. Zener diode regulator. Diode clamping and clipping. A. Kayssi.

ELEG 025 Programming II. 3 cr.; annually. Prerequisite: ELEG 015. Pointers and strings. Introduction to object oriented programs. Classes. Polymorphism, inheritance and overloading. Lists and applications. Weekly laboratory assignments. A. El-Hajj, S. Karaki.

ELEG 041 Electric Circuits. 3 cr.; annually. *For non ECE students.* Resistive circuit techniques and methods of analysis. Transient circuits. Sinusoidal analysis. Polyphase systems. Introduction to operational amplifiers. R. Chedid.

ELEG 042 Analog Electronics. 3 cr.; annually. Prerequisite: ELEG 022. Single-stage BJT and MOS amplifiers. Differential amplifiers. Multistage amplifiers. Frequency response of amplifiers. Output stages. Operational amplifier. Oscillators. Filters. A. Kayssi.

ELEG 043C Discrete Mathematics. 3 cr.; annually. Sets, sequences and functions, elementary logic, relations, induction and recursion, counting, introduction to graphs and trees, recursion, trees, and algorithms, digraphs, finite-state machines. K. Kabalan.

ELEG 044 Analog Electronics Laboratory. 1 cr.; annually. Co-requisite: ELEG 042. Experiments with BJT and FET amplifiers. Design of high input impedance amplifiers. Experiments with Op-Amps. Design of Op-Amp circuits. Design of power amplifiers. Design of wave generators and regulators. A. Kayssi.

ELEG 049 Digital Systems Design. 3 cr.; annually. Boolean Algebra. Describing logic equations. Realizing logic in hardware. Building blocks for digital design. Building blocks with memory. Design methods. Practicing design of combinational, synchronous and asynchronous logic circuits. A. El-Hajj, S. Karaki.

ELEG 052 Digital Electronics. 3 cr.; annually. Prerequisite: ELEG 049. Digital Circuits. Diode logic. The BJT as a switch. Digital technologies and families. Bistable circuits. Digital systems. MSI and LSI logic circuits. Interfaces. A/D and D/A conversion. A. Kayssi.

ELEG 052M Electronics. 3 cr.; annually. Prerequisite: ELEG 041. *For non ECE students.* Semiconductor theory. Diodes and applications. Bipolar transistors. Amplifier circuits. Operational amplifiers. Feedback amplifiers. Logic elements. Digital devices. S. Karaki.

ELEG 053E Electromagnetic Devices. 3 cr.; annually. Magnetic circuits: basic concepts, characteristics and applications of magnetic materials. Transformers: construction, types, connections, operational features and tests. Electromechanical energy conversion systems; singly-and doubly excited systems. Basic concepts of rotating machines. F. Chaaban.

ELEG 054 Digital Electronics Laboratory. 1 cr.; annually. Prerequisite: ELEG 049. Experiments with NAND and NOR gates. Design of decoders, adders, parity checkers and comparators. Experiments with flip-flops. Design of counters and shift registers. BCD adder. Experiments with an ALU and memories. Experiments with timers. A. Kayssi.

ELEG 055C Data Structures and Advanced Algorithms. 3 cr.; annually. Prerequisite: ELEG 025. Introduction to analysis of algorithms. Stacks, queues, trees and graphs with applications. Sorting and searching algorithms. A. El-Hajj.

ELEG 059 Microprocessor Systems. 3 cr.; annually. Prerequisite: ELEG 049. Microprocessor concepts. CPU instructions. Internal registers structure. 8085 and

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Z80 microprocessors. Basic microprocessor interfacing: memory chip selection, memory expansion, I/O interfacing. I/O techniques: polling, interrupts, DMA. Daisy-chaining. Overview of the state-of-the-art CPUs. H. Diab.

ELEG 063E Rotating Machinery. 3 cr.; annually. Prerequisite: ELEG 053E. DC machines: construction, types, steady-state performance of motors and generators, control. Synchronous and induction machines: construction, equivalent circuits, principle of operation, parallel operation of alternators. F. Chaaban.

ELEG 065C Software Applications and Design. 3 cr.; annually. Prerequisite: ELEG 055C. Analysis, design, construction, maintenance and evolution of large software systems. Project management techniques. Introduction to database systems. Students will work on projects that include the analysis, design and implementation of a software system. A. El-Hajj.

ELEG 066 Analog Signals and Systems Analysis. 3 cr.; annually. Prerequisite: ASST 055. System and signal representations. Fourier series and signal spectra. Fourier transform. Convolution. Sampling theorem. Power and energy spectral densities. Hilbert transform. K. Kabalan, J. Saade.

ELEG 071E Fundamentals of Electric Power Engineering. 3 cr.; annually. Basic concepts: generation, transmission and distribution. Economics of AC and DC systems. Design and modeling aspects of electricity supply systems. Current and voltage relations on a transmission line. Simplified load flow analysis. Introduction to power system operation and control problems. M. Yehia.

ELEG 072E Theory of Semiconductor Devices. 3 cr.; annually. Prerequisites: ELEG 042, ELEG 052. Semiconductor device fundamentals. Energy bands. Generation and recombination. Drift and diffusion. PN junctions. Metal-semiconductor junctions. Bipolar junction transistors. Junction field-effect transistors. MOS transistors. GaAs devices. Solar cells. Optoelectronics devices. Faculty Member.

ELEG 073 Feedback Controls. 3 cr.; annually. Prerequisite: ASST 045. Introductory Concepts. Mathematical models of systems. Transfer function and block diagrams. Performance specifications, stability analysis and controller design of continuous linear single input-single output control system in time and frequency domains. K. Kabalan, F. Mrad.

ELEG 074C Microprocessor Laboratory. 1 cr.; annually. Prerequisite: ELEG 059. Experiments sing icroprocessor it: MS rainer. esign nd mplementations of a controller board for interfacing to trainer. Troubleshooting techniques. Assembly language programming. Using the logic analyzer. A. El-Hajj.

ELEG 074E Electric Machines Laboratory. 1 cr.; annually. Prerequisite: ELEG 063E. Single and three phase transformers, DC machines: series, shunt and compound machines. Three phase synchronous machines and induction motors. F. Chaaban.

ELEG 077E Discrete Signals and Systems Analysis. 3 cr.; annually. Prerequisite: ELEG 066. Introduction to discrete signals and systems. Difference equations. Convolution techniques. Z-transforms. Discrete-time system analysis. Fourier analysis. Sampling and interpolation. Modulation. Introduction to digital filters. A. Al-Alaoui.

ELEG 078 Field Theory. 3 cr.; annually. Prerequisite: ASST 055. Electrostatic fields in vacuum and dielectrics. Conductors. Capacitance. Poisson's equation. Magnetic

fields. Inductance. Magnetic potential. Maxwell's equations. Wave equations. Propagation and reflections of electromagnetic waves. Skin effect. S. Khoury.

ELEG 078M Electromechanical System. 3 cr.; annually. Prerequisite: ELEG 041. *For ME students*. Magnetic circuits, electromechanical relays, and transformers. DC and AC machines and their principal of operation and control. R. Chedid.

ELEG 079C Computer Architecture. 3 cr.; annually. Prerequisite: ELEG 059. Computer interconnection structures. Microprocessor interfacing techniques. Serial/parallel communication. Processor/register organization. Instruction and arithmetic pipelining. CU operation. Hardwired/ microprogrammed control, micro-instruction sequencing/execution. Instruction set design. RISC systems. Controllers. Introduction to parallel processing. Computer systems design. H. Diab.

ELEG 081E Power System Analysis. 3 cr.; annually. Prerequisite: ELEG 071E. Power system modeling. Load flow studies. Reactive power compensation and voltage control. Economic operation. Symmetrical and unsymmetrical short circuit studies. Power system stability. Introduction to energy management systems. M. Yehia.

ELEG 082E Power Electronics. 3 cr.; annually. Prerequisites: ELEG 052, ELEG 063E. Diodes. Diode circuits and rectifiers. Thyristors. Controlled rectifiers. Power transistors. DC choppers. Pulse width modulated inverters. Introduction to gate and base drive circuits. Switching power supplies. S. Karaki.

ELEG 083C Electric Machines. 3 cr.; annually. Prerequisite: ELEG 021. Magnetic circuits and transformers. Force and torque in electromagnetic systems. DC and AC machines. Stepper motors: configurations, control algorithm, application in computer hardware, and driver configurations. F. Chaaban.

ELEG 083E Digital Control. 3 cr.; annually. Prerequisite: ELEG 077E. Discrete signals and systems analysis. Sampled data systems. Analysis and design of digital control systems using transform techniques. Design of digital control systems using state-space methods. Using microprocessor based controllers to control continuous processes. Practical applications of digital control. F. Mrad.

ELEG 084 Control Systems Laboratory. 1 cr.; annually. Prerequisite: ELEG 073. Introduction to the analog computer. Analysis of linear systems. Second order system. Effects of poles and zeros on the transient response. Effect of gain upon response and stability. Compensation implementation. F. Mrad.

ELEG 084E Power Electronics and Drives Laboratory. 1 cr.; annually. Prerequisite: ELEG 063E or ELEG 078M. Single phase induction motors. Stepper, motor drives. Solid state drives torque-speed tests, torque boost and variable frequency control. F. Chaaban.

ELEG 085C System Software. 3 cr.; annually. Prerequisite: ELEG 079C. Introduction to the design and construction of compilers, operating systems, assemblers, loaders, linkers and macroprocessors. A. El-Hajj.

ELEG 086 Analog Communications. 3 cr.; annually. Prerequisites: ELEG 066, ASST 037. Introductory concepts. Amplitude modulation. Frequency modulation. Random processes and noise. Noise in CW modulation. Pulse analog modulation. K. Kabalan, J. Saade.

ELEG 088 Signal Transmission. 3 cr.; annually. Prerequisite: ELEG 078. Transmission lines. Transient and steady state analysis and measurements. Impedance matching.

TE and TM waves. Rectangular and circular waveguides. Radiation and antennas. S. Khoury.

ELEG 089E Microprocessor Laboratory. 1 cr.; annually. Same as ELEG 074C. F. Mrad.

ELEG 101E Industrial Electrification. 3 cr.; annually. Prerequisites: ELEG 063E, ELEG 071E. Medium and low voltage installations. Lighting. Practical applications of electric machines. Motor control centers. Emergency power supplies. Auxiliary systems. Faculty Member.

ELEG 102E Instrumentation. 3 cr.; annually. A design course for complete instrumentation systems. Measurements, sensors, data acquisition, component integration. Application reas or ourse rojects nclude: ndustrial ontrol, biomedical equipment, electronics, electronics packages. F. Mrad.

ELEG 103E Electric Drives. 3 cr.; annually. Prerequisite: ELEG 063E. Single-phase motors: starting, control. DC drives: dynamic equations, choppers and inverter drives. AC drives: pulse width modulation, voltage and frequency controls, cycloconverters. Stepper motors: types, operational characteristics, dynamics, power drives configurations. Special motors: brushless dc and permanent magnet motors, servo motors. F. Chaaban.

ELEG 104 Control Systems Laboratory. 3 cr.; annually. Same as ELEG 084. F. Mrad.

ELEG 104C Communications Laboratory I. 1 cr.; annually. Prerequisite: ELEG 086. Sine-Cosine Oscillators. AM modulation. AM demodulation. FM modulation. Zero-crossing detector. PLLs. AM receiver stages. AM receiver. K. Kabalan.

ELEG 105C Computer Networks. 3 cr.; annually. Prerequisite: ELEG 079C. Network architecture. The OSI reference model. The physical, medium access, data link, network, transport, and application layers. TCP/IP and ATM networks. A Kayssi.

ELEG 106C Digital Communications. 3 cr.; annually. Prerequisite: ELEG 086. Representation of source messages (PCM, DPCM, DM). Baseband data transmission. Gram-Schmidt procedure and detection of bandpass signals. ASK, PSK, FSK. Correlators and matched filters. J. Saade.

ELEG 107 Final Year Project. 0 cr.; annually. Supervised project in groups of normally three students aimed at providing practical experience in some aspects of Computer, Communications, and Electrical Engineering. Faculty Members.

ELEG 107E Fiber Optics. 3 cr.; annually. Basic principles of optics: generation and propagation of light, interaction of light and matter, geometric optics, ray tracing and introduction to aberration theory, superposition of waves, coherence and interference, Fresnel and Fraunhofer diffraction. Special topics: lasers and holography. Faculty Member.

ELEG 109 Telephony I. 3 cr.; annually. Telephone system components. Switching, ESS, PABX. Signaling: functions, types and criteria. Transmission: speech and data. Carrier systems: analog and digital. Networks and loss assignments. Faculty Member.

ELEG 111 Microwave Communication Systems. 3 cr., annually. Transmission principles. Transmission media: lines, radio links, optical fibers. Antennas: L.F., H.F., earth stations, satellites. Design and performance of microwave links, satellite communications and cellular radio. Faculty Member.

ELEG 112E Power System Protection and Switchgear. 3 cr.; annually. Prerequisite: ELEG 063E. Current and voltage transformers and protection. Overvoltage

protection. Relays. Circuit breakers and fuses. Data transmission. Project. Faculty Member.

ELEG 113 Digital Control. 3 cr.; annually. Same as ELEG083E with additional hardware implementation of micro-controllers. F. Mrad

ELEG 114C Communications Laboratory II. 1 cr.; annually. Prerequisite: ELEG 106C. Experiments cover the following: Pulse amplitude modulation (PAM), pulse code modulation (PCM), differential PCM, pulse position modulation (PPM), pulse width modulation (PWM), time division multiplexing (TDM), as well as ASK, PSK, FSK and noise in digital signal reception. J. Saade.

ELEG 114E Power Systems Laboratory 1 cr.; annually. Prerequisite: ELEG 081E. Measurement of characteristic data of a transmission line. Voltage drop and losses. Steady-state operation of a "generator-infinite bus" system. Stability of electric power system. Power system software applications. M. Yehia.

ELEG 115C Design and Applications of Information Systems. 3 cr.; annually. Hardware and software election riteria. ase tudies. pplication oftware maintenance. Resource allocation. Scheduling. Staffing requirements processing organizations. Application. Faculty Member.

ELEG 116 Communications Laboratory I. 1 cr.; annually. Same as ELEG 104C. K. Kabalan.

ELEG 117 Final Year Project. 3 cr.; annually. Supervised project in groups of normally three students aimed at providing practical experience in some aspects of Computer, Communications, and Electrical Engineering. Faculty Members.

ELEG 118 Telephony II. 3 cr.; annually. Networks and common channel signaling: integrated services digital network, cellular global system for mobile communication, signaling system no. 7. Components and Protocols. Faculty Member.

ELEG 119E Microelectronic Systems Design. 3 cr.; annually. Introduction to CMOS circuits and MOS transistors. Processing technology. Characterization and performance estimation. Circuit and logic design. Design methods. Testing. Subsystem design. System design. Design project. A. Kayssi.

GRADUATE PROGRAMS

The Department of Electrical and Computer Engineering offers the degree of Master of Engineering in three majors:

1. Computer and Communications Engineering (CCE)
2. Electric Power Engineering (EPE)
3. Electronics, Devices, and Systems (EDS)

The requirements, structure, core and elective courses of each of the three majors are as stated below, with the overriding stipulation that up to three electives may be taken outside the major, of which up to two electives may be taken outside the Department, subject to the approval of the advisor.

MASTER OF ENGINEERING:
MAJOR, COMPUTER AND COMMUNICATIONS ENGINEERING

Requirements

1. All relevant requirements and regulations of the University and the Faculty of Engineering and Architecture for the Master's Degree shall apply to the Program.

2. In order to be eligible for admission to the Program, a student must have a Bachelor of Engineering Degree: major, Computer and Communications Engineering, or its equivalent. Electrical Engineering graduates in majors other than Computer and Communications Engineering may be admitted to the Program subject to making up deficiencies in their undergraduate studies.

Structure

1. A mandatory core of 3 courses (9 credit hours), one in each of the three areas of computers, communications, and networks. These courses are described below.

2. Five elective courses (15 credit hours) in areas related to computer and communications systems. These courses are listed under 'Electives' below.

3. Seminar Course: Every Semester. ELEG 700 Seminar (No credit).

4. A thesis based on independent research: ELEG 799 Thesis (6 credit hours).

COURSE DESCRIPTIONS

Core Courses

ELEG 710C Advanced Computer Architecture. 3 cr.; annually. Prerequisite: ELEG 079C. The course focuses on the allocation of hardware and software resources in solving large-scale computing problems, with emphasis on the relationships between hardware organization, system programming and language support in the evolution of advanced computer architectures. H. Diab.

ELEG 760C Stochastic Processes, Detection and Estimation. 3 cr.; annually. Prerequisites: ASST 037, ELEG 066. Types of random processes, series representation, and filtering. Hypothesis testing and parameter estimation from a probabilistic point of view. Extension to detection and estimation of known signals in white and non-white noise. Prediction and filtering problems. J. Saade.

ELEG 770C Discrete Event Stochastic Processes and Queueing Theory. 3 cr.; annually. Prerequisite: ELEG 760C. Poisson counting and renewal processes. Markov chains and decision theory, branching processes, birth death processes and semi-Markov processes. Simple Markovian queues, networks of queues, General single and multiple-server queues, bounds and approximations. K. Kabalan.

Elective Courses

ELEG 709C Computer Graphics. 3 cr.; annually. Prerequisite: ELEG 079C. Interactive graphics. Graphics hardware. Graphical input devices. Windowing. Clipping. Viewports. Zooming, geometrical transformations (2D and 3D). Data structures. Advanced raster display architectures. Raster algorithms. Special graphics techniques. Applications. H. Diab.

ELEG 711C Computer System Analysis. 3 cr. Prerequisite: ELEG 079C. Development of analytical models of computer systems and application of such models to performance evaluation. Topics include scheduling policies, paging algorithms, multiprogrammed resource management, and queuing theory. Faculty Member.

ELEG 712C Advanced Computer Graphics. 3 cr. Prerequisite: ELEG 709C. Examines advanced state-of-the-art computer graphics techniques needed to produce shaded images of three-dimensional solids, including ray tracing, new reflection models, and fractal systems. Faculty Member.

ELEG 713C Modeling and Simulation. 3 cr. Prerequisite: ELEG 079C. Deals with the construction, testing and use of mathematical models for engineering applications, as an aid to the design of engineering systems and in order to gain better understanding of interactions among the components of a given system and the effects of modifications of the system on its performance. H. Diab.

ELEG 714C Fault Tolerant Systems Design. 3 cr. Prerequisites: ELEG 710C, ELEG 760. Theory and techniques for the diagnosis of hardware faults in digital systems. Fault detection and diagnosis in logic networks. Static and dynamic redundancy to achieve error detection and error correction. Coding to achieve error detection and correction. Faculty Member.

ELEG 735C Time Series, System Analysis and Identification. 3cr. Prerequisites: ELEG 730S, ELEG 791C. Introduction to time series. Auto regressive moving average models and their characteristics. Modeling. Forecasting. Stochastic trends and seasonality. Multiple series and optimal control. Applications. Faculty Member.

ELEG 751C Artificial Intelligence. 3 cr.; annually. Search techniques, games, knowledge representation, logic and theorem proving. Expert systems. Natural language understanding vision. Learning from experience. Lisp is used to write programs related to the course. Faculty Member.

ELEG 755C Advanced Topics in Algorithms. 3 cr. Worst-case linear-time order statistics. Skip lists. Dynamic order statistics. Augmenting data structures. Interval trees. Greedy algorithms. Disjoint-set union. Amortized analysis. Graph searching, network flow. Sorting networks. Arithmetic circuits. Algorithms for parallel computers. Faculty Member.

ELEG 759C Object Oriented Systems. 3 cr.; annually. Prerequisite: Advanced Standing. Object oriented technology, languages, databases, analysis and designs, and systems: software lifecycles, layered architectures, object reusability, multideveloper support. Faculty Member.

ELEG 761C Advanced Digital and Data Communications. 3 cr.; alternate years. Prerequisites: ELEG106C. Measures of information. Source coding. Channel coding. Channel capacity. Soft and hard decision decoding. Digital signalling over a channel with intersymbol interference. Other topics. J. Saade.

ELEG 762C Information Theory and Coding. 3 cr. Prerequisite: ELEG 760C. Entropy and mutual information. Discrete memoryless channels and their capacity-cost functions. Discrete memoryless sources and their rate-distortion functions. Guassian channel and sources. Linear codes, convolutional codes, and variable-length source coding. A. Al-Alaoui

ELEG 763C Recursive Estimation. 3 cr. Prerequisites: ELEG 760C, ELEG 791C. State-space based theory of dynamic estimation. Kalman filter and its properties. The Riccati equation, the square root filter and efficient algorithms for the Kalman gain. Optimal smoothing for linear systems. Nonlinear filters and the extended and second-order Kalman filters. Faculty Member.

ELEG 764C Fuzzy Sets, Logic and Applications. 3 cr.; annually. Prerequisite: Senior or graduate standing. Fuzzy set and related concepts. Logical connectives. Mapping of fuzzy sets. Extension principle. Fuzzy relations and fuzzy set ordering. Fuzzy logic inference. Applications: Fuzzy control, signal processing, pattern recognition, decision making and expert systems. J. Saade.

ELEG 771C Data Communication Networks. 3 cr.; alternate years. Prerequisite: ELEG 105C. Network topology. Data transmission fundamentals. Error control. Multilayer network architecture and protocols. Network management. Network security and privacy. Network performance measurements. A. Kayssi.

ELEG 772C Local Area Networks. 3 cr. Prerequisite: ELEG 770C. Data communication. Data flow in networks and queries. Circuit-switched local networks. Networks truction and topology. Performance measures. Performance of Basic Access protocols. Polling network, ring networks, random access networks. The ISO reference model ethernet and token bus networks. Faculty Member.

ELEG 773C Neural Networks. 3 cr.; alternate years. Perceptron, madalina, back propagation and adaptive neural networks. Transformation by layered networks, statistical neurodynamics, associative memory and neural learning. Applications o functional approximations, signal filtering and pattern classification. A. Al-Alaoui.

ELEG 775C Client-Server Computing. 3cr.; alternate years. Prerequisite: ELEG105C. Internet and intranet technologies. The client-server model of interaction. Design and implementation of clients and servers. Interactive and concurrent servers. Distributed computing. Application gateways. Design project. A. Kayssi.

ELEG 791C Digital Signal Processing. 3 cr.; alternate years. Discrete-time signals. Z-transform. Discrete and fast fouiver Transorms. finite impulse response and infinite impulse response digital filters. Effects of finite word length. A. Al-Alaoui.

ELEG 792C Advanced Digital Signal Processing. 3 cr. Prerequisites: ELEG 760C, ELEG 791C. Fast Fourier transform. Spectral analysis. Multirate signal processing with applications. Signal processing hardware. Applications to speech processing. Faculty Member.

ELEG 793C Pattern Recognition. 3 cr. Prerequisite: ELEG 760C. Decision functions. Pattern classification by distance functions. Pattern classification by likelihood functions. Trainable pattern classifiers-deterministic and statistical approaches. Pattern preprocessing and feature extraction. Syntactic pattern recognition. A. Al-Alaoui.

ELEG 794C Digital Image Processing. 3 cr.; alternate years. Prerequisites: ELEG 760C, ELEG 791C. Two-dimensional signals and systems. Image formation and perception. Representation, coding, filtering restoration and enhancements. Feature extraction and scene analysis. Introduction to computer vision. A. Al-Alaoui.

Special Courses and Thesis

ELEG 797 Special Topics.

ELEG 798 Special Project. Assigned project, of not more than 3 credit hours, supervised by a Faculty member.

ELEG 799 Thesis. Every Semester. Faculty Member.

MASTER OF ENGINEERING:
MAJOR, ELECTRIC POWER ENGINEERING

Requirements

1. All relevant requirements and regulations of the University and the Faculty of Engineering and Architecture for the Master's degree shall apply to the program.

2. In order to be eligible for admission to the program, a student must have a degree of Bachelor of Engineering: major, Electrical Engineering, from AUB, or its equivalent. Electrical Engineering graduates of other universities, or in other majors, may be admitted to the program subject to making up for any deficiencies in their undergraduate studies.

Structure

The program comprises a total of 30 credit hours distributed as follows:

1. A mandatory core of two courses (6 credit hours), one in the area of electric machinery (ELEG710E) and the other in the area of electrical power systems (ELEG740E). These courses are outlined below.

2. Three technical elective courses (9 credit hours) in electric power engineering (course sequences ELEG71 xE – ELEG78 xE). Courses in these sequences are described below.

3. One elective course (3 credit hours) in the management and environmental areas (course sequence ELEG79 xE in the program and courses listed under the Electrical Engineering Sequence in the Engineering Management program). Courses in the sequence ELEG79 xE are described under 'Electives', below.

4. Two elective courses (6 credit hours) in areas related to electric power engineering, such as computer science, control systems, electronics, mechanical engineering, mathematics, economics, and management. These courses may be taken in the Faculty of Engineering and Architecture or in the Faculty of Arts and Sciences, as appropriate.

5. Seminar Course: ELEG 700 Seminar (no credit).

6. A thesis based on independent research: ELEG 799 Thesis (6 credit hours).

Course Descriptions

Core Courses

ELEG 710E Advanced Electric Machinery. 3 cr.; alternate years. Review of energy conversion principles. Reference frame theory, computer modeling of induction and synchronous machines, linearized and reduced order equations, modeling and simulation of non-conventional electromechanical converters. Introduction to the analysis of electric machines by finite elements method. R. Chedid.

ELEG 740E Computer Analysis of Power Systems. 3 cr.; alternate years. Large scale power systems, power system matrices and programming considerations. Advanced power flow studies, voltage and reactive flow control. Fault analysis, transient analysis and power system stability. S. Karaki.

Elective Courses

ELEG 711E Computer Aided Design of Electromagnetic Devices. 3 cr.; alternate years. The finite elements method in one and two dimensions. Non-linear and axi-symmetric problems. Preprocessing techniques, efficient solvers, postprocessing principles. Calculation of major parameters from field solutions. Introduction to finite elements in 3-D. R. Chedid.

ELEG 721E Power Plant Technology. 3 cr. Prime movers survey, analysis of energy transfer, control and protective systems, prime mover high speed dynamics, torsional vibration, coupling of prime movers and generators. Generator types, excitation systems, insulation, cooling, mechanical construction. Control systems, substations, test methods. Transient effects. Economics. Faculty Member.

ELEG 722E Transmission and Distribution Systems. 3 cr. State-of-the art in electric transmission systems: ultra high voltage ac transmission, h.v. dc. transmission, cable systems, interconnected system. Mechanical aspects, corona and audible noise. Substation design. Rural and urban distribution systems, street lighting. Faculty Member.

ELEG 723E Surge Phenomena and Insulation Coordination. 3 cr. Flashovers and impulse insulation strength of air, oil and SF6. Causes of overvoltages. Surge generators. Basic insulation levels, and overvoltage protection devices: principle of operation, construction, selection and location in the system, coordination of insulation levels with other system equipment. Faculty Member.

ELEG 724E Switchgear Technology. 3 cr. Arc phenomena in circuit breakers, networks switching conditions. Main types of circuit breakers, isolating and load switches, autoreclosure, electromechanical and solid state relays: principle of operation, basic construction, characteristics, testing. Computer-aided application of relays. Faculty Member.

ELEG 731E Modern Distribution Systems. 3 cr.; alternate years. Prerequisite: ELEG071E. Engineering-economic analysis of electric power supply systems. Computer-aided design techniques. Substation and distribution automation. Control centers. Information equirements nd rocessing echniques. D stribution management systems. Demand side management. M. Yehia.

ELEG 741E Power System Planning. 3 cr.; alternate years. Energy and peak load forecasts, weather-sensitive forecasts, generation reliability, load duration curves, loss-of-load expectation, capacity reserve evaluation, generation and transmission expansion, power flow analysis, reliability of bulk supply, cost-benefit analysis. S. Karaki.

ELEG 742E Electric Power System Operation and Control. 3 cr; alternate years. Short-term load forecasting, generation unit commitment, economic load dispatch, loss formula coefficients, nonlinear programming, optimal power flow, security assessment, security dispatch, spinning reserve evaluation, automatic generation control, reactive power and voltage control, state estimation. S. Karaki.

ELEG 784E Renewable Energy Systems. 3 cr.; alternate years. Wind, solar, hydro, biomass and geothermal resources. Resource assessment, electric drive options, control problems, environmental aspects of electricity generation, stand-alone and utility applications. Institutional and policy issues, integrated energy systems. R. Chedid.

ELEG 791E Management and Control Systems in the Power Industry. 3 cr.; annually. Engineering-Economic analysis of electric energy systems. Integrated national energy policies. Evolution of power engineering control technology. Power system control centers. Hardware and Software structure. Security assessment and enhancement. State Estimator and training simulator. Management, Geographic, and Customer Information Systems. Project management of EMS and power projects. M. Yehia.

ELEG 792 Environmental Aspects of Energy Systems. 3 cr.; alternate years. Prerequisites: Graduate standing and consent of instructor. World energy resources and classifications. Sources and effects of air pollution. Air quality modeling, Gaussian dispersion models. Motor vehicles emissions and noise pollution. Environmental impacts of electricity generation, pollution control systems, electromagnetic radiations. Environmental impact assessment; basic concepts. F. Chaaban.

Special Courses and Thesis

ELEG 797 Special Topics.

ELEG 798 Special Project. Assigned project, of not more than 3 credit hours, supervised by a Faculty member.

ELEG 799 Thesis. Every Semester. Faculty Member.

MASTER OF ENGINEERING:
MAJOR, ELECTRONICS, DEVICES, AND SYSTEMS

Requirements

1. All relevant requirements and regulations of the University and the Faculty of Engineering and Architecture for the Masters degree shall apply to the program.

2. In order to be eligible for admission to the program, a student must have a degree of Bachelor of Engineering: major, Computer and Communications Engineering or Electrical Engineering, from AUB. Computer, Communication and Electrical Engineering graduates of other universities, or in other majors, may be admitted to the program subject to making up deficiencies in their undergraduate studies.

Structure

In order to fulfil graduation requirements a student must complete 30 credit hours, distributed as follows:

1. A mandatory core of three courses (9 credit hours), as specified under "course descriptions" below.
2. Five elective courses (15 credit hours) provided that they are not limited to only one of the four areas: Control System, Optical Systems, Biomedical Systems, Semiconductor Devices and Systems, listed under electives.

3. Seminar Course: ELEG 700 Seminar (no credit).

4. A thesis based on independent research: ELEG 799 Thesis (6 credit hours).

Course Descriptions

Core Courses

ELEG 710S Semiconductor Devices. 3 cr.; alternate years. Schrodinger's equation. Energy bands, electrons and holes. Scattering. Generation and recombination. Heterojunction diodes. Tunneling and lasing. Bipolar transistors, MOSFETs, GaAs devices. Faculty Member.

ELEG 720S Circuit Synthesis and Design. 3 cr.; alternate years. Realization of one-port and two-port circuits. Operational amplifiers and control of poles and zeros. Applications to wave shaping, active filters, capacitive switching, design of analog to digital, digital to analog, and sample and hold circuits. A. Kayssi.

ELEG 730S System Analysis and Design. 3 cr.; annually. State-space models of discrete and continuous, linear and nonlinear systems. Controllability. Observability. Minimality. Eigenvector and transforms analysis of linear time invariant multi-input

multi-output systems. Pole shifting. Computer control. Design of controllers and observers. F. Mrad.

Elective Courses

1. Control Systems

ELEG 732S Optimal Control. 3 cr. Optimization theory and performance measures. Calculus of variations. The maximum principle. Dynamic programming. Numerical techniques. LQR control systems. Faculty Member.

ELEG 733S Process Control. 3 cr. Integrated study of process control and modern control theory, including process characteristics, control elements, control selection and evaluation, multi-loop systems, direct digital control, parameter sensitivity, and optimization. Faculty Member.

ELEG 734S Stochastic Control. 3 cr. Prerequisite: ELEG 730S. Analysis and optimization of controlled stochastic systems. Models: linear and nonlinear stochastic control systems, controlled Markov chains. Optimization of Markov processes; dynamic programming. System identification: off-line, recursive. Stochastic adaptive control: Markov chains, self-tuning regulators, bandit problems. Faculty Member.

ELEG 735S System Identification. 3 cr. Prerequisite: ELEG 730S, ELEG 731S. Introduction to time series. Auto regressive moving average models and their characteristics. Modeling. Forecasting. Stochastic trends and seasonality. Multiple series and optimal control. Applications. Faculty Member.

ELEG 736S Adaptive Control. 3 cr.; alternate years. Control of partially known systems. Analysis and design of adaptive control systems. Self-tuning regulators, model Reference Adaptive Control of uncertain dynamic systems. Typical applications. F. Mrad.

ELEG 737S Robotics. 3 cr.; annually. Robot manipulators: kinematics, control, programming, task planning, effect of load. Design of robot controllers: path tracking, force feedback control, real-time computation issues. Design project. F. Mrad.

ELEG 738S Non-Linear Control. 3 cr. Prerequisite: ELEG 730S. Methods of analysis and design of nonlinear control systems. Topics include: stabilizing controllers, absolute stability theory, describing function methods, input-output stability of feedback systems. Control techniques for nonlinear systems. Faculty Member.

2. Optical Systems

ELEG 741S Optical Sources, Detectors and Systems. 3 cr. Prerequisite: ELEG 710S. Polar and thermal radiation. Photons. Plank's law. Spontaneous and simultaneous emissions. Laser action. Semiconductor photodiodes. Amplifier noise in FETs. Signal-to-noise ratio and its effects on optical systems performance. Measurement precision. Detection probabilities. Bit error rates. Faculty Member.

ELEG 742S Modern Optics. 3 cr. Electromagnetic theory. Polarization, reflection, refraction, coherence and interference. Fraunhofer and Fresnel diffraction. Imaging

and transforming properties of lenses. Spatial filtering. Holography. Electro-optic and acousto-optic materials and devices. Guided optical waves. Faculty Member.

ELEG 743S Optical Fiber Communication. 3 cr. Light and circular mode theory. Step and graded index. Fiber characteristics. Losses. LED and Laser sources. Photodetectors and optical receivers. Digital communications. Faculty Member.

ELEG 745S Light-wave Systems. 3 cr. Prerequisites: ELEG 710S, ELEG 742S. LED and laser optical transmitters. PIN and APD receivers. Frequency and phase modulation of semiconductor lasers. Coherent optical communication. Sensitivity and frequency selectivity. FDM systems. Fiber non-linearity effect. High-power laser array. Wavelength division multiplexing. Faculty Member.

ELEG 747S Fiber-Optic Networks. 3 cr. Prerequisites: ELEG 710S, ELEG 742S. Fibers, couplers and taps. Tunable filters. Laser diodes. Lightwave amplifiers. Modulation, detection and demodulation of optical signals. Subcarrier systems. Topological organization of systems. Layered architectures and network control. Multiaccess, switching and performance. Realization of optical networks. Faculty Member.

3. Biomedical Systems

ELEG 701S Biomedical Engineering I. 3 cr.; alternate years. Prerequisite: Biology 210, or consent of instructor. Introduction: general instrumentation configuration, living cells, performance of instrumentation systems. Types and characteristics of transducers. Sources and characteristics of bioelectric signals and electrodes. Cardiovascular system, measurements and diagnostic equipment. Patient care and monitoring. N. Sabah.

ELEG 702S Biomedical Engineering II. 3 cr.; alternate years. Prerequisite: ELEG 701S. Respiratory system. Non-invasive diagnostic instrumentation. Nervous system. Biotelemetry. Clinical laboratory. X-ray and radioisotopes. Magnetic resonance.. Electrosurgery. Computers in medicine. N. Sabah.

ELEG 705S Neuroengineering I. 3 cr.; alternate years. Prerequisite: Biology 210, or consent of instructor. The importance of biological systems from the engineering viewpoint; living cells and mechanisms. Introduction to the nervous system. The resting membrane potential. Generation and propagation of the action potential. Motor systems. Synaptic transmission. Control of movement. N. Sabah.

ELEG 706S Neuroengineering II. 3 cr.; alternate years. Prerequisite: ELEG 705S. Motor systems: overall organization, locomotion, balance, manipulation, and vocalization. Auditory system and perception. Visual system and perception, machine vision. Higher functions: language and communication, learning and memory, consciousness. Machine intelligence and learning. N. Sabah.

4. Semiconductor Devices and Systems

ELEG 781S Modeling and Simulation of Semiconductor Devices. 3 cr. Prerequisite: ELEG 710S. Computer simulation techniques for IC processing and device modeling. Use of SUPREME for process modeling and SEDAN for device analysis

to characterize effects such as bipolar current gain, MOS threshold voltage, and model parameter extraction for SPICE. Faculty Member.

ELEG 782S RC Active Filters. 3 cr. The approximation problem, the second-order functions and active building blocks. Sallen-key filters, state variable filters. Design of high-order active filters using generalized immittance converter and multiloop techniques. Practical limitations. A. Al-Alaoui.

ELEG 783S Analog MOS ICs. 3 cr. Fundamentals of analog MOS IC design. Small-signal device and circuit models. Design of amplifiers, analog switches, sample and hold circuits, comparators and voltage references. A/D and D/A converters and switch capacitor filters. Faculty Member.

ELEG 784S Introduction to Digital VLSI Systems. 3 cr.; alternate years. MOS transistors, static and dynamic MOS gates, stick diagrams, mask layout. Design rules, resistance and capacitance extraction, power and delay estimate and scaling. MOS combinational and sequential design. Applications: shift registers, ROM, RAM, PLA, and microprocessors. A. Kayssi.

ELEG 785S Introduction to Analog VLSI Systems. 3 cr. Prerequisite: ELEG 784S. Basic IC building blocks. Current mirrors, voltage and current references, and amplifiers. Digital to analog converters, analog to digital converters, continuous-time filters, switch capacitor filters. Modulators and multiplexers, oscillators, and phase-locked loops. Faculty Member.

ELEG 786S IC Fabrication and Characterization. 3 cr. BJT, MOS, CMOS, BICMOS processes: silicon wafer preparation, photolithography, chemical etching, plasma etching, oxidation, diffusion, ion implantation, chemical vapor deposition and physical sputtering. Bonding and packaging. Faculty Member.

ELEG 787S Computer-Aided Analysis and Design of VLSI Circuits and Systems. 3 cr. Prerequisite: ELEG 784S. Circuit and logic simulation. Timing analysis and verification. Testing and fault simulation. Logic and high-level synthesis. Physical design automation. Faculty Member.

Special Courses and Thesis

ELEG 797 Special Topics.

ELEG 798 Special Project. Assigned project, of not more than 3 credit hours, supervised by a Faculty member.

ELEG 799 Thesis. Every semester. Faculty Member.

DEPARTMENT OF MECHANICAL ENGINEERING

Chairperson:	Moukalled, F.
Professors:	Azoury, P.; Ghaddar, N.; Moukalled, F.
Associate Professors:	Darwish, M.; Kuran, A.; Nuwayhid, R.
Visiting Assistant Professor:	Mashmoushy, H.
Senior Lecturers:	Abi-Said, C.; Mayyasi, A.
Lecturers:	Abu Ghali, K.; Azar, C.; Fardoun, F.; Kasamani, J.; Najm, W.;
Instructor:	Majzoub, M.

CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING: MAJOR, MECHANICAL ENGINEERING

Term I (Fall)	Credit hours
ASST 010 Computer Literacy I	0
ELEG 015 Introduction to Structured Programming	3
CVEV 011 Statics	3
Chem 201 Chemical Principles	3
Phys 211 Electricity and Magnetism	3
Math 201 Calculus and Analytic Geometry III	3
	15

Term II (Spring)	
ASST 020 Computer Literacy II	0
ELEG 025 Structured Programming and Data Structures	3
MCEG 011 Engineering Graphics	3
MCEG 022 Dynamics	3
Math 202 Differential Equations	3
SHOP 021 Shop I	2
	14

Term III (Summer)	
ASST 031 Cultural Course	3
ASST 035 Probability and Statistics in Engineering	2
ASST 036 Application of Numerical Methods in Engineering	3
CVEV 033 Science of Materials	2
	10

Term IV (Fall)	
ASST 045 Application of Analytical Methods in Engineering I	3
CVEV 041 Mechanics of Materials	3
ELEG 041 Electric Circuits	3
MCEG 044 Thermodynamics	3
MCEG 045 Engineering Materials	3
Cultural Course	3
	18

Term V (Spring)	Credit Hours
ASST 055 Application of Analytical Methods in Engineering II	3
CVEV 055 Fluid Mechanics	3
ELEG 052M Electronics	3
MCEG 051 Physics of Energy Conversion	3
MCEG 056 Internal Combustion Engines	3
Cultural Course	3
	18

Term VI (Summer)	
MCEG 061 ME Laboratory I	1
MCEG 062 Instrumentation and Measurements	2
MCEG 063 Machine Drawing	2
MCEG 065 Compressible Flow	3
	8

Term VII (Fall)	
SHOP 071 Engine Shop	1
MCEG 072 Mechanics of Machines	4
MCEG 073 Hydrodynamics and Boundary Layers	3
ELEG 078M Electromechanical Systems	3
ENMG 075 Engineering Economy	3
Enlg 206 English for Engineering and Architecture	3
	17

Term VIII (Spring)	
MCEG 081 ME Laboratory II	1
MCEG 082 Engineering Vibrations	3
MCEG 083 Mechanical Design I	3
MCEG 085 Heat and Mass Transfer	4
MCEG 086 Applied Fluid Mechanics	3
MCEG 087 Dynamic System Analysis	3
	17

Term IX (Summer)	
MCEG 090 Approved Experience	

Term X (Fall)	
MCEG 101 ME Laboratory III	1
MCEG 102 Automatic Controls	3
MCEG 103 Mechanical Design II	4
MCEG 105 Manufacturing Processes	3
Elective	3
Elective	3
	17

Electives for Term X	
MCEG 106 Steam Turbines	3
MCEG 108 Computer Applications in Mechanical Engineering	3
Graduate courses in Mechanical Engineering, or approved	
courses from other Departments.	

Term XI (Spring)	Credit hours
ASST 110 Technology and Society	3
MCEG 110 Project	3
MCEG 111 Mechanical Engineering Lab. IV	1
MCEG 114 Air Conditioning	3
Elective	3
Elective	3
	16

Electives for Terms XI	
MCEG 113 Water Services in Buildings	3
MCEG 118 Computer-Aided Design	3
MCEG 119 Aerodynamics	3

Graduate courses in Mechanical Engineering, or approved courses from other Departments.

COURSE DESCRIPTIONS

MCEG 011 Engineering Graphics. 3 cr.; each semester. Orthographic projection. Auxiliary views. Sections and conventions. Developed surfaces and intersections. Pictorial representation and sketching. Perspective drawing. Size description. Introduction to AutoCAD. Faculty Members.

MCEG 017 Engineering Mechanics. (CCE and EE students). 3 cr.; annually. Pre- or co-requisite: Math 201. Statics of particles. Rigid bodies. Equilibrium in two dimensions. Shear and bending moment diagrams. Friction. Kinematics and kinetics of particles and rigid bodies. Faculty Members.

MCEG 022 Dynamics. 3 cr.; annually. Prerequisite: CVEV 011. Principles of dynamics. Absolute and relative motion. Dynamics of particles and rigid bodies. Work and energy. Conservation of energy. Impulse and momentum. Faculty Members.

MCEG 044 Thermodynamics. 3 cr.; annually. Basic concepts. The First and Second Laws for systems and control volumes. Entropy. Ideal gases. Applications. N. Ghaddar, R. Nuwayhid.

MCEG 045 Engineering Materials. 3 cr.; annually. Prerequisite: CVEV 033. Physical and mechanical properties of materials. Treatment of materials. Selection and design guidelines of ferrous and nonferrous materials. M. Darwish.

MCEG 051 Physics of Energy Conversion. 3 cr.; annually. Prerequisites: Math 201, Physics 211. Wave energy conversion. Direct energy conversion: thermoelectric, thermionic, photovoltaic, and magnetohydrodynamic generation. Nuclear energy. R. Nuwayhid.

MCEG 056 Internal Combustion Engines. 3 cr.; annually. Prerequisite: MCEG 044. Theoretical and actual cycles. Combustion and fuel-air analyses. Fuel systems. Turbocharging. H. Mashmoushy ,P. Azoury.

MCEG 061 Mechanical Engineering Laboratory I. 1 cr.; annually. Prerequisites: MCEG 044, MCEG 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: H. Mashmoushy.

MCEG 062 Instrumentation and Measurements. 2 cr.; annually. Prerequisites: Physics 211, MCEG 022. General concepts. Measuring devices. Manipulation, transmission, and recording of data. H. Mashmoushy.

MCEG 063 Machine Drawing. 2 cr.; annually. Prerequisite: MCEG 011. Sectional views of various machine components. Free-hand sketching. Working drawings. Assembly drawings. AutoCAD applied to machine drawing. Faculty Members.

MCEG 065 Compressible Flow. 3 cr.; annually. Prerequisite: MCEG 044. General one-dimensional flow of a perfect gas. Homenergic and homentropic flow in nozzles and constant-area ducts. One-dimensional unsteady flow. N. Ghaddar.

MCEG 072 Mechanics of Machines. 4 cr.; annually. Prerequisite: MCEG 022. Linkages, cams, and gears. Gear trains. Kinematics of machinery. Force analysis of machinery. Balancing. Introduction to synthesis. A. Kuran.

MCEG 073 Hydrodynamics and Boundary Layers. 3 cr.; annually. Prerequisite: CVEV 055. Viscous flow. Momentum integral approach. Blasius solution. Skin friction and drag coefficients. Potential flow. Flow around cylinders, ellipsoids, and aerofoils. N. Ghaddar, F. Moukalled.

MCEG 077 Thermodynamics. (CCE students). 3 cr.; annually. Essentially the same as MCEG 044 plus some aspects of statistical thermodynamics. R. Nuwayhid.

MCEG 081 Mechanical Engineering Laboratory II. 1 cr.; annually. Prerequisites: MCEG 044, MCEG 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: H. Mashmoushy.

MCEG 082 Engineering Vibrations. 3 cr.; annually. Prerequisite: MCEG 022. Linear single-degree-of-freedom systems, transient and steady forced vibration. Linear undamped multi-degree-of-freedom systems. A. Kuran.

MCEG 083 Mechanical Design I. 3 cr.; annually. Prerequisite: CVEV 041. Stress analysis. Deflections. Statistical considerations. Design for static and fatigue strengths. Faculty Member.

MCEG 084 Applied Thermodynamics. (EE students). 3 cr.; annually. Prerequisite: MCEG 044. Gas and vapor power and refrigeration cycles. Thermodynamics of some electric phenomena. Introduction to heat transfer. R. Nuwayhid.

MCEG 085 Heat and Mass Transfer. 4 cr.; annually. Prerequisite: MCEG 044. Principles of conduction, convection and radiation. Combined heat transfer. N. Ghaddar.

MCEG 086 Applied Fluid Mechanics. 3 cr.; annually. Prerequisite: CVEV 055. Nature of flow in turbomachines. Similarity laws and factors. Hydraulic impulse and reaction turbines. Pumps. Wind energy converters. F. Moukalled, P. Azoury.

MCEG 087 Dynamic System Analysis. 3 cr.; annually. Prerequisites: MCEG 022, ELEG 041. Modelling and analysis of mechanical, electrical, electromechanical, thermal, and hydraulic systems. Simulation diagrams. Stability analysis. Faculty Member.

MCEG 101 Mechanical Engineering Lab III. 1 cr.; annually. Prerequisites: MCEG 044, MCEG 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: H. Mashmoushy.

MCEG 102 Automatic Controls. 3 cr.; annually. Prerequisites: MCEG 087, ELEG 052M. Representation of mechanical and electrical systems. Steady-state operation.

The characteristic function. Root-locus and frequency-response methods. Faculty Member.

MCEG 103 Mechanical Design II. 4 cr.; annually. Prerequisite: MCEG 083. Design of various machine elements. Simple and creative design problems. P. Azoury.

MCEG 105 Manufacturing Processes. 3 cr.; annually. Prerequisite: MCEG 045. Casting processes. Forming processes. Joining and cutting. Selection of manufacturing processes. Quality control. M. Darwish.

MCEG 106 Steam Turbines. 3 cr.; annually. Prerequisite: MCEG 044. Steam power cycles. Combined cycles. Impulse and reaction steam turbines. Design aspects of steam turbines. The steam power plant. Future trends. H. Mashmoushy.

MCEG 108 Computer Applications in Mechanical Engineering. 3 cr.; annually. Theory and applications of ordinary, partial parabolic, partial elliptic, and partial hyperbolic differential equations. F. Moukalled.

MCEG 110 Project. 3 cr.; annually. Supervised project in groups of one to four students aimed at providing practical experience in some design aspects of Mechanical Engineering. Faculty Members.

MCEG 111 Mechanical Engineering Lab IV. 1 cr.; annually. Prerequisites: MCEG 044, MCEG 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: H. Mashmoushy.

MCEG 113 Water Services in Buildings. 3 cr.; annually. Prerequisite: CVEV 055. Water quality and treatment. Water supply and distribution in buildings, including plumbing and hot-water supply, fire sprinkler and standby systems, and drainage services. Seismic protection. Noise control. Faculty Member.

MCEG 114 Air Conditioning. 3 cr.; annually. Prerequisite: MCEG 085. Heating and cooling loads. Psychrometric processes. Design of piping and duct systems. Domestic hot and cold water systems. Equipment. F. Moukalled.

MCEG 115 Gas Turbines. 3 cr.; annually. Shaft power cycles. Gas turbine cycles for aircraft propulsion. Turbojet and Turbofan engines. Design and analysis of centrifugal and axial flow compressors and turbines. P. Azoury, F. Moukalled.

MCEG 118 Computer-Aided Design. 3 cr.; annually. Prerequisite: MCEG 103. Computer design and optimization of mechanical elements and systems. Simulation programs and packages. M. Darwish.

MCEG 119 Aerodynamics. 3 cr.; annually. Prerequisite: MCEG 065. Basic aerodynamics. Aerodynamic shapes. Airplane performance, stability, and control. Thin airfoil theory. N. Ghaddar.

GRADUATE PROGRAMS

GENERAL INFORMATION

The Department of Mechanical Engineering offers a specialized graduate program leading to the degree of Master of Mechanical Engineering: major, Applied Energy, or Materials and Manufacturing, or Thermal and Fluid Sciences. The main purpose of the specialized program is to generate highly qualified engineers who are proficient in the state-of-the-art in selected areas of each of the above-mentioned specializations. The Department also continues to offer the general graduate program leading to the Degree of Master of Engineering: major, Mechanical Engineering.

Each graduate program comprises a total of 30 credit hours distributed as follows:

1. A mandatory core of three courses (9 credit hours) for all programs, as described below.

2. Five elective courses (15 credit hours) three of which should be from the selected area of specialization for the specialized major program or from general graduate courses offered by the department for the Master of Engineering program. The remaining two elective courses may be chosen from outside the area of specialization and/or from other programs with the approval of the advisor. These courses are described below under 'electives.

3. A thesis, MCEG 899 (6 credit hours) based on independent research. Offered every semester. Faculty Members.

REQUIREMENTS

In order to be eligible for admission to a program, a student must have a degree of Bachelor of Engineering: major, Mechanical Engineering, or equivalent, and must satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of the University catalogue (see pages 463 and 292).

COURSE DESCRIPTIONS

A. Core Courses

MCEG 805 Advanced Fluid Mechanics. 3 cr.; alternate years. Prerequisites: CVEV 055, MCEG 073. Fundamental concepts and principles. Basic relations for continuous fluids. Vorticity dynamics, Kelvin and Helmholtz theorems. Navier-Stokes equations. Turbulent and oscillating flows. N. Ghaddar, F. Moukalled.

MCEG 808 Advanced Engineering Design. 3 cr.; alternate years. Prerequisite: MCEG 103. Optimization, kinematics and mechanics, and human factors. Design process. Integrated design problems. Product design. M. Darwish.

MCEG 812 Advanced Dynamics. 3 cr.; alternate years. Prerequisite: MCEG 022. Three-dimensional kinetics and kinematics. Theory of rotating axis. Hamilton's equations. Lagrange's equations. Euler's equations. M. Darwish.

B. Elective Courses

1. Applied Energy Sequence

MCEG 818 Energy Conservation and Utilization. 3 cr.; alternate years. Prerequisite: MCEG 114. Methods for reduction of losses and gains from a building envelope. Energy conservation in cooling, heating, air-handling and plumbing systems. Energy management program. N. Ghaddar, R. Nuwayhid.

MCEG 826 Solar Energy. 3 cr.; annually. Prerequisite: MCEG 085. Fundamentals of solar radiation. Collectors and concentrators. Energy storage. Estimation and conversion formulas for solar radiation. Faculty Member.

MCEG 846 Wind Energy. 3 cr.; annually. Prerequisite: MCEG 065. Site selection. Wind data. Analysis of wind regimes. Mathematical description of output availability. Rotor design. Coupling an electrical generator to a wind rotor. Wind pumps. Faculty Members.

MCEG 864 Refrigeration. 3 cr.; annually. Prerequisite: MCEG 114. Fundamental concepts and principles. Cold storage. Functions and specifications of refrigeration equipment. Applications. A. Kuran.

MCEG 897A Special Projects in Applied Energy. 3 cr.; alternate years. Faculty Members.

MCEG 898A Special Topics in Applied Energy. 3 cr.; alternate years. Faculty Members.

2. Materials and Manufacturing Sequence

MCEG 810 Advanced Mechanical Metallurgy. 3cr.; alternate years. Plastic deformation of metals. Alloy types. The Fe-C equilibrium diagram. Heat and surface treatment of steels. Cast irons. Elements of fracture mechanics. Faculty Member.

MCEG 811 Elasticity and Plasticity. 3 cr.; alternate years. Prerequisite: CVEV 041. Tensor analysis. The general state of stresses. Properties and deformation of solid materials. Elasticity. Plasticity. Matrix methods. Applications. Faculty Member.

MCEG 832 Mechanics of Composite Materials. 3 cr.; alternate years. Prerequisites: CVEV 041, MCEG 045. Anisotropic elasticity and laminate theory. Analysis of various members of composite materials. Energy methods. Failure theories. Micromechanics. Faculty Member.

MCEG 837 Advanced Manufacturing Processes. 3 cr.; alternate years. Prerequisite: MCEG 105. Powder metallurgy. Bonding and welding processes. Processing of

ceramics and composite materials. Process planning. Designing for manufacture. CAM. Faculty Member.

MCEG 838 Simulation of Manufacturing Processes. 3 cr.; alternate years. Prerequisite: MCEG 105. Discretization methods. The finite volume method. Simulation of solidification and of injection. Applications. Faculty Member.

MCEG 897B Special Projects in Materials and Manufacturing. 3 cr.; alternate years. Faculty Members.

MCEG 898B Special Topics in Materials and Manufacturing. 3 cr.; alternate years. Faculty Members.

3. Thermal and Fluid Sciences Sequence

MCEG 804 Advanced Thermodynamics. 3 cr.; alternate years. Prerequisite: MCEG 044. Advanced thermodynamic concepts. Gas mixtures and multi-phase systems. Chemical reactions. Thermodynamic property relations. Chemical and phase equilibrium. Applications. N. Ghaddar.

MCEG 814 Advanced Heat Transfer. 3 cr.; alternate years. Prerequisites: CVEV 055, MCEG 085. Fundamental modes of heat transfer. Similarity between heat, momentum and mass transfer in forced and buoyancy-driven flows. Simultaneous heat, momentum and mass transfer with phase change. N. Ghaddar.

MCEG 815 Computational Fluid Dynamics. 3 cr.; alternate years. Prerequisites: ASST 036, CVEV 055, MCEG 085. Discretization process in fluid dynamics. Numerical approaches and applications. Iterative and direct matrix methods. Numerical implementation of turbulence models. N. Ghaddar, F. Moukalled.

MCEG 851 Unsteady Gas Flow. 3cr.; alternate years. Prerequisites: MCEG044, MCEG065. Equations of unsteady continuous adiabatic multidimensional flows. Unsteady continuous one-dimensional flow of a perfect gas with and without discontinuities. Applications. Pressure exchangers. P. Azoury.

MCEG 855 Turbulent Flow and Transport. 3 cr.; alternate years. Prerequisite: MCEG 073. Governing equations. Turbulence concepts. Turbulent shear flows. Modes of transition and hydrodynamic stability theories. Faculty Member.

MCEG 897C Special Projects in Thermal and Fluid Sciences. 3 cr.; alternate years. Faculty Members.

MCEG 898C Special Topics in Thermal and Fluid Sciences. 3 cr.; alternate years. Faculty Members.

4. Miscellaneous Courses

MCEG 802 Noise and Vibration Control. 3 cr.; alternate years. Prerequisites: MCEG 022, ASST 055, MCEG 082. Fundamental concepts. Transmission of vibration in structures and interaction with sound fields. Noise and vibration control in buildings and machinery. Applications. N. Ghaddar.

MCEG 803 Adaptive and Optimal Control. 3 cr.; alternate years. Prerequisites: MCEG 087, MCEG 102. Dynamic programming. Pontrygin's minimum principle. Self-

tuning and model reference control. Model following adaptive control. System identification and parameter estimation. Faculty Member.

MCEG 822 Advanced Vibrations. 3 cr.; alternate years. Prerequisite: MCEG 082. Multi-degree-of-freedom systems. Governing equations. Methods of analysis, including numerical procedures. Nonlinear and random vibrations. Faculty Member.

MCEG 823 Robotics. 3 cr.; alternate years. Prerequisites: MCEG 072, MCEG 087, MCEG 102. Manipulator kinetics. Manipulator and inverse kinematics. Trajectory generation. Position, velocity and force control. Intelligence of mechanical manipulators. Robot languages and systems. Faculty Member.

MCEG 824 Nuclear Engineering. 3 cr.; annually. Prerequisite: MCEG 051. Neutrons and their interactions. Fission. Slowing-down theory. Resonances. Nuclear reactor theory. The neutron diffusion equation. Criticality. Reactor kinetics. R. Nuwayhid.

MCEG 831 Theory of Plates and Shells. 3 cr.; alternate years. Prerequisite: CVEV 041. Thin-plate and thin-shell theories. Types of shells and examples. Sandwich-plate theory. Buckling of sandwich plates subjected to combined loads. Laminated composite plates. Faculty Member.

MCEG 841 Finite Element Method. 3 cr.; alternate years. Prerequisites: CVEV 041, MCEG 108. Equations of elasticity. Approximations with finite elements. Variational formulation of problems. Matrix formulation of finite element method. Numerical methods. Applications. Faculty Member.

ASSOCIATED STUDIES

ASST 010 Computer Literacy I. 0 cr.; annually. Essentials of computers. Input/Output devices. Introduction to software. Viruses and networks. DOS commands and advanced DOS features. Windows environment. Coordinator: M. Salameh.

ASST 020 Computer Literacy II. 0 cr.; annually. Memory management. Electronic spreadsheets and word processing. Coordinator: M. Salameh.

ASST 031 Cultural course. 3 cr.; annually. Faculty Members.

ASST 035 Probability and Statistics in Engineering. 2 cr.; annually. Prerequisite: Math 202. Introduction to probability and statistics, statistical distributions. Mean second moments and standard deviation. Fundamental laws of probability. Combinations and permutations. N. Abboud.

ASST 036 Application of Numerical Methods in Engineering. 3 cr.; annually. Prerequisite: ELEG 025. Mathematical modelling of typical engineering systems. Interpretation f xperimental ngineering ata sing umerical echniques. inite differences and simultaneous equations for solving conduction heat transfer, wave equations and deflection of beam problems. Computer aided tools will be used in applying these equations. A. El-Hajj, F. Moukalled, A. Kayssi.

ASST 037 Probability and Statistics in Electrical Engineering. 3 cr.; annually. Prerequisite: Math 202. Random variables. Laws of probability. Probability distributions. Expectation and variance. Moment generating functions. Joint distributions. Independence. Probability models. Chi-square, Student's t and f distributions. Estimation. Confidence limits. Significance tests. Regression. Faculty Members.

ASST 045 Application of Analytical Methods in Engineering I. 3 cr.; annually. Prerequisite: Math 202. Intermediate analytical techniques in solving engineering problems: vectors and vector products in fields of force; matrix analysis of linear physical processes; vector analysis of conservative fields; complex variables and application of the residue theorem in automatic controls and fluid flow. Computer aided tools will be used in applying these techniques. M. Salameh, A. El-Kassar, N. Nuwayhid.

ASST 055 Application of Analytical Methods in Engineering II. 3 cr.; annually. Prerequisite: ASST 045. Advanced analytical techniques in solving engineering problems: spectral analysis of non periodic signals; laplace transforms in the analysis of transfer functions; solution of transfer phenomena, potential problems and mechanical vibrations. Computer aided tools will be used in applying these techniques. M. Salameh, A. El-Kassar, N. Nuwayhid.

ASST 110 Technology and Society. 3 cr.; each semester. Nature and evolution of technology. Impact and risks of technology. Ethical and environmental issues. Conservation. Development. Transfer of technology; technology and the future. T. Mezher and other Faculty Members.

ASST 509 Computer-Based Instruction. 3 cr.; annually. Systematic design of instruction. Educational package development. Graphical user interface implementation and the use of multimedia techniques. A. Feghali.

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ASST 510 Advanced Computer-Based Instruction. 3 cr.; annually. Prerequisite: ASST 509. Human-computer interaction. Hypermedia. Integrated performance support systems and artificial intelligence in instruction. A. Feghali.

ASST 520 Introduction to Geographic Information Systems. 3 cr.; annually. Introduction to Geographic Information Systems (GIS) and their applications in the planning and engineering fields: alternatives in computer-based graphics; data concepts and tools; network data management and planning applications; implementation issues. This course is considered to satisfy the departmental requirements in all engineering graduate programs. K. Azar.

SHOP COURSES

SHOP 021 Shop I. 2 cr. Every Semester. Bench work. Selection and care of tools. Woodwork joints. Identification of common timbers. Metal cutting, threading, riveting, and fitting. Metal technology: machining, welding, and sheet metal working. M. Darwish and other Faculty Members.

SHOP 071 Engine Shop. 1 cr.; annually. Prerequisite: MCEG 056. Internal combustion engines. Components and accessories. Ignition, cooling, and power transmission systems of motor vehicles. Coordinator: F. Moukalled.

ENGINEERING MANAGEMENT PROGRAM

Coordinator:	Salameh, M.
Professor:	Salameh, M.
Associate Professors:	Abboud, N.; Abdul-Malak, M.; Mezher, T.
Senior Lecturer:	Jaber, M.
Lecturer:	Khoury, B.
Instructor:	Hayek, P.

GENERAL INFORMATION

The graduate program leading to the degree of Master of Engineering Management (MEM) caters for the specific needs of management of technical activities and enterprises by providing a professional education in engineering management, with emphasis on technically-based organizations and applications to various engineering disciplines.

The Engineering Management (EM) program is comprised of:

1. A mandatory core of five courses (15 credit hours) in basic engineering management, described below.

2. Six elective courses (18 credit hours) in engineering management and other engineering-related disciplines, described under 'electives' below.

3. A research project (3 credit hours) supervised by a full-time member of the Faculty.

A maximum of two elective courses may be selected, with the approval of the student's advisor, from the graduate level courses offered in the student's original field of specialization or in other engineering-related fields.

REQUIREMENTS

1. In order to be eligible for admission to the MEM program, a student must have a Bachelor degree in one of the engineering disciplines, or in architecture, and must satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of the University catalogue (refer to Graduate Study section).

2. All students admitted into the Engineering Management program are required to take, or have taken, the following courses, or their equivalents, as prerequisites:

i)   ASST 035 Probability and Statistics in Engineering. 3 cr.
ii) ENMG 075 Engineering Economy. 3 cr.
iii) ENMG 105 Engineering Management I. 3 cr.

3. A minimum grade of 70, or its equivalent, is required in each of these courses, and no
    credit is given for these courses towards the MEM degree. Graduates of universities
    other than AUB may be required to take undergraduate prerequisite courses to make
    up for any deficiencies they may have.

4. A student is not allowed to register in the program for more than four calendar years
    beyond the date of his/her first registration, except with the approval of the Graduate
    Studies Committee of the Faculty.

COURSE DESCRIPTIONS

UNDERGRADUATE COURSES

ENMG 075 Engineering Economy. 3 cr.; each semester. Prerequisite: ASST 035 or
    equivalent. Economic decision process in the design and implementation of real
    engineering projects. Investment, financing, depreciation, economic selection, and
    replacement. T. Mezher and other Faculty Members.

ENMG 105 Engineering Management I. 3 cr.; annually. Prerequisite: ASST 035 or
    equivalent. Operations research modelling concepts with emphasis on linear
    programming. Topics include: linear programming, network programming and
    project management. M. Salameh and other Faculty Members.

ENMG 115 Engineering Management II. 3 cr.; annually. Basic management models
    used to optimize operation systems. Discrete- and continuous-time Markov chains
    and their application in modeling queues, inventories, and production process
    behavior. M. Salameh, N. Abboud and other Faculty Members.

GRADUATE COURSES

A. Core Courses

ENMG 501 Decision Analysis and Behavioral Decision Theory. 3 cr.; annually.
    Prerequisite: ASST 035. Theory of optimal decisions and psychology of human
    decision making; probability, utility, risk, and uncertainty; rare events, group
    decision making, probability revision, and interpersonal conflict. N. Abboud.

ENMG 502 Engineering Project Management. 3 cr.; annually. Prerequisite: ASST 035
    or equivalent. Concentrates on planning and implementation aspects involved in
    managing both industrial and construction projects. PERT and CPM methods are
    studied in detail as project planning and control tools, particularly with respect to
    schedule and cost parameters. M. Abdul-Malak.

ENMG 503 Introduction to Stochastic Processes. 3 cr.; annually. Prerequisite: ASST 035. An introduction to techniques for modeling random processes used in engineering management. Topics covered include probability spaces and random variables, Bernoulli processes, Poisson processes, discrete and continuous time Markov chains, and renewal theory. N. Abboud.

ENMG 504 Theory of Engineering Management. 3 cr.; annually. A comprehensive and systematic approach to management policies, procedures, principles and practices. It concentrates on the four basic managerial skills necessary for engineering manager: planning, organizing, directing and controlling. T. Mezher.

ENMG 505 Project Evaluation and Financing. 3 cr.; annually. Prerequisite: ENMG 075. Advanced economic evaluation methods involving continuous compounding and inflation; multiple projects and constraints; models of project selection; portfolio theory and the capital asset pricing model; capital budgeting and rationing; international financial management. M. Abdul-Malak.

B. Electives

1. Industrial Engineering and Operations Research Sequence

ENMG 511 Stochastic Models in Operations Research. 3 cr.; annually. Prerequisite: ENMG 503. Applications of stochastic processes in operations research and engineering management with emphasis on systems such as queuing, inventory, reliability, traffic, and computer systems. N. Abboud.

ENMG 512 Linear Programming. 3 cr.; alternate years. Prerequisite: ENMG 115. The optimization of linear models including the revised dual and primal dual simplex methods, duality theorem, decomposition, cutting plane algorithms, and some network algorithms. N. Abboud, M. Salameh.

ENMG 513 Systems Analysis and Optimization. 3 cr.; annually. Prerequisite: ENMG 115. Presentation of the basic systems optimization methods, including Lagrange Multipliers, nonlinear programming techniques; geometric, quadratic, separable and stochastic programming; direct search techniques; and optimization of functionals. M. Salameh.

ENMG 514 Production-Inventory Planning and Control. 3 cr.; alternate years. Inventory management and production planning; continuous and periodic review models: optimal policies; material requirements planning; inventory, and work-force; multiechelon integrated production-inventory systems. M. Salameh, N. Abboud.

ENMG 515 Systems Simulation. 3 cr.; annually. Prerequisite: ENMG 503. Discrete-event simulation methodology with emphasis on analysis of systems and models of real-life problems. Random number and variate generation, input and output data analysis, validation, comparison of systems. N. Abboud.

ENMG 516 Transportation Systems Analysis. 3 cr.; alternate years. Transportation and traffic problems in modern society; travel forecasting problems and methods; theoretical techniques for traffic flow description and management; highway, railway, runway capacity and performance characteristics; air traffic simulation models and techniques; and economic considerations. I. Kaysi.

ENMG 517 Statistical Quality Control and Reliability. 3 cr.; alternate years. Prerequisite: ASST 035. Control charts for variables and attributes; acceptance sampling plans; commonly used standards; reliability and life testing; and systems reliability concepts. N. Abboud.

ENMG 518 Manufacturing Systems Analysis. 3 cr.; alternate years. Prerequisites: ENMG 105 and ENMG 115. Introduction which brings together useful models and modeling approaches that address a wide variety of manufacturing system design and operation issues. Topics include assembly lines, transfer lines, job shops, flexible manufacturing systems and group technology. N. Abboud.

ENMG 519 Inventory Theory. 3 cr.; alternate years. Prerequisites: ENMG 115, ENMG 503. Deterministic and probabilistic treatment of continuous nd eriodic eview inventory problems, the single period model, and dynamic inventory models. Multi-item problems, and multi-echelon techniques are also included. M. Salameh, N. Abboud.

ENMG 520 Network Optimization. 3cr.; alternate years. Prerequisite: Graduate standing. Introduction to network optimization. Basic properties of network flows. Shortest paths. Maximum flows. Minimum cost flows. M. Salameh and other Faculty Members.

ENMG 521 Research Statistical Design and Analysis. 3cr.; alternate years. Quantitative methods in basic and advanced statistical research and analysis. The course will make extensive use of computer packages of statistical analysis to provide students with hands-on real applications and experience. N. Abboud and other Faculty Members.

ENMG 522 Queueing Theory. 3 cr.; alternate years. Prerequisite: ENMG 503. Analysis of queue length, waiting time and busy period processes of classical queueing models. The models include M/M/s, M/G/1, G/M/s, and product-form networks. N. Abboud and other Faculty Members.

2. Construction Engineering and Management Sequence

ENMG 531 Advanced Construction Management. 3 cr.; alternate years. Prerequisite: Graduate standing. Processes and techniques of project management for construction. Economic feasibility and financial evaluation of construction investments. Constructibility issues during both conceptual planning and field operations. Knowledge-based expert systems as a construction planning and management tool. M. Abdul-Malak.

ENMG 532 Construction Administration. 3 cr.; alternate years. Administration and legal aspects of construction projects. Topics include: contracts, bidding, architects' and engineers' liabilities and responsibilities, owner's assurance of performance, scheduling and delay, dispute resolution, and others. M. Abdul-Malak.

ENMG 533 Analysis and Design of Construction Operations. 3 cr.; annually. The focus is on understanding, analyzing, improving, and designing construction work at the site; on data acquisition and analysis; and in computer simulation, modeling, and design of construction processes. Emphasis is placed on work methods development and improvement, logistic considerations, productivity and safety. M. Abdul-Malak.

ENMG 534 Construction Technologies. 3 cr.; alternate years. The focus is on construction technology development and challenges. The course follows a systems approach to technology analysis and management by assessing the demands for and the development, implementation, and impact of new technologies. M. Abdul-Malak.

ENMG 535 Issues in Land Use Planning and Control. 3 cr.; alternate years. Prerequisite: Graduate standing. Theory and practice of methods for the planning and control of development and the protection of the environment are covered. Includes site selection techniques and procedures for controversial facilities such as landfills, hazardous waste sites, and large industrial plants. Members of Faculty.

ENMG 536 Total Quality Management. 3 cr.; alternate years. Concept of total quality management and ISO standards. Topics include: leadership, customer satisfaction, employee involvement, continuous process improvement, supplier management, performance measures, preparation of a quality manual, amd the process of ISO certification. T. Mezher.

3. Information Management and Human Factors Sequence

ENMG 552 Decision Support Systems. 3 cr.; annually. Analysis of framework, techniques, and tools for assisting management in the decision-making process. Hardware and software limitations of alternative approaches; anticipated technological improvements. Effective implementation of decision support systems. (Computer laboratory work is required). T. Mezher.

ENMG 553 Human Factors Engineering. 3 cr.; alternate years. Systems development; human functions in systems; human capabilities and equipment design; personnel selection and training; human performance assessment; system evaluation; and man-machine systems design. T. Mezher.

ENMG 554 Technology-Based Entrepreneurship and Innovation. 3 cr.; alternate years. Prerequisite: ENMG 504. The process of creation, assessment, development, and operation of new and emerging ventures. Topics include: entrepreneurship, initiating, operating concerns, and growth and development of entrepreneurial ventures. T. Mezher.

ENMG 555 Human Resource Management. 3 cr.; annually. Prerequisite: ENMG 504. Focuses on six functional areas that are associated with effective human resources management: human resource planning, recruitment, and selection; human resources development; compensation and benefits; safety and health; employee and labor relations; and human resource research. T. Mezher.

4. Infrastructure and Miscellaneous Courses

ENMG 571 Highway Pavement Management Systems. 3 cr.; alternate years. Management systems concepts as applied to the highway pavement infrastructure facility. Topics include pavement management process; structural capacity, distress, and safety; economic evaluation of alternative pavement design strategies and other related topics. Faculty Members.

ENMG 572 Water Resources Systems: Planning and Management. 3 cr.; alternate years. Vital aspects of the planning and management processes as applied to the water resources infrastructure system. Topics include the planning process; economics and financing; water systems modeling; simulation, and optimization; water conveyance and storage; and water, management methods and facilities. Faculty Members.

ENMG 573 Utility Systems Planning. 3 cr.; alternate years. Prerequisite: Graduate standing. Methods of forecasting demand for electric power. Incorporation of conservation and uncertainty into demand forecasts. Choice of technology. Implications of incorporating alternative technologies. Faculty Members.

ENMG 574 Sustainable Development Management. 3 cr.; alternate years. Introduction to the concept of sustainable development. Topics include: the business of sustainable development, pricing the environment, energy and the marketplace, innovation process, technological cooperation, renewable resources, and leadership for sustainable development in developing countries. Case studies. T. Mezher.

ENMG 500 Seminar. 0 cr.

ENMG 597 Special Project. 3 cr. Supervised study that may involve special research work in the student's area of concentration.

ENMG 598 Special Topics. 3 cr. Advanced topics in Engineering Management. May be repeated for credit when topics vary.

ENMG 599 Project. 3 cr. The project is to demonstrate the candidate's independent ability to apply analytic concepts and accepted methods of research to engineering management problems. Empirical surveys or case studies are acceptable provided that collected data can be manipulated in a fashion that enables the candidate to draw an original conclusion of generalized nature.

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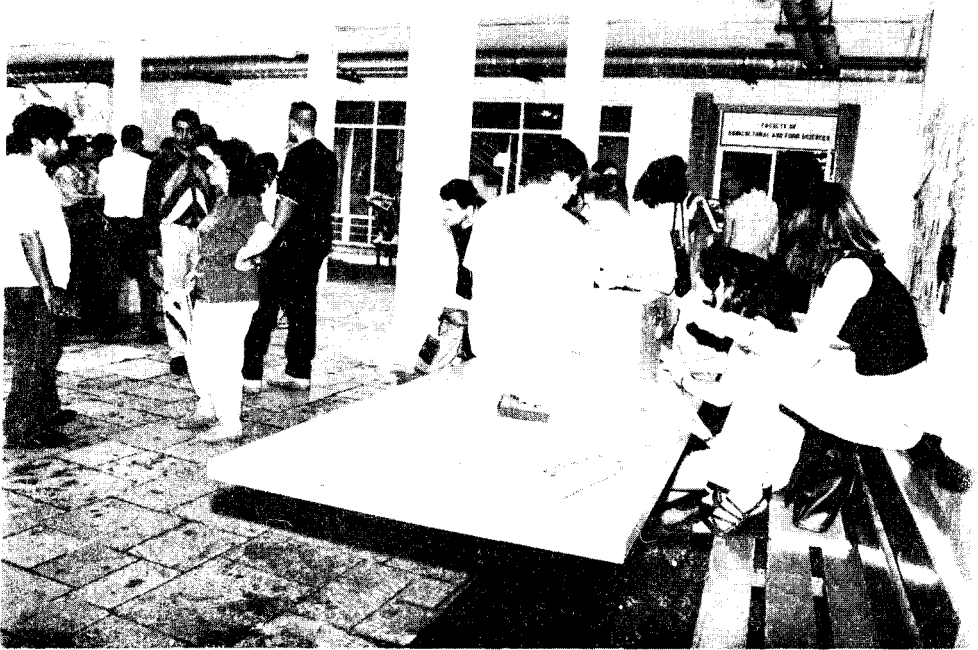
Students outside the Agriculture and Food Sciences building

A view of the tennis courts and the athletic field

Faculty of Agricultural and Food Sciences

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FACULTY OF AGRICULTURAL AND FOOD SCIENCES

FACULTY LIST 1998-99

Officers of the Faculty

John Waterbury	President
Nuhad Daghir	Dean of the Faculty
Mohamad Farran	Director of AREC
Waddah Nasr	Registrar
Wafa Khoury	Executive Officer
Salim Kanaan	Director of Admissions

Coordinators of Academic Programs

Mustafa Haidar	Coordinator of Undergraduate Studies, AGRL-Program
Adnan Miski	Coordinator of Undergraduate Studies, ND Program
Nasri S. Kawar	Coordinator of Graduate Studies
Rami Zurayk	Coordinator of Ecosystem Management Program

Professor Emeritus

Talhouk, Abdul Mun'im, Ph.D., University of Munich; Entomology

Professors

Al-Hajj, Fawzi, Ph.D., University of Wisconsin; Agricultural Economics and Development

Baba, Nahla, Ph.D., AUB; Food Technology and Nutrition

Daghir, Nuhad, Ph.D., Iowa State University; Animal Sciences

Hallab, Abdul Hamid, Ph.D., Louisiana State University; Food Technology and Nutrition

Kawar, Nasri, Ph.D., Pennsylvania State University; Crop Production and Protection

Nimah, Musa, Ph.D., Utah State University; Soils, Irrigation and Mechanization

Saad, Adib, Ph.D., University of Wisconsin; Crop Production and Protection

Sleiman, Fawwak, Ph.D., Michigan State University; Animal Sciences

Tannous, Raja, Sc.D., Massachusetts Institute of Technology; Food Technology and Nutrition

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[*] On tenure appointment.

Associate Professors

Abu Jawdeh, Youssef, Ph.D., Faculty of Agronomic Science, Belgium; Crop Production and Protection
Baalbaki, Riad, Ph.D., Michigan State University; Crop Production and Protection
Barbour, Elie, Ph.D., University of Minnesota; Animal Sciences
Farran, Mohamad, Ph.D., University of Maryland; Animal Sciences
Hamadeh, Shady, Ph.D., New Mexico State University; Animal Sciences
Miski, Adnan, Ph.D., University of California; Food Technology and Nutrition
Rubeiz, Ibrahim, Ph.D., University of Arizona; Crop Production and Protection
Sidahmed, Moatasim, Ph.D., University of California, Davis; Soils, Irrigation and Mechanization
Toufeili, Imad, Ph.D., University of Reading; Food Technology and Nutrition
Zurayk, Rami, Ph.D., Oxford University; Soils, Irrigation and Mechanization

Visiting Associate Professors

Bashour, Isam, Ph.D., University of California Davis; Soils, Irrigation and Mechanization
Yau, Sui Kwong, Ph.D., University of Western Australia, Crop Production and Protection

Assistant Professors

Abou-Fakhr-Hammad, Efat, Ph.D., Colorado State University; Crop Production and Protection
Al-Awar, Faraj, Ph.D., Colorado State University; Soils, Irrigation and Mechanization
Darwish, Mohamad-Ragy, Ph.D., Texas Tech University; Agricultural Economics and Development
Haidar, Mustafa, Ph.D., Colorado State University; Crop Production and Protection
Hamdar, Bassam, Ph.D., Mississippi State University; Agricultural Economics and Development
Talhouk, Salma, Ph.D., Ohio State University; Crop Production and Protection

Lecturers

p Battikha, George, M.S., University of California; Crop Production and Protection
p Khalil, Youssef, Ph.D., Université d'Auvergne, Clermont Ferrand I; Agricultural Economics and Development

Research Associates

Shadarevian, Sossy, B.S., AUB; Food Technology and Nutrition
Uwayjan, Michel, M.S., AUB; Animal Sciences

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p Part-time.

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Instructors

p Salam, Cherine, M.S, New York University; Food Technology and Nutrition
p Hamzeh, Imad, M.S. McGill University; Agricultural Economics and Development

Associates

Sayegh, Antoine, Ph.D., Oregon State University; Soils, Irrigation and Mechanization

Senior Research Assistant

Husseini-Salman, Salma, M.S., University of Arizona; Crop Production and Protection

Research Assistants

Abi Aad, Nabil, B.S., AUB; Animal Sciences
Abi Ghanem, Daad, M.S., AUB; Animal Sciences
Abi Karam, Boutros, B.S., McGill University; Animal Sciences
Abi Said, Diana, M.S., AUB; Crop Production and Protection
Abi Said, Mounir, M.S., AUB; Animal Sciences
Abu- Nohra, Joumana, B.S., AUB; Soils, Irrigation and Mechanization
p Al-Hajj, Zeina, B.S., AUB; Crop Production and Protection
p Al-Khatib, Bassel, B.S., AUB; Agricultural Economics & Development
Al-Khatib, Ali, B.S., AUB; Crop Production and Protection
Alwan, Amira, M.S., AUB; Agricultural Economics & Development
p Ammache Hani, B.S., AUB; Crop Production and Protection
Araman, Rula, B.S., AUB; Animal Sciences
Awadallah, Hani, B.S., AUB; Dean's Office
Baghdadi, Nada, M.S., AUB; Food Technology & Nutrition Dept.
Birbar, Wajdi, M.S., AUB; Animal Sciences
p Chammas, Gisele, B.S., Kaslik University; Crop Production & Protection
Dally, Mahmoud, B.S., AUB; Animal Sciences
p Daghir, Marcelle, B.S., AUB; Crop Production & Protection
Darwish, Layal, B.S., AUB; Soils, Irrigation and Mechanization
Dbouk, Hilal, M.S., AUB; Animal Sciences
p Debian, Nahed, M.S., CIHEAM; Crop Production and Protection
p El- Bejjani, Nassif, B.S., AUB; Animal Sciences
p El-Hurr, Nadia, M.S., AUB; Agricultural Economics & Development
p El Kanj, Rania, B.S., AUB; Crop Production & Protection
Freiwat, Marlene, B.S., AUB; Crop Production and Protection
Ghalayini, Aida, M.S., AUB; Crop Production and Protection
p Ghandour, Tania, B.S., AUB; Animal Sciences
Haddad, Tharwat, M.S., AUB; Soils, Irrigation and Mechanization
Hamadeh-Diryan, Basma, M.S., AUB; Food Technology and Nutrition
p Hamed, May, M.S., AUB; Soils, Irrigation and Mechanization
Hanna, Lucia, B.S., AUB; Crop Production and Protection

p   Hodeib, Hussein, B.S., AUB; Agricultural Economics and Development
    Jaafar, Hadi, B.S., AUB; Soils, Irrigation and Mechanization
p   Jazzar, Chantal, M.S., AUB; Crop Production and Protection
    Nemer, Nabil, M.S., AUB; Crop Production and Protection
    Ollaik, Rami, B.S., AUB; Agricultural Economics and Development
p   Rahal, Rana, B.S., AUB; Agricultural Economics and Development
p   Srour, Rafif, B.S., AUB; Soils, Irrigation and Mechanization
p   Sabra, Amal, B.S., AUB; Crop Production and Protection
p   Samad, Fatima, B.S., AUB; Soils, Irrigation and Mechanization
p   Shoucair, Gretta, B.S., AUB, Food Technology and Nutrition
    Sobh, Hana, M.S., AUB; Crop Production and Protection
p   Sukkariyah, Beshr, M.S., AUB; Soils, Irrigation and Mechanization
    Tannoury, Khalil, B.S., AUB; Animal Sciences

GENERAL INFORMATION

The Faculty of Agricultural and Food Sciences (FAFS) was established as the Faculty of Agricultural Sciences in 1952. Instruction takes place on the campus in Beirut and at the Agricultural Research and Education Center (AREC) located 80 kilometers from Beirut in the Beqa'a. AREC includes a research farm, staff residences, classrooms, a small library, laboratories, a dormitory, dining room, and recreational facilities. The facilities of the 100-hectare farm are used for teaching, research, and demonstrations. Under the provisions of the undergraduate Agriculture curriculum, each student spends one semester and a summer in residence at the AREC. Courses taken during this period are mainly of a practical nature and offer the student a unique opportunity to observe and participate in a wide range of farming operations. Undergraduate students majoring in Nutrition and Dietetics do not study at AREC.

The FAFS is deeply involved in the development of the region AUB serves. International workshops and conferences on various aspects of Agriculture, food and nutrition of importance to the Near and Middle East are sponsored. All faculty members are conducting research of importance to the region. Graduate students carry out thesis research in Lebanon and in other countries of the region. The objective of the Faculty is to graduate well-qualified people who have received a modern Education of the highest standard, and who also have an understanding of the food/nutrition and Agri/rural sectorial needs and problems of the area served by the Faculty. The area served extends from Bangladesh on the East to Morocco on the West, and from Turkey on the North to Somalia on the South.

Training in the scientific aspects of Agriculture, food and nutrition is complemented by a core of courses in the social sciences and humanities to better equip the student to understand and function in the world he or she must face. Every effort is made to install in all students the ideals of honesty, personal integrity, service to all mankind and the dignity of hard work with one's hands.

The Faculty offers programs leading to the B.S. and M.S. degrees.

The academic programs are administered by academic coordinators and advisors for both graduate and undergraduate programs.

ADMISSION

AUB admits students from both 12- and 13-year secondary school systems. Students holding diplomas from a 12-year secondary school system may gain admission to the Faculty of Agricultural and Food Sciences by completing the Freshman Science program at AUB, or its equivalent elsewhere. Students from a 13-year secondary school system must hold the Baccalaureate Part II, in Experimental Sciences or Mathematics, if they are from Lebanon or its equivalent if they come from another country. Holders of

Baccalaureate Part II in Philosophy may be considered for admission provided they take the following additional courses: CHEM 101, CHEM 102, MATH 201 or MATH 203 and MATH 204. Students applying for transfer from another Faculty or University must have a minimum average of 70 to be considered for admission. Admission is by selection of the most promising eligible applicants. For complete and detailed information regarding admission to the University, including certificates recognized, see the section on "Admissions" at the beginning of this catalogue.

UNDERGRADUATE PROGRAMS

Two undergraduate programs are offered in the FAFS:

1. B.S. (in Agriculture) and the Diploma of Ingénieur Agricole.

This program is offered by the FAFS for training in general Agriculture.

A limited number of credits are designated as electives to enable students to select courses from among the different disciplines in the FAFS for additional emphasis.

2. B.S. (in Nutrition and Dietetics)

Graduates of this program will not receive the Diploma of Ingénieur Agricole. An inter-faculty internship program of 12 months is available at the AUB Medical Center for graduates wishing to qualify as professional dietitians.

PREMEDICAL STUDY

Students entering the Faculty of Agricultural and Food Sciences who intend ultimately to enter the Faculty of Medicine must complete the premedical requirements as outlined in the chapter on the Faculty of Arts and Sciences under "Premedical Study."

GRADUATE PROGRAMS

In graduate study the Faculty offers the M.S. degree, with or without thesis, in the following majors: Agricultural economics, Agricultural extension, animal science, poultry science, crop production, food technology, nutrition, plant protection, irrigation, soils and mechanization. The Faculty also participates in the Interfaculty graduate program leading to the M.S. degree in Environmental Sciences (major: Ecosystem Management).

Rules and regulations for graduate programs are given in the chapter on "Graduate Study" in this catalogue, where details of the Environmental Sciences program may also be

found, and in the FAFS Graduate Study Manual. Changes made after the publication of this catalogue will be available with academic advisors.

GRADUATION REQUIREMENTS

A. ELIGIBILITY FOR GRADUATION

To be eligible for graduation with the degree of:

1. B.S. (in Agriculture) and the Diploma of Ingénieur Agricole, a student must:
   i) Complete a minimum of 128 semester credit hours.
   ii) Complete a minimum of seven semesters of residency.
   iii) Achieve an overall minimum grade average of 70.
   iv) Be approved for graduation by the Faculty.

2. B.S. (in Nutrition and Dietetics), a student must:
   i) Complete a minimum of 96 semester credit hours.
   ii) Complete a minimum of five semesters of residency.
   iii) Achieve an overall minimum average grade of 70.
   iv) Be approved for graduation by the Faculty.

For students who transfer to the Faculty of Agricultural and Food Sciences from another Faculty or University, course credits pertinent to the agricultural curriculum may be transferred at the discretion of the Academic Affairs Committee. However, advanced standing can be considered only for students who transfer from an Agriculture program of another recognized institution of higher learning. Transfer students from faculties within AUB to FAFS, are allowed to transfer a maximum of two semesters towards the residency requirements at FAFS based on the rate of equating each twelve credits of transferable courses taken at AUB, to one residency semester. For purposes of residency requirements, two summer sessions are equivalent to one semester.

B. SECOND B.S. DEGREE

1. To obtain a second B.S. in Agriculture and the Diploma of Ingénieur Agricole, a student must:

   i) Complete a minimum of 64 credits, plus 12 credits of elective courses, while registered at FAFS, including all AGRL. III and AGRL.IV required core courses and elective courses in Agriculture.

   ii) Complete the following prerequisite courses: AGRL. 201 (Orientation to Agriculture in the Middle East), SIMC 215 (Intro. to Soils), FTNT 261 (Int.

Biochemistry), AGRL 224 (Agr. Microbiology), CRPP 220 (Principles of Plant Physiology).

Applicants who have a B.S. degree in Biology, Chemistry, or Environmental ealth do not need to take any additional prerequisite courses. Holders of B.S. degrees from other majors will be requested to complete additional prerequisite courses as recommended by the Admission Committee and approved by the Academic Affairs Committee.

c) Complete at least five terms of residency at FAFS.

2. To obtain a second B.Sc. in Nutrition and Dietetics, a student must:

i) Complete a minimum of 51 credits while registered at FAFS, including all ND II and ND III required core courses listed in the Catalogue.

ii) Additional prerequisite courses may be recommended by the Admission Committee and approved by the Academic Affairs Committee.

iii) Complete at least three semesters of residency in the ND Program.

3. Students at FAFS can transfer their earned residency between the two programs at FAFS.

C. TRANSFER OF COURSES

Transfer of basic science courses taken at AUB with a minimum grade of 60 is accepted, if these courses are included as required courses in the core program of FAFS; all other elective courses should have a minimum grade of 70.

D. ELECTIVE COURSES

Candidates for the degree of B.S. in Agriculture must complete 18 credits of elective courses: 12 credits of elective courses in Agriculture, 3 credits from Humanities, and 3 credits from Humanities and/or Social Sciences.

E. GRADUATION WITH DISTINCTION

Students who complete the last two years of study in the FAFS with a general average of 85.00 or above, and who are recommended by the Faculty of Agricultural and Food Sciences, are awarded their degree with distinction. Students admitted to the FAFS for a second B.S. degree are not eligible for distinction.

ACADEMIC RULES AND REGULATIONS

Changes made after the publication of this catalogue will be available with the academic advisors or coordinators.

Rules and regulations for graduate study are given in the chapter on "Graduate Study" in this catalogue.

The following rules and regulations apply to the undergraduate programs.

A. CLASSIFICATION AND PROMOTION

1. B.S. degree (in Agriculture) and Diploma of Ingénieur Agricole

For clear promotion from Agriculture I to Agriculture II, a student must have completed a minimum of 27 credits (excluding credits from English 101 & 102). For promotion from Agriculture II to Agriculture III, a student must have completed a minimum of 58 credits. For promotion from Agriculture III to Agriculture IV, a student must have completed a minimum of 98 credits. All such credits should be from courses specified in the regular program.

2. B.S. degree (in Nutrition and Dietetics)

For clear promotion from ND I to ND II, a student must have completed a minimum of 30 credits. For promotion from ND II to ND III, a student must have completed a minimum of 63 credits. All such credits should be from courses specified in the regular program.

B. MAZIMUM CREDIT LOANS

Students are allowed to register for a maximum load of 18 credits per semester and 9 credits during the summer term.

C. GRADING SYSTEM

In the Faculty of Agricultural and Food Sciences the following grading system is used:

90-100, Excellent (A)   60-69, Weak (D)
80-89, Good (B)   below 60, Failing (F)
70-79, Fair (C)

A change in grade can only take place if the faculty member submits all relevant evidence to the Academic Affairs Committee.

D. INCOMPLETE GRADES

A student who receives an incomplete grade for a course at the end of a semester or summer session must complete the course within one month after the final exam. If the work for any course is not completed within the period specified, and the student does not have a valid excuse, a failing grade will be reported. Any diversions from this ruling should be approved by the Academic Affairs Committee.

For courses taken in other Faculties, the regulations of the Faculty concerned will apply.

E. ATTENDANCE

1. Classes and Laboratories

i) Students are expected to attend all classes, laboratories, or required field work. Absence of a student, whether excused or not, from any class or laboratory session does not excuse the student from his/her responsibility for the work done or for any announcement made during his/her absence.

ii) Any student who, during a semester, misses more than one third of the number of sessions of any course loses all credit for the course. They shall be graded a W (Withdrew) if they have a valid excuse for absenting themselves and W-F if they do not. For the purpose of averaging, W-F shall be considered as 40.

iii) No student may be excused from laboratory and fieldwork requirements. All missed laboratory or fieldwork must be made up.

2. Examinations and Quizzes

i) Students should not absent themselves from announced examinations and quizzes unless they present an excuse considered valid by the instructor of the course. The course instructor should then require the student to take a make-up examination.

ii) A student missing any examination with no excuse considered valid by the instructor will automatically receive a grade zero in that examination.

Only medical reports from the University Health Services are accepted. Should there be a question about the validity of other excuses, the matter may be submitted to the Academic Affairs Committee.

3. Courses in other Faculties

Students taking courses in other Faculties of the University are required to follow the attendance regulations of those Faculties.

F. WITHDRAWAL FROM COURSES

A student cannot withdraw from more than one required course per semester, but may withdraw from an elective course with the approval of the faculty advisor. The deadline for withdrawing is the end of the twelfth week during the first and second semester and the sixth week during a summer session.

G. REPEATING COURSES

A student may repeat any course with the approval of the faculty advisor. All required courses failed must be repeated at the earliest following term during which the course will be offered. No course may be taken more than three times. When a course is repeated, the highest grade will be considered in the calculation of the cumulative average.

H. EVALUATION OF ACADEMIC PERFORMANCE

At the end of each semester and summer session, the complete academic record of each student is reviewed by the Academic Affairs Committee and necessary action taken.

1. Placing on Academic Probation

A student will be placed on academic probation if any of the conditions below apply:

i) Two courses are failed in any one semester or summer session.
ii) One third or more of the total credits attempted are failed in any one semester.
iii) The total cumulative average is below 65 at the end of Agriculture I or ND I; or below 70 at the end of Agriculture II or ND II and at the end of each term thereafter.
iv) In the opinion of the Academic Affairs Committee, the academic performance is unsatisfactory, even though the required average is attained.

2. Removal of Academic Probation

Action to remove academic probation at the end of a semester or summer session will be taken if the reason(s) for placing the student on academic probation is (are) no longer applicable.

3. Repeating one Semester or a Year

A student will be required to repeat one semester or a year if:

i)   The total cumulative average is below 65 after completion of 40 credits or more, or below 70 after completion of 70 credits or more.

ii) A total of 9 credits of courses are failed during any one academic year (including the summer session).

In repeating one semester or a year, the student must register full-time but will be exempted from repeating courses in which grades of 70 or above were attained. Should the course load of repeated courses in any semester or summer session be less than full-time, additional courses must be taken from a list approved by the faculty advisor. For the satisfactory completion of a repeated semester or year, the appropriate conditions should be fulfilled.

4. Dismissal from the Faculty of Agricultural and Food Sciences

A student will not be permitted to register in the Faculty if:

i)   A required course is failed three times.

ii) Twelve (12) credits or more of courses are failed during any one academic year or the cumulative average is below 65 after completion of 40 credits or more, and below 70 after completion of 70 credits or more.

iii) Academic probation is not removed by the end of the third term after he/she had been placed on probation.

iv) The requirements of a repeated year are not fulfilled on schedule.

v)   In the judgment of the Academic Affairs Committee he/she is not making satisfactory academic progress, has not shown sufficient professional promise, or has behaved in a manner below the norms expected in the Faculty, including any attempt to cheat in an examination or plagiarize the work of others.

I. ELIGIBILITY FOR THE REGULAR AREC PROGRAM

To be eligible to enroll in the regular program at the AREC during the Agriculture III year, the student must:

1. Be of Agriculture III status;
2. Not have accumulated more than twelve (12) credits of failed-missed courses (of which no more than six (6) credits are in failed courses) specified in the regular program; and
3. Be approved for such action by the Academic Affairs Committee.

DEAN'S HONOR LIST

The list of requirements for a student to be placed on the Dean's Honor List can be found on page 89 of this catalogue.

CURRICULA AND COURSES

A brief statement and course listing is given for each Department and program of the Faculty of Agricultural and Food Sciences. General Agriculture courses (AGRL) are listed at the end of the section, after the Department of Soils, Irrigation and Mechanization.

Undergraduate courses are numbered 200 to 299.

The *first number* following the course title indicates the number of lecture hours per week.
The *second number* indicates the laboratory hours required per week.
The *third number* indicates the semester credit hours for the course.

Detailed course descriptions are available for those requiring further information.

CURRICULUM FOR THE B.S. DEGREE IN AGRICULTURE AND DIPLOMA OF INGENIEUR AGRLICOLE[1]

AGRICULTURE I		Credits
First Semester		
AGRL 201 Orientation to Agriculture in the Middle East		2
BIOL 201 General Biology I		4
CHEM 200 Basic Chemistry		3
CHEM 205 Introductory Chemistry Laboratory		2
MATH 209 Elements of Computer Programming		3
ENLG 101 Communication Skills[2]		(5)
	Total	14 + 5
Second Semester		
AEDV 212 Agricultural Economics, Principles and Policy		3
BIOL 202 General Biology II		4
CHEM 208 Survey of Organic Chemistry		3
MATH 201 Calculus and Analytical Geometry		3
ENLG 102 Communication Skills[2]		(5)
	Total	13+5

AGRICULTURE II		
First Semester		
AEDV 241 Farm Management		3
AGRL 243 Genetics		3
CRPP 220 Principles of Plant Physiology		3
FTNT 261 Introductory Biochemistry		3
ENLG 203 Communication Skills or Elective[3]		3
	Total	15
Second Semester		
AEDV 225 Rural Social System		3
AGRL 211 Agricultural Mechanics		2
AGRL 224 Agricultural Microbiology		3
FTNT 221 Basic Nutrition		3
SIMC 215 Introduction to Soils		3
	Total	14

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[1] A minimum of 128 credits are required for graduation.

[2] Dependent on English Placement Test.

[3] Three credits of electives should be in humanities; three credits should be in humanities and/or social sciences, and fifteen credits of elective courses in FAFS.

AGRICULTURE III		**Credits**
First Semester		
AEDV 235 Agricultural Extension in Development		3
ANSC 271 Animal Nutrition		3
ANSC 275 Anatomy and Physiology of Farm Animals		3
CRPP 221 Principles of Entomology		3
CRPP 223 Principles of Plant Pathology		3
	Total	15
Second Semester (AREC)		
AGRL 222 Farm Practices		2
ANSC 222 General Livestock Production		3
CRPP 222 Principles of Agronomy		3
CRPP 224 General Horticulture		3
CRPP 284 Weed Science		3
SIMC 228 Irrigation Principles		3
	Total	17
Summer Session (AREC)		
AGRL 223 Agricultural Project		2
ANSC 226 Poultry Production		3
SIMC 225 Farm Power		2
SIMC 226 Agricultural Machinery		2
	Total	9

AGRICULTURE IV		
First Semester		
AGRL 295 Current Topics in Agricultural and Food Sciences		0
FTNT 287 Food Processing		2
FTNT 289 Food Processing laboratory		1
SIMC 265 Soil Fertility		3
Electives as Offered[1]		9
	Total	15
Second Semester		
AGRL 296 Current Topics in Agricultural and Food Sciences		1
MATH 208 Elementary Statistics		3
Electives as offered[1]		12
	Total	16

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[1] Three credits of electives should be in humanities; three credits should be in humanities and/or social sciences, and fifteen credits of elective courses in FAFS.

CURRICULUM FOR THE B.S. DEGREE IN NUTRITION AND DIETETICS[1]

NUTRITION & DIETETICS I		Credits
First Semester		
BIOL 201 General Biology I		4
CHEM 208 Survey of Organic Chemistry		3
CHEM 209 Introductory Organic Laboratory		2
SBHS 201 Introduction to the Study of Society		3
ENLG 203 Communication Skills		3
	Total	15
Second Semester		
BIOL 202 General Biology II		4
CHEM 200 Basic Chemistry		3
CHEM 205 Introductory Chemistry Laboratory		2
AGRL 224 Agricultural Microbiology		3
FTNT 221 Basic Nutrition		3
	Total	15

NUTRITION & DIETETICS II		
First Semester		
FTNT 261 Introductory Biochemistry		3
FTNT 265 Food Chemistry		2
FTNT 267 Food Analysis		2
SBHS 216 Arab Culture and Society		3
EDUC 215 Learning and Human Development		3
Elective[2]		3
	Total	16
Second Semester		
Physl 246 Anatomy-Phys. for Nursing Degree students and Undergraduates		5
MATH 209 Elements of Computer Programming		3
EDUC 227 Statistics in Education *or* MATH 208		3
BADM 231 Management of Organizations		3
Elective[2]		3
	Total	17

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[1] A minimum of 96 credits are required for graduation.

[2] Minimum 9 credits selected from a suggested list of courses and 6 credits as free electives.

NUTRITION AND DIETETICS III   **Credits**

First Semester

FTNT 287 Food Processing	2
FTNT 289 Food Processing Lab	1
FTNT 274 Human Nutrition	4
FTNT 290 Food Services Management	3
AGRL 295 Current Topics in Agriculture and Food Sciences	0
AEDV 212 Survey of Economics	3
Elective[1]	3
Total	**16**

Second Semester

FTNT 288 Technology of Food Products	3
FTNT 293 Therapeutic Nutrition	3
FTNT 294 Therapeutic Nutrition Lab.	2
FTNT 299 Project in Nutrition and Food Science	2
AGRL 296 Current Topics in Agric. and Food Sciences	1
Elective[1]	6
Total	**17**

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[1] Minimum 9 credits selected from a suggested list of courses and 6 credits as free electives.

DEPARTMENT OF AGRLICULTURAL ECONOMICS AND DEVELOPMENT (AEDV)

Chairperson:	Darwish, R.
Professor:	Al-Hajj, F.
Assistant Professors:	Darwish, R.; Hamdar, B.
Lecturer:	Khalil, Y.
Instructor:	Hamzeh, I.

The Department of Agricultural Economics and Development provides teaching and research programs oriented toward the agricultural and rural economic and social problems of the region.

The Department offers a number of advanced undergraduate courses which provide a basis for more emphasis in Agricultural economics and rural development areas. Introductory courses in these subjects are required of all undergraduate students in the Faculty of Agricultural and Food Sciences as specified in the core requirements.

Graduate study leading to the M.S. degree includes the following majors, with or without thesis:

1. Agricultural economics, with the opportunity to emphasize environmental economics, resource economics, Agricultural development, farm production and management, Agricultural business, Agricultural marketing credit, and Agricultural rural sector analysis.

2. Agricultural extension, with the opportunity to emphasize extension, program development, administration of agricultural institutions and projects, technological change, and rural development.

The following courses are offered by the Department:

AEDV 212 Agricultural Economics, Principles and Policy. 3.0; 3 cr. An introduction to basic economic principles and their applications in the Agricultural sector. B. Hamdar.

AEDV 213 Production Economics. 3.0; 3 cr. Prerequisite: MATH 201, AEDV 212. An introduction to basic production economics theories and principles and their relevance to the Agricultural sector. B. Hamdar.

AEDV 225 Rural Social Systems. 3.0; 3 cr. Examination of institutional and sociological problems of rural areas; influence of rural institutions on rural development. Members of Faculty.

AEDV 235 Agricultural Extension in Development. 3.0; 3 cr. Prerequisite: AEDV 225. Comparative study of developmental philosophy, objectives, and adaptation to

developing countries; principles and methods of extension and adult teaching. Members of Faculty.

AEDV 241 Farm Management. 3.0; 3 cr. Prerequisite: AEDV 212 or Economics 203. Applying the principles and technique of management to the farm sector. R. Darwish.

AEDV 243 Marketing of Food Products. 3.0; 3 cr. The marketing of Agricultural and food products is examined in detail with case studies. B. Hamdar.

AEDV 282 Adoption of Innovations. 3.0; 3 cr. Prerequisites: AEDV 225, 235. The process of accepting new farming ideas and the factors affecting their adoption. Members of Faculty.

AEDV 284 Rural Leadership. 3.0; 3 cr. Prerequisites: EDV 25, EDV 35. he setting of principles and techniques of lay leadership in rural development, leadership practice in selected programs. Members of Faculty.

AEDV 286 Agricultural Development. 3.0; 3 cr. Prerequisites: AEDV 212, AEDV 241. Basic economic principles and policies of development. Domestic policies and problems encountered in the development process of Third World nations. R. Darwish.

AEDV 299 Special Topics in the Agricultural Social Sciences. 2 cr. Prerequisites: Fourth Year standing and consent of instructor. Members of Faculty.

AEDV 300 Tutorial. 1-3 cr. Special problem. Prerequisite: consent of instructor. Members of Faculty.

AEDV 311 Extension Programs and Community Development. 3.0; 3 cr.; alternate years. Approaches to planning extension programs, relative theories, and research findings; characteristics of the community development process and the principles involved; and case studies. Members of Faculty.

AEDV 312 Supervision of Extension Personnel. 3.0; 3 cr.; alternate years. Principles and functions of supervision in recruitment, training, appraisal, and planning of extension work. Members of Faculty.

AEDV 313 Leadership and Organizational Styles in Development. 3.0; 3 cr.; alternate years. Philosophies and characteristics of organizational styles; role expectations, behavioral styles and evaluations in leadership with emphasis on development oriented organizations; and case studies. Members of Faculty.

AEDV 315 Communication Strategies for Rural Development. 3.0; 3 cr. Prerequisite: AEDV 225. Communication theories, concepts and organizational ssues n ural development. Members of Faculty.

AEDV 320 Project Planning and Management. 3.0; 3 cr.; alternate years. Project preparation, evaluation and management. R. Darwish.

AEDV 324 Farmer Cooperatives and Credit. 3.0; 3 cr.; alternate years. Organizing farmers for higher income through improved resource use and competitive position. R. Darwish.

AEDV 325 Production Economics. 3.0; 3 cr.; alternate years. The economics of farm production and resource use. Production-response, production relationships, economic optimization and decision making under risk and uncertainty. B. Hamdar.

AEDV 352 Advanced Marketing Management. 3.0; 3 cr.; alternate years. Extensive readings in marketing and market development. New approaches to improving marketing systems in developing nations. B. Hamdar.

AEDV 353 International Agricultural Trade. 3.0; 3 cr.; alternate years. The role of trading institutions and commodity Agreements and the effects of governmental Agricultural policies on international trade. B. Hamdar.

AEDV 355 Agricultural Price Analysis. 3.0; 3 cr. Description of the pricing mechanism and institutions in Agriculture, and an introduction to empirical price analysis. B. Hamdar.

AEDV 372 Agricultural Policy and Planning. 3.0; 3 cr. Governmental programs and policies for Agriculture and the food industry; implications for modernization. B. Hamdar.

AEDV 374 Operations Research Principles and Application. 3.0; 3 cr. Prerequisite: MATH 201. An introduction to different optimization techniques in operations research and their relations to applied problems in different fields of Agriculture. R. Darwish.

AEDV 375 Resource Economics I. 3.0; 3 cr. The course is designed to raise the awareness of the student regarding the resource and environmental problems facing today's society. It provides the student with an intensive introduction to the economic theory necessary for an effective analysis of resource problems. B. Hamdar.

AEDV 376 Resource Economics II. 3.0; 3 cr. Resource and environmental problems facing today's society are addressed and analyzed. Emphasis on providing the student with an intensive introduction to the quantitative theory necessary for an effective analysis of resource problems. R. Darwish

AEDV 383 Change and Development in Rural Society. 3.0; 3 cr.; alternate years. Social and cultural resistance to change in rural areas; theories of change and their implications for rural development programs. Members of Faculty.

AEDV 384 Rural Social Change, Development and the Environment. 3.0; 3 cr. Population, resource and Agricultural development; theories of socio-economic development and cultural variables. Changes in Agriculture and socio-economic systems and their impact on the environment. Consequences of technology adaptation. Members of Faculty.

AEDV 389 Research Methodology in Agricultural Social Sciences. 3.0; 3 cr. Methods for preparing research proposals for field studies; methods of collecting data; preparation of survey schedules. Members of Faculty.

AEDV 391 Current Problems in Agricultural Social Sciences. 3.0; 3 cr.; alternate years. The examination of current topics in Agricultural development. Members of Faculty.

AEDV 395, 396 Graduate Seminar in Agricultural Social Sciences. 1.0; 1 cr. (each). Members of Faculty.

AEDV 399 M.S. Thesis.

DEPARTMENT OF ANIMAL SCIENCES (ANSC)

Chairperson:	Hamadeh, S.
Professors:	Daghir, N.; Sleiman, F.
Associate Professors	Barbour, E.; Farran, M.; Hamadeh, S.
Research Associate:	Uwayjan, M.

The main function of the Department of Animal Sciences is to produce qualified graduates who are capable of serving the region in all areas of Animal Science: research, services, business and Education.

The Department participates in offering courses within the Faculty of Agricultural and Food Sciences undergraduate core program, and in addition offers selected senior courses that cover areas of major importance in animal Agriculture, i.e. nutrition, physiology, management and production. Undergraduates having this area of emphasis in animal science are advised to take core requirements required by the Faculty, and in addition about 12 credits of elective courses selected from those offered by the Department of Animal Sciences.

The Department offers programs of study and research leading to the degree of Master of Science either in Animal or in Poultry Sciences, and it participates in the interfaculty program in Nutrition. The Department is especially qualified and equipped for graduate study and research in the following areas:
1. Nutrition of livestock and poultry.
2. Diseases of livestock and poultry including preventive immunology and epizootiology of diseases.
3. Production of milk, meat and eggs as related to breeding and feeding.

Graduate students in the Department of Animal Sciences may become candidates for a degree in the interfaculty program in Nutrition by meeting the requirements described in the chapter on "Graduate Study" in this catalogue.

The requirements for the degree of Master of Science in Animal Sciences include carefully selected graduate courses in animal science and other pertinent basic and applied areas, and research is required, generally through the preparation of a thesis. The program of the degree of Master of Science is designed primarily to produce specialists who have a broad understanding of animal science, and comprehensive knowledge in their selected major. The program also prepares the student for subsequent studies leading to the degree of Doctor of Philosophy.
The program of Master of Science contains two majors:
1. Animal Science
2. Poultry Science.

Three options exist in each of the two majors: Production, Nutrition, and PathoBiology. The candidates have the choice of selecting a thesis or non-thesis program. There is no difference between the two alternatives in the level of courses required in the program of study and research. The non-thesis candidate is required to take additional credits, and his/her research normally would be more field-oriented, with a research report presented instead of a thesis.

The following courses are offered by the Department:

ANSC 222 General Livestock Production. 2.3; 3 cr. Modern principles and practices in beef, sheep, and dairy production and reproduction. F. Sleiman.

ANSC 226 Poultry Production. 2.3; 3 cr. Prerequisite: ANSC 271. Modern principles and practices in poultry production with special emphasis on Middle Eastern conditions. M. Farran.

ANSC 241 Principles of Dairying. 2.3; 3 cr. Prerequisite: ANSC 222. Management, housing, feeding, breeding and record-keeping in dairy production. F. Sleiman.

ANSC 242 Sheep Production in Arid Regions. 2.3; 3 cr. Prerequisite: ANSC 222. Breeding, feeding and management of sheep under arid conditions. S. Hamadeh

ANSC 271 Animal Nutrition. 3.0; 3 cr. Prerequisite: FTNT 261. Structure and functioning of digestive systems of livestock and poultry. Bioenergetics, nutritional deficiencies, and nutrient requirements of farm animals. M. Farran, M. Uwayjan.

ANSC 275 Anatomy and Physiology of Farm Animals. 3.0; 3 cr. Systematic anatomy and physiology of farm animals. E. Barbour; S. Hamadeh

ANSC 276 Animal Physiology Laboratory. 0.3; 1 cr. Pre- or co-requisite: ANSC 275. E. Barbour.

ANSC 277 Animal Breeding. 2.0; 2 cr. Prerequisite: AGRL 243 or Biology 223. Principles of permanent improvement of animal and poultry production. S. Hamadeh.

ANSC 278 Feeds and Feeding. 2.3; 3 cr. Characteristics, onservation, nd reparation of feeds. Feeding various classes of livestock. M. Uwayjan.

ANSC 299 Special Topics in Animal Sciences. 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Library or laboratory research in a specialized topic. Members of Faculty.

ANSC 300 Graduate Tutorial. 1-3 cr. Prerequisite: Consent of instructor. Special problem. Members of Faculty.

ANSC 304 Preventive Immunology and Patterns of Animal Diseases. 3.0; 3 cr. Prerequisite: Biology 224 or AGRL 224. Basic aspects of specific and non-specific body defense mechanisms and the role of vaccination in population protection. Study of the patterns of diseases. E. Barbour.

ANSC 305 Poultry Disease. 3.3; 4 cr. Etiology, clinical characteristics, identification, prevention and control of the major infectious and metabolic diseases of poultry. E. Barbour.

ANSC 306 Diseases of Livestock. 3.0; 3 cr. Etiology, clinical characteristics, identification and control of some selected infectious and metabolic diseases of economic impact on animal production. E. Barbour.

ANSC 307 Poultry Production in Warm Regions. 3.0; 3 cr. Prerequisite: ANSC 226. Recent advances in poultry production practices under high temperature conditions

with special emphasis on physiology of heat stress in birds as related to housing, management and feeding. M. Farran, N. Daghir.

ANSC 314 Advanced Animal Breeding. 3.0; 3 cr. Prerequisites: ANSC 277, AGRL 301. Livestock quantitative and population genetics, recent advances in breeding practices and problems in livestock improvement. S. Hamadeh.

ANSC 329 Advanced Animal Physiology. 2.3; 3 cr. Prerequisite: ANSC 275 or equivalent. Comparative physiology of domestic animals with special emphasis on digestion, reproduction, lactation and thermoregulation. E. Barbour, M. Farran, S. Hamadeh, F. Sleiman.

ANSC 330 Advanced Livestock Production. 3.0; 3 cr. Recent advances in livestock production practices as related to interactions between animal and milieu, with reference to the specific nutritional and climatic conditions of the Middle East. F. Sleiman.

ANSC 334 Advanced Poultry Nutrition. 2.3; 3 cr. Prerequisite: ANSC 271. Recent developments in poultry nutrition. Design and implementation of poultry nutrition experiments. M. Farran, N. Daghir.

ANSC 336 Ruminant Nutrition. 3.0; 3 cr. Recent advances in the nutrition of cattle and sheep. F. Sleiman.

ANSC 388 Animal Production and Environmental Management. 3.03; 3 cr. The course characterizes the impact of extensive and intensive livestock systems on the environmental sustainability of the two systems, in terms of technical constraints and feasible corrective environmental management strategies. S. Hamadeh, , E. Barbour.

ANSC 395, 396 Graduate Seminar in Animal Science. 1.0; 1 cr. (each). Members of Faculty.

ANSC 399 M.S. Thesis.

DEPARTMENT OF CROP PRODUCTION AND PROTECTION (CRPP)

Chairperson:	Baalbaki, R.
Professors:	Kawar, N; Saad, A.
Associate Professors:	Abu Jawdah, Y.; Baalbaki, R.; Rubeiz, I; Yau,S.
Assistant Professors:	Abou-Fakhr-Hammad, E.; Haidar, M.; Talhouk, S.
Lecturer:	Battikha, G.
Professor Emeritus:	Talhouk, A.

The Department of Crop Production and Protection offers an integrated undergraduate major with the objective of training students in the various theoretical and practical aspects of crop production and protection. Department graduates are trained to successfully contribute to the research, business and Education sectors of the region. Course offerings are in the areas of Agronomy, entomology, floriculture, fruit and vegetable production, integrated pest management, pesticides, plant breeding, plant pathology, plant physiology and weed science. Introductory courses in these subjects are offered to Agriculture students within the framework of the core curriculum. Specialized and advanced courses are offered to students wishing to select an area of emphasis in crop production and protection for the B.S. degree in Agriculture.

Graduate study programs leading to the M.S. degree are offered in two majors: Crop Production and Plant Protection. The specific areas of emphasis within the crop production major include crop production in semi-arid areas, germplasm conservation, plant breeding, plant physiology, tissue culture, and vegetable production in protected environments. Areas of emphasis within the plant protection major include entomology, pesticide toxicology and residue analysis, plant pathology and weed science.

The following courses are offered by the Department.

CRPP 220 Principles of Plant Physiology. 2.3; 3 cr. Prerequisite: Biology 202. Introduction to environmental and physiological factors affecting crop growth and development. R. Baalbaki.

CRPP 221 Principles of Entomology. 2.3; 3 cr. Prerequisite: Biology 201. Insect morphology, anatomy, and Biology in relation to pest control. E. Abou-Fakhr-Hammad.

CRPP 222 Principles of Agronomy. 2.3; 3 cr. Principles and cultural practices of major field crops. S. Yau.

CRPP 223 Principles of Plant Pathology. 2.3; 3 cr. Fundamentals and practical aspects of plant diseases, their causes, and control. Y. Abu-Jawdeh.

CRPP 224 General Horticulture. 2.3; 3 cr. Principles and practices in the production of fruits, ornamentals, and vegetables. Members of Faculty.

CRPP 255 Plant Breeding. 2.3; 3 cr. Prerequisites: AGRL 243, CRPP 222. Application of genetic principles and allied subjects to crop improvement. S. Yau.

CRPP 265 Landscape Horticulture. 2.3; 3 cr. Prerequisite: CRPP 224. Basic knowledge in the horticultural aspects of landscaping and management of small landscapes. Major emphasis on understanding the arts and science of design, construction and management of functional and appealing landscapes. G. Battikha.

CRPP 275 Subtropical Fruit Production. 2.3; 3 cr. Prerequisite: CRPP 224. Techniques in nursery stock production, rootstocks, cultivars, and orchard cultural operations. S. Talhouk.

CRPP 277 Vegetable Production. 3.3; 3 cr; summers only. Prerequisite: CRPP 224. Classification, identification, and cultural practices of important vegetables of the area. Members of Faculty.

CRPP 278 Introductory Floriculture. 2.3; 3 cr. Prerequisite: CRPP 224. Principles and practices of the production of major cut flowers and potted plant crops in the field and in the greenhouse. G. Battikha, S. Talhouk.

CRPP 281 Deciduous Fruit Production. 2.3; 3 cr. Prerequisite: CRPP 224. Principles and practices underlying cultivation of deciduous fruit crops. Propagation, characteristics of cultivars and rootstocks, fertilizers, integrated pest control programs, and postharvest fruit handling. Members of Faculty.

CRPP 284 Weed Science. 2.3; 3 cr. Weeds and their control; emphasis on recommendations of herbicides and their fate in plants and soils. M. Haidar.

CRPP 285 Plant Propagation. 2.3; 3 cr. Prerequisite: CRPP 224. Theory and practices of sexual and asexual propagation of horticultural crops including such techniques as grafting, tissue culture, layering and cutting. S. Talhouk.

CRPP 287 Crop Production in Dry Regions. 3.0; 3 cr. Prerequisite: CRPP 222. General principles and practices, constraints, potentials and cultivation of specific crops in arid and semi-arid regions. R. Baalbaki.

CRPP 292 Applied Entomology. 2.3; 3 cr. Prerequisite: CRPP 221. Observation of insect pests in the field and greenhouses, with emphasis on recognition, evaluation and control. E. Abou-Fakhr-Hammad.

CRPP 293 Integrated Pest Management for Economic Crops. 3.0; 3 cr. Prerequisites: CRPP 221, CRPP 223. Basic concepts of the integrated approach to management of pests of economic crops including: components of IPM programs, principles and practices of management of plant diseases and insect pests, and the feasibility and economics of the various management strategies. Specific IPM cases on major crops will be discussed. A. Saad, N. Kawar.

CRPP 295 Pesticides. 3.0; 3 cr. Survey of the commonly used insecticides, fungicides, rodenticides, and related materials as to their Chemistry, mode of action and relation of structure to activity, toxicity, metabolism and hazards to the environment. N. Kawar.

CRPP 296 Applied Plant Pathology. 2.3; 3 cr. Prerequisite: CRPP 223. Observation and study of plant diseases in the field with emphasis on recognition, evaluation and control. Y. Abu Jawdeh, A. Saad.

CRPP 298 Special Topics in Crop Production. 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Directed study. Members of Faculty.

CRPP 299 Special Topics in Plant Protection. 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Directed study. Members of Faculty.

CRPP 300 Graduate Tutorial. 1-3 cr. Prerequisite: Consent of instructor. Research or advanced discussion of special problems. Members of Faculty.

CRPP 302 Biology and Control of Aphids and Mites. 2.3; 3 cr. Prerequisite: CRPP 221. Study of mites and aphids as to their systematic, characteristics, ecology, predator-parasite complex, economic importance and their management in the field. E. Abou-Fakhr-Hammad.

CRPP 303 Epidemiology of Plant Diseases. 3.0; 3 cr; alternate years. Prerequisite: CRPP 223. Advanced studies and concepts involved in the establishment and decline of epiphytotics. Emphasis will be on the use of epidemiological analysis to achieve better disease management measures. Y. Abu Jawdeh, A. Saad.

CRPP 307 Advanced Crop Production. 3.0; 3 cr. Prerequisite: CRPP 222. Recent advances in the production and management of major field crops. R. Baalbaki.

CRPP 308 Advanced Economic Entomology. 3.0; 3 cr. Prerequisite: CRPP 221. Principles underlying Chemical, Biological, genetic and other methods of insect control, stressing the integrated pest management approach. E. Abou-Fakhr-Hammad.

CRPP 309 Population Genetics. 3.0; 3 cr. Prerequisite: AGRL. 243. Introduction of basic genetic concepts and their use in assessing plant genetic diversity. S.K. Yau, coordinator.

CRPP 311 Characterization of Plant Genetic Resources. 2.3; 3 cr. Prerequisite: CRPP 309. Overview of basic concepts in molecular Biology and discussion of morphological and molecular techniques and their use in assessing plant diversity. S. Talhouk, coordinator.

CRPP 312 Advanced Principles and Methods in Plant Pathology. 2.3; 3 cr; alternate years. Prerequisite: CRPP 223. Principles of plant infection, physiology of host-parasite relationships, and modern methods of research. Y. Abu Jawdeh.

CRPP 314 Survey and Collection of Plant Genetic Resources. 2.3; 3 cr. Prerequisite; CRPP 309. Conducting ecogeographic surveys, planning and executing field collection missions, handling and processing of collected plant material. R.. Baalbaki, and S. Talhouk, coordinators.

CRPP 315 Seed Biology. 3.0; 3 cr; alternate years. Principles and factors involved in the production, harvesting, processing, and certification of seeds for sowing. M. Haidar.

CRPP 317 Plant Parasitic Fungi and Bacteria. 2.3; 3 cr; alternate years. Prerequisite: CRPP 223. Morphology, taxonomy, and identification of fungi and bacteria parasitic to crops. A. Saad.

CRPP 318 Plant Virology. 2.3; 3 cr. Prerequisite: CRPP 223. Fundamental and practical aspects of plant virology including isolation, characterization, identification and control of plant pathogenic viruses. Y. Abu Jawdeh.

CRPP 319 Plant Nematology. 2.3; 3 cr. Classification, morphology and Biology of plant parasitic nematodes with special emphasis on the Biology and control of nematodes attacking cultivated crops. A. Saad.

CRPP 320 Toxicology of Pesticides. 3.0; 3 cr. Prerequisite: CRPP 295. General principles of toxicology and specific study of the modes of action of the major groups of pesticides including their hazards, toxicity and metabolism in Biological systems.

The subject of movement and fate of pesticides in the environment is also covered. N. Kawar.

CRPP 321 Horticultural Production in Greenhouses. 2.3; 3 cr. Prerequisites: CRPP 224, CRPP 277, SIMC 265. Principles of production of horticultural crops in plastic covered greenhouses in semi-arid environment. Greenhouse anagement, lant nutrition and fertilizer application, drip irrigation and fertigation, reclamation for salinity and sodicity. Members of Faculty.

CRPP 325 Postharvest Physiology of Horticultural Crops. 3.0; 3 cr. Postharvest biochemical changes in fruits, vegetables and flowers. Quality components preservation. Handling, cooling, refrigerated storage and Chemical treatments. Members of Faculty.

CRPP 326 Methods in Plant Conservation and Use. 3.3; 4 cr. Application of different conservation methods including *in situ, ex situ* conservation, and techniques of germplasm use and regeneration. R. Baalbaki, coordinator.

CRPP 327 Biotechnology in Horticulture. 2.3; 3 cr. Prerequisite: AGRL 243. Overview of basic concepts in molecular Biology, introduction to techniques and their use in plant biotechnology. S. Talhouk.

CRPP 329 Global Issues in Conservation of Plant Genetic Resources. 2.0; 2 cr. Analysis and discussion of global issues related to plant conservation and the role of governmental, non-governmental, local, regional, and international organizations. R. Baalbaki, coordinator.

CRPP 331 Advanced Plant Breeding. 3.0; 3 cr. Prerequisite: AGRL 243. Principles, techniques, and problems in crop improvement. S. Yau.

CRPP 335 Mode of Action of Herbicides, 3.0; 3 cr. Prerequisite: CRPP 284. Absorption, translocation, selectivity and mechanisms of toxic action of herbicides and their fate in plants and soils. M. Haidar.

CRPP 340 Documentation of Plant Genetic Resources. 0.3; 1 cr. Overview of methods of documentation, information exchange and management of Plant Genetic Resource data. S.K. Yau, coordinator.

CRPP 345 Plant Disease Control. 3.0; 3 cr. Prerequisite: CRPP 223. Principles and practices of plant disease prevention and control including the different aspects of disease resistance, exclusion, eradication and therapy using cultural, Biological and Chemical control practices. A. Saad, Y. Abu Jawdeh.

CRPP 347 Biological Control of Crop Pests. 3.0; 3 cr. Prerequisite: CRPP 221. History and ecological basis of Biological control. Introduction, culture and establishment of natural enemies and their integration with other control methods. E. Abou-Fakhr-Hammad.

CRPP 352 Insect-Plant Interactions. 3.0; 3 cr. Prerequisite: CRPP 221. Principles and factors involved in interactions between insects and their host plants. Applying perspectives in CHEMical ecology to Agricultural systems. E. Abou-Fakhr-Hammad.

CRPP 354 Weed Ecology. 3.0; 3 cr. Prerequisite: CRPP 284. Principles and concepts of weed ecology, including evolution, interference, modeling, mechanisms governing weed population dynamics, and alternative weed management systems. M. Haidar.

CRPP 388 Integrated Pest Management. 3.0; 3 cr. Principles and concepts of integrated pest management. Monitoring and forecasting of pest population. Tactics,

strategies and implementations of IPM in the Agricultural ecosystem. Environmental, economic and social implications of IPM. Members of Faculty.

CRPP 395, 396 Graduate Seminar in Crop Production and Protection. 1.0; 1 cr. (each). Members of Faculty.

CRPP 399 M.S. Thesis.

DEPARTMENT OF FOOD TECHNOLOGY AND NUTRITION (FTNT)

Chairperson:	Tannous, R.
Professors:	Baba, N.; Hallab, A.; Tannous, R.
Associate Professors:	Miski, A.; Toufeili, I.
Research Associate:	Shadarevian, S.
Instructor:	Salam, Sh.

The Department's objective is to produce qualified graduates capable of serving the region in various areas of food technology, nutrition and dietetics. The Department participates in offering courses within the Faculty of Agricultural and Food Sciences undergraduate core program, and in addition offers selected junior and senior courses that cover areas of major importance in food science, nutrition and dietetics.

The Department offers a three year program leading to a B.S. degree in Nutrition and Dietetics. Graduates wishing to qualify as professional dietitians must complete the "Dietetics Internship 01936" by spending 11 months in the Dietary Department of the AUB Medical Center to acquire practical training in administrative and therapeutic Dietetics. Graduates of this program do not receive the Diploma of Ingénieur Agricole. Students who intend ultimately to enter the Faculty of Medicine must complete the premedical requirements (as outlined in the chapter on Faculty of Arts and Sciences, section entitled "Premedical Study," page 92).

The Department offers a graduate program leading to the M.S. degree in either Food Technology (thesis or non-thesis) or Nutrition (thesis only). The Nutrition degree is offered under the Interfaculty Graduate Nutrition Program (see chapter on "Graduate Studies" at the end of this catalogue.)

The following courses are offered by the Department:

FTNT 221 Basic Nutrition. 3.0; 3 cr. Brief nutritional survey of nutrients, including their food sources, digestion, metabolism, functions and requirements in humans. N. Baba, A. Miski.

FTNT 261 Introductory Biochemistry. 3.0; 3 cr. Prerequisite: Chemistry 208. Chemistry of Biological compounds, their enzymatic degradation and intermediary metabolism. I. Toufeili.

FTNT 265 Food Chemistry. 2.0; 2 cr. Prerequisite: Chemistry 208. Chemical composition, physical and sensory properties of foods. I. Toufeili.

FTNT 267 Food Analysis. 1.3; 2 cr. Prerequisites: Chemistry 205, Chemistry 209, FTNT 265. Laboratory methods for Chemical analysis of nutrients and Chemicals in food products. S. Shadarevian, I. Toufeili.

FTNT 274 Human Nutrition. 3.3; 4 cr. Prerequisites: FTNT 221. Nutrient requirements and deficiencies at different stages in the life span. A. Miski, S. Shadarevian.

FTNT 287 Food Processing. 2.0; 2 cr. Prerequisites: FTNT 261, AGRL 224. Principles of food spoilage, food preservation, and the different methods of food processing. R. Tannous.

FTNT 288 Technology of Food Products. 2.3; 3 cr. Prerequisites: FTNT 287, FTNT 289. Technology of processing major foods and their products; includes processing food products in the Pilot Plant. R. Tannous, B. Deryan-Hamadeh

FTNT 289 Food Processing Laboratory. 0.6; 1 cr. Pre- or co-requisite: FTNT 287. Laboratory exercises in the Pilot Plant in food preservation and processing. R. Tannous, B. Deryan-Hamadeh.

FTNT 290 Food Service Management. 2.3; 3 cr. Prerequisites: BADM 231, FTNT 221. Techniques of management of food production and service; training and supervision. Clinical learning experiences, self-study modules, reports and discussion. Members of Faculty.

FTNT 292 Diet Therapy in Inborn Errors of Metabolism. 3.0; 3 cr. Prerequisite: FTNT 274. The course deals with congenital defects that require special diet manipulations and possible nutritional support. Members of Faculty.

FTNT 293 Therapeutic Nutrition. 3.0; 3 cr. Prerequisite: FTNT 274. Process of assessing nutritional status, identifying nutritional needs; nutritional care in various diseases. N. Baba.

FTNT 294 Therapeutic Nutrition Laboratory. 0.6; 2 cr. Co-requisite: FTNT 293. Self-study modules, case studies, reports and discussions. Members of Faculty.

FTNT 297 Food Microbiology. 3.0; 3 cr. Prerequisite: AGRL 224. A survey of micro-organisms and their role in food deterioration and food poisoning, and their beneficial utilization in food applications. Members of Faculty.

FTNT 298 Dietetics Internship 01936. Training for eleven months in the Dietary Department of the AUB Medical Center.

FTNT 299 Special Topics in Nutrition and Food Sciences. 2 cr. Prerequisites: Third year standing. Directed study. Members of Faculty.

FTNT 300 Graduate Tutorial. 1-3 cr. Directed study. Members of Faculty.

FTNT 302 Dairy Technology. 2,3; 3 cr; alternate years. Prerequisite: FTNT 288. The Chemistry, technology, and processing of milk and milk products. Members of Faculty.

FTNT 304 Traditional Methods of Food Processing. 2.3; 3 cr; alternate years. Prerequisite: FTNT 288. Scientific basis of common traditional processing and preservation methods used in developing countries. R. Tannous.

FTNT 306 Food and Nutrition Problems. 3.0; 3 cr. Prerequisite: FTNT 274. Provides students with a working knowledge of the principles and application of community nutrition: identification and assessment of nutritional status in the community, nutritional surveys, program development, nutritional Education and planning policies, nutritional ecology. N. Baba.

FTNT 308 Advanced Therapeutic Nutrition. 3.0; 3 cr. Prerequisite: FTNT 274. Advances in nutritional care, metabolic changes and dietary management of diseases. N. Baba.

FTNT 310 Advanced Food Biochemistry. 3.0; 3 cr; alternate years. Prerequisite: FTNT 261. Study of food enzymes, mechanisms and details of fermentation processes in food technology; postmortem and postharvest biochemistry of muscle and plant tissues. I. Toufeili.

FTNT 311 Advanced Nutrition: Macro Nutrients. 3.0; 3 cr. Prerequisites: FTNT 221 or 274, FTNT 261. Advances in carbohydrate, protein, lipid, fiber and ethanol nutrition and metabolism. N. Baba.

FTNT 314 Advanced Nutrition: Mineral Elements. 3.0; 3 cr. Prerequisites: FTNT 221, FTNT 274. Advanced nutritional, biochemical and physiological aspects of macro and micro mineral elements, and toxic elements in humans and animals. A. Miski.

FTNT 315 Advanced Nutrition: Vitamins. 3.0; 3 cr. Prerequisites: FTNT 221, FTNT 274. Advanced nutritional, biochemical and physiological aspects of vitamins and vitamin-like substances in humans and animals. A. Miski.

FTNT 370 Advanced Food Science. 3.0; 3 cr. Prerequisite: FTNT 287. Advances in sensory analysis, processing operations and technology of food products. I. Toufeili, R. Tannous.

FTNT 371 Food Engineering. 3.0; 3 cr. Prerequisite: FTNT 287. Basic concepts and principles of food engineering and their applications; It focuses on engineering design and analysis of unit operations common to food processing. M. Sidahmed, R. Tannous.

FTNT 391 Laboratory Methods in Nutrition and Food Science. 1.6; 3 cr. Prerequisite: FTNT 267. Principles of animal experiments, analytical techniques, and instrumentation used in nutrition research studies. Members of Faculty.

FTNT 395, 396 Graduate Seminar in Nutrition and Food Science. 1.0; 1 cr (each). Members of Faculty.

FTNT 399 M.S. Thesis.

DEPARTMENT OF SOILS, IRRIGATION AND MECHANIZATION (SIMC)

Chairperson:	Sidahmed, M
Professor:	Nimah, M.
Visiting Associate Professor:	Bashour, I.
Associate Professors:	Sidahmed, M.; Zurayk, R.
Assistant Professor:	El-Awar, F.

The Department of Soils, Irrigation and Mechanization offers study and research in applying the physical sciences to solving problems of Agriculture in the Middle East.

Introductory courses in the three disciplines are offered to all Agriculture students within the framework of the core curriculum. Specialized and advanced courses are offered as electives at the undergraduate level. At the graduate level, training is available in the three areas of Soils, Irrigation and Mechanization.

The following courses are offered by the Department:

SIMC 215 Introduction to Soils. 2.3;3 cr. Origin, properties, classification, and management of soil with emphasis on soil behavior in relation to irrigated Agriculture, ecology, and the environment. R. Zurayk.

SIMC 225 Farm Power. 1.3; 2 cr. Internal combustion engines; power trains; drawbar performance; stability and safe operation tractors. M. Sidahmed.

SIMC 226 Farm Machinery. 1.3; 2 cr. Functional requirements, principles of operation, performance evaluation, and selection of farm machinery. M. Sidahmed.

SIMC 228 Irrigation Principles. 2.3; 3 cr. Surveying, land preparation, water measurement, conveyance and application, pumping, drainage, soil-water relationships, nd introduction to farm irrigation methods. M. Nimah.

SIMC 261 Hydraulics. 3.0; 3 cr. Principles of mass and energy conservation, pipe flow, measurement of fluid flow, and application of hydraulic principles to irrigation system design. F. El-Awar.

SIMC 262 Irrigation Methods. 3.0; 3 cr. Hydraulics of surface irrigation systems, and design of border, furrow and controlled flooding irrigation. Hydraulics of sprinkler and drip irrigation systems, and methods of evaluation of each system. M. Nimah.

SIMC 263 Pesticide Application Technology. 2.3; 3 cr. Basics of sprayers. Principles of operation of field and orchard sprayers. Performance parameters and evaluation. Drop size technology. Spray transport and dispersal. Drift and deposition measurement. Pesticides reduction drift control. Safety in handling and storage. M. Sidahmed.

SIMC 265 Soil Fertility. 3.0; 3 cr. Prerequisite: SIMC 215. Behavior of native and applied fertilizer elements in soils in relation to crop production, soil fertility

evaluation, fertilizer manufacture, fertilizer use in irrigation systems, and economics of fertilizer use. I.Bashour

SIMC 270 Environment Control in Agriculture. 3.0; 3 cr. Materials and design characteristics f arm tructures. Basics of heat and mass transfer. Design of environment control systems for animals, plants, and storage of Agricultural materials and products. M. Sidahmed.

SIMC 273 Plant-Soil-Water Relationships. 3.0; 3 cr. Prerequisite: SIMC 228. Physical relationships of soil moisture and plant growth, soil physical properties, crop water use and irrigation requirement determination. M. Nimah.

SIMC 275 Soil Chemistry. 3.0; 3 cr. Prerequisites: SIMC 265. Principles of soil chemistry and mineralogy, mineral formation of soils, crystal chemistry of silicates, colloidal properties, cations and anious retention and fractions of organic matter in soils. I. Bashour.

SIMC 277 Basic Hydrology. 3.0; 3 cr. Applied methods in hydrologic nalysis nd design. Hydrologic cycle components including precipitation, nfiltration, round water, and surface runoff. Basic considerations of reservoir flow routing and management. F. El-Awar.

SIMC 299 Special Topics in Soils, Irrigation and Mechanization. 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Directed study. Members of Faculty.

SIMC 300 Graduate Tutorial. 1-3 cr. Special topics in soils, irrigation, and mechanization. Members of Faculty.

SIMC 305 Irrigation Distribution System Design. 3.0; 3 cr. Prerequisite: SIMC 261. Open channel flow hydraulics, design of low head hydraulic structures, and pipe design considerations. Water demand modules, water supply alternatives, and design flow concepts. F. El-Awar.

SIMC 309 Drainage of Agricultural Lands. 3.0; 3 cr. Soil properties, porous media flow, and hydraulic conductivity measurement. Soil leaching requirements, drainage investigations, and surface and subsurface drainage system design. M. Nimah.

SIMC 310 Advanced Soil Physics. 3.0; 3 cr. Prerequisite: SIMC 273. Physical properties of soils in arid, semi-arid, and sub-humid regions. Soil-water-plant-atmosphere relationships, plant water extraction, and evapotranspiration. Salt and water flow in soils, soil heat flow, and modeling soil water extraction and evaporation. M. Nimah.

SIMC 312 Fertilizer Technology and Use. 3.0; 3 cr. Prerequisite: SIMC 265. Fertilizers in Agricultural development, current developments in fertilizer technology, fertilizer use in flooded soils, special problems associated with fertilizer use and research methodology in soil fertility. I. Bashour

SIMC 316 Ground Water Hydrology. 3.0; 3 cr. Occurrence, storage, distribution, and movement of ground water. Confined and unconfined aquifer properties, well-aquifer hydraulics and relationships, and ground water basin management. F. El-Awar.

SIMC 317 Surface Water Hydrology. 3.0; 3 cr. Relevant statistical concepts and extreme event distributions. Rainfall frequency analysis, rainfall-runoff relationships, unit hydrograph theory, overland flow routing, and stochastic processes in hydrology. F. El-Awar.

SIMC 318 Soil Salinity and Management. 3.0; 3 cr. Diagnosis and properties of salt-affected soils; plant growth and salinity. Water quality for irrigation, drainage, reclamation and management of saline and sodic soils. R. Zurayk.

SIMC 321 Systems Analysis in Water Resources. 3.0; 3 cr. Basic concepts of formulation and modelling of stimulation and optimization techniques in water resources. Planning and operation of single and multi-reservoir systems, and multi-basin river system Simulation and management. F. El-Awar.

SIMC 324 Methods of Soil and Plant Tissue Analysis. 2.3; 3 cr. Theory, analytical techniques, and operation of instruments in plant analysis and in physical, Chemical, and mineralogical analysis of soils. I.Bashour

SIMC 326 Surface Irrigation Engineering. 3.0; 3 cr. Prerequisites: SIMC 261, SIMC 262. Principles of design, operation, and evaluation of surface irrigation systems. Irrigation field design, and field measurement techniques. M. Nimah.

SIMC 328 Sprinkler and Micro-Irrigation Engineering. 3.0; 3 cr. Prerequisites: SIMC 261, SIMC 262. Fundamentals of design, operation, evaluation, and selection of pressurized irrigation systems. Pipe line economics, pump hydraulics, and pumping plant design considerations. M. Nimah.

SIMC 367 Soils Conservation. 3.0; 3 cr. Mechanics and control of wind and water erosion of cultivated, range and forest land. Emphasis on conservation problems of arid, and semi-arid regions. R. Zurayk.

SIMC 370 Materials Handling and Processing. 3.0; 3 cr. Physical properties of Agricultural materials. Principles and practices in the transporting, conveying, grading, and processing of Agricultural materials and products. Storage and conditioning of grain and forage. Transport and storage of fruits and vegetables. M. Sidahmed.

SIMC 372 Agricultural Machinery Management. 3.0; 3 cr. Selection, adoption, and economics of Agricultural machinery. Machine, power, and labour performance. Cost determination and management decisions. Matching implements and tractors. M. Sidahmed.

SIMC 375 Soil Mechanics in Tillage and Traction. 3.0; 3 cr. Prerequisite: SIMC 225. Static and dynamic properties of soils. Mechanics of tillage tools. Design and analysis of tillage tools. Design of traction and transport devices. Traction performance and evaluation. Soil-machine systems. M. Sidahmed.

SIMC 395, 396 Graduate Seminar in Soils, Irrigation and Mechanization. 1.0; 1 cr. (each). Members of Faculty.

SIMC 399 M.S. Thesis.

GENERAL COURSES IN AGRICULTURE

AGRL 201 Orientation to Agriculture in the Middle East. 2.0; 2 cr. A survey of the natural resource potentialities of the Middle East with emphasis on the principal input requirements for Agricultural development. Current trends in modernization of Agricultural production and the difficulties this process faces are emphasized. (M. Haidar; N. Kawar, Coordinators)

AGRL 211 Agricultural Mechanics. 0.6; 2 cr. Fabrication methods applicable to Agricultural equipment and structures. Members of Faculty.

AGRL 222 Farm Practices. 0.6; 2 cr. Prerequisite AGRLIII standing and must also be eligible to enroll in the regular program at AREC. Practical experience in operational activities and management decisions essential in modern Agriculture. Members of Faculty.

AGRL 223 Agricultural Project. 0.6; 2 cr. Prerequisite: AGRL III standing and must also be eligible to enroll in the regular program at AREC. Directed study with field and laboratory work. Members of Faculty.

AGRL 224 Agricultural Microbiology. 2.3; 3 cr. A course that covers basic and applied microbiology. The basic microbiology includes: bacterioiogy, virology, parasitology and immunology. The applied microbiology includes veterinary, soil and water, and food microbiology. E. Barbour.

AGRL 243 Genetics. 3.0; 3 cr. Principles of inheritance, with an introduction to modern genetics. S. Hamadeh.

AGRL 270 Computer Application in Agriculture. 1.3; 2 cr. Overview of computer hardware and software. Applying Basic programming language and other packages to problem solving in Agriculture. M. Sidahmed.

AGRL 295 and 296 Current Topics in Agricultural and Food Sciences. 1.0; 1 cr. Prerequisite: ND III or AGRL. IV standing. Each student is required to give at least one presentation on a chosen subject. (E. Abou-Fakhr Hammad; F. Sleiman, Coordinators)

AGRL 301 Statistical Methods in Agriculture. 3.3; 4 cr; Fall and Spring. Prerequisites: MATH 208, MATH 209. Statistical techniques needed to design experiments and analyze and interpret Agricultural research data. R. Baalbaki, S. Hamadeh, R. Darwish.

ECOSYSTEM MANAGEMENT COURSES

ECMG 654/ 311 Physical and Biological Resources in Terrestrial Ecosystems. 3 cr.; alternate years. Physical and Biological resources in ecosystems. Soils in the ecosystem. Soil conservation. Principles of soil Chemistry and microbiology. Plant and animal biodiversity. Collection and conservation of wild types. Preservation of endangered species. Plant response to environmental stress. R. Zurayk, Coordinator.

ECMG 631/ 314 Agricultural Pollution and Control. 3 cr.; annually. Fate of petrochemicals in the environment. Effect on terrestrial and aquatic systems.

Contamination, monitoring residues, methodologies and risk assessment models and research. M. Nimah, Coordinator.

ECMG 316 Sustainable Agriculture. 3 cr. Concepts, history, and economics. Organic farming and sustainable crop production systems. Pest management and sustainable soil fertility practices. policy issues and future trends. S. Hamadeh, Coordinator.

For **ES courses** given by FAFS, see under "Interfaculty Environmental Sciences Graduate Program," page 504.

All FAFS courses are open to students from other faculties, on condition that:

i) The student has taken the prerequisite courses.
ii) There is available space in the course, with priority given to students in the major.
iii) The student has approval from his/her Faculty to take the course.

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FACULTY OF HEALTH SCIENCES

FACULTY LIST 1998-99

Officers of the Faculty

John Waterbury	President of the University
Huda Zurayk	Dean of the Faculty
Iman Nuwayhid	Assistant Dean
Mona Katul	Executive Officer
Waddah Nasr	Registrar
Salim Kanaan	Director of Admissions

Professors Emeriti

Acra, Aftim, Ph.C., AUB; M.P.H., University of North Carolina; Environmental Sciences

Azar, Joseph, M.D., AUB; D.T.M. & H., London School of Hygiene and Tropical Medicine; Infectious Diseases and Epidemiology

Harfouche, Jamal, M.D., AUB; M.S., Dr.P.H., Harvard University; Maternal and Child Health

Professors

Saxena, Prem Chandra, Ph.D., Banaras Hindu University; Population Studies

Zurayk, Huda, Ph.D., Johns Hopkins University; Epidemiology and Biostatistics

Visiting Professors

Armenian, Haroutune, M.D., AUB; M.P.H., Dr.P.H., Johns Hopkins University; Epidemiology and Biostatistics[1]

Srinivasan, Krishnamurthy, Ph.D., Kerala University-India; Population Studies[2]

Associate Professors

Jurdi, May, Ph.D., AUB; Environmental Health

Nuwayhid, Iman, M.D., AUB; Dr.P.H., Johns Hopkins University; Environmental Health

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[1] February 3-8, 1999

[2] April 19–May 8, 1999

Assistant Professors

Afifi-Soweid, Rima, Ph.D., St. Louis University; Health Behavior and Education
Chaaya, Monique, Dr.P.H., Johns Hopkins University; Epidemiology and Biostatistics
Harakeh, Steve, Ph.D., Surrey University; Environmental Health
Kassak, Kassem, Ph.D., University of Minnesota; Health Services Administration
Kulczycki, Andrzej, Ph.D., University of Michigan; Population Studies
Shediac-Rizkallah, Mona, Ph.D., Johns Hopkins University; Health Behavior and Education
Sibai, Abla, Ph.D.; University of London; Epidemiology and Biostatistics

Adjunct Assistant Professor

Ramadan, Sima, Dr.P.H., Columbia University; Health Services Administration

Visiting Assistant Professor

[p] Nawfal, Hala, Diplome D'expert Demographe, Sorbonne University-France; Epidemiology and Biostatistics

Visiting Senior Lecturer

Myntti, Cynthia, Ph.D., London School of Economics; MPH, Johns Hopkins University; Health Behavior and Education[1]

Lecturers

[p] Asrawi, Fadi, Ph.D., University of Southern California; Health Services Administration

Deeb, Mary, Ph.D., Johns Hopkins University; Epidemiology and Biostatistics[2]
[p] El Jor, Nazih, M.B.A., Fairleigh Dickinson University - US; Doctorat 3eme Cycle-USEK - Lebanon; Health Services Administration[2]
[p] El Kak, Faysal, M.S., M.D., AUB; Health Behavior and Education[2]
[p] Ghattas, Renee, M.B.A., AUB; Health Services Administration
[p] Hatjian, Berj, Ph.D., University of Newcastle Upon Tyne - UK; Environmental Health[3]
[p] Karam, Nadim, M.D., AUB; M.P.H., Johns Hopkins University; Health Services Administration
[p] Khalidi, Aziza, Dr. Sc., Johns Hopkins University; Health Services Administration[2]

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[p] Part-time
[1] March 1–May 31, 1999
[2] Second Semester
[3] First Semester

P   Milki, Raif, D.E.S.T., Delft Technical University-Holland; Environmental Health

P   Tamim, Hala, Ph.D., McGill University - Canada; Epidemiology and Biostatistics

Visiting Lecturer

Mokdad, Ali, Ph.D., Emory University; Epidemiology and Biostatistics[1]

Instructors

P   Abi-Chahine, Karen, M.P.H., AUB; Health Services Administration[2]

P   El-Kak, Faysal, M.S., M.D., AUB; Health Behavior and Education[2]

Hajjar, Haytham, M.P.H., AUB; Health Services Administration

P   Kadi, May, M.P.H., AUB; Environmental Health[3]

Kambris, Mona, M.P.H., AUB; Environmental Health

Kanj, Mayada, M.P.H., AUB; Health Behavior and Education

Khatib, Rolla, M.S., AUB; Medical Laboratory Technology

Khayat, Rita, M.P.H., AUB; Epidemiology and Biostatistics

Kobeissi, Hanaa, M.P.H., AUB; Health Services Administration

Melhem, Nada, M.S., AUB; Medical Laboratory Technology

Mohammed Ali, Arabia, M.P.H., AUB; Health Services Administration

P   Moukheiber, Lina, M.P.H., University of Tennessee; Health Behavior and Education

Naffah, Nadine, M.P.H., AUB; Health Services Administration[4]

P   Ramadan, Mahassen, M.P.H., AUB; Medical Laboratory Technology

P   Tohme, Rima, M.P.H., AUB; Health Services Administration

P   Yassine, Bassam, M.B.A., Lebanese American University; Health Services Administration[2]

Assistant Instructor

Azar, Joseph, B.S., Haigazian University; Computer Sciences

Research Assistants

Al-Barazi, Rana, M.P.H., AUB; Environmental Health

Almawi, Joumana, M.P.H., AUB; Health Services Administration

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[1] December 28, 1998–February 6, 1999

[2] First Semester

[3] Second Semester

[4] Till February 28, 1999

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Beydoun, Hind, M.P.H., AUB; Environmental Health
Beydoun, May, M.P.H., AUB; Epidemiology and Biostatistics
El Hadi, Wissam, B.S., AUB; Health Services Administration
[p] Faour, Tania, B.A., AUB; Population Studies
Farhat, Tilda, M.P.H., AUB; Health Behavior and Education
[p] Ghosn, Ziad, B.A., AUB; Population Studies
[p] Ismail, Rana, B.S., AUB; Population Studies
[p] Kalfayan, Lina, B.S., AUB; Medical Laboratory Technology
Khouri, Mona, M.A., Leads University; Health Service Administration
Kobeissi, Loulou, B.A., AUB; Epidemiology and Biostatistics
Kouzi, Sarah, M.P.H., AUB; Environmental Health
Kodeih, Amal, B.S., AUB; Population Studies
[p] Kutaili, Lina, M.S., AUB; Environmental Health
Merhi, Mirvat, B.S., AUB; Epidemiology and Biostatistics
Nasser, Rania, B.E., AUB; Computer Center
Nsouli, Meerna, B.S., AUB; Epidemiology and Biostatistics
Shibl, Hadeel, B.A., AUB; Epidemiology and Biostatistics
Yeretzian, Joumana, M.S., Johns Hopkins University; Epidemiology and Biostatistics

Preceptors

Dubois, Claude, C.M.A., C.H.E., Canada; Health Services Administration
Hajj, Marina, M.D., AUB; M.B.A., I.N.S.E.A.D.; Health Services Administration
Jabbour, John, M.P.H., AUB; Epidemiology and Biostatistics
Kalout, Joumana, M.P.H., AUB; Epidemiology and Biostatistics
Kuntz, Dieter, M.H.A., University of Toronto; Health Services Administration
Mouro, Gladys, R.N., M.S.N., University of Pennsylvania; Health Services
    Administration
Muallem-Nassar, Saydih, M.P.H., AUB; Health Services Administration

Associates

Imad, Azmi, M.S., University of London; Environmental Health
Korfali, Samira, M.S., AUB; Environmental Health

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GENERAL INFORMATION

The Faculty of Health Sciences (FHS) serves to educate and train professionals to help meet the needs of the developing world for competent leaders in the field of health. Upon graduation, physicians, biostatisticians, population experts, hospital administrators, health planners, health managers, epidemiologists, environmentalists, medical laboratory technologists, health educators, and other members of the health team generally assume positions dealing with critical health needs in government, industry and the private sector in countries of the region.

Currently, the FHS emphasizes environmental health, epidemiology and biostatistics, population studies, health services administration, health education/health promotion, and medical laboratory technology. FHS also serves as a Department of Preventive Medicine for the Faculty of Medicine.

ADMISSION

For complete and detailed information regarding admission to the University, including recognized certificates, see the section on "Admissions" on page 29 in this catalogue.

UNDERGRADUATE PROGRAMS

Bachelor of Science in Health Sciences

(Environmental Health, Medical Laboratory Technology)

To be eligible for admission to the programs leading to the degree of Bachelor of Science in Health Sciences, candidates must have completed satisfactorily the Freshman Science program in the Faculty of Arts and Sciences, or an equivalent program, with a minimum cumulative average of 70 and a minimum science average of 70.

Lebanese students must present the Lebanese Baccalaureate, Part II (Experimental Sciences or Mathematics), or its equivalent, and should be considered by the Registrar to be eligible for admission to the Sophomore Science class.

Courses taken before the student is admitted to any of the B.S. programs in Health Sciences may be credited at the discretion of the appropriate Department.

GRADUATE PROGRAMS

A. Master of Public Health

Students may be admitted, according to their background, to one of the following alternatives:

Alternative I (MPH One-Year Program): Students in this group are physicians, or other professionals holding a Bachelor's degree, who have had solid, relevant experience in the health field for at least 3 years. Normally, applicants of this group will be full-time students enrolled for a 9-month program requiring the successful completion of at least 34 credit hours of academic course work.

A candidate, who wishes to enroll in the MPH one-year program as a part-time student, may do so provided he/she completes the requirements within a period of three and a half years.

Candidates eligible for consideration for admission to Alternative I, may choose to apply to Alternative II, however, only on a full-time basis.

Alternative II (MPH Two-Year Program): Students in this group hold a Bachelor's degree from a recognized institution and have less than 3 years experience in the field of health. Students in this group will be enrolled full-time in an academic program of 50 credit hours offered over a period of two years, including 10 credits of residency in a concentration of their choice. Currently, the concentrations available are: Environmental Health, Epidemiology and Biostatistics, Health Behavior and Education, and Health Services Administration.

A candidate will be eligible for consideration for admission to the MPH Programs if he/she obtains a minimum admission score of 80. (Admission scores will be based on academic achievement, experience in a health-related field, and extra-curricular activities.) A candidate with an admission score of at least 77 but less than 80 may be considered for admission on probation.

Undergraduate prerequisites for entering the MPH program consist of HSAD 203 and HSAD 206. In addition, HSAD 251 is required of applicants to the one-year program and HSAD concentration.

B. Master of Science in Epidemiology

This program is currently frozen.

C. Master of Science in Population Studies

Students accepted to the program must have a Bachelor's degree in Economics, Sociology, or Health Sciences. Students from other majors will be accepted at the discretion of the Faculty if found to have a background that will permit them to specialize in any one of the three concentrations of the Program. All relevant requirements and regulations of the University and the Faculty of Health Sciences for the Master of Science degree, not otherwise specified here, shall apply to the Program. Undergraduate prerequisites for entering the Program consist of the following courses or equivalents: ECON 211 and 212 or ECON 203, SBHS 201 and EPBS 204 or MATH 207 or MATH 208. In addition, adequate computer knowledge, as determined by the Faculty, is required.

While the program is expected to produce population scientists who have a good grasp of a core of population knowledge, it is designed to offer, through groups of elective courses, concentration in one of three areas, namely, demographic techniques, population and development, or population and health. The course requirement for this program is a total of 27 credit hours of graduate courses: a core of 21 credits plus 6 more of electives and a thesis.

D. Master of Science in Environmental Sciences (major: Environmental Health)

For full details of this interfaculty program, see the section on "Graduate Studies" at the end of this catalogue.

ACADEMIC RULES AND REGULATIONS

A. ATTENDANCE

Classes and Laboratories

1. Students are expected to attend all classes, laboratories, and any other required activities. Absence of a student, whether excused or not, from any class or laboratory session does not excuse the student from his/her responsibility for the work done or for any announcements made during his/her absence.

2. Any student who absents himself/herself during a semester from more than one third of the number of sessions of any course loses all credit for the course. The student shall be graded a W (Withdrew) if he/she has a valid excuse for absenting himself/herself and W-F if he/she does not. For the purpose of averaging, W-F shall be considered as 40.

3. No student may be excused from laboratory and field requirements. All missed laboratory and field requirements must be made up.

Examinations and Quizzes

1. Students may not absent themselves from announced final examinations and quizzes unless they present an excuse considered valid by the coordinator of the course. The course coordinator may then require the student to take a make-up examination.

2. A student missing a quiz or a final examination with no excuse considered valid by the coordinator will automatically receive a grade of "zero" for that quiz or project.

Courses in other Faculties

Students taking courses in other Faculties of the University are required to follow the attendance regulations of that Faculty.

B. GRADING SYSTEM

Evaluation of the student's achievement will include his/her work in theory, practice, professional attitudes and behavior.

In the Faculty of Health Sciences, the following grading system is used:

90-100 Excellent   70-79 Fair
80-89 Good   60-69 Weak
                             below 60 Failing.

In the M.P.H. and M.S. programs, the passing grade is 70. Certain courses in under-graduate programs require a passing grade of 70 (see individual curricula).

C. POLICY ON TRANSFER TO THE UNDERGRADUATE PROGRAMS

To be eligible for admission to advanced standing (second and third year), a candidate must have completed:

1. The equivalent requirements for the first year of undergraduate study in the Faculty of Health Sciences.
2. A minimum cumulative average of 70.
3. A minimum average of 70 in science courses.

A student who has completed a minimum of one semester of study as a sophomore student or its equivalent is eligible for admission to the first year in the Faculty of Health Sciences if:

1.   He/She obtains a minimum cumulative average of 70.
2.   He/She obtains a minimum average of 70 in science courses.

D. POLICY AND PROCEDURES ON EXEMPTION AND TRANSFER OF CREDITS TO THE MASTER OF PUBLIC HEALTH PROGRAM

1.   An exemption is considered when a course duly registered for and satisfactorily completed in a recognized university/faculty/program, normally with a minimum grade of 80 or equivalent, is substituted for a comparable course in the FHS. The requirement of this particular course is waived, but not its credits (i.e., the candidate will have to replace the exempted course credits by other credits).

      The exemption is best judged by a test administered to the candidate by the course instructor/department concerned.

2.   A transfer of credits is considered when a course duly registered for and satisfactorily completed in a recognized university/ faculty/ program with a minimum grade of 80 or equivalent is accepted as such in lieu of credits earned in a comparable ourse n he HS, rovided hat the candidate has not already used the credits of the course to obtain or be awarded a degree/diploma/ certificate (i.e., credits are to be used only once as a currency unit towards only one degree or diploma or certificate). However, for courses taken within the Faculty of Health Sciences, the Academic Committee will consider a minimum grade of 75 for transfer of credits.

3.   The maximum number of credits that can be transferred shall not exceed 12 credits of comparable courses at FHS. It is further deemed preferable not to exempt or transfer core-required courses unless the instructor/department/ committee concerned are fully confident of the nature and content of the courses in relation to FHS courses.

4.   To exempt or transfer courses, the candidate shall submit to the concerned department Chairperson, after consulting with the advisor, the following official documents:
      •   A letter of request for exemption and/or transfer.
      •   The official catalogue of the transferring institution.
      •   A detailed description of the course contents and syllabus.
      •   An official statement of records/grades earned for the course(s).

For both "exemption" and "transfer of credits," the programs/departments/ universities concerned hall e eemed f omparable tanding, uch s common membership in a professional association.

5. The Chairperson of the department concerned shall seek in writing the opinion of the course(s) instructor(s), and the department faculty, and then submit the recommendation f he epartment long ith he upporting ocuments to the Academic Committee of FHS for final approval.

E. WITHDRAWAL

Withdrawal from a Course

Students are permitted to withdraw from courses not later than 12 weeks after the start of the semester or 75% of the period of block courses. W (Withdrew) will be inscribed on their records.

Withdrawal from the Program

To maintain his/her student status, a student must register every semester, excluding the summer session, unless required by the program. If the student does not register, he/she will be considered withdrawn from the program and will have to apply for readmission.

F. PROMOTION

1. An undergraduate student shall be promoted to the next higher class when he/she has taken and passed 30 or more credits beyond the requirements for the previous class. However, a student who registers in October lacking 6 or fewer credits for completion of a class will be registered in the next higher class.

2. In the M.P.H. two-year program, a student will be promoted from first year to second year when he/she completes a minimum of 25 credits, including all core courses, and attains a weighted yearly average of 75 or more.

G. PROBATION AND FAILURE

UNDERGRADUATE PROGRAMS (ENHL, MLTP)

Placement on Probation

A student will be placed on probation for any one of the following reasons:

1. If at the end of a semester a student fails in two or more courses.
2. If at the end of a semester a student fails to obtain an average of 65 during the first year and an average of 70 during the second and third years.

A student will not be placed on probation in the last semester of his/her senior year if he/she attains an average of 70 in that year and fulfills the graduation requirements.

Removal of Probation

A student will be removed from probation at the end of a semester if:

1. The student passes all courses taken during that semester; and
2. At the end of a semester, the student achieves an average of 65 during his/her first year and an average of 70 during the second and third years; and
3. The student achieves the minimum yearly average of 70 if the semester/summer session in question is the last session of the student's senior year.

Repeating Courses

1. A student may repeat any course with the consent of the advisor if the grade is below 70.

2. All required courses that a student fails must be repeated.

3. In exceptional cases, a student may be allowed to take a make-up exam for a course failed, before the end of the following academic term. He/She must have the approval of the course coordinator and the Academic Committee. A pass or fail grade will be given to students taking make-up examinations. The original failing grade obtained will remain on the transcript and will be used in the computation of the cumulative average.

4. When a course is repeated, the highest grade obtained will be considered in the calculation of the student's cumulative average.

Repeating the Year

The Academic Committee may require a student to repeat the year if he/she:

1. Fails in one third or more of credit load attempted during that year, or
2. Fails to remove probation within two semesters, or
3. Fails to attain the minimum yearly average. Students repeating the year must register for a full load and repeat all courses in which they have scored below the minimum required for that year.

GRADUATE PROGRAMS

MPH Two-Year Program

Placement on Probation

A student will be placed on probation if:

1. He/She fails in any graduate course taken for credit. (Passing grade is 70.)
2. His/Her cumulative average falls below 75.

A student with an admission score of at least 77 but less than 80 will be admitted on probation.

Removal of Probation

A student will be removed from probation if he/she passes all courses and obtains a minimum cumulative average (in all courses taken) of 75.

A student admitted on probation must pass all courses and obtain a minimum average of 80 in his/her first semester of study in order to be removed from probation.

MPH One-Year Program

Placement on Probation

A student will be placed on probation if:

1. He/She fails in any graduate course taken for credit. (Passing grade is 70.)
2. He/She fails to obtain a minimum cumulative average of 75 after the completion of a minimum of 12 credit hours in graduate courses.

A student with an admission score of at least 77 but less than 80 will be admitted on probation.

Removal of Probation

If a student fails to obtain the minimum cumulative average of 75 after the completion of 12 credit hours of graduate courses (see section on Placement on Probation), yet he/she attains this average after taking and passing additional courses, probation may be removed.

If a student admitted on probation fails to obtain the minimum cumulative average of 80 after the completion of 12 credit hours of graduate courses (see section on Placement on

Probation), yet he/she attains this average after taking and passing additional courses, probation may be removed.

H. DISMISSAL FROM THE FACULTY OF HEALTH SCIENCES

UNDERGRADUATES

A student may be dismissed by vote of the Faculty upon the recommendation of the Academic Committee if he/she:

1. Fails to remove probation within two semesters; or
2. Fails to satisfy the requirements of a repeated year; or
3. In the judgment of the Academic Committee is not making satisfactory academic progress, has not shown sufficient professional promise, or has behaved in a manner below the norms expected in the Faculty.

GRADUATES

MPH Two-Year Program

A student may be dismissed from the program if:

1. He/She fails to attain a cumulative average of 80 at the end of the first year (applicable only to those admitted on probation); or
2. He/She fails to remove his/her probation within two semesters; or
3. In the opinion of the Academic Committee, and irrespective of the grades obtained, the work of the student is deemed unsatisfactory.

MPH One-Year Program

A student may be dismissed from the program if:

1. He/She fails to attain a cumulative average of 80 after the completion of 24 credit hours (applicable only to those admitted on probation); or
2. He/She fails to remove his/her probation after the completion of 24 credit hours; or
3. In the opinion of the Academic Committee, and irrespective of the grades obtained, the work of the student is deemed unsatisfactory.

I. APPLICATION FOR READMISSION

When, in accordance with University regulations, a student is dropped, the implication is that he/she is not qualified to continue his/her education. Consideration for readmission is given for one of the following reasons:

1. If a student was not able to do his/her work efficiently because of health reasons (in such cases, the University will depend on a medical report from the University Physician).

2. If the advisor of the student or a faculty member or administrative official of the University knows of certain family problems which may have influenced the academic achievement of the student.

3. If, after spending one or two years at another institution, the student is able to present a satisfactory record and recommendation.

Ordinarily, supporting documents for (1.) and (2.) must be presented within 30 days after the student is dropped from the University, but in exceptional cases this presentation may be made at the beginning of the following regular semester.

If a student is on probation and leaves the University after the tenth week of the semester, the Academic Committee will decide whether he/she may be allowed to return to the University.

J. INCOMPLETE GRADES

The designation for Incomplete grades shall be "I". The "I" will be removed if the course work is completed within the specified deadline (one month as of the beginning of the following semester) and will be replaced by the final grade. If the course work is not completed within the established deadline, the "I" shall be automatically replaced by a grade of 40.

K. DISCIPLINARY ACTION

The department concerned will refer a student engaging in academic misconduct, such as cheating in examinations or plagiarism, to the Dean and the Advisory Committee.

L. DEAN'S HONOR LIST

The list of requirements for a student to be placed on the Dean's Honor List can be found on page 89 of this catalogue.

GRADUATION REQUIREMENTS

All recommendations for graduation are made by vote of the Faculty, upon the recommendation of the Academic Committee.

BACHELOR OF SCIENCE IN HEALTH SCIENCES

1. *Concentration in Environmental Health:* To be eligible for graduation with the degree of Bachelor of Science in Health Sciences (concentration in Environmental Health), a student must have completed satisfactorily the prescribed course of study and passed a minimum of 96 credit hours (excluding the 5 required credits for field training), after Freshman Science class or equivalent, and attained a total cumulative average of 70.

2. *Concentration in Medical Laboratory Technology:* To be eligible for graduation with the degree of Bachelor of Science in Health Sciences (concentration in Medical Laboratory Technology), a student must have completed satisfactorily the prescribed program of study and passed a minimum of 100 credit hours, after the Freshman Science class or equivalent, and attained a total cumulative average of 70.

MASTER OF PUBLIC HEALTH (MPH)

To be eligible for graduation in the MPH program, a student must have:

1. Passed all required courses with a minimum grade of 70.

2. A weighted cumulative average of at least 75.

3. Passed a minimum of 34 credit hours, including required courses, for students in the one-year program and 50 credit hours for students in the two-year program.

MASTER OF SCIENCE IN EPIDEMIOLOGY

Refer to the section on "Graduate Studies" in this catalogue.

MASTER OF SCIENCE IN POPULATION STUDIES

For the course requirements refer to Section C under "Graduate Programs" in the FHS section of this catalogue and for other requirements refer to the section on "Graduate Studies" in this catalogue.

MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCES (MAJOR: ENVIRONMENTAL HEALTH)

Refer to the section on "Graduate Studies" in this catalogue.

GRADUATION WITH DISTINCTION

A student may be awarded his/her BS degree with distinction or high distinction based on a minimum cumulative weighted average of 85.00 and 90.00 for all work done at FHS during the student's junior and senior years, respectively. For purposes of graduation with distinction or high distinction, all grades (even if courses have been repeated) shall enter into the computation of the student's overall average. All proposed graduations with distinction and high distinction must be approved by the Faculty upon the recommendation of the Academic Committee.

CURRICULA

BACHELOR OF SCIENCE IN HEALTH SCIENCES

l. Concentration in Environmental Health

	Lecture Hrs/Week	Lab Hrs/ Week	Semester Credit Hrs
FIRST YEAR			
First Semester			
BIOL 201 General Biology I[1]	3	2	4
CHEM 200 Basic Chemistry[2]	3	0	3
CHEM 205 Introductory Chemistry Laboratory[2]	1	4	2
ENLG 203 English Communication Skills III[1]	3	0	3
ENHL 201 Man and His Environment	3	0	3
			15
Second Semester			
BIOL 202 General Biology II[1]	3	3	4
CHEM 208 Brief Survey of Organic Chemistry[2]	3	0	3
CHEM 209 Organic Laboratory[2]	1	4	2
ARAB 201 Studies in Arab Literature and Language[1]	3	0	3
ENHL 204 Solid Wastes Management	2	0	2
			14
SECOND YEAR			
First Semester			
HSAD 201 Introduction to Health Care Systems	3	0	3
HSAD 206 Computer Literacy	2	2	3
HBED 203 Communication and Group Dynamics for Health Professionals	2	2	3
ENHL 203 Food Hygiene	3	0	3
HBED 237 Theories and Methods of Health Education I	2	0	3
Elective	3	0	3
			18

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[1] For courses given in the Faculty of Arts and Sciences, see appropriate chapter in this catalogue.

[2] Chemistry 201, 206, 210, 211, 212 can be taken instead of Chemistry 200, 205, 208, and 209 by students planning to apply for admission to the medical program in the Faculty of Medicine.

	Lecture Hrs/Week	Lab Hrs/Week	Semester Credit Hrs
Second Semester			
EPBS 204 Introductory Biostatistics	2	2	3
HBED 238 Theories and Methods of Health Education II	1	4	3
ENHL 206 Environmental Toxicology	3	0	3
ENHL 211 Environmental Microbiology I	2	2	3
ENHL 214 Sanitation of Food Establishments	2	0	2
HSAD 202 Introduction to Organization and Management	3	0	3
			17
Summer Session			
ENHL 213 Field Training[1]	--	--	5
THIRD YEAR			
First Semester			
ENHL 205 Quality and Treatment of Water and Wastewater	3	0	3
ENHL 207 Occupational Hygiene	2	0	2
EPBS 223 Survey Methods I	2	2	3
EPBS 227 Basic Demographic Techniques	1	2	2
ENHL 295 Environmental Health Project	0	6	2
ENHL 212 Environmental Microbiology II	2	3	3
			15
Second Semester			
EPBS 208 Essentials of Epidemiology	1	2	2
ENHL 209 Examination of Water and Wastewater	1	3	2
FTNT 221 Basic Nutrition	3	0	3
EPBS 224 Survey Methods II	2	2	3
ENHL 217 Air Pollution	2	0	2
PBHL 201 Seminar	0	6	2
Elective[2]	3	0	3
			17

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[1] A minimum of five weeks of summer field training is required of all students after completion of the second year.

[2] Directed FHS electives, except for students planning to apply to the medical program at the Faculty of Medicine.

2. Concentration in Medical Laboratory Technology

FIRST YEAR	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hours
First Semester			
BIOL 201 General Biology I[1]	3	2	4
CHEM 200 Basic Chemistry[2]	3	0	3
CHEM 205 Introductory Chemistry Laboratory[2]	1	4	2
ENLG 203 English Communication Skills III[1]	3	0	3
SBHS 201 Introduction to the Study of Society	3	0	3
			15
Second Semester			
PHYL 246 Human Physiology	4	2	5
CHEM 208 Brief Survey of Organic Chemistry[2]	3	0	3
CHEM 209 Introductory Organic Laboratory[2]	1	4	2
EPBS 204-A Introductory Biostatistics	2	2	3
ENLG 204 English Communication Skills IV	3	0	3
SBHS 202 General Psychology	3	0	3
			19
SECOND YEAR			
First Semester			
LABM 201 Clinical Chemistry I	2	0	2
MLTP 219 General Microbiology	2	3	3
MBIM 221 Clinical Parasitology I	2	2	3
MLTP 205 Clinical Pathology I	4	0	4
FTNT 261 Biochemistry	3	0	3
			15

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[1] For courses given in the Faculty of Arts and Sciences, see appropriate chapter in this catalogue.

[2] Chemistry 201, 206, 210, 211, 212 can be taken instead of Chemistry 200, 205, 208, and 209 by students planning to apply for admission to the medical program at the Faculty of Medicine.

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
Second Semester			
LABM 202 Clinical Chemistry II	2	0	2
MLTP 206 Clinical Pathology II	4	0	4
MLTP 220 Systematic Bacteriology	2	5	4
MLTP 259 Diagnostic Serology	1	0	1
MBIM 222 Clinical Parasitology II	2	2	3
LABM 210 Cytology & Histological Tech.	2	0	2
			16
Summer Session			
Elective[1]	3	0	3
Practical Training in Laboratory Medicine	-	-	4
			7

THIRD YEAR[2]

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
First Semester			
LABM 231 Selected Topics in Laboratory Medicine	2	0	2
HSAD 201 Introduction to Health Care Systems *or* HSAD 202 Intro. to Organization & Management	3	0	3
Practical Training in Laboratory Medicine	-	-	8
			13
Second Semester			
LABM 232 Selected Topics in Laboratory Medicine	2	0	2
EPBS 208 Essentials of Epidemiology	1	2	2
HSAD 206 Computer Literacy	2	2	3
Practical Training in Laboratory Medicine	-	-	8
			15

Practical Training in Laboratory Medicine: Total period of 11 months (July-June excluding one month's vacation in September) to cover practical experience and application of theoretical knowledge in the following areas of laboratory medicine, for the periods and credits indicated:

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[1] A student may choose any humanities or social science course with the consent of the advisor.

[2] During Laboratory Rotation, students are expected to take weekend as well as evening duties as part of their training. University holidays do not apply to students who are rotating through the laboratory; only hospital holidays will be taken by these students.

	Duration	**Credits**
LABM 220 Clinical Chemistry	8 weeks	4
LABM 230 Clinical Hematology	8 weeks	4
LABM 240 Clinical Bacteriology	8 weeks	4
LÁBM 250 Clinical Parasitology & Urinalysis	4 weeks	2
LABM 260 Serology	4 weeks	2
LABM 270 Blood Banking	4 weeks	2
LABM 280 Phlebotomy, Endocrinology, Cytogenetics and Histo Techniques	4 weeks	2
		20

MASTER OF PUBLIC HEALTH

Core Required

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
EPBS 301 Principles of Epidemiology	2	2	3
EPBS 305 Biostatistics I	2	2	3
HSAD 301 Foundations of Health Administration I	3	0	3
HBED 301 Determinants of Health Behavior	3	0	3
ENHL 301 Introduction to Environmental Health	3	0	3

Group Required or Elective

1. Required for the MPH Two-Year Program Area of Concentration in Health and Hospital Administration

HBED 309 Research Design in Public Health	2	0	2
HSAD 310 Management and Organization Theory	3	0	3
HSAD 311 Management Information Systems for Health Care	2	0	2
HSAD 312 Health Planning and Project Management	3	0	3
HSAD 340 Accounting	2-3	0	2-3
HSAD 341 Financial Management in Health Institutions	2-3	0	2-3
HSAD 351 Health Economics	2	0	2
HSAD 355 Orientation to Health Care Facilities	2	2	3
HSAD 361 Practicum	16 wks	0	5
HSAD 362 Practicum	16 wks	0	5
HSAD 398 Project	-	-	0
EPBS 366 Statistical Methods in Survey Research	2	2	3

Students in this group should take at least one credit course to complete their credit requirements.

2. Required for the MPH Two-Year Program Area of Concentration in Epidemiology and Biostatistics

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
EPBS 302 Epidemiology, Prevention and Control of Infectious Diseases	1	2	2
EPBS 304 Epidemiology of Chronic (non-infectious) Diseases	1	2	2
EPBS 366 Statistical Methods in Survey Research	2	2	3
EPBS 367 Advanced Methods in Epidemiology	1	2	2
EPBS 308 Biostatistics II	2	2	3
EPBS 350 Practicum	8 wks	0	2
EPBS 351 Practicum	16 wks	0	4
EPBS 352 Practicum	16 wks	0	4
EPBS 380 Journal Club	1	0	1
EPBS 398 Project	-	-	0
HBED 309 Research Design in Public Health	2	0	2

Students in this group should take at least 10 credits of electives to complete their credit requirements.

3. Required for the MPH Two-Year Program Area of Concentration in Environmental Health

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
ENHL 302 Principles of Environmental Assessment	2	0	2
ENHL 303 Pollution of Marine Environment	2	0	2
ENHL 304 Advanced Water and Wastewater Quality and Treatment	3	0	3
ENHL 306 Management of Hazardous Wastes	3	0	3
ENHL 308 Tutorial	-	-	1-3
ENHL 312 Occupational Health	2	3	3
ENHL 350 Practicum	8 wks	-	2
ENHL 351 Practicum	16 wks	-	4
ENHL 352 Practicum	16 wks	-	4
ENHL 395 Environmental Health Project	3	0	3
ENHL 398 Project	-	-	0
PBHL 301 Journal Club	1	0	1

Students in this group should take at least 5 credits of electives to complete their credit requirements.

4. *Required for the MPH Two-Year Program Area of Concentration in Health Behavior and Education*

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
HBED 302 Health Education and Behavioral Change	3	0	3
HBED 303 Effective Communication and Group Process in Health Professions	3	0	3
HBED 306 Advanced Seminars in Health Behavior and Education	3	0	3
HBED 309 Research Design in Public Health	2	0	2
HBED 311 Program Evaluation	3	0	3
HBED 316 Tutorial in Health Behavior and Education	1	4	3
HBED 350 Practicum in Health Behavior and Education	8 weeks	-	4
HBED 351 Practicum in Health Behavior and Education	16 weeks	-	3
HBED 352 Practicum in Health Behavior and Education	16 weeks	-	3
HBED 398 Project	-	-	0

Students in this group should take up to 8 credits of Electives to complete their credit requirements.

5. *Required for the MPH One-Year Program*

HBED 309 Research Design in Public Health	2	0	2
HSAD 312 Health Planning	3	0	3
HSAD 321 Foundations of Health Administration II	3	0	3
HSAD 351 Health Economics	2	0	2

Students in this group should take at least 9 credits of electives to complete their credit requirements.

ELECTIVES[1]	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
ENHL 302 Principles of Environmental Assessment	2	0	2
ENHL 303 Pollution of Marine Environment	2	0	2
ENHL 308 Tutorial in Environmental Health	--	--	1-3
ENHL 312 Occupational Health	2	3	3
EPBS 302 Epidemiology, Prevention and Control of Infectious diseases	1	2	2
EPBS 304 Epidemiology of Chronic Diseases	1	2	2
EPBS 316 Tutorial in Epidemiology and Biostatistics	--	--	1-2
EPBS 366 Statistical Methods in Survey Research	2	2	3
EPBS 391 Nosocomial Infections	2	0	2
EPBS 392 Health Determinants in Population	3	0	3
HBED 302 Health Education & Behavioral Change	3	0	3
HBED 303 Effective Communication and Group Process in Health Professions	3	0	3
HBED 306 Advanced Seminars in Health Behavior and Education	3	0	3
HBED 311 Program Evaluation	3	0	3
HBED 307 Family Health Behavior	2	2	3
HBED 316 Tutorial in Health Behavior and Education	1-3	0	1-3
HSAD 321 Foundations of Health Administration II	2	0	3
HSAD 303 Seminars in Health Administration	1-2	0	1-2
HSAD 304 Seminars in Health Administration	1-2	0	1-2
HSAD 307 (a) Tutorial	1	0	L
HSAD 307 (b) Tutorial	2	0	2
HSAD 311 Management Information Systems for Health Care	2	0	2
HSAD 312 Health Planning and Project Management	3	0	3
HSAD 334 Health Services Research	2	0	2
HSAD 340 Accounting	2-3	0	2-3
HSAD 341 Financial Management in Health Institutions	2-3	0	2-3
HSAD 355 Orientation to Health Care Facilities	2	2	3

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[1] Consent of Department is required.

C. MASTER OF SCIENCE IN POPULATION STUDIES

Core Required Courses

POPS 301 Demographic Techniques I. 3 cr.
POPS 302 Demographic Techniques II. 3 cr.
POPS 311 Data Collection and Analysis I. 3 cr.
POPS 315 Population and Development. 3 cr.
POPS 318 Population Theory and Policy. 3 cr.
POPS 320 Mother and Child Health/Family Planning. 3 cr.
POPS 333 Population Movements. 3 cr.
POPS 399 M.S. Thesis

Electives[1]

Electives for the Concentration in Population

POPS 312 Data Collection and Analysis II. 3 cr.
POPS 319 History of Population Thought. 3 cr.
POPS 325 Population and Health. 3 cr.
POPS 340 Population, Environment, and Development. 3 cr.
POPS 350 Seminar on Contemporary Population Issues. 3 cr.

Electives for the Concentration in Health Sciences

EPBS 301 Principles of Epidemiology. 3 cr.
EPBS 326 Epidemiology. 3 cr.
EPBS 308 Biostatistics II. 3 cr.
EPBS 366 Statistical Methods in Survey Research. 3 cr.
EPBS 394 Epidemiology of Birth Defects. 3 cr.
HBED 301 Determinants of Health Behavior. 3 cr.
HBED 302 Health Education and Behavioral Change. 3 cr.
POPS 325 Population and Health. 3 cr.
HSAD 351 Health Economics. 2 cr.

Electives for the Concentration in Social Sciences

Six credits in Economics and or Sociology in areas such as urban economic development, health economics, Middle East culture and social change and development. Refer to the relevant departments in the catalogue for detailed course descriptions.

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[1] Electives other than those listed must be approved by the Department.

DEPARTMENT OF ENVIRONMENTAL HEALTH (ENHL)

Chairperson:	Jurdi, M.
Associate Professors:	Jurdi, M.; Nuwayhid, I.
Assistant Professor:	Harakeh, S.
Instructors:	Kadi, M.; Kambris, M.
Lecturer:	Milki, R.
Research Assistants:	Al-Barazi, R.; Beydoun, H.; Kouzi, S.
Associates:	Imad, A.; Korfali, S.

The Department of Environmental Health offers a three-year program in environmental health, after the completion of the Freshman science program or its equivalent, which leads to the Bachelor of Science degree. This curriculum provides a broad education in basic sciences and a fundamental knowledge of environmental health. Emphasis is placed on evaluation and control of major environmental health problems in developing countries in such fields as water supply, waste disposal, food hygiene, occupational health, radiation protection, air and marine pollution, and control of disease vectors. Students in this program are also required to take public health courses in the fields of epidemiology, biostatistics, health services administration, and public health education.

Developing countries are in great need of qualified personnel capable of planning and implementing programs for the improvement of the human environment. This provides great opportunities for graduates of this program.

Graduates may occupy senior or intermediate posts:

i) In some government agencies (e.g. Ministry of Health, municipalities, health centers, etc.);
ii) In the private sector, which offers a variety of job opportunities (industry, research institutions, universities, schools, private business, etc.); or
iii) In international agencies.

The Department also offers a graduate program leading to the MS degree in Environmental Sciences (major: Environmental Health). For details, refer to the section "Inter-faculty Graduate Environmental Sciences Program" in the chapter on "Graduate Studies" at the end of this catalogue.

In view of the increasing interest in development and its impact on the human environment, a variety of courses offered by this Department is made available for students in other fields.

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ENHL 201 Man and His Environment. 3.0; 3 cr. Development and focus of environmental sciences: population, technology, economics, and policy. Basic concepts underlying environmental sciences. Issues in environmental quality and control: air and water pollution, ecotoxic compounds, solid and hazardous waste, biodiversity, radiation and global climate change. Human habitats. Member of Department.

ENHL 203 Food Hygiene. 3.0; 3 cr. The emphasis will be placed on the relationship between contaminated food and food-borne diseases; food protection from source to consumer; and preparation, implementation, and appraisal of national food control programs. M. Jurdi.

ENHL 204 Solid Wastes Management. 2.0; 2 cr. Solid wastes—sources, characteristics, quantities, collection, transport, treatment, and disposal, including integrated management approaches. M. Jurdi.

ENHL 205 Quality and Treatment of Water and Wastewater. 3.0; 3 cr. This course covers the quality of water for domestic purposes, protection of sources, and purification processes; and the characteristics of wastewater, treatment methods, and disposal (or reclamation) for rural and urban communities. M. Jurdi.

ENHL 206 Environmental Toxicology. 3.0; 3 cr. General principles of toxicology relevant to xenobiotic agents contaminating the environment, including routes of entry, mode of action, toxicity, and metabolism. I. Nuwayhid.

ENHL 207 Occupational Hygiene. 2.0; 2 cr. A discussion of the health hazards to workers exposed to fumes, dusts, gases, noise, extreme temperatures, improper ventilation, and accidents in typical occupations in the region. Methods for prevention and control are included. Part of the course is devoted to radiation hazards and protective measures. I. Nuwayhid.

ENHL 209 Examination of Water and Wastewater. 1.3; 2 cr. Emphasis is placed on sample collection, analytical techniques, interpretation of results, and recommendations for prevention or corrective measures. M. Jurdi.

ENHL 211 Environmental Microbiology I. 2.2; 3 cr. Fundamental aspects of microbiology. S. Harakeh.

ENHL 212 Environmental Microbiology II. 2.3; 3 cr. Prerequisite: 211 or equivalent. Infectious diseases of man and animals transmitted through food, water, wastewater, air, etc., their etiologic agents, ecology and control. Effect of environmental and social factors. S. Harakeh.

ENHL 213 Field Training. 5 weeks, 5 cr. Practical training under supervision. Member of Department.

ENHL 214 Sanitation of Food Establishments. 2.0; 2 cr. This course deals with the assessment of the hygienic aspect of food preparation areas, food serving institutions, food vending institutions and imported food products. National and international legislations and standards will be reviewed. A field project is required. M. Jurdi.

ENHL 216-217 Atmospheric Pollution. 2.0; 2 cr. (each). Sources, public health aspects, emission and dispersion of air pollutants, control of air pollutants, instrumentation. Member of Department.

ENHL 218 Project. 0.6; 2 cr. A project on atmospheric pollution. A written report is required. Member of Department.

ENHL 295 Environmental Health Project I. 0.6; 2 cr. Execution of an assigned project relating to man's environment. A written report is required. Member of Department.

ENHL 296 Environmental Health Project II. 0.6; 2 cr. Execution of an assigned project relating to man's environment. A written report is required. Member of Department.

Field Visits. 0 cr. To acquaint the student with the practical aspects of the environment, problems encountered, and measures taken. Member of Department.

PBHL 201 Seminar. 0.6; 2 cr. Selected topics in global environmental issues. Member of Department.

PBHL 301 Journal Club. 1 cr. I. Nuwayhid.

ENHL 301 Environmental Health. 3.0; 3 cr. This course introduces the student to methods applied to the control of the physical environment for the prevention of disease and promotion of health. Air, water, food, housing, waste disposal, insects, rodents, accidents, and the physical stresses of heat, light, noise, and ionizing radiation are considered. M. Jurdi.

ENHL 302 Principles of Environmental Assessment. 2.0; 2 cr. The course provides a critical understanding of the nature and extent of ecosystem degradation resulting from developmental projects. The course introduces ecological and socio-economic methodologies for environmental impact-assessment of projects of public health importance. Member of Department.

ENHL 303 Pollution of Marine Environment. 2.0; 2 cr. Introduction to the marine environment, focusing on sources and types of pollutants, environmental degradation and its impact. Emphasis is placed on marine pollution management. International legislation for the conservation of marine environment is introduced. S. Harakeh.

ENHL 304 Advanced Water and Wastewater Quality and Treatment. 3.0; 3 cr. The course covers: water source characteristics; factors influencing water quality and consequent public health impacts; regulatory protection of source waters; source water and wastewater control techniques; public health concerns of wastewater reclamation and reuse. M. Jurdi.

ENHL 306 Management of Hazardous Wastes. 3.0; 3 cr. The course covers: sources and types of hazardous wastes; treatment and disposal technologies; hazardous waste management: components and priorities; risk assessment and risk management; site remediation and public health concerns. M. Jurdi.

ENHL 307 Management of Municipal Wastes. 3.0; 3 cr. Prerequisites: 310, 311. Introduces and identifies key issues in the natural and social sciences associated with municipal solid waste management practices in developed and developing countries. Public health implications are discussed. Interdisciplinary approach to solid waste management is presented with emphasis on community participation. M. Jurdi.

ENHL 308 Tutorial. 1-3 cr. Special environmental health projects of interest to the students are offered. A written report is required. S. Harakeh, M. Jurdi, and I. Nuwayhid.

ENHL 310 Toxicology. 3.0; 3 cr. Prerequisites: BIOL 201B, CHEM 201B. Reviews of the essentials of toxicology: dose response, toxicokinetics (absorption, distribution, metabolic conversion, elimination), and the molecular basis for toxic

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action, target organ toxicity, mutagenesis, teratogenesis, and carcinogenesis. Selected chemical and biologic agents that adversely affect man and environmental quality are introduced as case studies. I. Nuwayhid.

ENHL 311 Public Health Microbiology. 2.2; 3 cr. This course deals primarily with selected microbes including newly recognized microbes of public health significance and their interaction with man to cause disease. Emphasis is placed on host interactions that are pertinent to disease control, such as mechanisms of microbial survival and adaptation, virulence, and host adaptation. S. Harakeh.

ENHL 312 Occupational Health. 2.3; 3 cr. A course on conditions and hazards in occupational environments and their control and effect on workers and the neighborhood. Discussion will also cover the administrative aspects of occupational health programs in industries and monitoring of occupational environments. I. Nuwayhid.

ENHL 313 Indoor and Outdoor Air Quality. 3.0; 3 cr. Prerequisites: PHYS 204, CHEM 201B. Information about indoor and ambient air pollutants: sources, dispersion, health effects, measurement and control of emissions, regulations and standards, major public health issues, and the organization and administration of community control programs. Member of Department.

ENHL 314 Monitoring of Work Hazards. 3.0; 3 cr. Prerequisite: graduate standing. The basic concepts of occupational (industrial) hygiene are introduced through the review of different industrial practices and processes. Recognition, evaluation, and control of workplace hazards are addressed including the principles and methods of sampling, measurement and analysis. I. Nuwayhid.

ENHL 320 Food Quality and Control. 3.0; 3 cr. Prerequisite: 311. Sources of food contamination. Relationship between contaminated food and food-borne diseases. Food management from production to consumption. Preparation, implementation and appraisal of national food control programs. M. Jurdi.

ENHL 350, 351 and 352 Practicum. 10 cr. The objective of this residency is to acquaint students with the practical aspects of the environment, problems encountered, and measures taken. Credits are allocated as follows: Summer 2 cr.; Fall 4 cr.; Spring 4 cr. S. Harakeh, M. Jurdi, and I. Nuwayhid.

ENHL 395 Environmental Health Project. 3.0; 3 cr. Special environmental projects directed towards acquiring skills needed in planning, implementing and evaluating environmental health education programs for target community groups. Member of Department.

ENHL 398 Project. 0 cr. The project involves the formulation and implementation of a work in the field of Environmental Health. Upon completion, the student should submit a written report, present and defend it as part of his/her graduation requirements. S. Harakeh, M. Jurdi, and I. Nuwayhid.

DEPARTMENT OF EPIDEMIOLOGY AND BIOSTATISTICS (EPBS)

Chairperson:	Zurayk, H.
Professor:	Zurayk, H.
Assistant Professors:	Chaaya, M.; Sibai, A.
Visiting Lecturer:	Mokdad, A.
Lecturer & Coordinator of MPH:	Deeb, M.
Instructor:	Khayat, R.
Research Assistants:	Beydoun, M.; Kobeissi, L.; Kutayli, L.; Merhi, M.; Nsouli, M.; Shibl, H.; Yeretzian, J.
Preceptors:	Jabbour, J.; Kalout, J.

The Department of Epidemiology and Biostatistics offers courses in epidemiology and biostatistics to graduate and undergraduate students in Health Sciences, Medicine, and Nursing. The major offerings to Health Sciences students are in the form of core and elective courses to graduate students following the Master of Public Health (M.P.H.) program and the Master of Science (M.S.) program in Epidemiology and to undergraduate students in Health Sciences. Members of the Department coordinate and participate in teaching the courses of the preventive medicine and public health program of the Faculty of Medicine. Courses in statistics and epidemiology are also offered to graduate students in the Faculty of Medicine and to undergraduate students in the School of Nursing.

EPBS 204 Introductory Biostatistics. 2.2; 3 cr. Offered to undergraduate public health students. Methods of organizing and summarizing data; the normal distribution; methods of inference: estimation, testing hypotheses, analysis of variance, and measures and tests of association; and vital statistics. M. Deeb.

EPBS 204-A Introductory Biostatistics. 1.2; 2 cr. Offered to undergraduate nursing students. Methods of organizing and summarizing data; the normal distribution; methods of inference: estimation, testing hypotheses, and measures and tests of association; and vital statistics. M. Deeb.

EPBS 208 Essentials of Epidemiology. 1.2; 2 cr. A course in the basic principles of epidemiology for B.S. students. Epidemiological principles and methods are covered. Distribution and causation of diseases and their public health importance are illustrated using specific examples of infectious and non-infectious diseases. A. Sibai.

EPBS 222 Sampling Techniques. 2.2; 3 cr. This course introduces the student to methods of scientific sampling. It covers the sampling frame, sample size, methods of selection and estimation of parameters, and non-response. Member of Department.

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EPBS 223 Survey Methods I. 2.2; 3 cr. This course covers methods of survey design, including formulation of objectives, questionnaire construction, use of documentary sources, methods of data collection, preparing data for computer data processing and planning the analysis. M. Chaaya.

EPBS 224 Survey Methods II. 2.2; 3 cr. Prerequisite: EPBS 223, of which it is a continuation. It involves the execution of a survey investigation in the field of health. M. Chaaya.

EPBS 225 Medical Statistics. 1.2; 2 cr. Offered to Med I students. Descriptive statistics; probability and probability distributions; methods of inference: estimation, testing hypotheses, analysis of variance, and chi-square for contingency and goodness of fit; simple linear correlation and regression; elements of design; and vital statistics. M. Deeb.

EPBS 226 Epidemiology. 2.2; 3 cr. This course, required for medical students, consists of lectures and practical experience on the descriptive and analytic methods involved in the study of disease behavior and the determinants of that behavior in human populations. The principles discussed, while focusing on epidemiological methods, illustrate the role of epidemiology in disease prevention and control. A. Sibai.

EPBS 227 Basic Demographic Techniques. 1.2; 2 cr. Introduces the student to methods of demography. Covers sources of demographic data, particularly the population census and the vital registration system, population composition, mortality and fertility measures and their determinants, life tables and migration. M. Deeb.

EPBS 228 Introduction to Information Systems in Health. 2.2; 3 cr. Covers the elements of design and operation of medical and health information systems in hospitals, health centers, ministries of health and other organizations. Member of Department.

EPBS 301 Principles of Epidemiology. 2.2; 3 cr. A course in basic principles of Epidemiology for MPH students. Emphasis is placed on the interaction of agent, host, and environment in the distribution and causation of disease. Analytic methods used in epidemiological studies are stressed. A. Sibai.

EPBS 302 Epidemiology, Prevention, and Control of Infectious Diseases. 1.2; 2 cr. Prerequisite: EPBS 301. Normally offered to medically trained and graduate students, this course consists of lectures and practical exercises on the epidemiology, prevention, and control of specific infectious diseases or groups of these diseases, in particular those that are common and of importance in developing countries. Member of Department.

EPBS 304 Epidemiology of Chronic (Non-Infectious) Diseases. 1.2; 2 cr. Prerequisite: EPBS 301. The course emphasizes the epidemiology of important malignant neoplasms and other chronic and degenerative diseases. The various risk factors and methods of early disease detection are stressed. A. Sibai.

EPBS 305 Biostatistics I. 2.2; 3 cr. Offered to students in the MPH program. Descriptive statistics, probability and probability distributions; methods of inference: estimation, testing hypotheses, analysis of variance, and measure and tests of association; simple linear regression. Sources of vital and health statistics, rates, mortality measures, standardization, the life table techniques, fertility measures and health statistics. M. Deeb.

EPBS 306 Computer Literacy. 1.2; 2 cr. This is a hands-on introductory computer course to familiarize the student with basic computer concepts, technology and terminology. The student will leave this course with an ability to use new software packages by reading manuals and working through computerized tutorials when available. Member of Department.

EPBS 308 Biostatistics II. 2.2; 3 cr. This course is a continuation of EPBS 305 and is offered to graduate students. Discrete and continuous probability distributions, further topics in analysis of variance, measures and tests of significance of associations for qualitative variables, and non-parametric statistics. M. Deeb.

EPBS 316 Tutorial. 1-2 cr. Member of Department.

EPBS 325 Medical Statistics. 1.2; 2 cr. Similar to EPBS 225; offered to graduate students. M. Deeb.

EPBS 326 Epidemiology. 2.3; 3 cr. Similar to EPBS 226; offered to graduate students. A. Sibai.

EPBS 350, 351, 352 Practicum. 10 cr. The objective of this residency is to give students the necessary exposure to various epidemiological and statistical methods. Credits are allocated as follows: Summer 2 cr.; Fall 4 cr.; Spring 4 cr. M. Chaaya, M. Deeb, and A. Sibai.

EPBS 366 Statistical Methods in Survey Research. 2.2; 3 cr. Prerequisite: EPBS 305. Offered to MPH and other graduate students. It introduces the student to basic sampling techniques, to methods of multivariate data analysis and to computer processing. Students are required to conduct small surveys that will generate illustrative data for analysis during the course. M. Deeb.

EPBS 367 Advanced Methods in Epidemiology. 1.2; 2 cr. Prerequisite: EPBS 301. This course illustrates some of the special methods used in epidemiological investigation including use of the life table and person-years method in longitudinal studies, special design problems, the assessment of risk from different studies and the use of mathematical models in epidemiology. A. Sibai.

EPBS 380 (381) Journal Club. 1-2 cr. Member of Department.

EPBS 390 Directed Reading and Research. Credit hours vary. Member of Department.

EPBS 391 Nosocomial Infections. 2.0; 2 cr. Offered to MPH students during their second year of training. The course consists of a series of lectures given by a group of qualified faculty versed in this subject, and practical work at AUH, where several activities are conducted to investigate and prevent these infections. Member of Department.

EPBS 392 Health Determinants in Population. 3.0; 3 cr. This course addresses the wider framework in health of population groups, with special concern for Arab societies. It introduces basic sociological theories of development and discusses elements of the sociocultural context as they impact on health, and gives special focus to issues of child and reproductive health within a family context. H. Zurayk.

EPBS 394 Epidemiology of Birth Defects. 3.0; 3 cr. Prerequisite: EPBS 301. This course aims at introducing the students to epidemiological methods in genetic diseases and birth defects It takes the form of lectures and practical sessions. Member of Department.

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EPBS 398 Project. 0 cr. Preparation of a major research work which the candidate has to defend successfully as part of his/her graduation requirement and to be completed by the end of the residency period.

EPBS 399 M.S. Thesis. Credit hours vary.

DEPARTMENT OF HEALTH BEHAVIOR AND EDUCATION (HBED)

Acting Chairperson:	Shediac-Rizkallah, M.
Assistant Professors:	Afifi-Soweid, R.; Shediac-Rizkallah, M.
Visiting Senior Lecturer:	Myntti, C.
Lecturer:	El Kak, F.
Instructors:	Kanj, M.; Moukheiber, L.
Research Assistant:	Farhat, T.

Departmental courses are designed to introduce students to the field of health behavior and education which is concerned with facilitating the process of behavioral change from actions that are not conducive to health to those that are more favorable to health. The role of health educators as agents of change is emphasized, in addition to the importance of the participation of the target group in the assessment, implementation and evaluation of interventions that lead to health promotion.

The focus is on graduate level programs. However, several courses are offered at the undergraduate level. In cooperation with the Department of Education, the Department coordinates a Teaching Diploma in Health Education to undergraduate students.

The following courses are offered by the Department.

HBED 201 Health Awareness. 3.0; 3 cr. *Course is open to students from all Faculties and DEP.* The course aims at increasing understanding of the nature and definition of health and to the factors that relate to healthy living. It tackles common health problems and concerns as they relate to the individual, with emphasis on prevention and lifestyle behavior. Member of Department.

HBED 203 Communication for Health Professionals. 2.2; 3 cr. This course provides an introduction to the assumptions we make about communication and key elements of the communication process. Factors that inhibit communication as well as some of the functions of communication as they relate to increasing positive health behavior and group effectiveness will be dealt with. Member of Department.

HBED 209 Sociocultural Factors in Health and Illness. 2.0; 3 cr. This course introduces students to social and behavioral theories and concepts that apply to the analysis of health-related behaviors. Emphasis is placed on core concepts relating to health and illness, and on the main models relating to the study of health behavior at the personal, familial, institutional and cultural levels. M. Shediac.

HBED 237 Theories and Methods of Health Education I. 2.0; 3 cr. This course introduces students to the major theories of health behavior and health education. Emphasis is placed on the application of health behavior theories to health promotion and education practice. Member of Department.

HBED 238 Theories and Methods of Health Education II. 1.4; 3 cr., every semester. Prerequisite: HBED 237. This course provides students with the practical skills for planning, implementing, and evaluating health education teaching-learning activities in schools, communities, and patient-care settings. Students will apply the theory and method components of HBED 237 in actual field experience. Member of Department.

HBED 301 Determinants of Health Behavior. 3.0; 3 cr. This course examines the various sociocultural and psychological factors which influence disease and the way that people respond to it. It introduces basic concepts and methods of health education and health promotion as ways of affecting these factors. M. Shediac.

HBED 302 Health Education and Behavioral Change. 3.0; 3 cr. This course focuses on factors influencing behavior change. An ecological paradigm is emphasized. Thus theoretical perspectives on behavior change are explored in the intrapersonal, interpersonal, organizational, community and policy domains. R. Afifi.

HBED 303 Effective Communication and Group Process in Health Professions. 3.0; 3 cr. This course introduces students to the fundamentals of health communication. The first half of the course will cover a theoretical background of communication: overview of communication and functions of communication in health. This will be followed by the application of health communication in the second half of the course. R. Afifi.

HBED 306 Advanced Seminars in Health Behavior and Education. 3.0; 3 cr. Focus on analytical and critical examination of current issues in the fields of health behavioral sciences or health education. Member of Department.

HBED 307 Family Health Behavior. 2.2; 3 cr. Introduction to the major role of interactive social support systems on health and disease behavior of the individual. Review and critical analysis of theoretical aspects of how family changes affect community health. Member of Department.

HBED 309 Research Design in Public Health. 2.0; 2 cr. This course introduces students to the social research methods in health. Theory development, research design methods, and data collection procedures are taught. R. Afifi.

HBED 311 Program Evaluation. 3.0; 3 cr. This course introduces students to the fundamentals of program evaluation. Evaluation is critical in assessing the extent to which a program achieves its goals and objectives. The course emphasizes general evaluation methodology with applications and illustrations in health and other related fields. R. Afifi.

HBED 316 Tutorial in Health Behavior and Education. 1.4; 3 cr. Guided study in particular topics in health behavior and health education as defined by instructor and student. Member of Department.

HBED 350, 351, 352 Practicum in Health Behavior and Education. 10 cr. Provides an opportunity for students to practice their skills in program design and implementation in a selected setting (school, community, or health care institution) during the final 3 semesters of the student's program. Credits are allocated as follows: Summer 4 cr.; Fall 3 cr.; Spring 3 cr. Members of Department.

HBED 398 Project. 0 cr. The students will prepare a final project, based on residency experience and Departmental guidelines, which must be reviewed and approved by Departmental faculty prior to graduation.

DEPARTMENT OF HEALTH SERVICES ADMINISTRATION (HSAD)

Acting Chairperson:	Kassak, K.
Assistant Professor:	Kassak, K.
Adjunct Assistant Professor:	Ramadan, S.
Lecturers:	Asrawi, F.; El-Jor, N.; Ghattas, R.; Karam, N.
Instructors:	Abi Chahine, C.; Hajjar, H.; Mohammad Ali, A.; Kobeissi, H.; Tohme, R.; Yassine, B.
Preceptors:	Dubois, C.; Hajj, M.; Kuntz, D.; Mouro, G.; Muallem-Nassar, S.
Research Assistants:	Almawi, J.; El Hadi, W.; Khouri, M.

Departmental courses are designed to introduce the student to basic principles and methodologies of organization and administration in the field of health, including the nature of management, decision theory, planning, health manpower training, health economics, budgeting, evaluation, and the treatment of a health system as a purposeful cybernetic system.

Within the framework of the MPH program, the Department is responsible for the program in Health and Hospital Administration. The Department also contributes to the general teaching of public health and preventive medicine in the Faculties of Health Sciences and Medicine.

The following courses are offered by the Department.

HSAD 201 Introduction to the Health Care Delivery System. 3.0; 3 cr. The course covers the systems approach in health; the resources that comprise the health care system and how they operate; the sociological, historical and organizational factors that influence the development of the health care system; as well as international models of health care systems. Member of Department.

HSAD 202 Introduction to Organization and Management. 3.0; 3 cr. The purpose of this course is to familiarize undergraduate students with the basic concepts and theories of organization and management in health administration and to acquaint them with various planning, implementation and evaluation techniques as applied to health programs. Member of Department.

HSAD 203 Medical Terminology. 1.0; 1 cr. This course provides students with a basic understanding of the principles of medical term construction and a vocabulary of commonly used terms in diagnosis, operations, radiological investigations, and laboratory tests. Member of Department.

HSAD 206 Computer Literacy. 2.2; 3 cr. This course introduces students to computer hardware and software and to fundamental usage of popular microcomputer software packages. The student will be familiarized with basic computer concepts, technology and terminology. The course assumes that the student has had minimal exposure to computers. Member of Department.

HSAD 212 Introduction to Health Planning. 3.0; 3 cr. Prerequisite: HSAD 201. The course portrays the application of planning theory to health concerns. It covers basic terms and concepts relating to health planning and will also acquaint students with some tools of prediction and decision-making. Member of Department. ·

HSAD 251 Introduction to Health Care Economics. 3.0; 3 cr. The purpose of this course is to introduce the student to the basic principles of microeconomics and the elements necessary to apply these principles to the health care field. It introduces usable economic tools, especially those that will improve the efficiency of resource allocation and decision-making in the health sector. Member of Department.

HSAD 301 Foundations of Health Administration I. 3.0; 3 cr. A basic graduate course to assist the student to: utilize the systems approach in the field of health care; determine the basic components in the organization of health service; apply the concepts of organization and administration to the health care delivery system; utilize the methodology of planning, cost analysis and evaluation. K. Kassak.

HSAD 303 and 304 Seminars in Health Administration. 1-2.0; 1-2 cr. (each). K. Kassak.

HSAD 307 (a) Tutorials in Health Administration. 1.0; 1 cr. K. Kassak.

HSAD 307 (b) Tutorials in Health Administration. 2 0; 2 cr. K. Kassak.

HSAD 310 Management and Organization Theory. 3.0; 3 cr. Application of theories of organization to the health system and the development of the capacity to influence the behavior of others in present day health organizations. Emphasis is placed on small group relationships, communication networks, and the human side of the organization. K. Kassak.

HSAD 311 Management Information Systems for Health Care. 2.0; 2 cr. Prerequisite: HSAD 301, or equivalent. This course provides a descriptive and functional definition of data and information concepts. It analyzes the logical and physical ways in which data is processed/manipulated to yield information and describes the principles, methods, and techniques for developing an effective MIS in health.

HSAD 312 Health Planning and Project Management. 3.0; 3 cr. Prerequisite: HSAD 301 or equivalent. By the end of this course, the student is expected to apply the concepts and tools of planning and evaluation to real situations facing agencies, hospitals and ministries of health. K. Kassak.

HSAD 320 Health Care Systems. 2.0; 2 cr Prerequisite: HSAD 301, or equivalent. By the end of this course, the student is expected to: study the determinants and the forces at play within the health care system; participate in the analysis and critique of documents nd osition apers elated o he ealth are ystems n the region. Member of Department.

HSAD 321 Foundations of Health Administration II. 2.0; 2-3 cr. Deals with current issues in health care, such as primary health care, health care reform, and integration of social sciences in health sciences. Member of Department.

HSAD 331 Quantitative Techniques for Health Administration. 2.0. 2 cr. This course deals with the methodology of systems and models to health care situations; the techniques of operational research in decision-making; and the relevance of management cybernetics in the process and outcome of health projects. Member of Department.

HSAD 334 Health Services Research. 2.0; 2 cr. Study of the application of scientific methods to the study of health services research. In particular students will develop competence in hypothesis formulation and research methodology; master the science of examining critically published research in Health Services Administration. Member of Department.

HSAD 340 Accounting. 2-3.0; 2-3 cr. By the end of this course, the student is expected to: utilize accounting methods as a tool for planning, control and evaluation; to apply the methods of the accounting cycle to health institutions. Member of Department.

HSAD 341 Financial Management in Health Institutions. 2-3.0; 2-3 cr. Prerequisite: HSAD 301 or equivalent. Covers the utilization of concepts and tools of modern financial management as applied to health services and application of the principles and techniques of accounting, budget preparation, and cost sharing to the health care system. Member of Department.

HSAD 351 Health Economics. 2.0; 2 cr. The course covers the application of the principles of microeconomics to the health field; utilization of the techniques of microeconomics to the study of prices and markets in the health field; and developing competence in cost analysis and cost projections. Member of Department.

HSAD 355 Orientation to Health Care Facilities. 2.2; 3 cr. Offered to second year students in the MPH Program with concentration in Health Care Management. The purpose of the course is to expose students to factors influencing the health care delivery process at health care facilities. Member of Department.

HSAD 360 Practicum in Health and Hospital Administration. 2 cr. This constitutes an administrative residency program in hospitals or other health care facilities and health organizations. The objective of this residency is to orient students to different units of the residency site. Offered in summer for 8 weeks. Member of Department.

HSAD 361-362 Practicum in Health and Hospital Administration. 10 cr. This constitutes an administrative residency program in hospitals or in other health care facilities and health organizations. It prepares the student, through hands-on experience, to assume increasing levels of responsibility with confidence and competence n hese ettings. redits re llocated s ollows: Fall 5 cr.; Spring 5 cr. Members of Department.

HSAD 398 Project. 0 cr. Preparation of a research project with practical implications to healthcare management which the candidate has to successfully complete and present as part of his/her graduation requirements.

MEDICAL LABORATORY TECHNOLOGY PROGRAM (MLTP)

Coordinator: Khatib, R.
Instructors: Khatib, R.; Melhem, N.; Ramadan, M.
Research Assistant: Kalfayan, L.

In addition to faculty members in the Department of Laboratory Medicine in the Faculty of Medicine.

The MLTP program is designed to prepare the students for a career in the profession of Medical Technology by acquiring theoretical knowledge and practical skills in various disciplines of the specialty. Besides theoretical knowledge, the program is dedicated to training students in the reliable performance of physical, chemical and biological tests by utilizing routine and automated techniques. In addition, students are trained to develop the ability to interpret generated laboratory results in order to provide reliable laboratory data for the diagnosis of diseases. Continuing education, updating skills and knowledge as well as the medical professional ethics are emphasized.

MLTP 205 Clinical Pathology I. 4.0; 4 cr. The course consists of lectures and demonstrations in hematology and covers the three major areas of general hematology, red blood cell disorders, and hemostatic disorders. Member of the Department.

MLTP 206 Clinical Pathology II. 4.0; 4 cr. The course consists of lectures and demonstrations in hematology (with an emphasis on leukemias), blood banking, as well as a series of lectures on basic immunology. Member of the Department.

MLTP 219 General Microbiology. 2.3; 3 cr. This course covers structure and morphology of micro-organisms, nutritional requirements and growth, sterilization and disinfection, introduction to microbial genetics, collection and handling of clinical specimens, culture techniques for clinical specimens and expected pathogens, antibiotic sensitivity testing and assay. Member of Department.

MLTP 220 Systematic Bacteriology. 2.5; 4 cr. This course covers characteristics of the bacteria of medical importance with a concentration on the methods for their isolation and identification, including their advantages, disadvantages, limitations, control and interpretation. The course also includes an introduction to virology and mycology. Member of Department.

MLTP 259 Diagnostic Serology. 1.0; 1 cr. Introduction to the principles of serologic reactions and laboratory techniques in the diagnosis of infectious diseases. Member of Department.

This program is in coordination with the Department of Laboratory Medicine in the Faculty of Medicine. For description of the remaining courses required in the MLTP program, see the section under that Department.

DEPARTMENT OF POPULATION STUDIES (POPS)

Chairperson:	Saxena, P.
Professor:	Saxena, P.
Visiting Professor:	Sririvasan, K.
Assistant Professor:	Kulczycki, A.
Research Assistants:	Faour, T.; Ismail, R.; Kodeih, A.

In addition to faculty members from other Departments in FHS and from the Department of Social and Behavioral Sciences in the Faculty of Arts and Sciences.

The Department of Population Studies offers a Master of Science degree in Population Studies. A major objective of the Department is to produce highly skilled population scientists whose training is of direct relevance to the demographic conditions nd problems facing the Middle East. The Department also provides training in demographic techniques, statistical methods with computer applications, and population issues to students specializing in related disciplines nside nd utside he aculty. n ddition, it aims at enhancing population research of high academic quality in areas of data collection, demographic analysis, population and development and population policy.

POPS 301 Demographic Techniques I. 2.2; 3 cr. Introduction to demographic concepts and methods. The measurement of fertility, mortality, morbidity, population structure, internal migration, and urbanization. Construction and applications of life tables. P. Saxena.

POPS 302 Demographic Techniques II. 2.2; 3 cr. Prerequisite: POPS 301. Advanced methods of demographic estimation. Fertility schedules. Indirect techniques of estimation from incomplete data. Stable and generalized population models and their applications. Method of estimation and projection of population. P. Saxena.

POPS 311 Data Collection and Analysis I. 2.2; 3 cr. Sources of population data: civil registration, current statistics, sample surveys, household surveys, population and housing censuses, etc. Methods of collecting, evaluation and adjustment of data. Laws and regulations governing data collection in selected Middle Eastern countries and elsewhere. This course includes field and computer laboratory work. P. Saxena.

POPS 312 Data Collection and Analysis II. 2.2; 3 cr. Prerequisite: POPS 311. Design of censuses and sample surveys. ampling echniques. Organization of field operations. Application of advanced multivariate techniques in the analysis of data. Presentation f esults. This course includes field operation and use of relevant computer packages. P. Saxena.

POPS 315 Population and Development. 3.0; 3 cr. Population trends and prospects. Determinants and consequences of fertility, mortality, and population growth.

Linkages with development and health. Population and development in Arab countries. Social and economic aspects of fertility. Gender, family, and household structures. Migration, population distribution, and development. Aging. A. Kulczycki.

POPS 318 Population Theory and Policy. 3.0; 3 cr. Development of population theory and science. Theories of fertility. The case for population policy. Links between research and policy. Population policy making. Policy trade-offs. Population policy issues in the Arab world. Policies for aging, family, unwanted fertility and population distribution. A. Kulczycki.

POPS 319 History of Population Thought. 3.0; 3 cr. Population thinking among ancient scholars. Christian and Moslem thought. Arab population thought, particularly Ibn Khaldoun. Pre-Malthusian thinking. Malthus and the classical writers. Biological theories. Modern theories and approaches to population dynamics. Member of Department.

POPS 320 Mother and Child Health/Family Planning. 3.0; 3 cr. Data sources and indicators. Healthy pregnancy and delivery; maternal and child health services. Intended and unintended pregnancies. Maternal, infant and child morbidity and mortality. Adolescent sexuality and fertility. Contraceptive methods, adoption and use. Rationale, scope, design and evaluation of family planning programs. Provision of reproductive health services. A. Kulczycki.

POPS 325 Population and Health. 3.0; 3 cr. Demographic measures of health levels. Health and fecundity in different developmental contexts. Determinants of primary and secondary sterility. Causes of birth defects. Frequencies of pregnancies and health of mothers and children. Health education and family health standards. Mother and child health programs. Member of Department.

POPS 333 Population Movements. 3.0; 3 cr. Data and measurement. Theories of migration. Internal migration and residential mobility. International migration. Western Asia migration system, including Lebanon. Migrant adaptation and integration. Migrant policies and politics. Refugees. Migrant and urban health issues. Urbanization and counter-urbanization. Urban growth and development in Arab countries. A. Kulczycki.

POPS 340 Population, Environment and Development. 3.0; 3 cr. Effects of population growth and distribution on environmental conditions. Effects of environmental factors on human health and well being. Interrelationships etween opulation, environment nd evelopment nd omprehensive p licies a med a e tablishing optimal balance. Member of Department.

POPS 350 Seminar on Contemporary Population Issues. 3.0; 3 cr. The subject(s) of this seminar may vary from one year to another to reflect major regional and global population concerns. It will be taught by regular faculty and/or visiting scholars directly involved in research or action programs in the course subject for that year.

POPS 399 M.S. Thesis. 6 cr.

At work…

…or at play, on the steps of West Hall

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Division of
Education Programs

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DIVISION OF EDUCATION PROGRAMS

FACULTY LIST 1998-99

Officers of the Division

John Waterbury	President of the University
Makhluf J. Haddadin	Vice President for Academic Affairs
Munir Bashshur	Director
Waddah Nasr	Registrar
Salim Kanaan	Director of Admissions
Hala K. Azar	Executive Officer

Professors

* Bashshur, Munir, Ph.D., University of Chicago; Education

Jurdak, Murad, Ph.D., University of Wisconsin; Education, and Science and Mathematics Education Center

Associate Professors

Ghaith, Ghazi, Ph.D., Indiana University; Education

BouJaoude, Saouma, Ed.D., University of Cincinnati; Education, and Science and Mathematics Education Center

Ghusayni, Raouf, Ph.D., Stanford University; Education

Yaghi, Hussein, Ph.D., University of Southern California; Education

Assistant Professors

Abd -El-Khalick, Fuad, Ph.D., Oregon State University; Education

Abu Saba, Mary, Ph.D., University of Illinois; Education

Bou Zeineddine, Amal, Ed.D., Boston University; Education

El-Hassan, Karma, Ph.D., University of London; Education, and Office of Tests and Measurements

Mukallid, Samar, Ph.D., Columbia University; Education

Osta, Iman, Doctorat, University of Grenoble; Education, and Science and Mathematics Education Center

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* On tenure appointment.

Lecturers

* Abboud, Shehadeh, M.A., AUB; University Orientation Program
Abyad, Lina, Doctorat, Sorbonne University; Education
Al-Amine, Adnan, Doctorat, Sorbonne University; Education
Bashour, Najla, Doctorat, Saint Joseph University; Education
Faddoul, Simon, Ed.D., Univeristy of Cincinnati; Education
Merhej, Waltraud, M.D., University of Vienna; Education
Warren, David, Ph.D., San Diego State University; Education

Instructors

A'raj, Suad, M.A., University of Toledo; Education
Artinian, Rubina, Diplome de Fin d'Etudes, Conservatoire National de Musique;
    Education
Baalbaki, Rula, M.A., AUB; University Orientation Program
Hasan, Naemeh, M.A., AUB; Education
Heath, Marianne, M.A., St. Louis University; Education
Kanj, Mayada, M.P.H., AUB; Education, and Health Sciences
Karkanawi, Lina, M.A., AUB; University Orientation Program
Kudayh, Rabab, M.A., AUB; University Orientation Program
Làkkis, Khadijeh, M.A., AUB; University Orientation Program
Peltekian, Katia, M.A., Dalhousie University; University Orientation Program
Rashash-Shaaban, Reem, M.A., AUB; University Orientation Program
Zreik, Hassan, M.A., AUB; University Orientation Program

Assistant Instructors

Shihab, Mahmoud, B.S., AUB; Education

Research Assistants

Dani, Danielle, M.S., AUB; Science and Mathematics Education Center
Haidar, Maha, B.S., AUB; Science and Mathematics Education Center
Sakr, Rula, B.S., AUB; Science and Mathematics Education Center (PT)
Shahin, Iman, M.A., AUB; Department of Education (PT)

Test Development Specialists

Barudi, Salim, M.A., AUB; Office of Tests and Measurements
Safar, Mona, M.A., AUB; Office of Tests and Measurements

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* Seconded To REP

GENERAL INFORMATION

The Division of Education Programs was established in 1976. The aims of the Division are as follows:

1. To foster the study of education through research and teaching on both graduate and undergraduate levels. Graduate programs seek to prepare skilled educational research workers and practitioners; undergraduate programs aim at preparing elementary and secondary school teachers.

2. To enable potential students to meet the admission requirements of the University through a program that provides intensive English study and remedial work in other subject matter areas.

3. To provide opportunities for further education through special programs and courses.

4. To provide testing and evaluation services to the University and other institutions in the countries of the Middle East.

5. To help the educational systems of the Middle East in the planning, implementation, and evaluation of curricula, instructional materials, and training programs for various types of educational personnel.

6. To provide the countries of the Middle East with consultation and training services based on the expertise available at the University.

PROGRAMS OF STUDY

1. Bachelor of Arts
See under Department of Education.

2. Teaching Diploma
See under Department of Education.

3. Diploma in Educational Management and Leadership
See under Department of Education.

4. Diploma in Special Education
See under Department of Education.

5. Graduate Study

Information and general requirements for graduate study are found in the section "Graduate Study" at the end of this Catalogue. For details on graduate study in Education, see under Department of Education.

6. University Orientation Program

ACADEMIC RULES AND REGULATIONS

For the Bachelor's Degree in Education, the Teaching Diploma and the Master's degree program, the Division of Education follows the academic rules, regulations, and procedures of the Faculty of Arts and Sciences.

DEPARTMENT OF EDUCATION

Chairperson:	Jurdak, M.
Professors:	Bashshur, M.; Jurdak, M.
Associate Professors:	Ghaith, G; BouJaoude, S.; Ghusayni, R.; Yaghi, H.
Assistant Professors:	Abd-El-Khalick, F.; Abu Saba, M.; Bouzeineddine, A.; El-Hassan, K.; Mukallid, S.; Osta, I.
Lecturers:	Abyad, L.; Al-Amine, A.; Bashour, N.; Faddoul, S.; Merhej, W.; Warren, D.
Instructors:	Artinian, R; Hasan, N; Heath, M.; Kanj, M.
Assistant Instructor:	Shihab, M.

The Department of Education offers programs at both the undergraduate and the graduate levels. The undergraduate level program leads to a Bachelor of Arts degree. The post-B.A. Diploma program leads to a Teaching Diploma, Diploma in Special Education, or Diploma in Educational Management and Leadership. The graduate program leads to a Master of Arts degree in Education.

UNDERGRADUATE PROGRAM

The Department of Education offers a program leading to the Bachelor of Arts in Education/Elementary. To be admitted to this program, applicants must meet the admission requirements of the University. Holders of the Lebanese Baccalaureate (literary or scientific) or its equivalent may apply. Selection of candidates will be based on SAT I scores and secondary school grades. Detailed information regarding admission is given in the section "Admission" on page 29 of this catalogue and in the section "Admission to Sophomore Class" on page 45 of this catalogue.

PURPOSE

The Bachelor's degree in Education/Elementary aims at developing:

1. Professional understanding of children and their learning needs at the elementary level.

2. Broad-based competencies in methods and techniques of teaching to meet and develop learning needs.

3. Adequate knowledge of subject matter taught in elementary schools.

PROGRAM

The program for the B.A. in Elementary Education is based on at least 96 credits as follows:

1. **General University requirements** (21 crs.): CVSP 201, 202, 203, 204, ENLG 203, 204, ARAB 201.

2. **Education requirements** (45 crs.):

   a)   Core Education courses (24 crs.): EDUC 211, 215, 216, 217, 219, 220, 223 and 230.

   b)   Specialization courses (21 crs.):
       1. Core specialization courses (9 crs.): EDUC 218, 225, 231.
       2. Methods courses (6 crs.): One of the following pairs: EDUC 240 & 251 (Arabic and Social Studies), EDUC 245 & 251 (English and Social Studies), EDUC 252 & 257 (Math and Science), EDUC 228 - 229 (Arts and Music).
       3. Practicum (6 crs.): EDUC 267.

3. **Subject matter courses** (24 crs.):

   a)   Specialization courses (18 crs.): These are from 200 and above, excluding general university requirements. They include one course in each of Math and Science and 12 credits to be selected from two related disciplines (Math-Science, Arabic-Social Studies, English-Social Studies, Art-Music). Special Math and Science courses designed for teaching in the elementary school are offered by the Department (EDUC 271, 272, 273, 274). The Art and Music courses are available in the Faculty of Arts and Sciences.
   b)   Electives (6 crs.): 3 crs in either nutrition or environmental health, and 3 crs in Art or Music.

4. **General Electives** (6 crs.)

POST-B.A. DIPLOMA PROGRAM

The Diploma program has three main purposes:

1.   To prepare elementary and secondary school teachers. This requires specialization in a subject matter area that, in principle, should be completed before professional preparation begins in the Department of Education. Once completed, this preparation culminates in a Teaching Diploma which qualifies a student to teach at either the Elementary or the Secondary level.

2. To provide knowledge and practical training in the area of special education that culminates in a Diploma in Special Education.

3. To provide knowledge and practical training in the areas of educational management and leadership.

TEACHING DIPLOMA

The program for a teaching diploma comprises a total of 21 credit hours in Education divided into two blocks:

Block A: includes courses that may be taken (all, or any of them, or any combination thereof) concurrently with requirements for the Bachelor's degree in a subject matter area, or after receiving such a degree from AUB, or from a recognized institution.

Block B: can only be taken after receiving the Bachelor's degree in a subject matter area from AUB or from a recognized institution.

Teaching Diploma in Elementary Education

Education Course Requirements

Block A (9 cr. hrs.)	**Block B** (12 cr. hrs.)
EDUC 215	For students concentrating on teaching Arabic and Social Studies: EDUC 231, 240, 251, 268
EDUC 230	
an elective	For students concentrating on teaching English and Social Studies: EDUC 231, 245, 251, 268
	For students concentrating on teaching Math and Sciences: EDUC 231, 252, 257, 268
	For students concentrating on teaching Fine Arts: EDUC 231, 228, 229, 268

Subject Matter Requirements

24 credit hrs. in courses numbered 200 or above in one or two subject matter areas from the following combinations: a) English and Social Studies, b) Arabic and Social Studies, c) Math and Sciences, and d) Fine Arts. The Math and Science courses offered by the Department of Education (EDUC 271, 272, 273, 274) may be considered to satisfy part of the subject matter requirement in Mathematics and Sciences.

Teaching Diploma in Secondary Education

Education Course Requirements

Block A (12 cr. hrs.)	Block B (9 cr. hrs.)
EDUC 211 or 216 EDUC 215 EDUC 230 an elective	Two Methods courses from the sequence EDUC 237-256 inclusive Relevant course from the seq. EDUC 261- 266

Subject Matter Requirements

Students must complete the requirements for a Bachelor's degree in a subject matter area taught in elementary and/or secondary schools before they are granted the Diploma. These areas include Arabic, English, Math, Physics, Chemistry, Biology, History, Geography and Health. In case of a shift in major students are required to complete a minimum of 24 cr. hrs. in the new subject matter area in courses numbered 200 or above.

NOTE: Courses in areas such as Political Sciences, Public Administration, Business Administration, Economics, Psychology or Philosophy are excluded from the definition of subject matter area for the purposes of the Teaching Diploma. An exception to this is the Teaching Diploma in Social Studies where a minimum of 9 cr. hrs. in History and 3 cr. hrs. in Geology are required, and the balance of 12 credits may be selected from other social science departments, including Philosophy.

Methods Courses

Methods courses at the Secondary Level are subject matter oriented, i.e., they deal with teaching a subject matter which has been chosen by the student as a major field of specialization. The distribution is as follows:

EDUC 237-238	Theories and Methods of Health Education
EDUC 241-242	Teaching of Arabic
EDUC 243-244	Teaching of English as a Foreign Language
EDUC 249-250	Teaching of Social Studies
EDUC 253-254	Teaching of Math
EDUC 255-256	Teaching of Sciences

In the case of students who are actual teachers in a recognized school, special arrangements may be made with the instructors of the Methods courses to adjust the practical components of the course requirements for the Methods courses and the Practicums.

Admission to the Teaching Diploma Programs

Interested students should obtain an application from the Registrar's office and apply as new students. Applications will be reviewed by the Department and, when accepted, students will be classified as Special Students working for the Teaching Diploma. Completion of the Bachelor's Degree is a requirement for admission to the Teaching Diploma Program. This is despite the fact that students may have taken Block A courses in Education before receiving their BAs. Block B courses can only be taken after the BA.

Qualifications for the Teaching Diploma and Official Recognition by the Lebanese Government

Students qualify for the Teaching Diploma upon completion of the program of study as detailed above, attaining a cumulative average of 70 or above in its courses, and receiving the recommendation of the Department of Education.

Official recognition of the Diploma is granted by the Government of Lebanon to Lebanese citizens as equivalent to the License d'Enseignement, if the person:
1. holds the Bacc. II; and
2. the number of credits taken for the Diploma are over and above the total number required for a B.A. or B.S .

DIPLOMA IN SPECIAL EDUCATION

The purpose of this Diploma is to provide knowledge and practical training in the area of Special Education for mildly to moderately mentally retarded children between the ages of 3 and 15 years. Holders of such a Diploma are expected to be able to deal with mildly mentally retarded children enrolled in Special Education centers as well as in regular schools. They should be able to work as assistants to school psychologists (consulting teachers), and/or as teachers in self-contained special classes or resource rooms. Although the focus of this Diploma is on special methods and techniques to alleviate the effects of disability on such learners, the Diploma has relevance to almost all educational settings, especially for children in their early stages of growth.

For admission to this Program a student must hold a Bachelor's degree. It is preferable if the undergraduate major is in Education or in Psychology, but students with other undergraduate majors may be considered.

For completion of this Program 21 credit hours are required with a cumulative average of 70. The program is composed of the following courses:

Prerequisites: (6 cr.hrs.)

SBHS 202: General Psychology (or equivalent)
EDUC 225: Human Development and Special Education (or equivalent)

Requirements: (21 cr.hrs.)

Basic Courses (9 cr. hrs.):   EDUC 215, 221, 222
Methods Courses (12 cr. hrs.): EDUC 280, 281, 283

DIPLOMA IN EDUCATIONAL MANAGEMENT AND LEADERSHIP

The purpose of this Diploma is to provide knowledge and practical training in the areas of educational management and leadership. Holders of this Diploma will be qualified to become managers of schools and educational training institutions and programs.

Program Requirements

Block A (15 cr.)	Block B (6 cr.)
May be taken concurrently with the Bachelor degree	*Can only be taken after the Bachelor degree*
EDUC 211 or 216	EDUC 214 (Management in practice)
EDUC 212	EDUC 224 Instructional Supervision (Practicum)
EDUC 213	
EDUC 226	
EDUC 230	

To be eligible for consideration for admission to the Diploma Program in Educational Management and Leadership, applicants should have a bachelor degree from a recognized university. It is preferable to have a minimum teaching experience of one year.

Students qualify for the Diploma in Educational Management and Leadership upon the recommendation of the Department and completion of the specified program of study with a cumulative average of 70 or above.

GRADUATE PROGRAM

The graduate program comprises six areas of study: educational foundations and policy studies (frozen at present); educational psychology (tests and measurements or school guidance); educational administration and policy studies; mathematics education; science education; and teaching of English as a foreign language (in conjunction with the Center for English Language Research and Teaching). A student may pursue his/her studies

toward the Master of Arts degree in Education in any one of the five areas of concentration provided he/she meets the University requirements for admission to graduate work.

REQUIREMENTS

The program includes a minimum of 21 credits and a thesis. A non-thesis option, which includes a minimum of 33 credits, including a project, is also available. The prerequisites include: the Teaching Diploma program or its equivalent, EDUC 227 or its equivalent, and other courses as required by the Department. In case of deficiencies in undergraduate preparation a student may be required to complete other prerequisites. For admission requirements, see the chapter "Graduate Study" in this catalogue. In very special and few cases, when there is a verified case that a student who is accepted for graduate work is not going to enter the field of teaching, he/she may be exempted from some of the Diploma courses subject to the approval of the Department.

All M.A. candidates are required to complete the following courses in the Core Program: EDUC 315, EDUC 321 and one of the following Education Courses: EDUC 301, EDUC 302, EDUC 303, EDUC 314, EDUC 316, EDUC 326 or EDUC 332. The balance of the program is comprised primarily of specialized courses in one of the six areas of study mentioned above.

COURSE DESCRIPTIONS

UNDERGRADUATE COURSES

EDUC211 The School and the Social Order. 3.0; 3 cr.; annually. The importance of teaching as a profession in the larger context of social and cultural change; the manner in which teaching can influence the nature and direction of change. Contrasts between advanced and developing countries. Faculty Member.

EDUC212 Educational Laws and Policies. 3.0; 3 cr.; annually. Educational laws which govern public and private schools. This will include policies related to various educational levels, certification and equivalency issues, government approval syllabi, book authorship, examinations and educational plans. Faculty Member.

EDUC213 Introduction to Educational Administration. 3.0; 3 cr.; annually. Survey of various aspects of school administration with emphasis on organizational structure, functions and responsibilities of school officials, and public control of education. Faculty Member.

EDUC215 Learning and Human Development. 3.0; 3 cr.; annually. An introduction to instructional theory, the nature of intelligence, child development, learning and behavior management, with an emphasis on the basic implications for classroom teaching. K. El-Hassan, M. Abu-Saba.

EDUC216 Philosophy of Education. 3.0; 3 cr.; annually. A review of the development of educational thought through the ages as expressed in the writings and ideas of major philosophers. The review will endeavor to deal with thought in the context of the historical times. Arab thought will be included. Faculty member.

EDUC217 Measurement and Evaluation for Classroom Teachers. 3.0; 3 cr.; annually. Prerequisite: EDUC215. Introduction and practice in the construction, use, and interpretation of classroom tests. K. El-Hassan.

EDUC218 Children's Literature. 3.0; 3cr.; annually. A study of the diverse elements of ancient and modern children's literature. Topics include poetry, fairy tales, epics, myths and legends, fantasy, fiction and illustrated stories. The skill of using literature effectively with children is particularly stressed. A. Bou-Zeineddine.

EDUC219 Computers in Education. 3.0; 3 cr.; annually. General knowledge about microcomputers; asic computer concepts and skills; potential to enhance general problem-solving skills; microcomputer use in specific educational areas: mathematics, languages, science, social studies, administration and libraries. I. Osta.

EDUC220 Instructional Media and Techniques. 2.2; 3 cr.; annually. Systematic approach to instruction, selection and use of media, with practical experience. H. Yaghi.

EDUC221 Introduction to Special Education. 3.0; 3 cr.; annually. Special education and the various categories of exceptionality. Nature, causes, educational characteristics of children with mental retardation, learning disabilities, emotional disturbance, speech impairment, visual impairment, hearing impairment, and giftedness. Faculty Member.

EDUC222 Introduction to Assessment in Special Education. 3.0; 3 cr.; annually. An introduction to theory and uses of assessment techniques and instruments in special education. Emphasis is placed on educational implications for learners with special needs. S. Mukallid.

EDUC223 Introduction to Guidance and Counseling. 3.0; 3 cr.; annually. Prerequisite: EDUC215. An introduction to the field of guidance and counseling. The role of the counselor in school and community settings is emphasized. M. Abu-Saba.

EDUC225 Human Development and Special Education. 3.0; 3 cr.; annually. Early perceptual, cognitive, and social/emotional development, interaction of biological and environmental factors, and the influence of family and school on development over the life span. Implications to special education are emphasized. Faculty Member.

EDUC226 Personnel Management and Development. 3.0; 3 cr.; annually. Personnel policies and procedures; recruitment; salary scales, benefits, promotions and pension plans; job description and evaluation; organizing the personnel department; training and development of human resources. Faculty Member.

EDUC227 Statistics in Education. 3.0; 3 cr.; annually. *Students who receive credit for this course cannot receive credit for any other introductory statistics course, such as Mathematics 207 or 233, Economics 213, or Psychology 210.* Descriptive statistics, correlation, prediction, and statistical inference as applied to educational situations. Faculty Member.

EDUC230 Instructional Procedures. 3.0; 3 cr.; annually. An introduction to the process of instructional communication. Group-instructor interaction, basic organizational

and planning techniques, audio-visual operations, and evaluation procedures. H. Yaghi.

EDUC271 Mathematics for Elementary Teachers I. 3 cr.; annually. An in-depth study of mathematical concepts and skills in pre secondary mathematics curriculum.. I. Osta.

EDUC272 Mathematics for Elementary Teachers II. 3 cr.; annually. An in-depth study of mathematical concepts and skills in pre secondary mathematics curriculum. Prerequisite EDUC 271. I. Osta.

EDUC273 Science for Elementary Teachers I. 3 cr.; annually. An in-depth study of science concepts and skills in pre-secondary science curriculum. S. BouJaoude.

EDUC274 Science for Elementary Teachers II. 3 cr.; annually. An in-depth study of science concepts and skills in pre-secondary science curriculum. S. BouJaoude.

EDUC290 Special Topics. 1-3 cr.; annually.

METHODS COURSES

EDUC214 Management in Practice. 1.4; 3 cr.; annually. Planning, organizing and personnel management. Supervised training at AUB, and hands-on management practices and training in educational institutions. Faculty Member.

EDUC224 Instructional Supervision. 1.4; 3 cr.; annually. Supervised workshop training method at AUB, and hands-on skills in educational training institutions. Approaches to instructional supervision; the generalist and specialist supervisor; communication, motivation, evaluating, monitoring and staff and curriculum development skills. Faculty Member.

EDUC228 The Teaching of Art in Elementary School. 2.2; 3 cr.; annually. Theory and practice in teaching visual art in the elementary school with observation and practice teaching in classrooms. Faculty Member.

EDUC229 The Teaching of Music in Elementary School. 2.2; 3 cr. annually. The development of student's basic skills in music (general vocal and instruments) is combined with a study of source materials in the teaching of music. It also includes observation and practice teaching in classrooms. Faculty Member.

EDUC231 The Teaching of Reading in the Elementary School. 3.0; 3cr; first semester. Trends, theories, and practices in the teaching and evaluation of reading in the elementary school. Alternative teaching/learning strategies for developing readiness, comprehension, and evaluation of progress in reading. A. Bou-Zeineddine.

EDUC237 Theories and Methods of Health Education I. 2.2; 3 cr.; annually. Principles and practice with applications to school community and patient-care settings including determinants of health behavior, behavioral diagnoses and assessment of health actions, health behavior change, interpersonal and communication skills, and instructional health education materials. M. Kanj.

EDUC238 Theories and Methods of Health Education II. 1.4; 3 cr.; annually. Prerequisite: EDUC237. Practical skills for planning, implementing, and evaluating health education teaching-learning activities in schools, communities, and patient-care settings. Students will apply the theory and methods components of Ed237 in video microteaching and actual field experience. M. Kanj.

EDUC240 The Teaching of Arabic in Elementary Schools. 2.2; 3 cr. annually. Theory and practice in methods of teaching Arabic in elementary schools with observation and practice teaching in classrooms. Faculty Member.

EDUC241 The Teaching of Arabic I. 2.2; 3 cr.; first semester, alternative years. Theory and methods of teaching Arabic language and literature, at the secondary level, with emphasis on new approaches. Faculty Member.

EDUC242 The Teaching of Arabic II. 1.3; 3 cr.; second semester, alternate years. Prerequisite: EDUC241. A practicum of classroom observation and supervised practice teaching of Arabic language and literature at the secondary level. Faculty Member.

EDUC243 The Teaching of English as a Foreign Language I. 2.2; 3 cr.; first semester, annually. Theoretical background and approaches to the teaching of English as a foreign/second language. Principles and techniques of teaching the basic language skills. Includes classroom observation and micro teaching practices. G. Ghaith.

EDUC244 The Teaching of English as a Foreign Language II. 1.4; 3 cr.; second semester, annually. Prerequisite: EDUC243. Preparation and evaluation of teaching materials through individual and group projects. Guided and supervised practice teaching in schools. G. Ghaith.

EDUC245 The Teaching of English as a Foreign Language in Elementary School. 2.2; 3 cr. annually. Theory and practice in methods of teaching English as a foreign language in Elementary school, with observation and practice teaching in classroom. A. Bou-Zeinuddine.

EDUC249 The Teaching of Social Studies I. 2.2; 3 cr.; first semester, alternate years. Approaches to the teaching of history, geography and civics; adaptation of social science concepts and generalizations to the secondary level. Faculty Member.

EDUC250 Teaching of Social Studies II. 1.4; 3 cr.; second semester, alternate years. Prerequisite: EDUC249. A practicum of classroom observation and supervised practice teaching of social studies or history, geography and civics in neighboring schools. Faculty Member.

EDUC251 The Teaching of Social Studies in Elementary School. 2.2; 3 cr. annually. Theory and practice in methods of teaching history, geography, and civic education in elementary school, with observation and practice teaching. Faculty Member.

EDUC252 The Teaching of Mathematics in Elementary School. 2.2; 3 cr. annually. Theory and practice in methods of teaching mathematics in the elementary school, with observation and practice teaching. M. Jurdak.

EDUC253 The Teaching of Mathematics I. 2.2; 3 cr.; first semester, annually. Pedagogical and mathematical basis of various approaches in mathematics teaching in middle and secondary schools. Includes demonstration, classroom observation, and applications. M. Jurdak, I. Osta.

EDUC254 The Teaching of Mathematics II. 1.4; 3 cr; second semester, annually. Prerequisite: EDUC253. Analysis and preparation of teaching/learning materials, plans, and tests for mathematics teaching, including supervised practice teaching and individual and group meetings. M. Jurdak, I. Osta.

EDUC255 The Teaching of Science I. 2.2; 3 cr.; first semester, annually. The nature of science and its implications in teaching. Critical study of various science teaching

techniques. Survey and practice in the utilization of instructional materials. S. BouJaoude.

EDUC256 The Teaching of Science II. 1.4; 3 cr.; second semester, annually. Prerequisite:EDUC255. Review of various science curriculum projects and programs. Curriculum planning. Micro teaching and practicum in classroom observation and teaching. S. BouJaoude.

EDUC257 The Teaching of Science in Elementary School. 2.2; 3 cr.; annually. Theory and practice in methods of teaching science in the elementary school with observation and practice teaching in classrooms. Faculty member.

EDUC261 Practicum in TEFL in Secondary School. 0.6; 3 cr. Members of Faculty.

EDUC262 Practicum in Teaching Math in Secondary School. 0.6; 3 cr. Members of Faculty.

EDUC263 Practicum in Teaching Science in Secondary School. 0.6; 3 cr. Members of Faculty.

EDUC264 Practicum in Health Education. 0.6; 3 cr. Members of Faculty.

EDUC265 Practicum in Teaching Arabic in Secondary School. 0.6; 3 cr. Members of Faculty.

EDUC266 Practicum in Teaching Social Studies in Secondary School. 0.6; 3 cr. Members of Faculty.

EDUC267 Practicum in Elementary School. 0.12; 6 cr. Observation and practice in classroom situations under the guidance of experienced teachers. A. Bou-Zeineddine.

EDUC268 Practicum in Elementary School. 0.6; 3 cr. Observation and practice in classroom situations under the guidance of experienced teachers. A. Bou-Zeineddine.

EDUC280 Methods and Materials for Children with Mild Mental Retardation I. 2.2; 3 cr.; annually. Instructional strategies; organization and adaptation of material for teaching mildly to moderately mentally retarded children in functional (self-help) skills, socio-emotional skills, and pre-vocational skills. S. Mukallid.

EDUC281 Methods and Materials for Children with Mild Mental Retardation II. 4.4; 6 cr.; annually. Prerequisite: EDUC280. Training in instructional strategies and program development for students with mild mental retardation at different maturational levels. Organization, planning, adaptation of instructional materials in language, science, and math instruction. S. Mukallid.

EDUC283 Practicum in Education of Children with Mental Retardation. 0.6; 3 cr.; second semester, annually. Prerequisites: EDUC280 and 281. Supervised student-teaching in special institutions and other appropriate settings. S. Mukallid.

GRADUATE COURSES

EDUC301 Seminar in the History and Philosophy of Education. 3.0; 3 cr.; annually. Development of educational thought and practice through primary sources. Systems of educational theory will be examined from the age of Pericles to post World War II, with special emphasis on contemporary educational practice. Faculty member.

EDUC302 Seminar in the History and Philosophy of Arab Education. 3.0; 3 cr.; alternate years. Study of the development of Arab educational thought and practice through primary sources. Selected problems and representative thinkers from various

periods will be examined, beginning with Islam and ending in the early twentieth century. Faculty member.

EDUC303 Determinants of Educational Policy. 3.0; 3 cr.; annually. This course focuses on the process of establishing educational aims and policies. Forces such as social values, religious beliefs, economic and manpower needs, etc., are explored and examples of practices in various countries are examined. M. Bashshur.

EDUC305 Foundations of Science Education. 3.0; 3 cr.; alternate years. Study of the nature of science and its philosophical and sociological foundations, with emphasis on educational mplications. sychological ases f concept-learning in science and the contributions of research to science education. S. BouJaoude.

EDUC306 Recent Developments in Science Education. 3.0; 3 cr.; alternate years. Study of recent developments in science curricula, methods of teaching, utilization of facilities, evaluation, and teacher education and supervision. S. BouJaoude.

EDUC307 Seminar: Problems and Innovations in Elementary Education. 3.0; 3 cr.; alternate years. A review and analysis of contemporary problems, innovations and trends in elementary education. Organizational structures, teaching competencies, classroom logistics, student discipline, instructional improvement strategies. Faculty Member.

EDUC308 Educational Planning and Policy Studies. 3.0; 3 cr.; annually. Planning models at the macro level and applications in a number of nations, policy formulation, policy changes, and policy implementation issues as they relate to private and public educational systems. Faculty Member.

EDUC309 Foundations of Mathematics Education. 3.0; 3 cr.; alternate years. Study of the nature of mathematics and its philosophical, historical, and sociological foundations, with emphasis on educational implications. Psychological bases of concept learning in mathematics and the contributions of research mathematics teaching. M. Jurdak.

EDUC310 Recent Developments in Mathematics Education. 3.0; 3 cr.; alternate years. Study of recent developments in mathematics curricula, methods of teaching, utilization of instructional media, evaluation techniques, and teacher education and supervision. Includes tryouts in actual school situations of some of these innovations. M. Jurdak.

EDUC311 Seminar in Supervision of Instruction. 3.0; 3 cr.; annually. Prerequisite: EDUC213. The role of the supervisor as he works with teachers to improve instruction. Examination of theoretical and practical aspects with special attention given to research in the field. Faculty Member.

EDUC313 Management and Organization Theories in Education. 3.0; 3 cr.; annually. Prerequisite: EDUC213. Advanced theoretical study focusing on concepts of leadership, decision making, group dynamics, and organizational behavior and change, with particular emphasis on research in the field. Faculty Member.

EDUC314 Comparative Education. 3.0; 3 cr.; alternate years. Theory and methods of comparative education, with examination of schooling in a number of leading Western educational systems. The study will concern itself with historical, social, political, and economic forces influencing and underlying these systems. M. Bashshur.

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EDUC315 Psychology of Education (Advanced). 3.0; 3 cr.; annually. Prerequisite: EDUC215. A comprehensive analysis of instructional theory, measurement skills, cognitive development, learning theory and methods of applying behavior modification in the classroom. S. Mukallid.

EDUC316 Comparative Study of Middle Eastern Education. 3.0; 3 cr.; alternate years. A survey of Arab educational systems and analysis of their major problems in light of changing situations. M. Bashshur.

EDUC317 Theory and Methods of Testing. 3.0; 3 cr.; alternate years. Critical survey of major types of measurement techniques, including tests of intelligence, special abilities, achievement, djustment, nterests, nd ttitudes. Theoretical approaches to measurement, asic roblems n est onstruction and use, and functions and limitations of existing instruments. K. El-Hassan

EDUC318 Test Construction in Education. 3.0; 3 cr.; alternate years. Prerequisite: EDUC317. Development of testing techniques and skills for appraisal of the cognitive and affective objectives of instruction. K. El-Hassan.

EDUC320 Seminar in Human Development. 3.0; 3 cr.; annually. Growth and development of the child and adolescent; problems of learning and adjustment and their implications for teachers, counselors, and school officials. S. Mukallid.

EDUC321 General Research Methodology in Education. 3.0; 3 cr.; annually. Prerequisite:EDUC227 or equivalent. Aims at the development of a scientific orientation in the solution of educational problems. Develops students' skills in identifying and developing research problems dealing with a variety of research designs. Basic elementary statistical concepts are included. M. Jurdak.

EDUC322 Applied Behavior Analysis. 3.0; 3 cr.; annually. An analysis of respondent, instrumental, and social learning theory as well as the application of experimentally derived principles of learning to problems of educational and social significance. S. Mukallid.

EDUC324 Problems of Teaching Reading and Literature. 3.0; 3 cr.; annually. Principles and practice of teaching reading. Physiology of reading and problems of teaching speed and comprehensive English as a foreign language; issues in teaching literature including cultural content of literature and problems of teaching appreciation. G. Ghaith.

EDUC325 Problems of Teaching Writing and Composition. 3.0; 3 cr.; annually. Principles and practices of teaching writing; consideration of various current grammatical approaches to problems of teaching writing and the relationship of language, logic, rhetoric, and culture. G. Ghaith.

EDUC326 Theory and Design of Curriculum. 3.0; 3 cr.; annually. Examination of organization, scope, and sequence of curricula with special emphasis on various approaches to curriculum development. Faculty Member.

EDUC327 Seminar in Rural Education. 3.0; 3 cr.; alternate years. Structure and characteristics of rural societies and the role that education plays in effecting change and development n uch ocieties. The teacher as an agent of change in rural communities. Focus on developing countries, particularly the Middle East. Faculty Member.

EDUC328 Seminar in TEFL. 3.0; 3 cr; annually. Selected topics in linguistics, psychology, or instructional aids and technology and the application to classroom problems of teaching and evaluation. G. Ghaith.

EDUC329 Seminar in Education and Social Change. 3.0; 3 cr.; annually. Different theories of social change, followed by an examination of the school system and the teacher as an agent of social change. Faculty Member.

EDUC330 Theories in Guidance and Counseling. 3.0; 3 cr.; annually. A survey of various theories and approaches to the study and practice of guidance and counseling. M. Abu-Saba.

EDUC331 Field Experience in Guidance and Counseling. 1.4; 3 cr.; annually. Prerequisite: EDUC330 or 322. Supervised experience in counseling in the school setting. Observing, interviewing, and testing as needed for educational and vocational objectives to meet pupil needs. M. Abu-Saba.

EDUC332 Seminar in Educational Planning for Social and Economic Development. 3.0; 3 cr.; annually. Theory and practice of educational planning for social and economic development. Techniques of assessing manpower needs and translating these into educational strategies and plans. M. Bashshur.

EDUC335 Curricula and Methodologies in Elementary Education: Language Arts and Social Studies. 3.0; 3 cr.; alternate years. Prerequisites: EDUC231 and 251. A review of recent curricular and methodological developments in elementary language arts and social studies. Current research and resulting trends applicable to the elementary classroom. Faculty Member.

EDUC336 Curricula and Methodologies in Elementary Education: Science and Mathematics. 3.0; 3 cr.; alternate years. Prerequisites: EDUC252 and 257. Recent curricular and methodological developments n lementary cience nd athematics. Current research and resulting trends and advanced instructional practices applicable to the elementary classroom. Faculty Member.

EDUC390 Special Topics. 1-3 cr. Deals with special issues and concerns not included in regular courses. The following examples are taken from topics given during the last few years: Futurism in Education; Special Education; Children's Literature; and Moral and Civic Education.

EDUC389 M.A. Project. 3 cr.

EDUC398 M.A. Project. 0 cr.

EDUC399 M.A. Thesis.

SCIENCE AND MATHEMATICS EDUCATION CENTER (SMEC)

Director:	BouJaoude, S.
Professor:	Jurdak, M.
Associate Professor:	BouJaoude, S.
Assistant Professors:	Abd-El-Khalick, F.; Osta, I.

The functions of the Science and Mathematics Education Center are:

Teaching of science and mathematics education courses in collaboration with the Department of Education.

Research and development in the fields of science and mathematics education.

Production of textbooks, experimental curricula, and instructional materials in science and mathematics.

Consultation in science and mathematics to schools, institutions, or governments regarding curriculum planning, textbooks, laboratories, equipment, and methods of evaluation.

In-service training of science and mathematics teachers by means of institutes, conferences, workshops, or evening classes in conjunction with other DEP units.

OFFICE OF TESTS AND MEASUREMENTS

Director:	El-Hassan, K.
Senior Test Development Specialists:	Barudi, S.; Safar, M.

The Office of Tests and Measurements is in charge of all AUB admission tests. The Office offers similar testing services to other educational institutions in Lebanon and the region. More specifically the functions of the Office are:

1. To develop and administer admission tests to AUB and other institutions in Lebanon and the region.

2. To act as a testing center for international test administration (e.g. ACT, MCAT, MELAB, Open University, etc.)

3. To offer program and teacher evaluation to AUB departments.

4. To conduct in-service training workshops in testing and evaluation.

5. To offer consultation to schools, institutions, or governments regarding testing and evaluation.

6. To conduct validity and reliability studies.

7. To prepare technical reports.

UNIVERSITY ORIENTATION PROGRAM

Director:	Rashash-Shaaban, R.
Lecturer:	Abboud, S.
Instructors:	A'raj, S.; Baalbaki, R.; Karkanawi, L.; Kudayh, R.; Lakkis, K.; Peltekian, K.; Rashash-Shaaban, R.; Zreik, H.

PURPOSE

The University Orientation Program (UOP) offers an intensive English language program designed to prepare students for successful performance on English proficiency tests as well as in the regular University program. Students who do not meet the English entrance requirements of the University are eligible to enroll in the Program.

DESCRIPTION OF THE PROGRAM

ENGL100 University Orientation. 0 cr. A twenty - hour per week intensive English program which includes the following components:

Writing: In this component, students are exposed to various forms of writing skills and given ample opportunity to practice using these forms to produce acceptable college-level writing. At lower levels, emphasis is placed on sentence structure and paragraph writing, while at the more advanced levels emphasis is on paragraph and essay writing, and on the structure and style of effective sentences. Other skills, such as paraphrasing, summarizing and synthesizing are included, together with Journal and other forms of creative writing.

Speaking: The aim of this component is to improve the ability of students to express themselves appropriately in a variety of situations. At the lower levels it focuses on improving basic survival skills and accuracy of pronunciation, while at higher levels it shifts to other skills such as expression of opinions, debate and negotiation.

Reading: This component is designed to help students develop both intensive and extensive reading skills and build up their vocabulary repertoire. Word recognition, mechanical (including speed reading) and comprehension skills make up the core of the course. Study skills (including test-taking strategies) and basic reference skills (using the library, etc.) are introduced and they increase in frequency as the levels become more advanced. Students are also trained for the reading component of different proficiency tests.

Listening: This component is designed to develop the students' aural abilities through exposure to a variety of spoken discourse. The focus at the lower levels is on comprehension skills (details and main ideas), moving to advanced listening skills (identifying functions, register, etc.) at the higher levels. In addition, students are prepared to take the listening part of English proficiency tests.

Grammar: In this component students are given the opportunity to practice and master the various grammar structures through integrated tasks and activities, ensuring the development of their communicative skills as well as their linguistic competencies. In addition, students are trained to master the test-taking skills required for passing the standardized English proficiency tests.

ADMISSION

Students accepted into the Program enroll as either Regular or Special. Regular students are those who have already gained acceptance to AUB, whereas Special students are those who expect to obtain one in the future.

DURATION

The length of time required to complete the Program varies with the linguistic background and performance of the student; it usually ranges between one semester and a calendar year depending upon entry level.

ATTENDANCE

University Orientation Program classes meet daily, Monday through Friday. Because of the intensive nature of the Program, regular attendance in all classes is expected. Continued absence from classes results in a student being recommended to be discontinued from the Program. Discontinuation from UOP may also be the result of discipline problems and/or academic performance.

METHODS

The Faculty members of the Program are specially trained and experienced in teaching English. The methods are effective and up-to-date and the materials and equipment used are selected to meet the needs and interest levels of the students. Individual abilities and/or linguistic deficiencies of the students are addressed by the Program.

EVALUATION

Special examinations are administered to students regularly. Practice tests, quizzes, a midterm and a final exam are given to help assess the students' progress. However, entrance to University status from the UOP is by examination as required by the University. The English Entrance Examination is administered to all UOP students towards the end of each semester or summer session at the expense of the Program. If necessary, a second sitting is allowed at the expense of the student.

Students in front of the recently reopened College Hall

Center for Advanced Mathematical Sciences

CENTER FOR ADVANCED MATHEMATICAL SCIENCES

Officers of the Faculty

John Waterbury	President of the University
Makhluf J. Haddadin	Vice President for Academic Affairs
Ali H. Chamseddine	Director
Wafic A. Sabra	CAMS Faculty
Jihad Touma	CAMS Faculty

International Advisory Committee

Sir Michael Atiyah, Head of Advisory Committee (Chairman), University of Edinburgh, UK

Luis Alvarez-Gaume, European Organization for Nuclear Research (CERN), Geneva, Switzerland

Jean Pierre Bourguignon, Director of "Institut des Hautes Etudes Scientifiques", Bures-Sur-Yvettes, France; Professor, Ecole Polytechnique, Paris

J. Frohlich, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland

R. Jackiw, Massachusetts Institute of Technology (MIT), Cambridge, USA

N. Khuri, Rockefeller University, New York, USA

E. Vesentini, President, Accademia Nationale dei Lincei, Rome, Italy

The Center for Advanced Mathematical Sciences (CAMS) serves as a vehicle for promoting research and graduate studies in the mathematical sciences as well as a focal point for promotion of collaborative research among scientists and mathematicians in Lebanon and the region at large. It shall endeavor to:

- Conduct research in the sciences and engineering, with special emphasis on the mathematical aspects of research. In this regard, the Center acts as a regional research facility in various mathematical sciences such as Theoretical Physics, Pure and Applied Mathematics, Computer Science, Engineering and a variety of fields in Computational Science.
- Promote and contribute to the graduate programs in the mathematical sciences and engineering.
- Promote postdoctoral research and education at AUB and other local universities and foster a multidisciplinary environment encompassing various areas of mathematical science.
- Assist the university community at large in integrating the use of high performance computing into the various academic and administrative programs by capitalizing on the expertise developed by the scientific and professional staff of the Center.
- Identify and pursue promising new fields of science and engineering that might be integrated within the Center and the University.
- Act as a focal point for promoting collaborative research among scientists in the region, partly by accommodating visitors for a variety of intervals of time

and also by organizing topical meetings, workshops and conferences in various fields.

The academic members of the Center consist of the President of the University, The Vice President for Academic Affairs, The Director, full time, part time, associate faculty, research associates, and visiting faculty members.

All appointments shall be made according to established University policies and procedures.

The following are eligible for appointment to the Center:

a) Full-time and part-time faculty members. Normally the majority of CAMS faculty will hold joint appointments with departments in various Faculties and DEP. These joint appointments are made upon the recommendation of the International Advisory Committee.

b) Associate faculty members from other universities where they hold a professorial title, with no remuneration or employment benefits from AUB, who shall conduct research in collaboration with faculty members of the Center. AUB faculty members may also join the Center as Associates.

c) Visiting Faculty.

d) Research Associates appointed to do research funded by grants and gifts to AUB specifically in support of CAMS. Their appointment is restricted to the Center and subject, among other considerations, to availability of funds.

Promotion, renewal, and non-renewal of contracts are subject to established University policies and procedures.

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Extension
Programs

AUB EXTENSION PROGRAMS

Shehadeh Abboud   Director

The Office of Extension Programs at the AUB is a major learning resource in the service of our local and regional community. Inter-Faculty and multi-disciplinary in nature, the Extension Program is designed to cater to the continuing educational needs of professionals and para-professionals in a wide variety of areas including business, accounting, office automation, languages, information technology, etc. In all cases, our programs are based on the principle of offering world-class expertise in a context relevant to present and emerging needs of our community.

All programs offered by the AUB Extension Programs satisfy three-key criteria, namely:

1. A standard of excellence and quality traditionally characteristic of AUB programs
2. A distinct interdisciplinary focus
3. Cutting-edge curriculum and delivery methods.

Sponsored individuals or small groups may be accepted for limited and specified periods of specialized and supervised training. While enrolled in Extension courses, they are not considered candidates for a university degree although some may be university graduates. They may be sent by a sponsoring agency to develop their competencies, knowledge, and skills in a particular field. Training periods may be of varying lengths of time depending upon the objectives of the program of study.

The Office of Extension Programs is a window of opportunity for self-renewal available to a wide-range of professionals in a true spirit of partnership reflecting shared values and a common pursuit of shared goals. It is an integral part of the office of the Vice President for Regional External Programs, where AUB expertise in various specialties is channeled to promote higher professional standards within Lebanon and throughout the Middle East.

Graduate
Study

GRADUATE STUDY

GENERAL STATEMENT

Study leading to the Master's degree was begun at the American University of Beirut in 1904; the first Master's degree was awarded in 1905. Study leading to the degree of Doctor of Philosophy was initiated in 1961; the first Ph.D. degree was granted in 1966.

Graduate study is under the direction of the graduate committees of the various Faculties and the Board of Graduate Studies. The Board of Graduate Studies is accountable to the University Senate.

New programs may be added upon the recommendation of a Faculty Graduate Committee and the approval of the Faculty(ies) concerned, the Board of Graduate Studies, the Senate, and the Board of Trustees.

AREAS IN WHICH GRADUATE STUDY IS OFFERED

The University offers both the Master's degree and the degree of Doctor of Philosophy. The Master's degrees offered are: Master of Arts (M.A.), Master of Business Administration (M.B.A.), Master of Engineering (M.E.), Master of Engineering Management (M.E.M.), Master of Mechanical Engineering (M.M.E.), Master of Money and Banking (M.M.B.), Master of Public Health (M.P.H.) and Master of Science (M.S.).

A. MASTER'S DEGREES

These are currently offered in the following areas of specialization:

Faculty of Arts and Sciences
Anthropology (M.A.)
Arabic Language and Literature (M.A.)
Archaeology (M.A.)
Biology (M.S.)
Chemistry (M.S.)
Economics (M.A.)
English Language (M.A.)
English Literature (M.A.)
Geology (M.S.)
History (M.A.)
Mathematics (M.A. & M.S.)
Money and Banking (M.M.B.)
Philosophy (M.A.)

Physics (M.S.)
Political Studies (M.A.)
Psychology (M.A.)
Public Administration (M.A.)
Sociology (M.A.)
Statistics (M.A. & M.S.)

Faculty of Medicine

Biochemistry (M.S.)
Human Morphology (M.S.)
Medical Sciences (Interdepartmental) non-thesis (M.S.)
Microbiology (M.S.)
Pharmacology and Therapeutics (M.S.)
Physiology (M.S.)

Faculty of Engineering and Architecture

Applied Energy (M.M.E.)
Civil Engineering (M.E.)
Computer and Communications Engineering (M.E.)
Electronics, Devices and Systems (M.E.)
Electric Power Engineering (M.E.)
Environmental and Water Resources Engineering (M.E.)
Materials and Manufacturing (M.M.E.)
Master of Engineering Management (M.E.M.)
Mechanical Engineering (M.E.)
Thermal and Fluid Sciences (M.M.E.)
Urban Design (M.U.B.)
Urban Planning (M.U.P.)
Environmental Science: Environmental Technology (M.S.)*

Faculty of Agricultural and Food Sciences

Agricultural Economics (M.S.)
Agricultural Extension (M.S.)
Animal Science (M.S.)
Crop Production (M.S.)
Food Technology (M.S.)
Irrigation (M.S.)
Nutrition (M.S.)*
Plant Protection (M.S.)
Poultry Science (M.S.)
Soils and Mechanization (M.S.)
Environmental Science: Ecosystems (M.S.)*

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* Interdisciplinary program.

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Faculty of Health Sciences
Public Health (M.P.H.)
Epidemiology (M.S.)
Population Studies (M.S.)
Environmental Science: Environmental Health (M.S.)*

Division of Education Programs
Education (M.A.)

Interfaculty Programs
Neuroscience (M.S.): Arts and Sciences, Engineering and Architecture, and Medicine.
Nutrition (M.S.): Arts and Sciences, Health Sciences, and Medicine.

B. PH.D. DEGREES

These are offered in the following areas of specialization:

Faculty of Arts and Sciences: **Arabic, **Arab History, **Chemistry

Faculty of Medicine: **Basic Medical Sciences

C. COMBINED DEGREE PROGRAMS

Faculty of Medicine: M.S.-M.D., and **M.D.-Ph.D.

APPLICATION FOR ADMISSION

Application forms for admission to graduate study may be obtained from the Office of the Registrar, American University of Beirut, Beirut, Lebanon. All applications for admission should be made on these forms and returned to the Office of the Registrar. Any subsequent correspondence should also be addressed to the Office of the Registrar. Completed application forms should reach the Office of the Registrar by May 31 for applicants who wish to begin graduate study in Summer or October, and by January 5 for applicants for the second semester.

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* Interdisciplinary program.
** Temporarily frozen.

To be eligible for admission to graduate work, an applicant must hold a University degree based on a secondary certificate recognized by the Lebanese Ministry of Education and Fine Arts as equivalent to the Lebanese Baccalaureate and recognized by the University.

GENERAL INFORMATION

The sections below refer to the minimum University requirements. It should be noted that Faculty Graduate Committees, and individual departments or programs, may add further requirements. Information on such requirements may be found in the appropriate sections of this catalogue.

ADMISSION

Graduate study is offered on a selective basis only to students who have shown distinct academic ability. Applicants for graduate study may be considered for admission in one of the following three categories:

1. Graduate

A candidate qualifies for this category if he or she holds a bachelor's degree from AUB or an equivalent degree from another recognized institution with a cumulative undergraduate average of at least 80 or its equivalent in the major field of study.

2. Graduate on Probation

A candidate qualifies for this category if he or she holds a bachelor's degree from AUB or an equivalent degree from a recognized institution with a cumulative undergraduate average of at least 75 in the major field of study or its equivalent.

3. Prospective Graduate

A candidate qualifies for this category if he or she has an undergraduate degree from AUB with a cumulative average of at least 75, or an equivalent performance from another recognized institution, and applies for a different major. The Faculty Graduate Committee shall act on the admission of prospective graduate students upon the recommendation of the department or program of the intended major. The department, or program of the intended major, recommends to the Faculty Graduate Committee the supplementary undergraduate courses the applicant must take before consideration for admission to graduate work. Upon the completion of the supplementary undergraduate courses with an average of at least 80, the department or the academic unit may recommend to the Faculty Graduate Committee the admission of the applicant to the graduate program. The supplementary courses must be completed within four successive semesters.

The English Language Proficiency Requirement (ELPR)

A score of 550 on the English Entrance Examination (EEE), or 600 on the paper-based Test of English As a Foreign Language (TOEFL), or 250 on the computer-based TOEFL, is required for admission of new applicants to graduate or prospective graduate study from recognized institutions of higher education. Those who score between 500 and 549 on the EEE, or between 575 and 599 on the paper-based TOEFL, or between 230 and 249 on the computer-based TOEFL, will be required to sit for the English Placement Test (EPT). The Faculties of Arts and Sciences and Agricultural and Food Sciences require such applicants to take the appropriate English courses as will be determined by the EPT. The Faculties of Engineering and Architecture, Health Sciences, Medicine and the Division of Education Programs require such applicants to qualify for, and take, English 203, otherwise they lose their places. For more information on the EPT see page 36 of this catalogue. Graduates or prospective graduates may also meet the ELPR by scoring 7.5 or more on the International English Language Testing System (IELTS). Those who may have scored 500 or better on the Verbal Reasoning section of the General part of the Graduate Record Examination (GRE) are exempted from taking any English Proficiency Tests for the purpose of meeting the ELPR.

Further requirements

Individual Faculties may have further requirements such as GRE or GMAT for admission. Prospective applicants should ascertain from the Faculty concerned whether they meet its requirements.

Applicants for Ph.D. study must hold a Master's degree or its equivalent, and must have demonstrated, at the Master's level, outstanding academic ability (minimum average of 85 or its equivalent) and potential to conduct scholarly research.

TRANSFER OF CREDITS

Graduate courses taken beyond the requirements for the Bachelor's degree at AUB or at other recognized institutions are not transferable for credit towards the requirements for the master's degree, unless the applicant has attained a cumulative average of at least 80 in the undergraduate courses taken in the major field of study. Only courses in which the applicant has earned a grade of 80 or above may be transferred. Not more than 6 credits (9 credits for non-thesis programs) are transferable. Approval of the Graduate Committee is required for all transfers.

SUPERVISION

During the first semester of graduate study, the department or program will assign an academic advisor to the student. The advisor will guide and help the student in planning a course of study. Not all of the credits need be in courses offered by the department or

program in which the student is enrolled, but all of them must be in courses which, in the judgement of the department or program, are relevant to the field in which the student is specializing. At a later date, each student enrolled in a thesis program will be assigned to a thesis advisor who must be a full-time member of the Faculty and who will serve as chairperson of the thesis committee. The thesis advisor and the members of the thesis committee should be of professorial rank.

The proposal of the Master's thesis topic and the selection of the advisor and the members of the thesis committee should receive the approval of the Faculty Graduate Committee. The Ph.D. thesis topic, examining committee, and admission to candidacy require approval of the Board of Graduate Studies.

COURSES AND GRADES

Courses taken as part of a student's graduate study program fall in one of two categories, graduate or prerequisite, with different grading systems.

1. Graduate Level Courses

These are normally numbered 300 or above. The minimum passing grade for a graduate course is 70. Students in graduate study are required to maintain a cumulative average of at least 80 in all courses taken for graduate credit. A student who is absent without excuse from more than one third of the number of sessions in any one course, or who fails to sit for scheduled examinations, or fails to fulfill required written or oral work, will be given the minimum grade for graduate courses, which is 55. Results of tutorial courses, projects, or theses will be reported as Pass (P) or Fail (F).

2. Prerequisite Courses

These are usually undergraduate courses, taken to make up for any deficiencies in the student's background. They do not carry graduate credit. The minimum passing grade for a prerequisite course is 70; however, a department or program may set a higher minimum passing grade.

PROBATION AND DISMISSAL

A student working for a Master's degree may be placed on academic probation by the Faculty Graduate Committee. A student working for a Ph.D. degree may be placed on academic probation by the Board of Graduate Studies.

A graduate student is placed on academic probation if he or she:

1. Is admitted to graduate study on probation;

2. Fails in any course taken for graduate credit;

3. Does not maintain the cumulative average mentioned above in the section "Courses and Grades."

The department or program in which the student is enrolled may recommend probation even though the student may have attained an adequate cumulative average.

The probation of a Master's student may be removed through action of the appropriate Faculty Committee and of a Ph.D. student by the action of the Board of Graduate Studies, if both of the following conditions are satisfied:

1. The student has completed a minimum of 9 credits of graduate level courses within the two consecutive semesters after being placed on probation, has passed all courses, and has obtained the cumulative averages specified in the section "Courses and Grades" above. If the student fails to meet any of these conditions, he or she will be dropped from the program.

2. The department or program in which the student is studying recommends removal of probation.

The faculty Graduate Committee may discontinue a Master's student and the Board of Graduate Studies a Ph.D. student from graduate study if:

1. Probation status is not removed within a period of two semesters in which the courses that are taken are for credit; or

2. In the opinion of the department or program, and irrespective of the grades obtained, the work of the student is deemed unsatisfactory; or

3. The student fails the comprehensive examination twice, or fails the thesis defense twice.

COMPREHENSIVE EXAMINATION

A student must pass a comprehensive examination after completion of most of the course requirements for the degree. The timing of the examination will be set by the department or program concerned. The purpose of the examination is to ascertain the student's knowledge of the field of specialization and related areas. The examination need not be restricted to the content of courses.

A student who does not pass the Comprehensive Examination may take it a second time after a period of at least three months.

THESIS/DISSERTATION/PROJECT

In partial fulfillment of the requirements for the degrees of Master, and of Doctor of Philosophy, a student must submit a thesis based on results of original, independent research. Except in departments or programs in which the medium of instruction is not English, the thesis must be in English.

An abstract not exceeding 350 words must be submitted with the thesis. If the thesis is in a language other than English, the abstract must be written both in that language and in English.

As soon as approval for writing a thesis/dissertation/project is granted, a student should get from the Library a copy of the Thesis Manual which provides instructions on the preparation of theses. Its application is mandatory and theses not conforming to its requirements will not be accepted.

For all matters not discussed in the Manual, theses must follow the form and style described in the latest edition of K. L. Turabian, *Manual for Writers of Term Papers, Theses and Dissertations* (University of Chicago Press), or any other form specified by the department or program provided this conforms to the manual.

Copies of the thesis, unbound but ready for binding, should be submitted by the student to the members of the thesis committee at least two weeks before the thesis defense. Copies may be obtained by any legible and durable form of reproduction. Additional copies may be required, as specified by the department or program concerned.

Thesis Committee

The Master's thesis committee should be composed of at least three members recommended by the department or program and approved by the Faculty Graduate Committee. The Ph.D. dissertation committee should be composed of at least four members recommended by the department or program and approved by the Board of Graduate Studies. The proposal of the thesis topic and the selection of the advisor and the members of the thesis committee for candidates for the Master's degree should have been approved by the Faculty or Division Graduate Committee at least four months, and by the Board of Graduate Studies for the candidates for the Ph.D. degree at least eight months, before the student defends the thesis. It is advisable that the thesis committee include one member from outside the department or program. This member may be from an institution other than AUB. All committee members should hold professorial rank. The thesis committee approves the thesis topic and research program and conducts the thesis defense examination.

Thesis Defense

Thesis defense is open to the public and must be taken not later than October 20, February 20, or May 30, for students who wish to graduate in October, February, or July, respectively.

Students should be registered in the session in which they expect to graduate.

Pass or fail is reported for the combined thesis and thesis defense. If fail is reported, the student may resubmit the thesis and defend it after a period of at least three months. Failure on the second attempt results in discontinuation from graduate work.

Deposit of the Thesis in the Library

After passing the thesis defense examination, the student is required to deposit at the Jafet Memorial Library two copies of the thesis, and three in the case of a Ph.D. dissertation. A Library receipt of these copies must be delivered to the Office of the Registrar before the student is awarded the degree. The student should sign a release form indicating whether or not the Library is authorized to supply copies of the thesis to other libraries or to individuals. The non-authorization option is valid for a period of two years only, after which copies of the thesis will be supplied on request.

Deadlines

	For Graduation in:	October	February	July
Deadline for approval of	For Master's candidates	June 20	Oct. 20	Feb. 1
thesis topic and committee	For Ph.D. candidates	Feb. 20	June 20	Oct. 1
Deadline for thesis defense	For both Master's and Ph.D. candidates	Oct. 20	Feb. 20	May 30
Deadline for deposit of thesis at library	For both Master's and Ph.D. candidates	Oct. 31	March 1	June 10

SPECIFIC REQUIREMENTS FOR THE MASTER'S DEGREE

In addition to satisfying the general requirements set in the preceding sections, students working towards a Master's degree must fulfill the requirements described below.

COURSE REQUIREMENTS

Two types of Master's degree programs are available:

1. A Master's program requiring a thesis based on independent research work. Students following this program are required to take a minimum of 21 graduate credit hours and to present a thesis. A maximum of 6 credits may be in tutorial courses.

2. A non-thesis Master's program. The student following this program is required to take a minimum of 33 graduate credit hours and should follow a course of study approved by the department or program and by the Graduate Committee of the Faculty.

LANGUAGE REQUIREMENTS

There are no special University language requirements for the Master's degree. However, individual departments and programs may set their own language requirements either as a general rule or in specific cases. Examination procedures should be approved by the Faculty Graduate Committee.

RESIDENCE REQUIREMENTS

To meet the minimum residence requirements for the Master's degree, a student must register and be in residence, as a graduate student, for at least two semesters, one semester and two summers, or four summers.

All requirements for the Master's degree must be completed within a period of four years after admission to graduate study. Students attending summer sessions only must complete all requirements within a period of six summers after admission to graduate study. Extension beyond the maximum allowed period of study requires the approval of the Graduate Committee of the Faculty.

SPECIFIC REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

In addition to satisfying the general requirements, students admitted to the Doctor of Philosophy program must fulfill the requirements described below. Only students holding a Master's degree or its equivalent are admitted to the Ph.D. program upon the recommendation of the Faculty Graduate Committee and the approval of the Board of Graduate Studies. Equivalence requires the approval of the Board of Graduate Studies.

ADMISSION TO CANDIDACY

Students must be admitted to candidacy at least two semesters before obtaining their Ph.D. degree. For students to be admitted to candidacy they are expected to have fulfilled the following requirements:

1. Submitted a program approved by the Board of Graduate Studies. Any subsequent change in plan requires its approval.

2. Completed at least 12 credits of graduate courses beyond the Master's degree.

3. Attained a cumulative average of at least 85 in all courses taken beyond the Master's degree.

4. Passed the comprehensive examination set by the department.

He or she is also expected :

1. To present and defend a proposal for research work. The presentation must be publicized in the department and the University.

2. Not to be on probation.

PROGRAM AND COURSE REQUIREMENTS

Each student, in consultation with his or her advisor, should finalize a program of study and submit it to the Board of Graduate Studies within two semesters of the beginning of study towards the Ph.D. degree. The Board of Graduate Studies shall monitor the progress of the student through annual reports by chairpersons of departments or programs.

The program must include:

1. At least 15 credits of graduate level courses beyond those required for the Master's or M.D. degree.

2. The program should define the thesis problem and the approach to solving it. The program should also include the names of the examining committee, which should be composed of at least four members, one of whom is from outside the department or program.

LANGUAGE REQUIREMENTS

Depending on the research topic, the thesis committee and the department may require proficiency in one or more foreign languages.

RESIDENCE REQUIREMENTS

To fulfill the minimum residence requirements for the Ph.D. degree, the student must register for at least four semesters beyond the completion of the Master's degree. Requirements for the degree of Doctor of Philosophy must be completed within a period of five years after starting graduate work beyond the Master's degree. Extension requires approval of the Board of Graduate Studies.

INTERFACULTY PROGRAMS

Interfaculty programs are under the direction of the Vice President for Academic Affairs. Each interfaculty program is administered by an interfaculty coordinating committee consisting of representatives of all Faculties and the DEP, with one member from each Faculty and the DEP.

Upon the recommendation of the Dean concerned and the Director of the DEP, members of the Committee will be appointed by the Vice President for Academic Affairs, who will also appoint the Chairman from within the membership of the Committee. The Chairman and members will serve for a term of two years, subject to renewal. The Committee will act on applications for admission to the program upon the recommendation of the graduate committee of the Faculty offering the major of specialization to which the student is applying. The Committee will coordinate among the various Faculties, through the departments concerned, course offerings, contents and standards. It will be responsible for continuous evaluation of the program, including approval of new, required or elective courses, and the discontinuation or modification of existing courses. The Committee will recommend to the Board of Graduate Studies any changes in requirements for student admission, evaluation or graduation that are specific to the program.

INTERFACULTY GRADUATE ENVIRONMENTAL SCIENCES PROGRAM

General Information

The Interfaculty Graduate Environmental Sciences Program (IGESP) leads to the Master of Sciences (MS) degree in Environmental Sciences with three possible majors depending on the Faculty to which the student applies:

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1. Environmental Technology at the Faculty of Engineering and Architecture (FEA)
2. Ecosystem Management at the Faculty of Agriculture and Food Sciences (FAFS)
3. Environmental Health at the Faculty of Health Sciences (FHS)

The Program draws on the resources of various departments of the Faculties of Agricultural and Food Sciences (FAFS), Engineering and Architecture (FEA), Health Sciences (FHS), Medical Sciences (FM), and Division of Education Programs (DEP), and provides opportunities for study and research in the general field of the environment.

The Program provides graduates with the necessary tools for professional practice and/or the pursuit of higher education. It is administered by an Interfaculty Coordinating Committee with the Graduate Committees of the Faculties concerned. To be accepted into the program, an applicant must:

1. Meet general University requirements for admission to graduate study. In addition, applicants to the Program may be admitted under the following categories:

    I. Graduate, if the average in the last 60 credits is greater than 80.

    II. Graduate on Probation, if the average in the last 60 credits is less than 80 and greater than 75.

2. Be recommended by the appropriate Faculty Graduate Committee and accepted by the
Interfaculty Coordinating Committee of the Program.

3. Meet the necessary background in the in the physical, natural, and mathematical sciences,
    including statistics and computer science.

The following undergraduate courses are recommended as prerequisites: Biol 200, Chem 202, Chem 205, Phil 209, ENSC 201, ENSC 202, Math 208, and Math 209. Adequate preparation to take any graduate course is decided by the Academic Advisor and the Interfaculty Graduate Environmental Sciences Program Committee (IGESPC).

Degree Requirements

Requirements for the MS degree in Environmental Sciences (any major), both thesis and non-thesis options, are tabulated below.

Course type	Group	Thesis Option No. of credits	Non-Thesis Option No. of credits
Core	A	18	18
Broad Electives	B	6	6
Specialized Electives	*C or other[1]*	6	6
Additional Electives	*B or C or other[1]*	0	9
Thesis		6	0
Project		0	3
Total No. of Credits Required for Graduation		**36**	**42**

Core courses, as well as basic and broad electives are listed below. These courses are structured to provide students with a diversified and multi-disciplinary background in Environmental Sciences and to allow them to specialize in one or more areas of the following:

- Air Quality Management
- Waste Management
- Water and Wastewater Management
- Ecosystem Management
- Environmental Health

Group A	Core Courses in Environmental Sciences
ENSC 600/CVEV 534	Air Pollution and Control I. 3 cr.
ENSC 610/CVEV 531	Solid Waste Management I. 3 cr.
ENSC 620/CVEV 586	Water and Wastewater Treatment. 3 cr.
ENSC 630/ENSC 330	Natural Resources Management. 3 cr.
ENSC 640/ENHL 309	Toxicology and Environmental Health Hazards. 3 cr.
ENSC 650/CVEV 639	Environmental Case Studies and Conflict Resolution. 3 cr.
ENSC 690/CVEV 690[2]	Seminar in Environmental Sciences. 0 cr.

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[1] Other relevant graduate courses from any Faculty may be taken as an Elective (up to a maximum of two courses) upon consent of the Academic Advisor.

[2] All students admitted to the Program must register for this seminar whenever offered until they graduate.

Group B	Broad Electives in Environmental Sciences
ENSC 651/CVEV 540	Methods of Environmental Sampling and Analysis. 3 cr.
ENSC 652/CVEV 539	Environmental Impact Assessment. 3 cr.
ENSC 654/ECMG 311	Physical and Biological Resources in Terrestrial Ecosystems. 3 cr.
ENSC 655/AGRL 301	Research Design and Statistical Methods. 3 cr.
ENSC 656/ENHL 311	Public Health Microbiology. 3 cr.

Group C	Suggested Specialized Electives in Environmental Sciences
ENSC 601/CVEV 535	Air Pollution and Control II. 3 cr.
ENSC 602/CVEV 627	Air Pollution Modeling. 3 cr.
ENSC 611/CVEV 538	Solid Waste Management II. 3 cr.
ENSC 612/CVEV 537	Industrial/Hazardous Waste Management. 3 cr.
ENSC 621/CVEV 523	Water and Sewage Design. 3 cr.
ENSC 622/CVEV 527	Environmental Chemistry and Microbiology. 3 cr.
ENSC 623/CVEV 634	Physical, Chemical, and Biological Processes. 3 cr.
ENSC 631/ECMG 314	Agricultural Pollution and Control. 3 cr.
ENSC 632/SIMC 318	Soil Salinity and Management. 3 cr.
ENSC 633/SIMC 319	Water Conservation
ENSC 641/ENHL 312	Occupational Health. 3 cr.
ENSC 642/ENHL 314	Food Quality and Control. 3 cr.

While it is not required to specialize in any one field, students are encouraged to do so when feasible as it helps them in selecting a thesis or project topic. Suggested course sequences for specific areas of specialization are listed below.

SUGGESTED COURSE SEQUENCES FOR SPECIFIC AREAS OF SPECIALIZATION

Air Quality Management

- **Air Pollution and Control I**
- Air Pollution and Control II
- Air Pollution Modeling
- Environmental Chemistry and Microbiology
- Research Design and Statistical Methods
- Environmental Impact Assessment
- Methods of Environmental Sampling and Analysis
- Occupational Health

Waste Management

- **Solid Waste Management I**
- Solid Waste Management II
- Industrial/Hazardous Waste Management
- Physical, Chemical, and Biological Processes
- Environmental Chem-istry & Microbiology
- Research Design and Statistical Methods
- Environmental Impact Assessment
- Methods of Environ-mental Sampling and Analysis

Water and Wastewater Management

- **Water and Waste-water Treatment**
- Water and Sewage Design
- Physical, Chemical, & Biological Processes
- Environmental Chemistry and Microbiology
- Research Design and Statistical Methods
- Environmental Impact Assessment
- Methods of Environmental Sampling and Analysis

Ecosystem Management

- **Natural Resources Management**
- Physical & Biological
- Resources in Terres-trial Ecosystems
- Agricultural Pollution and Control
- Soil Salinity and Management
- Water Conservation
- Research Design and Statistical Methods
- Environmental Impact Assessment
- Methods of Environmental Sampling and Analysis

Environmental Health

- **Toxicology & Environmental Health Hazards**
- Public Health Microbiology
- Occupational Health
- Food Quality and Control
- Research Design and Statistical Methods
- Environmental Impact Assessment
- Methods of Environmental Sampling and Analysis

SUGGESTED CURRICULUM FOR THE DEGREE OF MASTERS OF SCIENCE IN ENVIRONMENTAL SCIENCES

Thesis Option

Term I	Fall	Credits
ENSC 610	Solid Waste Management I	3
ENSC 630	Natural Resources Management	3
ENSC 640	Toxicology & Environmental Health Hazards	3

Term II	Spring	
ENSC 600	Air Pollution & Control I	3
ENSC 620	Water & Wastewater Treatment	3
ENSC 690	Seminar in Environmental Sciences	0
ENSC 69_	Elective	3

Term III	Summer	
ENSC 699	Thesis	6

Term IV	Fall	
ENSC 69_	Elective	3
ENSC 69_	Elective	3
ENSC 699	Thesis (continued)	--

Term V	Spring	
ENSC 650	Environmental Case Studies & Conflict Resolution	3
ENSC 690	Seminar in Environmental Sciences	0
ENSC 69_	Elective	3
ENSC 699	Thesis (continued)	--

Term VI	Summer	
ENSC 699	Thesis (continued)	--

| | Total | 36 |

Non-Thesis Option

Term I	Fall	Credits
ENSC 610	Solid Waste Management I	3
ENSC 630	Natural Resources Management	3
ENSC 640	Toxicology & Environmental Health Hazards	3

Term II	Spring	
ENSC 600	Air Pollution & Control I	3
ENSC 620	Water & Wastewater Treatment	3
ENSC 690	Seminar in Environmental Sciences	0
ENSC 69_	Elective	3

Term III	Summer	
ENSC 697	Project	3
ENSC 69_	Elective	3

Term IV	Fall	
ENSC 69_	Elective	3
ENSC 69_	Elective	3
ENSC 69_	Elective	3

Term V	Spring	
ENSC 650	Environmental Case Studies & Conflict Resolution	3
ENSC 690	Seminar in Environmental Sciences	0
ENSC 69_	Elective	3
ENSC 69_	Elective	3

Term VI	Summer	
ENSC 697	Project (continued)	--

| | Total | 42 |

Course Descriptions

ENSC 600/CVEV 534 Air Pollution and Control I. 3 cr.; annually. Prerequisite: Chem 201 or equivalent. Introduction to air pollutants, sources and effects. Emissions estimates, regulations, and monitoring techniques. Particulate matter characterization. Meteorology and atmospheric dispersion. Air pollution control processes. M. El-Fadel.

ENSC 601/CVEV 535 Air Pollution and Control II. 3 cr.; alternate years. Prerequisite: ENSC 600 or consent of instructor. Process analysis, operational limitations, cost and performance, and evaluation of control process and equipment. Case studies, field visits, and inspection of industrial installations. M. El-Fadel.

ENSC 602/CVEV 627 Air Pollution Modeling. 3 cr.; alternate years. Prerequisite: ENSC 600 or consent of instructor. Air pollution meteorology. Plume rise. Dispersion and atmospheric chemistry. Meteorological models. Gaussian, statistical, and other special application models. M. El-Fadel.

ENSC 610/CVEV 531 Solid Waste Management I. 3 cr.; annually. Nature and effects of solid wastes including hazardous wastes. Engineering management principles, practices, and techniques for management of solid wastes, administration. Solid waste generation, storage, collection and transport, processing, resource recovery, and disposal. Trip to a local facility. M. El-Fadel.

ENSC 611/CVEV 538 Solid Waste Management II. 3 cr.; alternate years. Prerequisites ENSC 610 or consent of instructor. Design of solid waste disposal schemes, including design reports and literature search on the development of conventional treatment and disposal processes. M. El-Fadel.

ENSC 612/CVEV 537 Industrial/Hazardous Waste Management. 3 cr.; alternate years. Sources, quantity, and quality of industrial wastes. Basic industrial waste treatment processes. Major industries, types of wastes and existing treatment practices. Disposal and fate of industrial wastes. M. El-Fadel.

ENSC 620/CVEV 586 Water and Wastewater Treatment. 3 cr., annually. Quality and methods of treatment of water and wastewater. Literature search on the development of conventional treatment processes. Students who have taken CVEV 086 cannot register for this course. G. Ayoub.

ENSC 621/CVEV 523 Water and Sewage Works Design. 3 cr.; alternate years. Prerequisites: CVEV 076, CVEV 586 or ENSC 620 or consent of instructor. Design of wastewater schemes, including design reports and literature search on the development of conventional treatment processes. G. Ayoub.

ENSC 622/CVEV 527 Environmental Chemistry and Microbiology. 3 cr.; alternate years. Prerequisite: Chem 201, Biol 210 or equivalent. Introduction to the quantitative aspects of organic, inorganic, and physical chemistry. Homogeneous and heterogeneous solutions. Chemical equilibria. Reaction kinetics. Acidity, alkalinity, hardness, colloids, and solids. Introduction to the composition, morphology, life characteristics, and broad classification of microorganisms. Biochemistry, including energy, metabolism and synthesis. Population, growth, decay and biochemical kinetics in biological processes. Biological water quality indicators. F. Nazzal.

ENSC 623/CVEV 634 Physical, Chemical and Biological Processes. 3 cr.; alternate years. prerequisite: ENSC 620 and 622 or consent of instructor. Physical-chemical

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processes: coagulation, locculation, oftening, ron nd anganese emoval, sedimentation, sand filtration, chlorination, principles of desalination. Biological processes: trickling filter, biological disks, activated sludge, waste stabilization ponds. Sludge treatment. G. Ayoub.

ENSC 630/ENSC 330 Natural Resources Management. 3 cr.; alternate years. Prerequisites: ENSC 201, ENSC 202 or consent of instructor. The role and value of natural resources, the ecosystem concept in natural resources, resource utilization and sustainability. Management of natural resources with special reference to developing countries. Specific issues: mountainous environments, arid and semi-arid zones, coastal environments, lakes and rivers, urban areas, non renewable energy, mineral resources. R. Zurayk.

ENSC 631/ECMG 314 Agricultural Pollution and Control. 3 cr.; annually. Fate of petrochemicals in the environment. Effect on terrestrial and aquatic systems. Contamination, monitoring residues, methodologies and risk assessment models and research. M. Nimah.

ENSC 632/SIMC 318 Soil Salinity and Management. 3 cr.; alternate years. Diagnosis and properties of salt affected soils; plant growth and salinity. Water quality for irrigation, drainage, reclamation and management of saline and sodic soils. R. Zurayk.

ENSC 633/SIMC 319 Water Conservation. 3 cr.; alternate years. Environmental climatological conditions in relation to water availability and management. Drought prediction and management. Structural and non-structural water conservation measures. F. El-Awar.

ENSC 640/ENHL 309 Toxicology and Environmental Health Hazards. 3 cr.; annually. Prerequisites: Biol 201B, Chem 201B or equivalent. Reviews of the essentials of toxicology: dose response, toxicokinetics (absorption, distribution, metabolic conversion, elimination), and the molecular basis for toxic action, target organ toxicity, mutagenesis, teratogenesis, and carcinogenesis. Selected chemical agents that adversely affect human health are introduced as case studies. Concepts of Risk Assessment. I. Nuwayhid.

ENSC 641/ENHL 310 Occupational Health. 3 cr.; alternate years. Conditions and hazards in occupational environments, control and effect on workers and the neighborhood. Administrative aspects of occupational health programs in industries and monitoring of occupational environments. I. Nuwayhid.

ENSC 642/ENHL 314 Food Quality and Control. 3 cr.; alternate years. Prerequisites ENSC 642. Sources of food contamination. Relationship between contaminated food and food born diseases. Food management from production to consumption. Preparation, implementation, and appraisal of national food control programs. M. Harakeh.

ENSC 650/CVEV 639 Environmental Case Studies and Conflict Resolution. 3 cr.; annually. Prerequisite: ENSC 610, 620, and 630, or consent of instructor. Case studies in solving an existing problem at installations associated with adverse environmental impacts or that typically generate potential conflict from perceived adverse environmental impacts particularly the usage of controversial chemical products or siting of waste disposal facilities (i.e. pesticide application, usage of asbestos building materials, air pollution exposure from industrial facilities, solid

waste landfilling, wastewater treatment facilities, oil exploration, ocean dumping, deep well injection, construction of reservoirs, water resources diversion, etc.). Interfaculty Committee.

ENSC 651/CVEV 540 Methods of Environmental Sampling and Analysis. 3 cr., alternate years. Theory and practice of sampling techniques and instrumental methods used in environmental sciences and technology, with emphasis on the determination of pollutants in water, air, and soil by modern analytical techniques. Adaptation of procedures to specific environmental matrices through case studies and practical application. F. Nazzal.

ENSC 652/CVEV 539 Environmental Impact Assessment. 3 cr.; alternate years. Prerequisites: ENSC 600, 610, 620, or consent of instructor. Theories and procedures of assessing environmental impact. Analysis of the impact of development on various measures of environmental quality. Benefit-cost considerations in environmental impact assessment. M. El-Fadel.

ENSC 654/ECMG 311 Physical and Biological Resources in Terrestrial Ecosystems. 3 cr.; alternate years. Physical and biological resources in ecosystems. Soils in the ecosystem. Soil conservation. Principles of soil chemistry and microbiology. Plant and animal biodiversity. Collection and conservation of wild types. Preservation of endangered species. Plant response to environmental stress. R. Zurayk.

ENSC 655/AGRL 301 Research Design and Statistical Methods. 3 cr.; alternate years. Prerequisite: Math 208 or equivalent. Non experimental observational studies. Survey research instrumentation and analysis. Factorial design and analysis. Model testing and validation. Basic statistical concepts. Regression and correlation analysis. Analysis of variance and covariance. Chi square and other non-parametric tests. R. Baalbaki.

ENSC 656/ENHL 311 Public Health Microbiology. 3 cr.; alternate years. Selected microbes including newly recognized microbes of public health significance and their interaction with man to cause disease. Emphasis on host interactions pertinent to disease control, such as mechanisms of microbial survival and adaptation, virulence, and host adaptation. M. Harakeh.

ENSC 690/CVEV 690 Seminar in Environmental Sciences. 0 cr.; Current research or applied projects are presented by faculty members, students, or invited speakers. Interfaculty Committee.

INTERFACULTY GRADUATE NUTRITION PROGRAM

The interfaculty Graduate Nutrition Program (GNP), leading to the M.S. degree in Nutrition, draws on the resources of various departments of the Faculties of Agricultural and Food Sciences, Arts and Sciences, Medicine, and Health Sciences and provides opportunities for study and research in the general field of nutrition. The involvement of several faculties in this program provides the student with a wide range of choices and enables him or her to specialize in an area of nutrition such as basic nutrition, community

nutrition, clinical nutrition, nutritional biochemistry, or dietetic nutrition. The student may register in this program in any of the four Faculties concerned.

The program is administered by an Interfaculty Coordinating Committee and the Graduate Committees of the four Faculties concerned.

To be accepted into the program the student must:
1. Meet general University requirements for admission to graduate study;
2. Be recommended by the department concerned, and by the appropriate Faculty Graduate Committee and accepted by the Interfaculty Coordinating Committee.

Degree Requirements

Requirements for the M.S. degree in Nutrition consists of course work, research and writing a thesis.

Course Requirements

The following courses or their equivalent are required prerequisites:

FTNT 261 or Biol 220	Introductory Biochemistry	3cr.
FTNT 221	Basic Nutrition	3cr.
Physiology 246	Physiology for Nursing Degree Students and Undergraduates	5cr.

The following courses are required core courses:

FTNT 311	Advanced Nutrition: Macro Nutrients	3cr.
FTNT 314	Advanced Nutrition: Mineral Elements	2cr.
FTNT 315	Advanced Nutrition: Vitamins	3cr.
FTNT 306	Food and Nutrition Problems	3cr.

The required balance of credits is chosen from among the following general subject matter areas:

1. Biochemistry
2. Biology
3. Chemistry
4. Economics
5. Environmental Health
6. Food Technology
7. Microbiology
8. Nutrition
9. Physiology
10. Psychology
11. Sociology
12. Statistics

13. Epidemiology and Biostatistics
14. Other courses, as approved by the Coordinating Committee.

The course program followed by the student and the thesis that is undertaken will be selected in consultation with the Coordinating Committee and the department concerned depending on the student's background and interests.

INTERFACULTY GRADUATE NEUROSCIENCE PROGRAM

The interfaculty graduate program leading to the M.S. degree in neuroscience draws on the resources of the Faculty of Medicine, the Faculty of Engineering and Architecture, and the Faculty of Arts and Sciences, and is administered by the Neuroscience Coordinating Committee, in collaboration with Graduate Committees of the Faculties concerned.

Neuroscience is the study of the nervous system. The scientific disciplines which are considered to constitute the basic core of neuroscience include neuroanatomy, neurophysiology, neurobiophysics (including neurocommunication and such fields as cybernetics, bionics, and artificial intelligence), neurochemistry, neuropharmacology, neuropathology, and behavior. The faculties of several departments at the University contribute to the basic neuroscience program. These include the Medical School departments of Anesthesiology, Human Morphology, Internal Medicine, Pathology, and Physiology; the Faculty of Engineering and Architecture Department of Electrical Engineering; and the Faculty of Arts and Sciences Department of S.B.S. (Psychology).

To be accepted into the program, the student must be recommended by the department concerned and the appropriate Graduate Committee, and accepted by the Interfaculty Coordinating Committee. The course program followed by the student and the thesis that is undertaken will be selected on the basis of the student's background and interests.

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American University of Beirut
Campus Map

Beach

AVENUE DE PARIS (CORNICHE)

Sea Gate

Athletics

Gate

Engineering Alumni Hall

F2

Sea Parking

Changing and Gym

Biology

Agriculture

Engineering Stores and Labs

Faculty Gate

F3

Physics

GREEN FIELD

R

Corporation Yard

P

R

ACS

F4

ACS

Chemistry

R

R

Bechtel Engineering

R

R

Architecture

W4

Greenhouses

Tennis Courts

W2

W3

Observatory

Registrar

W1

Mary Dodge Hall

INTERNATIONAL COLLEGE

Jafet Library

Parking

Diana Tamari Sabbagh Building

Infirmary

Nicely Hall

Marquand House

College Hall

Van Dyck Hall

Bliss Hall

M1

West Hall

Fisk Hall

School of Buisness Mangement

Post Hall

Continuing Education Center

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Parking

Ada Dodge Hall

Main Gate

Assembly Hall

Old Pharmacy

Medical Gate

Building 56

BLISS STREET

Jessup Hall

Saab Medical Libary

Dale Home

Periphery Gate

F1

Alumni Club

Medical Center