

That they may have life and have it more abundantly

CATALOGUE

1997-1998



AMERICAN UNIVERSITY OF BEIRUT



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1997-98
CATALOGUE

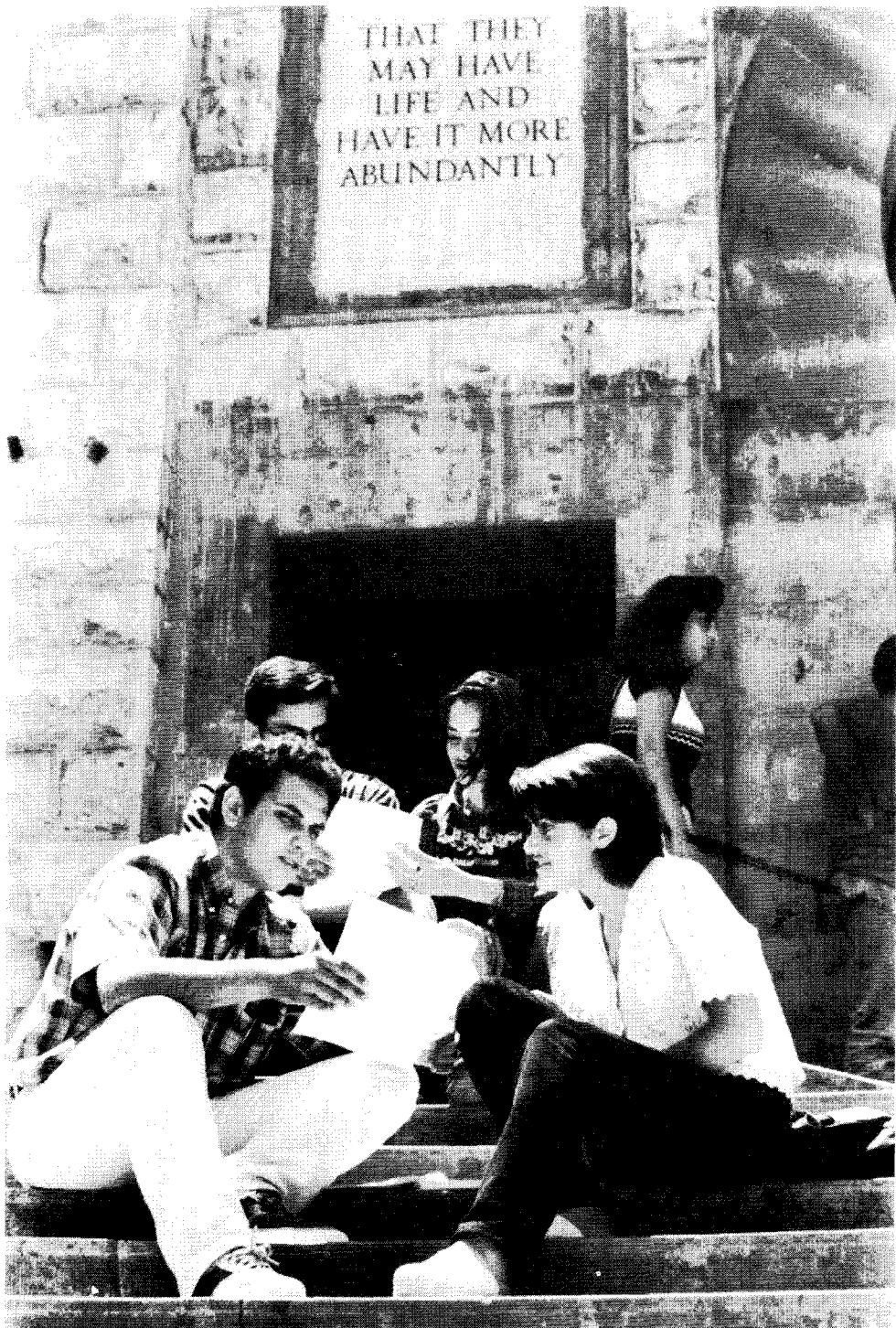
Address all correspondence regarding admission to:

**The Registrar
American University of Beirut
Beirut
Lebanon**

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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UNIVERSITY CALENDAR ACADEMIC YEAR 1997-98

1997

June	12	Thurs		Registration and payment of fees for Medicine III and IV.
June	16	Mon		Clerkships begin for Medicine III and IV.
August	27	Wed		Registration and payment of fees for Medicine I & II.
Sept	1	Mon		Classes begin for Medicine II.
Sept	8	Mon		Classes begin for Medicine I.
Sept	22-25			Pre-registration for new students in all Faculties and DEP except Medicine.
Sept	25-26			Advising (without course confirmation)
Sept	29, 30, Oct 1-3			First Semester on-line registration begins for all Faculties and DEP except Medicine.
Oct	1-4, 6			Payment of fees for First Semester
Oct	6	Mon	8:00 a.m.	First Semester begins for all Faculties and DEP except Medicine.
Nov	1	Sat		All Saints' Day, holiday.
Nov	22	Sat		Independence Day, holiday.
Dec	3	Wed		Founder's Day.
Dec	23	Tues	10:00 p.m.	Christmas Vacation begins.

1998

Jan	4	Sun	10:00 p.m.	Christmas Vacation ends.
Jan	12-16			Second Semester advising for current students.
Jan	19-23			Second Semester on-line course registration for current students.
Jan	27	Tues	8:00 a.m.	Reading Period begins.
Jan	28,29,30 ***			Id al-Fitr, holiday
Feb	2	Mon	10:00 p.m.	Reading Period ends.
Feb	3	Tues	8:00 a.m.	First Semester Examinations begin.
Feb	9	Mon		St. Maroun's Day, holiday.
Feb	10-12			Second Semester pre-registration and on-line registration for new students.
Feb	14	Sat	10:00 p.m.	First Semester ends for all Faculties and DEP except Medicine.
Feb	13-14, 16-18			Payment of fees for Second Semester.

Feb	23	Mon	8:00 a.m.	Second Semester begins for all Faculties and DEP except Medicine.
April	6-7 ***	Mon, Tues		Al-Adha, holiday.
April	9	Thur	10:00 p.m.	Latin Easter vacation begins.
April	13	Mon	10:00 p.m.	Latin Easter vacation ends.
April	16	Thur	10:00 p.m.	Greek Orthodox Easter vacation begins.
April	20	Mon	10:10 p.m.	Greek Orthodox Easter vacation ends.
April	27 ***	Mon		Hijra New Year, holiday.
May	1	Fri		Labor Day, holiday.
May	6	Wed		Martyrs' Day, holiday.
May	6 ***	Wed		Ashoura, holiday.
May	11-15			Advising for current students for Summer 1997.
May	18-21			On-line registration for current students for Summer 1998.
May	22	Fri		Classes end for Medicine II.
May	25-29			Advising for current students for First Semester 1998-99.
June	1-5			On-line registration for current students for First Semester 1998-99.
June	14	Sun		Clerkships end for Medicine III and IV.
June	15	Mon	8:00 a.m.	Reading Period begins.
June	16-18			Pre-registration and on-line registration for new students for Summer 1998.
June	18	Thur	10:00 p.m.	Reading Period ends
June	19	Fri	8:00 a.m.	Second Semester Examinations begin.
June	30	Tues	10:00 p.m.	Second Semester ends for all Faculties and DEP except Medicine.
June	30	Tues		Classes end for Medicine I.
July	1-3			Payment of fees for Summer 1998.
July	15	Wed		Commencement Exercises.

continued on next page

SUMMER SESSION 1998

July	7	Tues	7.30 a.m.	Classes begin for all Faculties and DEP except Medicine.
July	6 ***	Mon		Prophet's Birthday, holiday.
Aug	15	Sat		Assumption Day, holiday.
Aug	26 - Sept 1			Reading Period and Final Examinations for all Faculties and DEP except Medicine and Agricultural & Food Sciences.
Sept	2-9			Reading Period & Final Examinations for the Faculty of Agricultural & Food Sciences.

* 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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Mrs. Allison Halaby ¹⁰	

¹ Until June 30, 1996.

² As of March 15, 1996.

³ As of March 15, 1996.

⁴ Deceased July 12, 1996.

⁵ Until December 19, 1996.

⁶ Deceased June 11, 1996.

⁷ Deceased April 23, 1996.

⁸ Deceased December 15, 1996.

⁹ Deceased January 1, 1997.

¹⁰ Deceased June 17, 1996.

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William F. Rice, Master of Letters, Vice President³
Makhluf J. Haddadin, Ph.D., Vice President for Academic Affairs
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William P. Van Arsdale, M.Ed., Vice President for Finance⁴
Colette M. Pollitt, M.A., Assistant to the President

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Leila Badre, Doctorat 3^e Cycle, Curator of the University Museum
Edward Mazloum, B.A., Associate Registrar
Fouad Salibi, B.A., Assistant Registrar⁵
Sobhi Renno, B.A., Assistant Registrar
Helen Bikhazi, B.A., A.L.A., University Librarian

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Shehadeh Abboud, M.A., Assistant to the Vice President

¹ As of December 20, 1996

² Until December 19, 1996

³ Until June 30, 1996

⁴ Until January 3, 1997

⁵ Until February 21, 1997

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 Nabil Bukhalid, B.Sc.EE., Manager, PC Support Unit
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 Nazih Zeidan, M.A., Director of Development (Beirut) and Assistant to the President for
 Alumni Affairs

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 Raif E. Nassif, M.D., Director of the University Medical Center¹⁰
 Dieter Kuntz, M.H.A., Hospital Director¹¹

⁶ As of January 13, 1997

⁷ As of January 1, 1997

⁸ As of January 17, 1997

⁹ As of August 1, 1996

¹⁰ Until September 30, 1996

¹¹ As of October 1, 1996

ADMINISTRATION

Mounir Obeid , M.D., Acting Chief of Staff
Ghosn Ghosn, B.A., Assistant Hospital Director¹²
Marina El-Hajj, M.D., M.B.A., Assistant Hospital Director
Saydih Muallem-Nassar, M.P.H., Assistant Hospital Director
Gladys Mouro, B.S., Assistant Hospital Director, Director of Nursing
Ghassan Hamadeh, M.D., Director, University Health Service

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Frederick W. Heineken, Ph.D., Associate Dean
Kassim Shaaban, Ph.D., Assistant Dean

FACULTY OF MEDICINE

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Joseph A. Simaan, M.D., Associate Dean
Nadim Cortas, M.D., Associate Dean for Research and Development
Selwa Makarem, R.N., Ed.D., Director of the School of Nursing

FACULTY OF ENGINEERING AND ARCHITECTURE

Nassir H. Sabah, Ph.D., Dean
Albert Kuran, M.E., Associate Dean
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FACULTY OF AGRICULTURAL AND FOOD SCIENCES

Nuhad Daghir, Ph.D., Dean¹³
Raja Tannous, Ph.D., Acting Dean¹⁴
Mohammad Farran, Ph.D., Director of AREC

FACULTY OF HEALTH SCIENCES

Makhluf J. Haddadin, Ph.D., Acting Dean

¹² Until December 31, 1996

¹³ As of August 12, 1996

¹⁴ Until August 11, 1996

DIVISION OF EDUCATION PROGRAMS

Makhluf J. Haddadin, Ph.D., Vice President for Academic Affairs
Munir Bashshur, Ph.D., Director

OFFICE OF STUDENT AFFAIRS

Fawzi M. Hajj, Ph.D., Dean
Salma Dabbagh, M.A., Assistant Dean for Women
Ghaleb Halimi, M.S., Director of Athletics

OFFICE OF INFORMATION

Ibrahim Khoury, B.A., Director of Information



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 which 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.

INTRODUCTION

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

INTRODUCTION

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
Acting President	Mr. David S. Dodge	1996-

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 1996, the total number of Degrees, Diplomas and Certificates awarded since June 1870 totaled 58,242.

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 the Saab Memorial Medical Library, and Jafet Memorial Library as the central libraries, with 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 59.6% increase in student reading room areas, and 151% increase in stack/storage areas. Building works were completed in the summer of 1996. The first phase of library automation was implemented in April 1997, and full automation is envisaged for the near future.

The central library with its branches have over 460,436 volumes and 1,401 manuscripts, with 2,841 subscriptions to periodicals, of which about 266 are in Arabic. There are also nearly 920,000 audiovisual items of all kinds. The Archives and Special Collections Department of the Library includes 10,349 volumes of theses, projects and dissertations, 9,100 photographs and 1,415 posters and 1,510 maps.

The Saab Memorial Medical Library 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 66,000 backfile periodical volumes, nearly 37,000 books plus over 2,000 of historical value (such

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as Auicenna's *Books of Cannon* published in 1593), and nearly 2,000 audio-visual items, including computer software. There are seven CD-ROM based databases, of which the Medline CD-ROM is on the network. The Library has been fully automated since 1990 using Data Trek, Inc. 'Manager Series.' The Library has been connected on-line to DIALOG (Knight-Rider) since 1985.

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**, in Post Hall, brings together distinctively Near Eastern archeological collections, which are arranged with a view to their educational use for students and scholars in the archaeology of the Near East. The **GEOLOGICAL MUSEUM** is housed on the upper floor.

The **BIOLOGICAL COLLECTION** is housed in the Biology Department. It includes collections of birds, reptiles and other animals. 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 of the SPC.

The **UNIVERSITY COMPUTER CENTER** is equipped with two IBM mainframes (ES9000 and 4381) running VM/ESA and VSE/ESA operating systems. In addition it has a number of PC-based servers running Novell Netware, NT and AIX. Academic and administrative users access these systems either through dedicated terminals or PC workstations on their Local Area Networks. The mainframes are used for administrative functions, registration, course instruction and research. Various programming languages and statistical packages are available on these systems.

The Computer Center operates a Computer Laboratory with forty networked PCs. This Laboratory is used for course instruction by the various departments and for personal use by 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 Computer Center is dedicated to the administrative, financial and medical operation of the Hospital. It operates an IBM AS/400 advanced S36 with terminals spread throughout the Hospital. A gateway connects the hospital system to the campus network.

The **MEDICAL CENTER**, containing 421 beds, was opened in 1970. More than 153,595 patients per year are cared for in the Hospital and its related Outpatient Clinics and Emergency Room. A medical staff of 231 highly qualified physicians, assisted by 1,577 professional and auxiliary personnel and aided by the latest scientific equipment, provides a broad spectrum of health care. The Hospital is the major teaching facility of the Faculty of Medicine and the Faculty of Health Sciences.

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 33 of this catalogue.

Attendance Requirements

In accordance with the charter which 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 60 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 Registrar 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 1997.

CANDIDATE'S FOLDER

For purposes of admission and selection, a special folder for every candidate is kept in the Admissions Section of the Office of the Registrar. 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.
- 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 the Registrar.**
- 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 1998-1999 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 chart below.

Deadlines for receiving applications for admission

For admission to the:	Undergraduate Study	Graduate Study
Second Semester of the academic year 1997-1998	November 28, 1997	January 5, 1998
First Semester of the academic year 1998-1999	March 2, 1998	May 29, 1998
Second Semester of the academic year 1998-1999	November 27, 1998	January 5, 1999

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

Mailing address: Office of the Registrar
 American University of Beirut
 Beirut, Lebanon
 E-Mail address: registrar@aub.edu.lb
 Fax number: 00961-1-744469
 Telex: AMUNOB 20801 LE

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

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

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 and who do not register for that semester, are eligible for admission to the Second Semester provided they fulfill all their admission requirements (meet the English Language Proficiency Requirement, pass the entrance examinations, obtain the required certificates, etc.) and provided they inform the Office of the Registrar, in writing, at a date not later than November 28, 1997. Such applicants are eligible for admission to the Second Semester to the Faculty of Engineering and Architecture or to the Faculty of Health Sciences as 'Special Students,' taking non-engineering or non-Health Science courses.

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 not apply to more than two faculties. Applicants for admission to the Division of Education Programs may not apply to more than one faculty.

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. **Once the application is submitted to the Office of the Registrar, no additions, deletions, or substitutions are allowed.**

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.

The Application for Undergraduate Study Booklet contains three application forms. If an applicant applies to one Faculty, two application forms should be *identically* filled. If the applicant applies to two Faculties, three application forms should be *identically* filled.

For further information, see the instructions on the covers of the Application Booklet.

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

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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 the Registrar is responsible for the administration of the admissions policy and all correspondence pertaining to admission.

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 Registrar as special part-time students. 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.

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 the Registrar within the deadlines specified in the chart on page 30 of this Catalogue. Upon request, the Admissions Section of the Office of the Registrar will send the applicant the necessary application forms which must be completed and returned with the documents required enclosed. Applicants will be notified of the decisions of the Admissions Committees shortly after these decisions are made.

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 the Registrar within the following deadlines: the end of February for students

applying for readmission for the First Semester; the end of November for students seeking readmission for the Second Semester; and June 1 for students seeking readmission for the Summer Session. Graduate students seeking readmission should consult the section on “Graduate Study” at the end of this Catalogue (page 463).

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 (see page 35).
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 attain a cumulative average of 70 or more at the end of the semester while on strict probation.

B. The English Language Proficiency Requirement (ELPR)

Candidates 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, and 550 for applicants to graduate study. This examination is given several times per year at the University. The Office of Tests and Measurements, American University of Beirut, Beirut, Lebanon, will provide information on the schedules of examinations that are given by the University and will send, upon request, a copy of the test syllabus and a sample test.
- By achieving 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, and 600 for applicants to graduate study on the Test of English as a Foreign Language (TOEFL) (institutional TOEFL scores are not accepted for consideration for admission to the AUB), or by taking the English test of the American College Testing Program (ACT), or the Verbal Reasoning part of the Scholastic Assessment Test (SAT I) of the Admissions Testing Program (ATP), or the English Composition Test of the ATP. The Educational Testing Service, Princeton, NJ 08540, USA, will upon request provide information and application forms relating to TOEFL and ATP. 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 the Registrar at this University. For tests that are administered by the ETS the institution Code Number of the AUB is: **0902**. A minimum score of 20 on the English test of the ACT, or 500 on the recentered

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scale of the Verbal Reasoning part of the SAT I, reflects a satisfactory level of English proficiency.

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 1997.

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

Applicants to the graduate program, other than AUB graduates, must also meet the English Language Proficiency Requirement.

Newly accepted applicants who have met the English Language Proficiency Requirement must take the English Placement Test as specified on page 35.

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 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 455 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 or to the Faculty of Health Sciences.

2. *The English Placement Test (EPT)*

The English Placement Test is required of all newly accepted applicants at the undergraduate level. 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 by scoring at least 450 on the EEE or at least 525 on the TOEFL 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 by obtaining a score of at least 500 on the EEE or at least 575 on the TOEFL 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, or to the Faculty of Health Sciences. 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 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 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 such 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)**

Applicants for admission to undergraduate study at the American University of Beirut are advised that the University no longer requires applicants to take the Scientific Quantitative General Tests (SQ) or the SAT II (subject tests).

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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 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 1995-1996 will still be valid for the purpose of admission to any semester of the academic year 1997-1998 but will not be valid for admission to any semester of the academic year 1998-1999 or subsequent years.

SAT I scores 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 <u>not</u> have been taken earlier than the:
Second Semester of the academic year 1997-1998	November 1997 testing session	October 1995 testing session
First Semester of the academic year 1998-1999	January 1998 testing session	October 1996 testing session
Second Semester of the academic year 1998-1999	November 1998 testing session	October 1996 testing session

The Office of the Registrar will accept only SAT scores that are sent directly from the Educational Testing Service to the Office of the Registrar. Applicants for admission to the American University of Beirut should make sure, when registering for the SAT I, to enter in the appropriate place 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. **Lebanese applicants for admission to the Freshman Class** are required, by the Equivalence Committee of the Lebanese Ministry of Education, 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 39 of this Catalogue.

NOTE: Change of Nationality

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.

APPLICATIONS FOR ADMISSION TO GRADUATE STUDY

Applications for admission to graduate study should be submitted to the Admissions Section of the Office of the Registrar before May 29 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 sit for the EEE or the TOEFL. 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, Political Science, 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 their scores would be received by the Office of the Registrar 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.

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For detailed information regarding admission to graduate study, see the admission section in the chapter on “Graduate Study” at the end of this catalogue (page 463).

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 Registrar 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 33 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 (pages 432 and 457).

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. 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 36 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

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 to the Lebanese Baccalaureate Part II. 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:

<i>Subject</i>	Minimum Number of Credits per Subject	
	<i>Freshman Arts</i>	<i>Freshman Sciences</i>
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 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

ADMISSIONS

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 33 of this catalogue.

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 Professionel” (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 into 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). These tests must be taken within the deadlines that are indicated in the chart on page 36 of this Catalogue. **SAT scores for tests that are not taken within the set deadlines will not be accepted by the Admissions Committees.**

All applicants are reminded that they must meet the English Language Proficiency Requirement as spelled out on page 33 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 45-47 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

* Arts: 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.

ADMISSIONS

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, 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 36 and provided that they meet the English Language Proficiency Requirement (see page 33). 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 36.
- 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 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 35 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 33).

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 the Registrar, 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 orientation may be 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 36 and must meet the ELPR (see page 33).

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

SECONDARY SCHOOL CERTIFICATES AND THE CLASSES TO WHICH THEY ADMIT

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

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 36 and the English Language Proficiency Requirement must be met (see page 33). The abbreviations used in the chart are as follows:

Agric	= Agricultural and Food Sciences	Educ	= Education	Lang	= Language
Arab	= Arabic	Elect	= Elective	Lit	= Literature
Arch	= Architecture	Eng’g	= Engineering	Math	= Mathematics
Biol	= Biology	Engl	= English	Nurs	= Nursing
BusAdm	= Business Administration	Equiv	= Equivalent		= Petroleum Studies
Chem	= Chemistry	ExpSc	Experimental Sciences	PetStud	
CompSc	= Computer Science	Fresh	= Freshman	Phil	= Philosophy
Econ	= Economics	Geog	= Geography	Phys	= Physics
		Geol	= Geology	PolStud	= Political Studies
		HS	= Health Sciences	Socio	= Sociology
				Soph	= Sophomore
				Trig	= Trigonometry

CERTIFICATE, CLASS, AND EXAMINATION CHART

All endnotes that are indicated in the chart appear on page 47.

CERTIFICATE	CLASS AND DEPARTMENT TO WHICH THE CERTIFICATE ADMITS
<p>High School Diploma or Secondary School Leaving Certificate, based on at least twelve years of schooling starting with Elementary I Class.</p>	<ul style="list-style-type: none"> • Fresh Arts, Fresh Sciences, or Nurs I.
<p>Government Secondary Certificates (literary)</p> <p>Government Secondary Certificates (scientific)</p> <p>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 equivalent classes in the other faculties</p> <p style="padding-left: 40px;"><i>Literary</i></p> <p style="padding-left: 40px;"><i>Scientific</i></p>	<ul style="list-style-type: none"> • Fresh Arts, BusAdm, or Nurs I. • Fresh Sciences, Fresh Arts, or Nurs I. • Soph Arts,¹ BusAdm, Educ (BA Program), Nurs II,² or Graphic Design I. • Soph Sciences, Arts,¹ BusAdm, Educ (BA Program), Nurs II, Agric I, HS I, Eng'g I, Arch I, or Graphic Design I.
<p>Lebanese Baccalaureate, French Baccalaureate, German Abitur, and GCE (5 subjects: 3 at Ordinary level and 2 at Advanced).</p>	<ul style="list-style-type: none"> • 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.
<p>Lebanese or French Baccalaureate (Philo)</p>	<ul style="list-style-type: none"> • Soph Arts¹, BusAdm, Educ (BA Program), Nurs II,² or Graphic Design.
<p>Lebanese or French Baccalaureate (ExpSci or Math)</p>	<ul style="list-style-type: none"> • Soph Sciences, Arts¹, BusAdm, Educ (BA program), Agri I, HS I, Eng'g I, Arch I, Graphic Design I, or Nurs II.

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), Graphic Design, or Nurs II².

For those who followed the scientific track

- Soph Sciences, Soph Arts,¹ BusAdm, Educ, Graphic Design, or Nurs. II.
- Applicants to HS I and Agric 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 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.

Soph Sciences with Majors in:

Must take the following subjects at Advanced level:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Math and Biol • Math and Chem • Math and Phys • Math and Phys • Math and one from Biol, Chem, or Phys | <ul style="list-style-type: none"> • Biol • Chem • Phys • CompSci • Geol, Math, or PetStud |
|---|---|

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:

Any combination of 3 HL and 3 SL

- Fresh Arts, or Nurs I

3 HL including HL Math and at least one HL science and 3 SL

- Fresh Sciences, or Nurs I

For admission to the Sophomore and Equivalent Classes:

Any combination of 3 HL and 3 SL

Soph Arts,¹ BusAdm, Educ (BA Program), Graphic Design, or Nurs II²

Applicants to Soph Sciences and equivalent classes with major in:

Must take the following subjects at HL:

- Math and Biol
- Math and Chem
- Math and Phys
- Math and one from Biol, Chem, or Phys
- Math and Phys
- Math and Chem

- Biol
- Chem
- Phys
- Geol, Math, or PetStud
- Eng'g I, Arch I, or Graphic Design I
- Agric I, HS I, or Nurs II.

¹ Arts: Arabic Language or Literature, Archaeology, Economics, English Language, English Literature, History, Mathematics (B.A.), Philosophy, Political Studies, Public Administration, Psychology, and Sociology-Anthropology.

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

REMINDERS AND SUMMARY OF IMPORTANT REQUIREMENTS

- 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 34 and page 455.)
- All accepted applicants who meet the English Language Proficiency Requirement are required to take the English Placement Test (EPT) (see page 35).
- 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 SAT II.** (For more details see page 39.)
- 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 30. The Office of the Registrar 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 36. The Office of the Registrar 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, please write to, or call:

Office of the Registrar
American University of Beirut - Beirut, Lebanon
Tel: 350000 - 865250 - 340740 (Ext. 2570 or 2585)
Fax: 00961 1 744469
E-Mail: registrar@aub.edu.lb

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

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.

Faculty of Health Sciences

Medical Laboratory Technology	B.S.
Population Studies	M.S.

Programs

Faculty of Engineering and Architecture

Applied Energy
 Computer and Communications Eng.
 Engineering Management
 Environmental and Water Resources Eng.
 Electronics, Devices and Systems
 Electric Power Engineering
 Graphic Design
 Materials and Manufacturing
 Thermal and Fluid Science

Faculty of Agricultural and Food Sciences

Diploma of Ingénieur Agricole
 Soils and Mechanization

Interfaculty Programs

Environmental Sciences

Neuroscience
 Nutrition

Division of Education Programs

Diploma in Special Education
 Education
 Education/Elementary
 Teaching Diploma
 Diploma in Educational Management and Teaching

Degrees or Certificates

M. of Mechanical Eng'g
 B.E., M.E.
 M.E.M.
 M.E.
 M.E.
 M.E.
 B.G.D.
 M. of Mechanical Eng'g
 M. of Mechanical Eng'g

Diploma
 M.S.

M.S. (majors in:
 Ecosystem Management,
 Environmental Technology,
 and Environmental Health)
 M.S.
 M.S.

D.S.Ed.
 M.A.
 B.A.
 T.D.
 D.Ed.M.T.

REGISTRATION

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 add up to 108

Licence d'Enseignement

M.A., M.S., M.B.A.

Diplome d'Etude Supérieur

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 Registrar, are cleared at the Office of the Registrar. 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.

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 Records Section at the Office of 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 Haigazian, LAU 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 guide 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.

REGISTRATION

NATIONAL SOCIAL SECURITY FUND (NSSF) MEDICAL BRANCH

Membership in the NSSF is by law mandatory 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 (completed). 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 **اخراج 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 an 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 62 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 two full semesters 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** following 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.

REGISTRATION

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 30). 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 which 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:

- A) 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.

- B) 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.
- C) Information will be disclosed to parents of a dependent student.
- D) Information will be disclosed in compliance with a judicial order.
- E) 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

Students who graduate in October or February may attend the Commencement Exercises at the end of the academic year. However, students wishing to attend the Commencement Exercises should notify the Office of the Registrar of their decision by mid-June at the latest. Attendance of June graduates is mandatory.

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, 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 they wish to hold at any one of the various halls on campus designated for that purpose.

STUDENT HOUSING

Residence on Campus

There are seven student residence halls on Campus capable of accommodating around 1200 students—approximately half for women and half for men.

All have heating, hot water, showers, and the commonly expected furniture. Reception lounges are also available. Shower and toilet rooms are made to serve about 10 students per unit, except for the New Women's Dormitory, where each shower and toilet serves 4 students only.

Accommodation is made on the basis of two students per room. Occasionally, and if space is available, rooms in the residence halls may be used as private rooms.

Head Residents and Student Residence Hall Assistants are always available to help the students living in the Halls.

Students living on campus will be charged the housing fee for each term separately, along with the tuition and other fees. These charges will be shown on the Statement of Fees.

Compulsory On-Campus Living

New Freshman students whose parents do not reside in Beirut or its suburbs, are required to live, during their first year, in the University Residence Halls. Unless otherwise authorized in writing by the parents and approved by the Dean of Student Affairs, these students must fill in the Room Reservation Form and hand it to the Office of Student Affairs before the deadline.

Arrangements for On-Campus Housing

All arrangements for living on campus in the University Student Residence Halls should be made through the Office of Student Affairs.

New students are sent application forms together with their letters of provisional acceptance. These applications must be filled and returned to the Office of Student Affairs before September 1.

Current students, who wish to continue living on campus, should apply at the Office of Student Affairs before the end of June.

It must never be assumed by students that housing arrangements are made on their behalf; each student should handle such matters personally and make sure that proper action is taken.

Based on the foregoing paragraphs on “Student Housing” the University wishes to make clear the following points:

1. The University offers housing to students as a service not as an obligation; therefore it is bound only to the extent of the service it offers.
2. The University, once it admits a student to its residence halls, is not responsible for providing housing for longer than one year for that student. Students wishing to continue living in the dorms should apply at the end of each academic year.
3. Students wishing to reside on Campus for the Spring Semester and/or Summer Session will be accommodated subject to the availability of places.

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 4.30 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.

FEES AND EXPENSES (1997-98)

The American University of Beirut is a non-profit institution. The charge to students is kept at the minimum consistent with 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 the announced deadline. Under special circumstances, late registration will be permitted during a period of *no more than five days after the announced deadline*, but subject to a late registration fee of LL 100,000.
3. Students able to demonstrate financial need may make formal application for deferred payment arrangements **for tuition fees only** to the Office of the Comptroller by the announced deadline. 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 DEP.**
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 late registration fee of LL 100,000, together with a monthly late payment fee. All the above arrangements must be concluded by the announced deadlines.

6. Every student granted deferred payment arrangements must sign a statement indicating his/her understanding that failure to complete payment by the set deadline will result 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 1997-98	Second Semester 1997-98	Summer 1998
HUMANITIES AND SOCIAL SCIENCES			
Undergraduate and special students			
12 or more credits per semester	4,769,900	4,769,900	
Less than 12 credits per semester or summer session (per credit)	396,500	396,500	396,500
Graduate (per credit)	504,000	504,000	504,000
SCIENCES			
Undergraduate and special students			
12 or more credits per semester	5,052,900	5,052,900	
Less than 12 credits per semester or summer session (per credit)	427,200	427,200	427,200
Graduate (per credit)	522,500	522,500	522,500
BUSINESS AND MANAGEMENT; INSTITUTE OF MONEY & BANKING			
Undergraduate and special students			
12 or more credits per semester	5,817,100	5,817,100	
Less than 12 credits per semester or summer session (per credit)	484,100	484,100	484,100
Graduate (per credit)	545,600	545,600	545,600

FEES & EXPENSES

FACULTY OF AGRICULTURAL AND FOOD SCIENCES

	<i>Tuition Fees in Lebanese Pounds</i>		
	First Semester 1997-98	Second Semester 1997-98	Summer 1998
Undergraduate and special students			
12 or more credits per semester	5,871,200	5,871,200	
Less than 12 credits per semester or summer session (per credit)	491,800	491,800	491,800
Graduate (per credit)	599,400	599,400	599,400

FACULTY OF ENGINEERING AND ARCHITECTURE

	<i>Tuition Fees in Lebanese Pounds</i>		
	First Semester 1997-98	Second Semester 1997-98	Summer 1998
Undergraduate and special students			
12 or more credits per semester	6,498,700	6,498,700	
Less than 12 credits per semester or summer session (per credit)	545,600	545,600	545,600
Summer Training			922,000
Graduate (per credit)	630,200	630,200	630,200

FACULTY OF MEDICINE

	<i>Tuition Fees in Lebanese Pounds</i>		
	First Semester 1997-98	Second Semester 1997-98	Summer 1998
M.D. Program			
First Year through Fourth Year	11,372,400	11,372,400	
First Year: Microscope Fee (per year)	639,900		
Graduate (per credit)	634,600	634,600	634,600

SCHOOL OF NURSING

	<i>Tuition Fees in Lebanese Pounds</i>		
	First Semester 1997-98	Second Semester 1997-98	Summer 1998
BSN Program			
12 or more credits per semester	4,700,100	4,700,100	
Less than 12 credits per semester or summer session (per credit)	430,200	430,200	430,200

MEDICAL CENTER

	<i>Tuition Fees in Lebanese Pounds</i>	
	First Semester 1997-98	Second Semester 1997-98
X-ray technician training (First Year only)	934,900	934,900

FACULTY OF HEALTH SCIENCES

	<i>Tuition Fees in Lebanese Pounds</i>		
	First Semester 1997-98	Second Semester 1997-98	Summer 1998
Undergraduate and special students			
12 or more credits per semester	6,268,200	6,268,200	
Less than 12 credit per semester or summer session (per credit)	522,500	522,500	522,500
Summer Program			917,900
Graduate			
M.S. Program per credit	614,800	614,800	614,800
MPH Program:			
Full-time students	8,173,400	8,173,400	
Part-time students (per credit)	614,800	614,800	614,800

DIVISION OF EDUCATION

	<i>Tuition Fees in Lebanese Pounds</i>		
	First Semester 1997-98	Second Semester 1997-98	Summer 1998
Undergraduate and special students			
12 or more credits per semester	4,769,900	4,769,900	
Less than 12 credits per semester or summer session (per credit)	396,500	396,500	396,500
Graduate (per credit)	504,000	504,000	504,000
University Orientation Program	5,414,400	5,414,400	2,965,900

AUDITORS

The fee for auditors, in all faculties, per credit, is LL 261,300.

FEES & EXPENSES

RESIDENCE FEES FOR STUDENTS REGISTERED FOR THESIS OR DISSERTATION

	<i>Tuition Fees in Lebanese Pounds</i>	
	AUB Students ¹	Non-AUB Students ²
Humanities & Social Sciences	3,630,700	3,976,600
Sciences	3,803,500	4,149,400
Business & Management; Money & Banking	3,976,600	4,322,300
Education	3,630,700	3,976,600
Agricultural & Food Sciences	4,322,300	4,840,900
Engineering	4,495,100	5,013,900
Medical Sciences	5,668,000	5,186,700
Health Sciences	4,495,100	5,013,900

¹ 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.

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	
4. Aptitude Test	20,000	

General Deposit Fee

A general deposit of LL 250,000 is required of every student on their initial enrollment 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

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 1997-98, for one semester, per student, is:

for a regular double occupancy room:	LL 1,397,200
for a semi-private double occupancy room:	LL 1,621,500

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 2,912,000 to LL 3,248,000 depending upon the individual student's needs.

Incidental Expenses

The estimate of incidental expenses for books, stationery, supplies, and laundry ranges from LL 1,904,000 to LL 2,688,000 per academic year, depending on the course for which the student registers. Expenses for travel, clothing, and pocket money are left to parental discretion.

FEES & EXPENSES

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 1,669,000 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 at a later date. 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, merit scholarships, graduate assistantships and student work scholarships. 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.

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 and the student's qualifications will be the final determining factors.

Merit Scholarships

A limited number of merit scholarships is offered to newly admitted undergraduate students in Arts and Sciences, Engineering and Architecture, Agricultural and Food Sciences, Health Sciences, Nursing and Education. These scholarships cover full tuition for the first academic year and are based on outstanding academic records of the applicants.

Graduate Assistantships

For students on the graduate level there are fellowships which 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.

Student Work Scholarship

Opportunities are available for students to work in the various campus offices. 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.

APPLICATIONS

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

FINANCIAL AID

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 A. Agha Scholarship
Ain El-Murayseh and Mina' El-Husn Womens Association 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
Sâm Andrews' Sons Scholarship
Anonymous Scholarship
Arabia Insurance Company Scholarship
Arabian Mining Habre & Co. Scholarship
J.J. Arakelyan Scholarship Fund
Aramex Scholarship
AREC '78 and Friends Scholarship
AREEN Projects Scholarship Fund
Joseph Asmar Scholarship
Khalid and Alfida Ataya Scholarship
AUB Alumni Association of Australia
AUB Alumni Association—Greece Branch Scholarship
AUB Alumni Association—UK Branch Scholarship
AUB Alumni Development Scholarship
AUB Alumni in Geneva Scholarship
AUB Alumni at National Petroleum Construction Company (N.P.C.C.), Abu Dhabi

The Fawzi Azar Scholarship (Makassed Philanthropic Islamic Association)
 Azm and Saadeh Foundation
 Mary Bajada Memorial Scholarship Fund
 Lucy M. Baghal Memorial Scholarship
 Abdul Aziz Al Bahar Scholarship
 Fuad and Madelene Bardawil Scholarship
 Wafic Barrage Scholarship
 Bassatne Petroleum Company Scholarship
 Eisa A. Bateh and Bros. Scholarship
 Anis Abdul Hamid Bibi Memorial 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
 British Bank Foundation Scholarship
 Khalil Bsheer Memorial Scholarship
 Centennial Scholarship Fund
 Anwar Challah Scholarship
 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
 Mohamad Omar Daouk Scholarship
 Dr. Nadim Fawzi Daouk Scholarship
 Zouheir Chafik Daouk Memorial Scholarship
 Adnan Derbas Scholarship
 Vivian Demirjian Scholarship
 Deputy President Discretionary Fund
 Office of Development Scholarship
 Badr Dimechkie Scholarship
 Julia Tomey Dimechkie Scholarship
 Dr. Harry G. Dorman Scholarship
 Douma Ladies' Charitable Society of Boston, Massachusetts Scholarship

FINANCIAL AID

Scholarships to Economics Students
Harold Morton Esty Memorial Fund
Aznive Etinoff Memorial Scholarship
Naheda Al Fadel Scholarship
Muneef Assaf Farah Scholarship
Suhayl Assaf Farah Scholarship
George F. Faris Memorial Scholarship
Nabih Faris Scholarship Fund
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
George H. Haddad Scholarship
Mrs. Salma Haddadin Scholarship
Hagggar Foundation Scholarship
Isam Hage-Ali 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
H.T.F. Scholarship Fund Montreal
Akram Abdul-Mohsen Hijazi Scholarship
Badre Hijazi Scholarship
Philip and Mary Hitti Scholarship
Harold B. Hoskins Scholarship
Albert Hourani Memorial 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
Sakina Jarudi Scholarship
Yervant Jidejian Memorial Scholarship
Mr. and Mrs. Mustafa Jundi Scholarship Fund

Jamilee Dagher Jureidini Scholarship
 Issam Kabbany 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
 Samir and Salwah Khoury Scholarship
 Marie Al-Khoury Scholarship Fund
 Samuel B. and Grace H. Kirkwood Scholarship Fund
 Ramzi N. Kteily Scholarship
 Sadie B. Latouf Scholarship Fund
 Pauline Nadim Makdisi Memorial Scholarship
 Peter Hanna Malak Scholarship
 Farah Maloof Medical Scholarship
 Faris S. Maloof Memorial Scholarship
 Michel Najem Maloof Scholarship
 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 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
 Dr. Akef Al-Moghrabi Scholarship
 Tewfic Pasha Moufarrige Memorial Scholarship
 Al-Moghtareb Bank Scholarship
 Ardemis Diane Mouneimne Scholarship

FINANCIAL AID

Nada Suheil Muasher Endowed Scholarship
Sami Mubarak Scholarship
Raef Murtada Scholarship
Faysal Al-Mutaweh Scholarship
Dean Robert E. Najemy Memorial Scholarship
Fuad Nakhleh Scholarship
Anis W. Nassar Scholarship
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
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
Hazimeh S. Rasi Scholarship
Julia Dodge Rea Scholarship Fund
Abdullah Rishani Memorial Transportation Fellowship
Dorothy H. Rogers Memorial Scholarship
Farid Sa'd Graduate Scholarship in Sciences or Technology
Zahieh Tawfik Al-Sadek Memorial 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
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. Shammash 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
 Maurice Tabry Scholarship
 Fadwa Nassif Taleb Scholarship
 May Halabi Taleb Scholarship
 Farouk Tamr Scholarship
 Dr. Nizar Tannir Scholarship
 Khalil Thabet Memorial Scholarship
 Dr. Kaiser Tomeh Memorial Scholarship
 Dr. Fuad and Alice Trabulsi Endowment Scholarship
 Sleyman and Sobhia Trabulsi Scholarship
 Makram Ghassan Tuani Scholarship Fund
 Shafik and Mary Tumeih Endowment Scholarship
 H.R.H. Prince Turki Bin Abdel Aziz Scholarship
 Sheikh Saleh Turki Scholarship
 U.A.E. Alumni Scholarship
 U.S. Omen Scholarship
 Gordon H. Ward Scholarship
 Dr. Samuel E. White (Waheed) Scholarship
 C.R. Whittlesey Memorial Scholarship
 Dr. Joseph Yammine Family 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
 Constantine Zurayk Scholarship

Scholarship Loans

AUB Physicians Loan Fund
 Maria Aziz Loan Fund
 Dorothy Berry Loan Fund

FINANCIAL AID

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
Anees and Mima Malouf 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
Al-Shark Hospital Social Club
Southern California Chapter of AANA
Student Aid Loan Fund
Student Council Loan
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."

Aramex Prize: Two awards, one to the student with the highest grade point average in all Business courses and one to the student who has attained the highest grade point average in all accounting courses.

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.

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.

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.

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

Sinan Kaysi Farran Award: Annual award of \$300 to a student who has completed a thesis in Animal Sciences judged to be excellent in the aspects of research quality, presentation and publishability.

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

FINANCIAL AID

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.

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 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 student 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 sponsor.

The BSO, as liaison between AUB and bursary sponsors, coordinates and distributes all information necessary for implementation of instructions and actions regarding bursary students.

FINANCIAL AID

In addition, the BSO represents the student's sponsor on campus and acts as guardian to the sponsored student, as well as a liaison between the student and his sponsor.

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.

Such candidates are requested to submit their applications along with a sponsorship letter from their sponsors, 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.



Faculty of Arts and Sciences



FACULTY OF ARTS AND SCIENCES

FACULTY LIST 1996-97

Officers of the Faculty

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President
Samir A. Makdisi	Deputy President
Lutfy N. Diab	Dean of the Faculty
Frederick W. Heineken	Associate Dean
Kassim Shaaban	Assistant Dean
Rudolph Jabbour	Executive Officer
Leila Knio	Student Record Officer
Robert Betts	Secretary of the Faculty

Ex-Officio Members

Waddah Nasr	Registrar
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
Babikian, Levon, Ph.D., University of Wisconsin; Biology
Beydoun, Ziyad, Ph.D., Oxford University; Geology
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
Zeine, Zeine, Ph.D., University of London; History and Archaeology
Ziadeh, Nicola, Ph.D., University of London; History and Archaeology
Zurayk, Costi, Ph.D., Princeton University; History and Archaeology

¹ Until December 19, 1996.

² As of December 20, 1996.

Professors

- Abi Khuzam, Faruk, Ph.D., University of Cambridge; Mathematics
Baalbaki, Ramzi, Ph.D., University of London; Arabic
Baydoun, Elias, Ph.D., University of Cambridge; Biology
Dajani, Nabil, Ph.D., University of Iowa; Social and Behavioral Sciences
Diab, Lutfy, Ph.D., University of Oklahoma; 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
Heineken, Frederick, Ph.D., University of Amsterdam; Physics
Iskandar, Adnan, Ph.D., American University, Washington; Political Studies and Public Administration
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
Salibi, Kamal, Ph.D., University of London; History and Archaeology
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

Visiting Professor

Nazer, Musa, Ph.D., Harvard University; Chemistry

Associate Professors

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
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
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

* On tenure appointment

- Khashan, Hilal, Ph.D., Florida State University; Political Studies and Public Administration
- Khazen, Farid, Ph.D., Johns Hopkins University; Political Studies and Public Administration
- Kisirwani, Marun, Ph.D., Indiana University; Political Studies and Public Administration
- 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
- 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., Tübingen University; History and Archaeology
- 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
- Sultan, Rabih, Ph.D., University of Indiana; Chemistry

Visiting Associate Professor

Butcher, Kevin, Ph.D., University of London; History and Archaeology

Adjunct Associate Professor

Najjar, George, Ph.D., University of Southern California; adjuncted to the University of Bahrain

Assistant Professors

Abdallah, Hanin, Ph.D., University of Virginia; Business and Management

Abdel-Rahman, Abdel-Fattah, Ph.D., McGill University; Geology

Abou-Ezze, Pierre, Ph.D., McMaster University; Business and Management

Abu-Salih, Abbas, Ph.D., Texas at Austin; Civilization Sequence Program

Agha, Saleh S., Ph.D., University of Toronto; Arabic

Alami, Tarek, Ph.D., The American University, Washington DC; Economics

Al-Harithy, Howyda, Ph.D., Harvard University; Civilization Sequence Program

Al-Kassab, Tala'at, Ph.D., University of Gttingen; Physics

Andary, Saad, Ph.D., Aberdeen University; Money and Banking

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

◦ On furlough or leave

- Baalbaki, Imad, Ph.D., Georgia Institute of Technology; Business and Management
Bassin, Jatinder, Ph.D., Hatfield Polytechnic; Chemistry
Bornedal, Peter, Ph.D., University of Copenhagen; Civilization Sequence Program
Chehab, Samir, Ph.D., University of Ottawa; Physics
Dadoyan, Seeta, Ph.D., University of Yeravan; Civilization Sequence Program
Darwiche, Adnan, Ph.D., Stanford University; Mathematics
Diab, Hassan, Ph.D., Syracuse University; Social and Behavioral Sciences and
Civilization Sequence Program
El-Cheikh, Nadia, Ph.D., Harvard University; History and Archaeology
Fahed, Nabil, Ph.D., George Washington University; Business and Management
Gali-Muhtasib, Hala, Ph.D., Kansas State University; Biology
Ghaleb, Mary, Ph.D., University of Texas; English
Ghaziri, Hassan, Ph.D., Ecole Polytechnique Lausanne; Business and Management
Haddad, John, Ph.D., University of Waterloo; Mathematics
Harakeh, Hani, Ph.D., AUB; Biology
Haydar, Bashshar, Ph.D., Columbia University; Philosophy
Imam, Abdulrazaq, Ph.D., University of West Virginia; Social and Behavioral Sciences
Jabir, Imad, Ph.D., Oklahoma State University; Economics
Jalloul, Ghinwa, Ph.D., University of Sydney; Mathematics
Jarrar, Maher, Ph.D., University of Tubingen; Arabic
Kassab, Elizabeth, Ph.D., University of Fribourg; Philosophy
Khair, Kamal, Ph.D., Geological Prospecting Institute, Moscow; Geology
Khairallah, Shereen, Ph.D., University of London; Civilization Sequence Program
◦ Klushin, Leonid, Ph.D., University of Leningrad; Physics
Knio, Khouzama, Ph.D., University of California, Riverside; Biology
Krayem, Hassan, Ph.D., University of Southern California; Political Studies and Public
Administration
Kuraydiyyah, Sawsan, Ph.D., AUB; Biology
Melhem, Randa, Ph.D., Purdue University; Biology
Nabti, Patricia, Ph.D., University of California; Social and Behavioral Sciences
Nahle, Ayssar, Ph.D., University of Southampton; Chemistry
Nasr, Sonia, Ph.D., Purdue University; Biology
Nasri, Ahmad, Ph.D., University of East Anglia; Mathematics
◦ Naud, Darren, Ph.D., New Mexico Institute of Mining and Technology; Chemistry
Neaime, Simon, Ph.D., University of York; Money and Banking and Economics
Precious, James Loyd, Ph.D., University of Heidelberg; English
Sadek, Riyad, Ph.D., Manchester University; Biology
Safieh-Garabedian, Bared, Ph.D., University of London; Biology
Saumarez Smith, Richard, Ph.D., Cambridge University; Civilization Sequence Program
Shayya, Bassam, Ph.D., University of Wisconsin; Mathematics
Sleiman, Hanadi, Ph.D., Stanford University; Chemistry
Spencer, Sara, Ph.D., University of London; Geology
Talhok, Rabih, Ph.D., Ohio State University; Biology
Tarraf, Charbel, Ph.D., University of Virginia; Biology

◦ On furlough or leave.

Van Ophuijsen, Johannes, Ph.D., University of Leiden; Civilization Sequence Program
 Walley, Christopher, Ph.D., University of Wales; Geology
 Youssef, Ghazi, Ph.D., Wayne State University; Economics

Senior Lecturer

Rahhal, Asad, Ph.D., Syracuse University; Political Studies and Public Administration

Lecturers

Agha, Saleh J., Ph.D., Oxford University; Philosophy
 Aker, Nizar, M.S., AUB; Geology
 Azzam, Intisar, Ph.D., University of California, Irvine; Social and Behavioral Sciences
 Boulos, Mitri, Ph.D., St. Joseph University; Arabic
 Chalak, Hasan, Ph.D., Lebanese University; Political Studies and Public Administration
 Chatila, Imad, Ph.D., University of Southern California; Economics
 Cook, Jean-Marie, Ph.D., Harvard University; English
 Dabbagh, Salah, Doctorat, University of Lyon; Business and Management
 Dib, George, Ph.D., University of Amsterdam; Political Studies and Public Administration
 Ferguson, Kenneth, Ph.D., Cornell University; Philosophy
 Ghaly, Salwa, Ph.D., University of Alberta; English
 Ghanam, Jihad, Ph.D., University of South Dakota; Geology
 Hamadeh, Najla, Ph.D., Georgetown University; Civilization Sequence Program
 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
 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
 Najjar, Ibrahim, Ph.D., University of Toronto; Civilization Sequence Program
 Nakib, Khalil, Ph.D., Florida State University; Political Studies and Public Administration
 Nashabi, Hisham, Ph.D., McGill University; CAMES
 Nasr, Roger, C.P.A., Massachusetts Institute of Technology; Business and Management
 Ramadan, Usamah, Ph.D., Michigan State University; Economics
 Saab, Adib, M.Phil., London University; Arabic
 Salam, Nawaf, Doctorat, University of Paris; Political Studies and Public Administration
 Shebaya, Peter, M.A., University of Michigan; Civilization Sequence Program
 Shwayri, Antoine, M.B.A., AUB; Money and Banking
 Sidani, Yusuf, Ph.D., University of Mississippi; Business and Management
 Sukariyah, Bassam, Ph.D., Indiana University; Social and Behavioral Sciences
 Trad, Shafika, Ph.D., Syracuse University; Physics
 Zein, Abdel Fattah, Doctorat 3^{eme} Cycle, University of Paris; Arabic

Instructors

Abdel Malek, Rouba, M.S., AUB; Chemistry
Abul Husn, Khaled, M.B.A., AUB; Business and Management
Abu-Jawdeh, Siham, M.A., AUB; Arabic.
Ad-Daoud, Nassib, T.E.F.L., University of Wales; English
Akl, Nada, M.B.A., AUB; Business and Management
Al-Khalil, Ziad, M.B.A., University of Pennsylvania; Business and Management
Atassi, Mona, Maitrise, University of Nice; Physics
Baki, Ilham, M.A., AUB; English
Barakat, Marwan, M.B.A., AUB; Business and Management
Bitar-Ghanem, George, M.A., AUB; Political Studies and Public Administration
Bu Khuzam, Mazen, M.B.A., AUB; Mathematics
Charara, Rabih, M.B.A, AUB; Business and Management
Dabbagh, Salma, M.A., AUB; Social and Behavioral Sciences
Deeb, Hana, M.S., AUB; Chemistry
Deeb, Rima, M.A., AUB; English
Diab, Micheline, M.B.A., AUB; Business and Management
Ekmekji, Arda, Doctorat, University of Paris; Civilization Sequence Program
Fadda, Nada, M.A., The City University, London; English
Fakhry, Rima, M.A., AUB; English
Geutcherian, Rita, M.B.A., AUB; Business and Management.
Ghosn, Amine, Doctorat 3^{eme} Cycle, University of Paris; Arabic
Habbal, Abdel Rahman, M.B.A., AUB; Business and Management
Habbal, Dolly, M.A., AUB; Social and Behavioral Sciences
Hamdan, Wael, M.M.B., AUB; Business and Management
Harb, Sirene, M.A., AUB; English
Iskandarani, Reema, M.A., AUB; English
Jaafar, Nahed, M.A., AUB; Arabic
Jamali, Dima, M.A., San Jose State College; Social and Behavioral Sciences
Jundi, Tala, M.B.A., AUB; Business and Management
Kaskas, Alia, M.P.H., AUB; Chemistry
Khachadourian, Zador, M.S., AUB; Mathematics
Khalaf, Roseanne, M.A., Simmons College; English
Kheireddine, Marwan, M.B.A., Columbia University; Business and Management
Khoury, Samira, M.A., AUB; Civilization Sequence Program
Khoury, Viviane, M.S., AUB; Physics
Khuri, Malakeh, M.A., AUB; English
Livingstone, David, M.A., AUB; English
Maktabi, Sawsan, M.A., AUB; English
Mansour, Rania, M.S., AUB; Chemistry
Mikati, May, M.Phil., University of Cambridge; English
Mufarrij-Merhij, Rita, M.A., AUB; Social and Behavioral Sciences
Mujaes, Samar, M.A., AUB; Arabic
Nasrallah, May, C.P.A., Georgetown University; Business and Management
Nassar, Mazen, M.B.A., AUB; Business and Management

Rafoul, Rafoul, M.B.A., AUB; Business and Management
 Rizkallah, Hind, M.S., AUB; Biology
 Saadeh, Miryam, M.M.B., AUB; Economics
 Sadek, Samar, M.S., AUB; Chemistry
 Salem, Suhaila, M.A., AUB; English
 Shadid, Rima, M.A., AUB; English
 Shalak, Maha, M.A., AUB; English
 Shalhoub-Khoury, Nina, M.A., AUB; English
 Shami, Samira, M.A., University of South Illinois; English
 Shibl, Shibl, M.A., AUB; English
 Shmaysani-Sheato, Hayfa, M.A, AUB; English
 Shukri, Grace, M.A., AUB; English
 Sinno, Zane, M.A., Georgetown University; English
 Sinnu-Saoud, Nada, M.S., AUB; Biology
 Siyouri, Diana, M.S., University of Boston; Business and Management
 Turk-Ariss, Rima, M.A., AUB; Economics
 Ubayd, Hind, M.S., AUB; Chemistry
 Yazbeck, Adel, M.S., University of Colorado; Business and Management
 Zableet, Toufiq, Docteur Ingenieur, Strasbourg; Physics
 Zakhem, Ghada, M.S., AUB; Chemistry

Assistant Instructors

Darwiche, Ghazwa, B.S., AUB; Mathematics
 El Maiss, Arwa, B.S., AUB, Mathematics
 Kassis, Amal, B.S., AUB; Biology
 Mneimneh, Moustapha, B.S., AUB; Physics
 Muhtar, Nizar, B.S., AUB; Chemistry
 Naim, Kamal, B.S., AUB; Business and Management
 Sarrou', Magid, B.S., AUB; Chemistry
 Shaya, Wissam, B.S., AUB; Physics
 Zeinoun, Nadine, B.S., AUB; Chemistry

Research Assistants

Alagha, Joseph, B.A., AUB; Political Studies and Public Administration
 Attie, May, B.S., AUB; Chemistry
 El-Husseini, Rami, B.S., AUB; Biology
 El-Husseiny, Wadad, M.A., AUB; Social and Behavioral Sciences
 Gedeon, Walid, B.S., AUB; Mathematics
 Haddad, John, M.S., AUB; Biology
 Hakim-Doweik, Carol, B.A., University of Oxford; CAMES
 Jalakhian, Raffy, M.S., AUB; Biology
 Malti, Samir, M.A., AUB; Arabic
 Nassif, Yasmine, B.A., AUB; Social and Behavioral Sciences
 Simaan, Carol, B.S., AUB; Biology
 Sodir, Nicole, B.S., AUB; Biology
 Taljeh, Carol, B.A., AUB; Social and Behavioral Sciences

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 27 of this catalogue.

The specific requirements for admission to the freshman or sophomore class are found on pages 38-40. Criteria for admission to graduate study are found on page 93 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 103 below). 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 99 below).

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 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). 15 credits

Physics: and basic electronics with laboratory (normally Physics 204, 205, 206, 207 or Physics 211, 212, 213, 214).	8 credits
Mathematics: (Mathematics 102 (Calculus I) 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

- A cumulative average of at least 80 in the major field of study.
- A cumulative average of at least 75 in all work done in the sophomore, junior, and senior year.
- A minimum grade of 70 in English 203 or exemption from the course, and a minimum grade of 70 in English 204.
- All applicants should have taken the GRE or GMAT.

2. Graduate on Probation

- A cumulative average of at least 77 in the major field of study.
- A cumulative average of at least 75 in all work done in the sophomore, junior, and senior year.
- A minimum grade of 70 in English 203 or exemption from the course, and a minimum grade of 70 in English 204.
- All applicants should have taken the GRE or GMAT.

3. Prospective Graduate

- A cumulative average of at least 75 in the major field of study.
- At least 18 credits of supplementary undergraduate courses in the intended field of study, to be specified by the academic unit.
- 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

The freshman program, completion of which entitles a student to promotion to the sophomore class, normally consists of 30 credits.

On admission to the freshman class, a student must enroll in either the Arts program or the Science program.

1. Freshman Arts

	<i>Semesters</i>	<i>Credit Hours</i>
Arabic 101 and 102	2	6
English (level determined by placement test)	2	6 - 10
History 101 and 102	2	6
Any combination of the following science courses provided that the credits add up to a minimum of six: Biology 103, Biology 104, Chemistry 101, Chemistry 102, Geology 200, Geology 201, Geology 203, Physics 103, Physics 107, or Physics 200		6 - 8
Electives as necessary to add up to		30

Arabic 101 and 102 are required of all students whose native language is Arabic. Students who are exempted from the Arabic language elect in place of Arabic any two courses open to freshman students; however, freshman arts students can elect Mathematics 101 and 102 only if they achieve in the entrance examination in mathematics the minimum score required for these courses or if they secure the approval of the Department of Mathematics.

2. Freshman Science

	<i>Semesters</i>	<i>Credit Hours</i>
Arabic 101 and 102	2	6
English (level determined by placement test)	2	6 - 10
Mathematics 101 and 102	2	6
Sciences courses as detailed below		8 - 14

- Chemistry 101 and 102 are required for Health Sciences or Agricultural and Food Sciences, and for students planning to major in chemistry.
- Physics 101, 102, 105 and 106 are required of students planning to major in physics.
- Chemistry 101 and Physics 101, 102, 105 and 106 are required of students planning to enter engineering and architecture or study computer sciences.
- Chemistry 101 and 102, and Physics 103 and 107 are required of students planning to major in biology.
- Arabic 101 and 102 are required of all students whose native language is Arabic. Non-Arabic speaking students elect in place of Arabic any two courses open to freshman students.

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; Arabic 201 or any other Arabic language course numbered 211 or above (for Arabic-speaking students only); and Civilization Sequence 201, 202, 203, and 204.

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. Some departments further require that students sit for the Undergraduate Record Examination.
9. 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.
10. 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.
11. 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.
12. 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 441).

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; | } cumulative |
| 2. For the completion of the sophomore class: | 60 credits; | |
| 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 5 (100, 95, 90... 40).

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 79 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 Dean's Office 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 of the following reasons:

1. If at the end of a semester or summer session the student fails in one-third or more of the total number of credits he/she is carrying; or
2. If at the end of a semester, while carrying 12 or more credits (6 or more credits in the 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 12 or more 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 sophomore student will not be placed on probation at the end of his/her first semester at the University unless he/she fails in one-half or more of the credit hours carried.

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 be not less than 12 nor more than 13 credit hours. During a regular summer session, all students on probation shall carry loads of not more than seven credits.

Removal of Probation

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

Probation will be removed at the end of a semester or summer session provided the student passes in all courses and attains a grade of 70 or more in one third or more of the total number of credits he/she is carrying. For purposes of removing probation, a summer session is regarded as a semester, but only if the student carries a minimum of six credit hours.

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.

Dismissal from the University

The Faculty reserves the right to drop a student at any time for what it considers to be adequate reason.

A student on probation who fails at the end of any semester or summer session in one-third or more of the total credits he/she is carrying will be dropped. A student who fails to remove probation by the end of the third semester after he/she is placed on probation will be dropped.

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 will be dropped from the Faculty of Arts and Sciences.

A student placed on probation for the third time, having been placed on and removed from probation twice before, will be allowed a maximum of one semester to remove his/her probation. If he/she fails to do so, he/she will be dropped from the Faculty of Arts and Sciences.

If a student fails to pass an Arts and Sciences required course (Arabic, CS or English) for which he/she has been allowed to register three times, that student will be dropped from the Faculty of Arts and Sciences.

Once 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 notify the Office of the Registrar and the Office of the Dean of the decision. Majorless students who were originally Science students become majorless Science students, who are advised by the Science Academic Advisor, while those who were originally Arts or Business students become majorless Arts students and are advised by the Arts Academic Advisor. A majorless student may stay without a major for a maximum period of two semesters after which he/she is dropped by the Arts and Sciences Administrative Committee from the Faculty of Arts and Sciences if he/she does not get accepted by a department. A student who fails to meet departmental requirements for the second time will be dropped from the Faculty of Arts and Sciences by the Administrative Committee.

Failures 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 register for a course for a maximum of three times, including withdrawals, but for the third registration the permission of the student's Academic Advisor and the Academic unit concerned is required.

A student who at the end of his/her senior year fails to attain a cumulative average of 70 or more in his/her major field will be required to take additional courses in that field or to repeat courses in which that student has gotten 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 of credit may be granted.

If a student is on probation and leaves the University after the 12th week of the semester, the Administrative Committee will decide whether he/she may be allowed to return to the University.

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 requires the approval of the Arts and Sciences Administrative Committee while readmission of students dropped from other AUB Faculties to A&S requires the approval of the Arts and Sciences Admissions Committee. Before action 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 the Freshman Science Advisor; Freshman Arts students should consult the 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. For these, see the chapters "Division of Education Programs" and "AUB Extension" 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

CE 037 Surveying and Photogrammetry (3)
CE 055 Fluid Mechanics (3)
CE 084 Soil Mechanics (3)
CE 085 Hydrology (3)
EE 011 Electric Circuits I (3)

EE 021 Electric Circuits II (3)
EE 022 Basic Electronics (3)
EE 052 Digital Electronics (3)
EE 049 Digital Systems Design (3)
ME 044 Thermodynamics (3)
AS 045 Application of Analytical Methods in Engineering I (3)
AS 055 Application of Analytical Methods in Engineering II (3)

Faculty of Agricultural and Food Sciences

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

Faculty of Health Sciences

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

DEPARTMENT OF ARABIC AND NEAR EASTERN LANGUAGES

Chairperson:	Baalbaki, R.
Professors:	Baalbaki, R.; Makarim, S.; Naimy, N.
Assistant Professors:	Agha, S.; Jarrar, M.
Lecturers:	Boulos, M.; Jeha, G.; Saab, A.; Zein, A.F.
Instructors:	Abu-Jawdeh, S.; Ghosn, A.; Jaafar, N.; Mujaes, S.

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; Arabic 201 in the Sophomore, Junior or Senior years.

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.** 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.
- 201 Studies in Arabic Literature and Language.** 3.0; 3 cr.; annually. A close textual and analytical study of extracts from classical and modern Arabic literature. These extracts form the basis of class work in order that students may be trained intensively in reading correctly, and in expressing themselves precisely and clearly in high Arabic, both orally and in writing. Members of Department.
- 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 *ʿrab*. R. Baalbaki.
- 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. R. Baalbaki.
- 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 stylistic *balagha* in 221 and metrics (*‘arud*) in 222. It surveys the contribution of the Arabs to stylistic studies and introduces their theory of versification.
- 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. S. Agha.
- 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. S. Agha.
- 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. M. Jarrar.
- 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 in which it developed, and analyzing in detail its various characteristics. A. Ghosn.
- 239 and 240 Modern Arabic Prose.** 3.0; 3 cr.; 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 novel, its development, and the most prominent novelists, 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. A. Ghosn.
- 243 Classical Arabic Prose.** 3.0; 3 cr.; annually. This course includes reading thoroughly and analyzing critically, 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 beginning of the Abbasid dynasty up to the age of al-Ma’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 *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. M. Jarrar.

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. R. Baalbaki.

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:	Melhem, R.
Professors:	Baydoun, E.
Associate Professors:	Dagher, S.
Assistant Professors:	Ghali-Muhtasib, H.; Harakeh, H.; Knio, K.; Kuraydiyyah, S.; Melhem, R.; Nasr, S.; Sadek, R.; Safieh-Garabedian, B.; Talhouk, R.; Tarraf, C.
Lecturers:	Kanaan, S.
Instructors:	Rizkallah, H.; Sinno-Saoud, N.
Assistant Instructors:	Kassis, A.

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.

- 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. S. Dagher.
- 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. S. Dagher.
- 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. B. Safieh-Garabedian, H. Gali-Muhtasib.
- 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. E. Baydoun, B. Safieh-Garabedian.
- 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. R. Melhem.
- 224 Microbiology.** 3.3; 4 cr.; each semester. Prerequisite: 223. Deals with microorganisms, especially bacteria, and in particular those of pathogenic and industrial importance. Basic knowledge on isolation, classification, and the various metabolic processes is included. H. Harakeh.
- 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. K. Knio.
- 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. R. Sadek.
- 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. K. Knio.
- 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. H. Gali-Muhtasib.
- 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. S. Kuraydiyyah.
- 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. H. Harakeh.
- 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. H. Gali-Muhtasib.
- 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. H. Gali-Muhtasib.
- 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 recycling of nutrients. R. Sadek.
- 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. R. Sadek.
- 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. R. Talhouk.
- 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. H. Harakeh.
- 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. S. Kanaan.
- 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. H. Gali-Muhtasib.
- 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. E. Baydoun.
- 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. C. Tarraf.
- 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. S. Nasr.
- 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. K. Knio.
- 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: 260, Math 208, Math 209. 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 AND MANAGEMENT

Director:	Abou-Ezze, P.
Associate Professors:	Eid, N.; Shibl, Y.
Assistant Professors:	Abdallah, H.; Abou-Ezze, P.; Baalbaki, I.; Fahed, N.; Ghaziri, H.
Lecturers:	Dabbagh, S.; Nakib, K.; Nasr, R.; Sidani, Y.
Instructors:	Abul Husn, K.; Akl, N.; Al-Khalil, Z.; Barakat, M.; Charara, R.; Diab, M.; Geutcherian, R.; Habbal, A.; Hamdan, W.; Jundi, T.; Kheireddine, M.; Nasrallah, M.; Nassar, M.; Rafoul, R.; Siyouri, D.; Yazbeck, A.
Assistant Instructor:	Naim, K.

The Graduate School of Business and 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.

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 Business Administration 201 and 256, Economics 211 or 212, Mathematics 201 for Science students or Mathematics 203 for Arts 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 the student starts at the English 102 or 203 level (or 3 semesters if he/she starts at the 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 the 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 are as follows: 201, 212, 220, 223, 224, 231, 241, 251, 252, 254, 255, 256, 257 and 261.

- 201 Introduction to Financial Accounting.** 3.0; 3 cr. annually. Prerequisite: English 101. An overview of financial accounting, including 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 and Cost Accounting.** 3.0; 3 cr.; annually. Prerequisite: 201. An introduction to internal accounting, including cost behavior and cost volume relationships, relevant information and discussion-making, budgeting and budget variance analysis, responsibility accounting and product costing. N. Eid.
- 213 Auditing.** 3.0; 3 cr. Prerequisite: 214, or 70 in 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; 3 cr. Prerequisite: 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; 3 cr. Prerequisite: 214, or 80 in 201. Advanced level financial accounting covering specialized topics that include accounting for business combinations and consolidations, for partnerships, for fiduciary and institutional entities, and for international operations and foreign exchange.
- 220 Business Law.** 3.0; 3 cr.; annually. Prerequisite: Junior standing in Business. This course covers laws pertaining to businessmen, business associations, the business firm, commercial paper, and letters of credit.
- 223 Financial Markets and Institutions.** 3.0; 3 cr.; annually. Prerequisite: 224 and Economics 212. A study of money and capital markets focusing on the intermediation process and the functions and operations of financial institutions in the money and capital markets.
- 224 Financial Management.** 3.0; 3 cr.; annually. Prerequisites: Junior Standing, Economics 211 and 212. To determine and analyze the major decisions a financial manager has to make: the sources of fund investment opportunities. H. Abdallah.
- 225 Investment.** 3.0; 3 cr. Prerequisites: 223, 224. Operations of securities markets, investment policies, and valuation of individual securities. The course also introduces the student to portfolio selection in investment decisions.
- 227 Commercial Banking.** 3.0; 3 cr. Prerequisite: 223. Covers the management aspects of commercial banks and provides students with a description and analysis of

- operations of commercial banks. Main topics: assets and liability management, credit analysis, investment policy, and international banking.
- 228 Insurance.** 3.0; 3 cr. Prerequisite: Senior Standing. An operational approach to risk management in business and personal affairs. Its major thrust is to know how to manage risk and make the best use of insurance contracts and coverages.
- 229 Finance** (For non-B.B.A. graduates). 4.0; 4 cr.; annually. Prerequisites: 201 and 252. 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, cost and structure of capital and other topics. Y. Shibl.
- 231 Management of Organizations.** 3.0; 3 cr.; annually. Prerequisite: Junior Standing. The objective of this course is to provide the student with the basis of management theory and practice: the managerial functions of planning, organizing, staffing, leading, and controlling. N. Fahed.
- 236 Operations Management.** 3.0; 3 cr. Prerequisite: 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; 3 cr. Prerequisite: 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 Development.** 3.0; 3 cr. Prerequisite: 231. A senior level course dealing with the various steps and decisions that directly influence human resources in business organizations. The main emphasis is on training as a function and a need that will improve organizational performance.
- 241 Marketing Management.** 3.0; 3 cr.; annually. Prerequisite: Economics 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. I. Baalbaki.
- 245 International Marketing.** 3.0; 3 cr. Prerequisite: 241. Introduces the elements of international marketing and assesses the impact of changes in the global environment on marketing activities abroad. The course follows a practical approach as the students are required to apply the theoretical concepts in case studies and actual settings. I. Baalbaki.
- 246 Marketing Research.** 3.0; 3 cr. Prerequisites: 241 and 254. Designed to provide a thorough coverage of various marketing research tools. A systematic coverage of the steps comprising the market research process, starting with research problem definition and terminating with data collection and analysis. I. Baalbaki.
- 251 Managerial Economics.** 3.0; 3 cr.; annually. Prerequisite: 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. Y. Shibl.

- 252 Macro Business Analysis.** 3.0; 3 cr.; annually. Prerequisite: Economics 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. P. Abou-Ezze.
- 254 Quantitative Methods for Business Decisions.** 3.0; 3 cr.; annually. Prerequisite: Economics 213. *Business students cannot 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. R. Geutcherian.
- 255 Operations Research.** 3.0; 3 cr.; annually. Prerequisite: Economics 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. H. Ghaziri.
- 256 Business Data Processing.** 3.0; 3 cr.; annually. An introductory computer course covering basic hardware concepts for the business user. The software component familiarizes students with a standard spreadsheet package (Excel 5™) and simple programming (Visual Basic 4™).
- 257 Business Information Systems.** 3.0; 3 cr. Prerequisite: 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™. H. Ghaziri.
- 261 Strategic Planning and Policy Formulation.** 3.0; 3 cr.; annually. Prerequisites: 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. N. Fahed.
- 263 Senior Tutorial.** 3.0; 3 cr. Prerequisite: Senior Standing.

GRADUATE 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. 3-6 cr.

303 Business Economic Analysis and Forecasting. 3.0; 3 cr. Prerequisites: 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; 3 cr.; annually. Prerequisite: 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. I. Baalbaki.

305 Seminar in Accounting Theory. 3.0; 3 cr. Prerequisite: 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; 3 cr.; annually. Prerequisite: 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; 3 cr.; 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; 3 cr. 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; 3 cr. 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; 3 cr. Focuses on existing trends which can be identified as shaping the managerial requirements of the future, the changes developing from impinging factors and forces in our society. Emphasis is on emerging issues affecting managerial behavior.

- 320 Marketing Management.** 3.0; 3 cr.; 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. N. Eid.
- 321 Marketing Research.** 3.0; 3 cr. Prerequisite: 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. I. Baalbaki.
- 322 Consumer Behavior.** 3.0; 3 cr. Prerequisite: 241 or 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. I. Baalbaki.
- 323 Promotion and Advertising.** 3.0; 3 cr. Prerequisite: 241 or 320. The various facets of marketing communications. Advertising, personal selling, and sales promotion 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. I. Baalbaki.
- 324 Product Planning.** 3.0 : 3 cr. Prerequisite: 241 or 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 the new product development process.
- 325 Strategic Marketing.** 3.0; 3 cr. Prerequisite: 241 or 320. Focus 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. I. Baalbaki.
- 326 International Marketing.** 3.0; 3 cr. Prerequisite: 241 or 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. N. Eid.
- 327 Advanced Statistical Methods in Marketing Research.** 3.0; 3 cr. Prerequisite: 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. I. Baalbaki.
- 330 Financial Analysis and Policy.** 3.0; 3 cr.; annually. Prerequisite: 229 or equivalent. The course includes investment analysis and decision making, capital budgeting, financial instruments valuation, optimal financial structures and dividend policy, using the case study approach. N. Fahed, H. Abdallah.
- 331 Investment Analysis.** 3.0; 3 cr. Prerequisite: 229 or equivalent. The course focuses on portfolio selection theory and security valuation models. Particular emphasis is placed on stocks, bonds, and financial futures and options. P. Abou-Ezze.
- 332 International Business Finance.** 3.0; 3 cr. Prerequisite: 229 or equivalent. A study of international financial markets and instruments. Topics covered include the foreign

- exchange markets, the international securities markets including credit and equity, and the currency forward, futures and options markets. P. Abou-Ezze
- 333 Central Banking and Monetary Policy.** 3.0; 3 cr. Prerequisite: 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, with special reference to Lebanon.
- 334 Commercial Bank Management.** 3.0; 3 cr. Prerequisite: 229 or equivalent. Financial decision-making procedures and policies of commercial banks. Management of the assets, liabilities, and capital is emphasized using the portfolio analysis approach and capital adequacy indicators. Y. Shibl.
- 335 Corporate Finance.** 3.0; 3 cr. Prerequisite: 330. This course emphasizes the relation between financial theory and financial policy with direct application through the case study approach. It aims at exposing students to the theory through a series of highly mathematical publications, which deal with model building and equilibrium concepts. H. Abdallah.
- 336 Financial Instruments.** 3.0; 3 cr. Prerequisite: 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; 3 cr.; annually. Prerequisite: completion of 8 or more graduate courses. The focus of the course is on strategy formulation, and implementation and development of policies in a changing environment for both profit and non-profit organizations. Y. Shibl.
- 341 Management Information Systems.** 3.0; 3 cr. Prerequisite: 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. H. Ghaziri.
- 342 Managerial Problem Solving.** 3.0; 3 cr. 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; 3 cr. Prerequisite: 229 or equivalent. Capital budgeting techniques and major investment criteria applied in the screening and adoption of projects are explored. Y. Shibl.
- 351 Project Management.** 3.0; 3 cr. Prerequisite: 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. Y. Shibl.
- 352 Production and Operations Management.** 3.0; 3 cr. Prerequisite: 255 or equivalent. A study of the field of operations management in its modern context where emphasis is placed on application to all types of production activities. Covers topics such as quality control and management, project planning and control, inventory planning, just-in-time production system, product design and process selection.
- 398 Project.**

CENTER FOR ARAB AND MIDDLE EAST STUDIES (CAMES)

Director: Salibi, K.

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 core courses of the program include: a Middle East Area course with a related tutorial course, 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 a reading and speaking competence to at least the intermediate level 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 coordinates research and course offerings in the appropriate departments and offers the M.A. in the following areas:

1. Arabic and Islamic Studies.
2. Modern Middle East Studies.

A Ph.D. in the above areas, to be given by the Center, is planned for the future. The Department of History and Archaeology and the Department of Arabic and Near Eastern Languages continue to offer the Ph.D. in their respective fields.

The Center sponsors lectures, seminars, and conferences. *Arab Political Documents* and *Chronology of Arab Politics* are published by the Center.

CENTER FOR BEHAVIORAL RESEARCH

Director: Khalaf, S. G.
Executive Committee: Al-Harithy, H.; Imam, A.; Khazen, F.; Seikaly, S.
Post-Doctoral Fellow: Tarabulsi, F.

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: Ghaleb, M.
Associate Professors: Shaaban, K.
Assistant Professors: Ghaith, G.; 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.
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 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:	Kasparian, M.
Professors:	Haddadin, M.
Visiting Professors:	Nazer, M.
Associate Professors:	Kasparian, M.; Salameh, A.; Sultan, R.
Assistant Professors:	Basin, P.; Nahle, A.; Naud, D.; Sleiman, H.
Instructors:	Abdel Malek, R.; Deeb, H.; Kaskas, A.; Mansour, R.; Sadek, S.; Ubayd, H.; Zakhem, G.
Assistant Instructors:	Muhtar, N.; Sarrou, M.; Zeinoun, N.

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.

- 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 thermodynamics. A survey of common groups in the periodic table and an introduction to organic chemistry, nuclear chemistry, and electrochemistry. Includes laboratory practice. D. Naud.
- 200 Basic Chemistry.** 3.0; 3 cr.; each semester. 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. P. Bassin.
- 201 Chemical Principles.** 3.0; 3 cr.; each semester. Introduction to chemical principles. A theoretical course stressing atomic structure, bonding, stoichiometry, and solution

equilibria. Designed for students with a background in chemistry equivalent to Chemistry 101. M. Kasparian, R. Sultan.

- 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.* Theory and practice of gravimetric and volumetric techniques, and an introduction to instrumental methods of quantitative analysis. The course is designed for biology majors. A. Nahle.
- 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 chemistry of compounds containing carbon. P. Bassin.
- 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. A. Salameh.
- 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 experiments in organic chemistry including synthesis and techniques of separation and purification of organic compounds. D. Naud.
- 211 Organic Chemistry I.** 3.0; 3 cr.; each semester. Prerequisite 201. *Students cannot receive credit for both 208 and 211.* An introduction to organic chemistry organized according to functional groups, with some emphasis on mechanistic and stereochemical aspects of organic reactions. The course is designed primarily for chemistry majors, but includes sufficient discussion of biological relevance to appeal to students interested in the medical and biological sciences. A. Salameh, H. Sleiman.
- 212 Organic Chemistry II.** 3.0; 3 cr.; each semester. Continuation of Chemistry 211, which is prerequisite. Students should take 210 or 213 concurrently. A. Salameh, H. Sleiman.
- 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. Members of Department.

- 215 Analytical Chemistry.** 3.0; 3 cr.; each semester. Pre-requisites: 201, 205; Math 201. *Students cannot receive credit for both 215 and 206.* Fundamental analytical processes, including solution equilibria. Electrochemical theory and applications, chromatographic and spectrochemical techniques. A. Nahle.
- 216 Analytical Chemistry Laboratory.** 0.4; 2 cr.; annually. Pre- or co-requisite: 215. Experimental work in related areas of chemical analysis and instrumentation. A. Nahle.
- 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. R. Sultan.
- 218 Molecular Structure.** 3.0; 3 cr.; annually. Prerequisites: 201, Mathematics 201. Failures of classical physics. Quantum theory. Schrödinger 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. R. Sultan.
- 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. Thermo-dynamics of chemical reactions. Phase changes and phase equilibria. Thermodynamics of solutions. Colligative properties. Debye-Huckel theory. Equilibrium electrochemistry. R. Sultan.
- 220 Physical Chemistry Laboratory.** 0.6; 3 cr.; annually. Prerequisites: 217 and 219, or consent of instructor. Experiments in thermodynamics, kinetics, electrochemistry, spectroscopy, and exercise in computational chemistry. M. Kasparian, R. Sultan.
- 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. M. Haddadin.
- 228 Inorganic Chemistry.** 3.0; 3 cr.; annually. Prerequisite: 201. Bonding Theory: covalent (VBT, MOT), ionic (lattice energy). HSAB. VSEPR. Electronegativity. Ionic structures. Crystal defects. Symmetry and group theory: applications to IR/Raman spectroscopy.
- 229 Coordination Compounds.** 3.0; 3 cr.; annually. Prerequisite: 228. Coordination chemistry theories (crystal field, Ligand field), use of group theory in coordination compound analysis, structures of coordination compounds, reaction mechanism of coordination compounds.
- 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. Prerequisite: Senior standing with minimum average of 80 in major; must be taken by students who wish to graduate with distinction.

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, homogeneous and heterogeneous catalysis, non-equilibrium thermodynamics, coordination and organometallic chemistry, photochemistry and photophysics, synthetic heterocyclic chemistry, and organic high pressure chemistry.

- 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 Tanabe-Sugano diagrams. Factors affecting stability of coordination compounds. Stereochemistry. Trans effect. 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 stereochemistry 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 Schrödinger equations. Variational principle and perturbation theory; treatment of polyelectronic atoms. Molecular orbital theory of diatomic molecules; Hückel molecular orbital theory for conjugated molecules.
- 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.
- 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:	Betts, R.
Associate Professors:	Amyuni, M.; Betts, R.; Mousalli, A.; Nassar, C.; Shehadeh, L.
Assistant Professors:	Abu-Salih, A.; Al-Harithy, H.; Bomedal, P.; Dadoyan, S.; Diab, H.; Khairallah, S.; Saumarez Smith, R.; Van Ophuijsen, J.
Lecturers:	Hamadeh, N.; Kurani, D.; Najjar, I.; Shebaya, P.
Instructors:	Ekmekji, A.; Khoury, S.

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 (CS 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 CS 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 CS 201 are prerequisites for 201 and 202 respectively. Members of Department.

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. Members of Department.

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.

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. L. Shehadeh.
- 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. S. Dadoyan.
- 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. S. Dadoyan.
- CS/ Art 220 Basic Drawing I.** 0.6; 3 cr.; annually. D. Kurani.
- CS/ Art 222 Basic Painting Procedure I.** 0.6; 3 cr.; annually. D. Kurani.
- CS/ Theater 265 Introduction to Theater.** 3.0; 3 cr.; annually. An introductory course on the 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. P. Shebaya.
- CS/ Theater 267 Voice and Acting in the Theater.** 2.2; 3 cr.; annually. Basics of clear speaking, vocal projection and acting. D. Kurani.
- CS/ Theater 270 Theater History.** 3.0; 3 cr.; annually. A survey of the different kinds of plays, including the theaters of realism, romance, exaltation, laughter and disruption. D. Kurani.
- CS/ 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. D. Kurani.
- CS/ 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. D. Kurani.
- CS/ German 201 Elementary German I.** 3.0; 3 cr.; annually.
- CS/ German 202 Elementary German II.** 3.0; 3 cr.; annually. Prerequisite: German 201.
- CS/ German 211 Intermediate German.** 3.0; 3 cr.; annually. Prerequisite: German 202.
- CS/ French 201 Elementary French I.** 3.0; 3 cr.; annually.
- CS/ French 202 Elementary French II.** 3.0; 3 cr.; annually. Prerequisite: French 201.
- CS/ French 211 Intermediate French.** 3.0; 3 cr.; annually. Prerequisite: French 202.
- CS/ 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. R. Betts.

- CS/ 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). R. Betts.
- CS/ 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. R. Betts.
- CS/ Music 243 Applied Music (Choir) II.** 1 cr.; annually. Further study of the various forms of choral work and expansion of the choral repertoire. R. Betts.
- CS/ 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.
- CS/ 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.
- CS/ 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.
- CS/ 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.
- CS/ 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, Giotto, 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.
- CS/ Fine Arts 224 Art and Architecture of the Middle East 650-1250.** 3.0; 3 cr. H. Al-Harithy.
- CS/ Fine Arts 225 Art and Architecture of the Middle East 1250 - present.** 3.0; 3 cr. H. Al-Harithy.
- CS/ 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. H. Al-Harithy.
- CS/ 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. H. Al-Harithy.

DEPARTMENT OF ECONOMICS

Chairperson:	Sirhan, G.
Professors:	Makdisi, S.
Associate Professors:	Sirhan, G.
Assistant Professors:	Alami, T.; Jabir, I.; Neaime, S.; Youssef, G.
Lecturers:	Chatila, I.; Ramadan, U.
Instructors:	Saadah, M.; Turk-Ariss, R.

UNDERGRADUATE PROGRAM

Students wishing to major in Economics are accepted as provisional majors in the sophomore year until they have passed Economics 211, 212, English 203, and Mathematics 201 with a minimum grade of 70 in each. In addition to these courses, they are expected to take *Economics 213 and 214 during their sophomore year*. Economics Majors must also complete Mathematics 209 or equivalent and Business Administration 210 and 211. 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.

- 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 I.** 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. R. Geutcherian, I. Jabir.

- 214 Economic Statistics II.** 3.0; 3 cr.; annually. Prerequisite: 213 or equivalent. Not open to students who have completed B.Ad. 254. Analysis of variance, simple regression and correlation analysis, multiple regression, and time series analysis.
- 217 Intermediate Price Theory.** 3.0; 3 cr.; annually. Prerequisites: 70 or more in 211 and 212. Consumers choice and demand theory, theory of production and costs; price and output determination under alternative market structures. G. Sirhan.
- 218 Income Distribution and Welfare Economics.** 3.0; 3 cr.; annually. Prerequisite: 70 or more in 217. 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, up to the late nineteenth century.
- 222 Twentieth Century Economic Thought.** 3.0; 3 or; 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 1980s.
- 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. U. Ramadan.
- 227 Intermediate Macroeconomics.** 3.0; 3 cr.; annually. Prerequisites: 70 or more in 211 and 212. A study of the aggregative approach to economics; models of income determination; money and interest; inflation and stabilization policies; business cycles and macropolicy. 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. G. Youssef.
- 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 227. An investigation of the structure and operation of difference economic systems. The systems include various forms of market-oriented and centrally planned economies.
- 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. Prerequisites: 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. G. Youssef.
- 239 Introduction to Mathematical Economics.** 3.0; 3 cr.; annually. Prerequisites: 70 or more in 217 and 227; Mathematics 201 or its equivalent. 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 countries.
- 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 economic performance. U. Ramadan.
- 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 choice; theory of production and theory of costs; market structure and market behavior.
- 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 the classical, Keynesian and Post-Keynesian macro-economic systems; analysis of the structure of income determination models; a survey of theories of inflation and stabilization policies; business cycles and economic growth. G. Sirhan.

- 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.
- 335 International Trade Theory.** 3 cr.; annually. An intensive examination of the theory of comparative advantage: the classical and Heckscher-Ohlin statements, and recent contributions.
- 336 International Economic Policy.** 3 cr.; annually. An intensive examination of the theory of balance of payments and the processes of its automatic adjustment processes, 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 of development in developing countries.
- 338 The Framework of Economic Development: Case Study.** 3 cr.; annually. Application of the theoretical framework of Economics 337 to the contemporary experience of selected Arab countries.
- 339 Topics in Mathematical Economics.** 3 cr.; annually.
- 399 M.A. Thesis.**

DEPARTMENT OF ENGLISH

Chairperson:	Shaaban, K.
Associate Professors:	Nassar, C.; Shaaban, K.
Assistant Professors:	Ghaleb, M.; Precious, L.
Lecturer:	Cook, J.M.; Ghaly, S.
Communication Skills Coordinator:	Shalhoub-Khoury, N.
Instructors:	Ad-Daoud, N.; Baki, I.; Deeb, R.; Fadda, N.; Fakhry, R.; Harb, S.; Iskandarani, R.; Khalaf, R.; Khury, M.; Livingstone, D.; Maktabi, S.; Mikati, M.; Salem, S.; Shadid, R.; Shalak, M.; Shalhoub-Khoury, N.; Shami, S.; Shibl, S.; Shmaysani-Sheato, H.; Shukri, G.; 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.

- 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. S. Ghaly, C. Nassar, L. Precious.
- 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. J.M. Cook, S. Ghaly, L. Precious.
- 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. S. Ghaly.
- 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. L. Precious.
- 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. L. Precious.
- 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. S. Ghaly, L. Precious.
- 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. L. Precious.
- 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 prescientific thought with rationalism is followed in the work of Donne, Jonson, Marvell, Vaughan, Browne, Milton and others. L. Precious.
- 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, Johnson, and Blake are the main authors studied. L. Precious.
- 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. J-M. Cook.
- 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. C. Nassar.

- 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, Rosetti, Swinburne; and selections from the prose writings of two or three writers such as Arnold, Mill, Newman, and Darwin. J-M. Cook, C. Nassar.
- 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. J-M. Cook.
- 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. Members of Department.
- 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. S. Ghaly.
- 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. J-M. Cook.
- 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. J-M. Cook.
- 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. S. Ghaly.
- 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. Members of Department.
- 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. Members of Department.
- 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. M. Ghaleb, K. Shaaban.
- 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. K. Shabaan.
- 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. M. Ghaleb, K. Shaaban.
- 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. M. Ghaleb.
- 236 Art of the Essay.** 3.0; 3 cr.; annually. 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.
- 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. M. Ghaleb.
- 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. M. Ghaleb.
- 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.
- 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. K. Shaaban.

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. M. Ghaleb, S. Ghaly.
- 302 Selected Topics in English Literature before 1800.** 3.0; 3 cr.; annually. Members of Department.
- 303 Selected Topics in English Literature after 1800.** 3.0; 3 cr.; annually. Members of Department.
- 304 Selected Topics in American Literature.** 3.0; 3 cr.; annually. Members of Department.
- 305 Graduate Tutorial in English or American Literature.** 3.0: 3 cr. Members of Department.
- 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. K. Shaaban.
- 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. S. Ghaly.
- 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. K. Shaaban.
- 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. Members of Department.
- 344 Graduate Tutorial in Linguistics.** 3 cr. Members of Department.
- 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. M. Ghaleb.
- 346 Selected Topics in Applied Linguistics.** 3.0; 3 cr. K. Shaaban.
- 399 M.A. Thesis.**

DEPARTMENT OF GEOLOGY

Chairperson: Walley, C.
 Assistant Professors: Abdel-Rahman, A.; Khair, K.; Spencer, S.; Walley, C.
 Lecturer: Aker, N.; Ghanem, J.

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 Earth 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 four undergraduate elective courses, one at freshman level (101) and three courses at sophomore level and above, in the area of general geology (201) and in environmental geology (204 and 205).

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. Advanced students in their final year are encouraged to take additional geology courses such as 225 and 271 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 SBS 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. C. Walley.

- 200 The Earth and Human Affairs.** 3.0; 3 cr.; each semester. *No credit for geology majors.* Basic geological principles, internal and external earth processes, earth cycles, earth resources, natural hazards, man's use and abuse of resources and environment, conservation and recycling. K. Khair, C. Walley.
- 201 Physical Geology.** 3.0; 3 cr.; each semester. Introduction to minerals, rocks and earth structures. Internal and external earth processes, plate tectonic theory. A. Abdel-Rahman, S. Spencer.
- 202 Historical Geology.** 3.0; 3 cr.; annually. Prerequisites: 201, 203. 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. C. Walley.
- 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. Members of Department.
- 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. K. Khair, C. Walley.
- 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. A. Abdel-Rahman, K. Khair.
- 207 Map Interpretation.** 1.4; 3 cr.; annually. Prerequisites: 201, 203. Description, reading and interpretation of topographic and geological maps. Introduction to stereographic projections. Construction of cross sections across geologic structures. Basic field mapping techniques. S. Spencer.
- 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. S. Spencer.
- 211 Crystallography and Physical Mineralogy.** 2.3; 3 cr.; annually. Prerequisite: Chemistry 101. 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. A. Abdel-Rahman.
- 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. A. Abdel-Rahman.
- 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. S. Spencer.
- 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. C. Walley.

- 215 Invertebrate Paleontology.** 1.4; 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. A. Abdel-Rahman.
- 222 Sedimentology.** 1.4; 3 cr.; annually. Prerequisites: 212, 214. The study of sedimentary rocks using petrographic and field study methods. Diagenetic processes, depositional environments, elementary basin analysis. C. Walley.
- 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. K. Khair.
- 225 Petroleum Geology.** 3.0; 3 cr.; annually. Prerequisites: 213, 214. Hydrocarbon formation and occurrence as oil and gas fields. Exploration and extraction methods. K. Khair.
- 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. 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. A. Abdel-Rahman.
- 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. K. Khair.
- 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. K. Khair.
- 306 Economic Minerals Geology.** 3.0; 3 cr. 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. A. Abdel-Rahman.
- 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.** 1.4; 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. K. Khair.
- 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. The geology, search for and location of ground water, with emphasis on semi-arid regions, techniques in water exploration, bore hole production and chemical water analysis.
- 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:	Seikaly, S.
Professors:	Salibi, K.; Seeden, H.; Seikaly, S.
Associate Professors:	Abu Husayn, A.; Sader, H.
Visiting Associate Professor:	Butcher, K.
Assistant Professors:	El-Cheikh, N.

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.

All courses are given annually unless otherwise specified.

- 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. Members of Department.
- 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.
- 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. N. El-Sheikh.
- 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. A. Abu-Hussein.
- 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. S. Skeikaly.
- 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. A. Abu-Hussein.

- 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. S. Seikaly.
- 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. A. Abu-Hussein.

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. S. Seikaly.
- 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 291, 292.

- 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. H. Seeden.
- 213 The Old Stone Age (up to ca. 10,000 B.C.).** 3.0; 3 cr.; alternate years. The Human Story I: The physical and cultural evolution of man subsisting on food gathering, hunting and fishing in a Pleistocene environment. The cultural and functional significance of early man's artifacts are investigated. H. Seeden.
- 214 The New Stone Age (10th to 4th Millennium B.C.).** 3.0; 3 cr.; alternate years. The Human Story II: The gradual domestication of plants and animals leading to food production, and the development of socio-cultural systems with increasing differentiation of activities. H. Seeden.
- 215 and 216 The Near East in the Bronze Ages (3500-1200 B.C.).** 3.0; 3 cr. (each); alternate years. The growth of small towns and larger urban centers in an essentially agricultural environment. The changes occurring during the later second millennium and the breakdown of the Bronze Age urban palace culture are investigated.
- 217 and 218 History of Ancient Egypt.** 3.0; 3 cr. (each); alternate years. Not presently offered.
- 221 and 222 Archaeology of the Greek World.** 3.0; 3 cr. (each); alternate years.
- 223 and 224 Hellenistic and Roman Archaeology.** 3.0; 3 cr. (each); alternate years. The history and archaeology of the Seleucid and Ptolemaic kingdoms and the Roman empire, with particular emphasis on the Levant. This includes religion, art and architecture.
- 225 and 226 The Greek World and the Near East.** 3.0; 3 cr. (each); alternate years.
- 227 and 228 The Near East in the Roman and Early Byzantine Ages.** 3.0; 3 cr. (each). The focus is on studying the history and material culture of the Near East between 64 BC and AD 565 within the broader context of the Roman and Byzantine empires. N. El-Sheikh.
- 229 and 230 Ancient Mesopotamia.** 3.0; 3 cr. (each); alternate years. 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 sites are chosen to illustrate the material culture of the successive historical periods from Late Uruk to Neo-Babylonian times. H. Sader.
- 231 Ancient Near Eastern Religions.** 3.0; 3 cr.; alternate years. 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. H. Sader.

- 232 The History of the Syro-Lebanese Coast in Antiquity.** 3.0; 3 cr.; alternate years. The Levant in the Iron Age, 1200-300 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. H. Sader.
- 233 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. H. Seeden.
- 234 Problems in Archaeology.** 3.0; 3 cr. An in-depth study of special topics in Near Eastern Archaeology. It deals mainly with major cultural achievements in the fields of economy, trade, architecture and other aspects of near Eastern material culture. H. Sader.
- 291 and 292 Senior Tutorial.** 3.0; 3 cr. (each).
- 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. Study of particular ancient sites, architecture, religion, art and artifacts to train students in research and analysis of specific subjects in Near Eastern Archaeology. H. Sader.
- 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 in Special Topics in Near Eastern Archaeology.** 3.0; 3 cr. (each); can be repeated for credit. Projects on the rescue, preservation and management of cultural heritage in Lebanon, and comparative study of local and Near Eastern heritage management centers and experiences elsewhere. Special emphasis on public education, creation of regional site and eco-museums, and community centers. H. Sader.
- 323 and 324 Advanced Fieldwork and Data Collection.** 3.0; 3 cr. (each). Graduate participation in archaeological surveys, excavations, artifact recording or ethnographic data collection related to archaeological fieldwork. H. Seeden.
- 325 and 326 Advanced Archaeological Research.** 3.0; 3 cr. (each). Post-excavation analysis of archaeological material, spot-dating of artifacts and phasing of contexts, archaeological database programs; preparation of archaeological reports.
- 399 M.A. Thesis.**

INSTITUTE OF MONEY AND BANKING

Director:	Andary, S.
Professors:	Makdisi, S.
Assistant Professors:	Andary, S.
Lecturers:	Hobeika, L.; Itani, I.; Shwayri, A.

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 money and banking 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

Candidates for the Master's degree should complete the following undergraduate courses: Economics 211, 212, 213, 214 and 227; 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 218, and 224; Mathematics 200 or its equivalent.

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 nine courses:

- 301 Macro-Economics: Theory and Policy.** 3.0; 3 cr. A survey of the classical, Keynesian, and post-Keynesian macroeconomic systems; a quantitative approach to macroeconomics and examination of stabilization policies. The format of the course is lectures, and macroeconomic modeling using TSP software. S. Andary.
- 302 Monetary-Economics with Special Reference to Central Banking and Monetary Policy.** 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 lectures with assigned presentations by students of monetary policy applications in individual countries. S. Andary.
- 303 International Finance: Balance of Payments Theory and Policy.** 3.0; 3 cr. Examines the concept of balance of payments and payment imbalances, adjustment processes and policies to cope with imbalances. Format includes lectures and assigned student presentations of selected topics. S. Makdisi.
- 304 Commercial Banking: Principles, Policies, Operations.** 3.0; 3 cr. Discusses key issues in commercial bank 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.
- 305 Financial Management for Credit Institutions.** 3.0; 3 cr. Studies the principles of financial management as applied to short-term and long-term credit institutions. Topics covered include models for financial planning, equity valuation, technical analysis.
- 306 Investment and Security Analysis.** 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.** 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 Financial Institutions and Regulations.** 3.0; 3 cr. Designed to provide an in-depth study of the legal environment of business with emphasis on financial rules and regulations. Although the focus is primarily on the Lebanese system, the course uses examples and problems relating to a variety of trading countries.
- 309 Money, Banking and Capital Markets in the Arab World.** 3.0; 3 cr. Studies the role of money and the emerging securities markets in Arab countries in the mobilization of savings and resource allocation. Compares debt financing with equity

financing in the region, and relates it to financial innovation and the evolution of universal bank systems leading to global financial integration.

Two additional courses will be chosen from the following list of courses:

- 310 Investment Banking with Special Reference to Advanced Financial Instruments.** 3.0; 3 cr. Topics covered include the derivatives markets, hedging speculation and arbitrage, options on common stocks, futures on TB's and bonds, swaps, and applications of investment banking instruments in the Lebanese market.
- 311 International Banking and Capital Movements.** 3.0; 3 cr.
- 312 Project Evaluation.** 3.0; 3 cr.
- 313 Industrial Organization and Public Policy.** 3.0; 3 cr.
- 314 Business Policy.** 3.0; 3 cr.
- 315 Organizational Theory.** 3.0; 3 cr.
- 316 Selected Topics in Monetary Economics and Finance.** 3.0; 3 cr. This course centers on the preparation of research papers covering topics in banking and finance.
- 398 Project.** Preparation of a major research work which the candidate has to defend successfully as part of his/her graduation requirements.
- 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 money and banking at the graduate level or who 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 301-309 in consultation with the Director of the Institute plus a thesis (MMB 399) equivalent to 9 credits of course work.

DEPARTMENT OF MATHEMATICS

Chairperson:	Shamsuddin, A.
Professors:	Abi Khuzam, F.; Hanna, A.; Lyzzaik, A.; Nasri, A.; Shamsuddin, A.
Associate Professors:	Abu-Khuzam, H.; Haidar, N.; Jureidini, W.; Nahlus, N.; Nikiel, J.
Assistant Professors:	Jalloul, G.; Nasri, A.
Instructors:	Bu Khuzam, M.; Khachadourian, Z.

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. A program leading to an M.S. degree in Computer Science is anticipated at a future date.

UNDERGRADUATE PROGRAM

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:

B.A. or B.S. in Mathematics

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

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 or Physics 211, 213 and EE 022.

All prospective computer science majors are expected to complete Mathematics 200, 201, 202 or 210, 211, and 212 in their sophomore year with a grade of at least 70 in Mathematics 200, and 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

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. Members of Department.
- 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. Members of Department.
- 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. Members of Department.
- 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. Members of Department.
- 203 Mathematics for Social Sciences I.** 3.0; 3 cr.; annually. *Not open to holders of Lebanese Bacc. II Exp. Sc. or Math. Elem. or 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. Members of Department.
- 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. A. Shamsuddin.

- 213 Higher Geometry.** 3.0; 3 cr.; annually. Isometry and similarity in Euclidean plane; groups of symmetries, introduction to ordered geometry and affine geometry. H. Abi-Khuzam.
- 214 Topology I.** 3.0; 3 cr.; annually. Prerequisite: 211. Topological spaces. Open and closed sets, bases. Connectedness, compactness, continuous functions; separation axioms; metric, product, and quotient spaces. J. Nikiel.
- 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. A. Hanna.
- 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. H. Abi-Khuzam.
- 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. H. Abi-Khuzam.
- 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. H. Abi-Khuzam.
- 225 Introduction to the Theory of Ordinary Differential Equations.** 3.0; 3 cr. Prerequisites: 202, 224. 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 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 Topics in Algebra I.** 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. A. Nahlus.
- 242 Topics in Algebra II.** 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, diagonal linear transformations, the triangular form theorem, Jordan and rational canonical forms. Group theory, Galois theory. A. Nahlus.

- 261 Number Theory:** 3.0; 3 cr.; annually. Prerequisite: 219. General introduction to the theory of numbers. Theorems of divisibility 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.; biannually. 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

- 207 Elementary Statistics for the Social Sciences.** 3.0; 3 cr.; annually. *Open only to Arts students.* Not open to any major in the Department. Not open to science students nor to those who hold Bacc II Exp. Sc. or Math. Elem. *Students cannot receive credit for more than one of the following: Mathematics 207, Economics 213, or Education 227.* Designed for 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. J. El-Haddad.
- 208 Elementary Statistics for the Sciences.** 3.0; 3 cr.; annually. Not open to students with prior credit in 233. *Students can receive credit for only one of 207 and 208.* 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 between numerical variables (regression). J. El-Haddad.
- 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 discrete and continuous 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. J. El-Haddad.
- 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.** (Same as EB 222). 2.2; 3 cr.; annually. Pre- or co-requisite: 234. Simple random, systematic, stratified, 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 Pascal. 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.* Introduces computers and illustrates their use through common application packages. Word-processing, spreadsheets and database systems are considered. Programming will be introduced through a commonly used programming language. 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.* Introduces computers and illustrates their use through common application packages. Word-processing, spreadsheets and database systems are considered. Programming will be introduced through a commonly used programming language. 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. W. Jureidini, A. Shamsuddin.

212 Intermediate Programming with Data Structure. 3.3; 4 cr.; annually. Prerequisite: 70 or more in 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. A. Nasri.

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 or 209, 202 or 210. Introduces the classical 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. W. Jureidini.

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. G. Jalloul.
- 256 Advanced Algorithms and Data Structures.** 3.0; 3 cr.; annually. Prerequisite: 212. Systematic study of algorithms and their complexity. Topics include advanced searching and sorting algorithms, graph and matrix algorithms, and intractable problems. A. Shamsuddin.
- 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 $<P$ problems, P-time reductions and NP-Completeness. W. Jureidini.
- 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 functional, object oriented, and rule-based paradigms, using the languages Lisp, Smalltalk, and Prolog. Students are assumed to be familiar with the procedural paradigms. G. Jalloul.
- 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 synchronizations, and general resource allocation. A. Nasri.
- 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. G. Jalloul.
- 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, file organization and the internal structures of database systems, and issues of query optimization, protection, concurrent operations, and distributed database systems. Students will be exposed to query languages such as SQL or Quel. W. Jureidini.
- 281 Numerical Linear Algebra.** 3.0; 3 cr.; biannually. 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 overrelaxation, Alternating directions, and conjugate gradient iterative methods.
- 282 System Design and Analysis.** 3.0; 3 cr.; biannually. 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. G. Jalloul.
- 283 The Logic of Programming.** 3.0; 3 cr.; biannually. 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: 256. Covers the practice of, and underlying mathematical foundation for, interactive graphics programming. Topics include segmentations, windows and viewports, clipping, hidden, lines, geometric transforms, data structures for memory management, and device independent graphics specifications. A. Nasri.
- 287 Artificial Intelligence.** 3.0; 3 cr.; annually. Prerequisites: 256, 258. 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.
- 303 Measure and Integration.** 3.0; 3 cr.; annually. Prerequisite: 224. 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. J. Nikiel.
- 315 Algebraic Topology II.** 3.0; 3 cr.; annually. Prerequisite: 314. Characteristic functions; types of convergence; limiting properties of distribution and characteristic functions; limit theorems; multivariant functions.
- 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 cogenerators, tensor products and flat modules. Finiteness conditions; Artinian and Neotherian modules and rings, modules with composition series. A. Shamsuddin.
- 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. A. Hanna.
- 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

- 331 Advanced Probability Theory.** 3.0; 3 cr.; annually. Prerequisites: 227, 238, 304. 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 T^2 ; 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:	Nasr, W.
Associate Professors:	Nasr, W.
Assistant Professors:	Arabi, O.; Haydar, B.; Kassab, E.
Lecturer:	Agha, S.; 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, 202, 203 and 204.

- 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. E. Kassab.
- 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. W. Nasr.
- 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. Members of Department.
- 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. S. Agha, E. Kassab.
- 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. W. Nasr.
- 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. E. Kassab.
- 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. S. Agha.
- 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:	El-Eid, M.; Heineken, F.
Associate Professors:	Abou Ghantous, M.; Christidis, T.; Haidar, N.
Assistant Professors:	Al-Kassab, T.; Chehab, S.; °Klushin, L.
Lecturers:	Katul, J.; Trad, S.
Instructors:	Atassi, M.; Khoury, V.; Zableet, T.
Assistant Instructors:	Mneimneh, M.; Shaya, W.

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 an average of at least 70 in the physics courses normally taken in the Sophomore year (211, 212, 213, 214) and an average of at least 70 in Mathematics 201 and 202 before they are allowed to proceed to the junior level. 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, 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* physics course out of each of the following pairs of courses: 101-103; 102-204; 105-107; 106-206.

° On furlough or leave

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.

- 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. Members of Department.
- 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, the first and second laws and entropy. Members of Department.
- 103 Physics for the Life Sciences.** 3.0; 3 cr.; annually. Units and dimensions, scalars and vectors. Kinematics, dynamics, energy, gravitation, and rotational motion. Members of Department.
- 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. Members of Department.
- 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. Members of Department.
- 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. Members of Department.
- 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. M. El-Eid.
- 204 Classical Physics for Medical Sciences.** 3.0; 3 cr.; annually. Prerequisite: 103. Fluids, thermodynamics. wave phenomena, geometrical and physical optics. Members of Department.
- 205 Modern Physics for Medical 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, elementary particles. Members of Department.
- 206 Classical Physics for Medical 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. Members of Department.
- 207 Modern Physics for Medical 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. Members of Department.
- 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. Members of Department.
- 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 Schrödinger equation with simple applications, the notion of atomic physics and an elementary introduction to both nuclear and elementary particles physics. Members of Department.
- 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. Members of Department.
- 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, photoelectric effect, Bragg's and electron diffraction. Members of Department.
- 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, Lagrangian mechanics. M. El-Eid.
- 218 Quantum Mechanics I.** 3.0; 3 cr.; annually. Prerequisite: 224. Wave packets and the postulates of quantum theory, operators, eigenvalues and eigenfunctions, one-dimensional problems and the harmonic oscillator. The Schrödinger equation in three dimensions, angular momentum and the hydrogen atom. T. Christidis.
- 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. T. Christidis.
- 220 Electromagnetic Theory.** 3.0; 3 cr.; annually. Electrostatics, electric currents, magnetostatics, induction, Maxwell's equations and wave propagation. T. Al-Kassab
- 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. J. Katul
- 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, semiconductors, dielectrics, optical magnetic, super-conducting properties of solids. S. Chehab.
- 227 Elementary Particles.** 3.0; 3 cr. Prerequisite: 218.
- 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-digital conversion. T. Christidis.

- 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. Members of Department.
- 231 Selected Topics.** 3.0; 3 cr. May be repeated for credit. Members of Department.
- 232 Selected Topics.** 3.0; 3 cr. May be repeated for credit. Members of Department.
- 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. M. Abou Ghantous.
- 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. N. Haidar.
- 242 Computational Physics Laboratory.** 0.2, 1 cr.; annually. Prerequisite: 241. Two-hour weekly laboratory on "Mathematica." M. Abou Ghantous.
- 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. T. Christidis.
- 248 Undergraduate Seminar.** 1.0; 1 cr.; annually. Prerequisite: Senior standing. Members of Department.
- 249 Nuclear 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. Members of Department.

GRADUATE PROGRAM

The Department provides facilities for graduate work leading to the M.S. degree. The research activities of the Department include biophysics, condensed matter physics, electron paramagnetic resonance, chaos, and astrophysics.

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.

- 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, Hamiltonian equations, canonical transformations and Hamilton-Jacobi theory, stability, integrable systems and chaotic motion. S. Trad.
- 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, fluctuations. M. El Eid.
- 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, electromagnetic waves. M. Abou Ghantous.
- 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 Schrödinger equation, quantized harmonic oscillators, path integrals, radial wave equation, and time-independent perturbation theory. M. El Eid.
- 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. M. El Eid.
- 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 metal, Coulomb gas, Fermi liquid, electrons and phonons, superconductivity, superfluidity, magnetism, disordered systems and critical phenomena. M. Abou Ghantous.
- 308 Nuclear Physics.** 3.0; 3 cr.
- 309 and 310 Selected Topics.** 3.0; 3 cr. (each). May be repeated for credit. Members of Department.
- 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:	Iskandar, A.
Associate Professors:	Hamzeh, N.; Harik, J.; Khashan, H.; Khazen, F.; Kisirwani, M.; Moussalli, A.; Nehme, M.; Salem, P.
Assistant Professors:	Antoun, R.; Krayem, H.;
Senior Lecturers:	Rahhal, A.
Lecturers:	Chalak, H.; Dib, G.; Masri, S.; Nakib, K.; Salam, N.
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 plus a minimum grade of 70 in English 203 and 204; a cumulative average of 70 in CS 201 and 202; and a minimum grade of 70 in either SBS 201 or 202. 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, SBS 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.

- 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. Members of Department.
- 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. Members of Department.
- 203 Research Methodology.** 3.0; 3 cr. 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. J. Harik.
- 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. N. Hamzeh, P. Salem.
- 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. F. El-Khazen, H. Khashan.
- 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. G. Bitar-Ghanem.
- 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. A. Moussalli.
- 216 Western Political Thought I.** 3.0; 3 cr. A survey of Greco-Roman political thought with special reference to social developments. N. Hamzeh.
- 217 Western Political Thought II.** 3.0; 3 cr. A survey of Western political thought from the Renaissance to the present. P. Salem.
- 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. F. El-Khazen.
- 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. J. Harik.
- 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. H. Khashan, H. Krayem.
- 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. J. Harik, H. Krayem.
- 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. F. El-Khazen, H. Krayem.
- 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. R. Antoun.
- 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. H. Khashan.
- 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. R. Antoun.
- 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. R. Antoun.
- 275 Organization and Management.** 3.0; 3 cr. 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. M. Kisirwani.
- 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. G. Bitar-Ghanem.
- 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. H. Khashan.

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. N. Hamzeh.

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. P. Salem.

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. F. El-Khazen.
- 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. N. Hamzeh.
- 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. H. Krayem.
- 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. J. Harik.
- 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. H. Krayem.
- 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. P. Salem.
- 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. M. Kisirwani.
- 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. M. Kisirwani.
- 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. R. Antoun.
- 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.; Diab, L.; Khalaf, S.
Associate Professors:	Faour, M.
Assistant Professors:	Awaida, M.; Diab, H.; Imam, A; Nabti, P.
Lecturers:	Azzam, I.; Sukariyah, B.
Instructors:	Dabbagh, S.; Habbal, D.; Jamali, D.; Mirhij, R.

The Department of Social and Behavioral Sciences (SBS) 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 SBS 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 SBS 202 more than twice. Prospective majors who obtain a grade below 60 in SBS 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 SBS 202, 211, 217 or 225, 219, 221, 223, 233, and 293. In addition to these required courses, the student must elect at least 15 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 or Mathematics 207.

- 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. Members of Department.
- 211 Social Psychology.** 3.0; 3 cr.; annually. Prerequisite: 202. The study of the behavior of the individual in relation to social stimulus situations. L. Diab.
- 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.

- 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. A. Imam.
- 221 Psychology of Learning.** 3.0; 3 cr.; annually. Prerequisite: 202. Examines neurological, behavioral and other current approaches to human learning. A. Imam.
- 223 Experimental Methods.** 2.3; 3 cr.; annually. Prerequisites: 219, 221 or 233, 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. M. Awaida.
- 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. M. Awaida.
- 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. Prerequisite: 202. Psychological development from before birth to adulthood. M. Awaida.
- 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. M. Awaida.
- 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. A. Imam.
- 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 SBS 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 SBS 201 more than twice. Prospective majors who obtain a grade below 60 in SBS 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 SBS 201, 210, 212, 214, 216 or 218, 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 or Mathematics 207.

- 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. 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. M. Faour.
- 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. P. Nabti.
- 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. S. Khalaf.
- 216 Arab Culture and Society.** 3.0; 3 cr.; alternate years. Prerequisite: 201. 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. M. Faour; P. Nabti.
- 218 Analysis of Social and Behavioral Data.** 3.0; 3 cr. Prerequisite: 210 and a course in statistics. 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. M. Faour.
- 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. N. Dajani.
- 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. S. Khalaf.
- 224 Population Studies.** 3.0; 3 cr.; alternate years. Prerequisite: 201. Introduction to the field of population studies; basic techniques and methods of demographic analysis; issues in population policy and planning. M. Faour.
- 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. M. Faour; P. Nabti.
- 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. P. Nabti.
- 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. S. Khalaf.
- 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. N. Dajani.
- 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. N. Dajani.
- 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. N. Dajani.
- 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. Prerequisite: 201. A senior 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. M. Faour.
- 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 SBS 301 (or SBS 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 Mathematics 207. 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. Prerequisites: 217, 225. History and method of assessment, and specific diagnostic techniques.
- 309 Counseling and Psychotherapy.** 3.0; 3 cr.; alternate years. Prerequisite: 307. Theories and practices of psychological counseling.
- 311 Seminar in Social Psychology.** 3.0; 3 cr.; annually. Prerequisite: 301. 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 SBS 300 plus at least four 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 will participate in actual research projects and will apply various techniques of data collection and analysis to interpret research findings. M. Faour.

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.

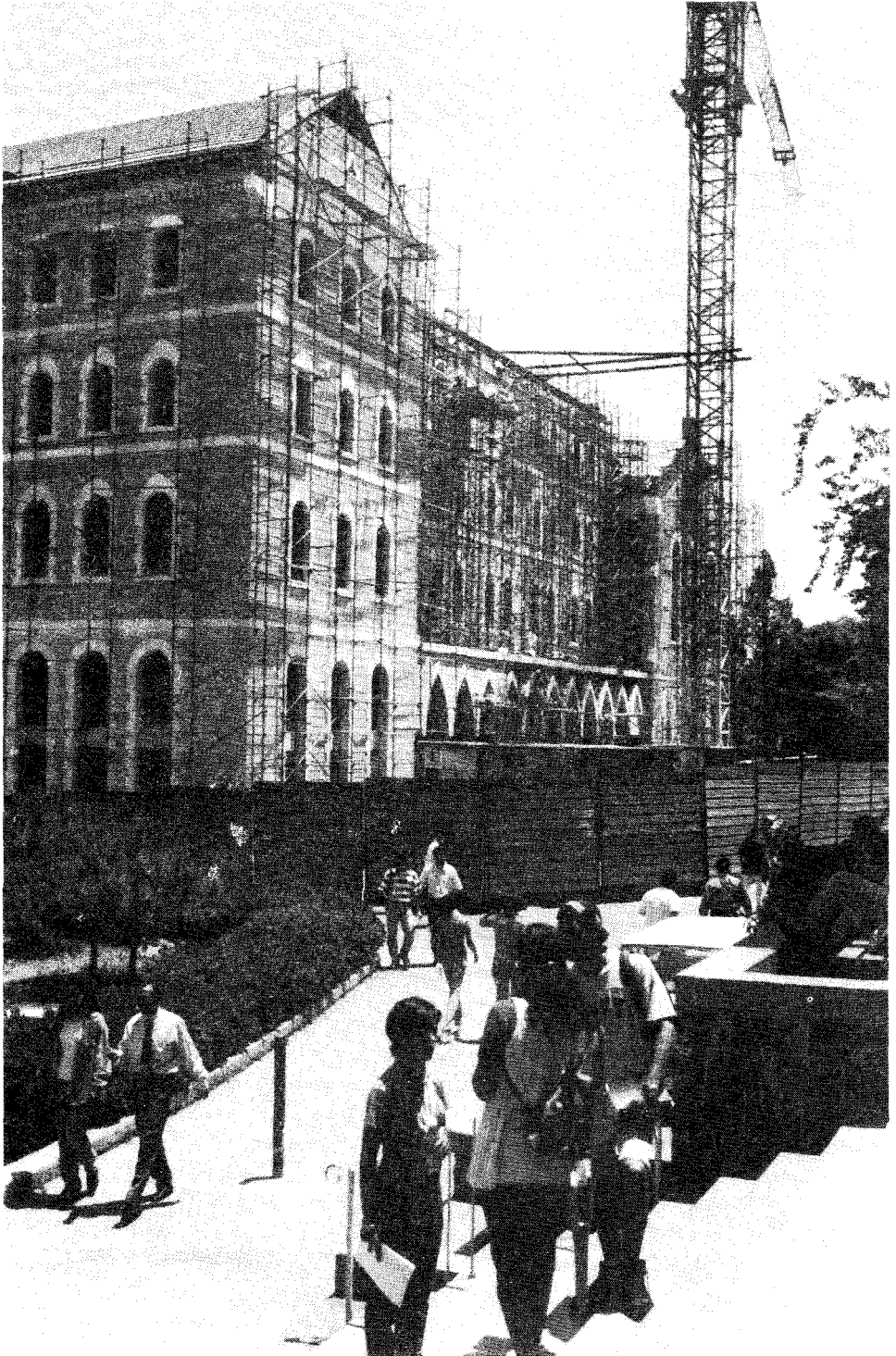
312 Advanced Sociological Theory. 3.0; 3 cr.; alternate years. Prerequisite: Graduate standing. A survey in-depth of the major theoretical developments in current sociology. The seminar focuses on both systematic treatment of issues and theories as well as the contributions of leading theorists. S. Khalaf.

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. S. Khalaf.

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. P. Nabti.

- 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. Prerequisite: 258. 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. M. Faour.
- 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. P. Nabti.
- 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. M. Faour.
- 399 Thesis.** 6 cr.; annually.



The new College Hall approaching completion, seen from the steps of the student cafeteria in Ada Dodge Hall.



*Faculty of
Medicine*

FACULTY OF MEDICINE

FACULTY LIST 1996-97

Officers of the Faculty

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President
Samir A. Makdisi	Deputy President
Samir S. Najjar	Dean, Faculty of Medicine and Medical Center
Joseph A. Simaan	Associate Dean for Academic Affairs
Nadim E. Cortas	Associate Dean for Research and Development
Marwan M. Uwaydah ³	Associate Dean for Hospital Affairs, Chief of Medical Staff
Mounir Obeid ⁴	Acting Chief of Medical Staff
Raif E. Nassif ⁵	Director, University Hospital
Dieter Kuntz ⁶	Director, University Hospital
Ghassan N. Hamadeh	Director, University Health Service
Waddah N. Nasr	Registrar
Tannous A. Touma	Executive Officer

Professors Emeriti

Azar, Joseph, M.D., AUB; Internal Medicine
Dagher, Ibrahim, M.D., AUB; Surgery, Cardiothoracic, Clinical
Haddad, Fuad Sami, M.D., AUB; F.R.C.S., Canada; Surgery, Neurosurgery, Clinical
Manougian, Antranik, M.D., AUB; Psychiatry
Mufarrij, Afif, M.D., AUB; Human Morphology
Nachman, Henry, M.D., AUB; Pediatrics
Shwayri, Edmond, M.D., AUB; Internal Medicine, Nephrology
Tabbara, Riad, M.D., AUB; Internal Medicine, Cardiology

Honorary Professors

Fawwaz, George, Ph.D., University of Gratz; M.D., University of Heidelberg;
Pharmacology
Firzli, Salim, M.D., AUB; Pediatrics, Clinical

¹ Until December 19, 1996.

² As of December 20, 1996.

³ Until August 31, 1996.

⁴ As of September 1, 1996.

⁵ Until September 30, 1996.

⁶ As of October 1, 1996.

Nsouli, Afif, M.D., AUB; Surgery, Orthopedic, Clinical
Sabra, Fuad, M.D., AUB; Internal Medicine, Neurology

Professors

Abdelnoor, Alexander, Ph.D., University of Michigan; Microbiology and Immunology
Alam, Samir, M.D., AUB; Internal Medicine, Cardiology

- * Alami, Samih, Ph.D., M.D., University of Oklahoma; Pathology and Laboratory Medicine
- Araj, George, Ph.D., AUB; Pathology and Laboratory Medicine
- Atweh, Samir, M.D., M.Sc., AUB; Internal Medicine, Neurology

- ¹ Badr, Kamal, M.D., AUB; Internal Medicine
- Baraka, Anis, M.D., B.Ch., D.A., D.M., University of Cairo; Anesthesiology
- Bekaily, Ghassan, Ph.D., Université de Sherbrooke; Pharmacology and Therapeutics
(Adjunct)

Bikhazi, Anwar, Ph.D., University of Michigan; Physiology

- * Birbari, Adil, M.D., AUB; Physiology, Internal Medicine, Nephrology
- ² Comair, Youssef, M.D., Université Saint Joseph, Beirut; Surgery
- Cortas, Nadim, M.D., AUB; Pharmacology and Therapeutics, Internal Medicine
- Durr, Ibrahim, Ph.D., Case Western Reserve University; Biochemistry
- Habbal, Zuhair, Ph.D., AUB; Pathology and Laboratory Medicine
- Hemady, Kamal, M.D., AUB; Surgery, Urology
- Issa, Philip, M.D., Université Saint Joseph, Beirut; Radiotherapy
- * Jabbur, Suhayl, M.D., AUB; Ph.D., University of Washington; Physiology
- Karam, Karam, M.D., AUB; Obstetrics and Gynecology, Clinical
- Khalil, Ismail, M.D., AUB; Surgery, Vascular
- Khauli, Raja, M.D., AUB; Surgery, Urology
- Khogali, Mustafa, M.B.B.S., D.M., University of Khartoum; Family Medicine.
- Mikati, Mohammad, M.D., AUB; Pediatrics
- Mroueh, Adnan, M.D., AUB; Obstetrics and Gynecology, Clinical
- Muallem, Musa, M.D., AUB; Anesthesiology
- Mufarrij, Amjad, M.D., AUB; Pathology and Laboratory Medicine
- ³ Nabbut, Nassim, Ph.D., University of Texas; Microbiology
- Najjar, Samir, M.D., AUB; Pediatrics
- Nassar, Camille, Ph.D., AUB; Physiology
- Nassar, Nabil, M.D., AUB; M.P.H., Johns Hopkins University; Internal Medicine,
Infectious Diseases
- Nasser, Michel, M.D., University of Geneva; Physiology, Internal Medicine, Cardiology
- ⁴ Nassif, Raif, M.D., AUB; M.P.H. Yale University; Laboratory Medicine
- Rebeiz, Jean, M.D., AUB; Pathology, Internal Medicine, Neurology

* On tenure appointment.

¹ Visiting July 1 - December 31, 1996.

² As of January 1, 1997.

³ Retired September 30, 1996.

⁴ Retired September 30, 1996.

Rizk, Ghassan, M.D., AUB; Diagnostic Radiology.

Saadé, Nayef, Doctorat d'Etat ès Sciences, University of Paris; Human Morphology, Physiology

- * Salti, Ibrahim, M.D., AUB; Ph.D., University of Toronto; Internal Medicine, Endocrinology
- Shammaa, Munir, M.D., AUB; Internal Medicine, Gastroenterology, Clinical
- * Simaan, Joseph, M.D., AUB; Pharmacology and Therapeutics
- Uthman, Suhayl, M.D., AUB; Internal Medicine, Gastroenterology, Clinical
- Uwaydah, Marwan, M.D., AUB; Internal Medicine, Infectious Diseases, Microbiology
- Zaatari, Ghazi, M.D., AUB; Pathology and Laboratory Medicine
- Zaynoun, Shukrallah, M.D., AUB; Dermatology, Clinical

Honorary Associate Professors

Abu Haydar, Fadlo, M.D., AUB; Internal Medicine, Gastroenterology, Clinical
Bulos, Suhayl, M.D., AUB; Surgery, Orthopedic, Clinical

Associate Professors

- Abbas, Jaber, M.D., AUB; Surgery, General, Clinical
Baroudi, Maurice, M.D., AUB; Anesthesiology
Bikhazi, Kamal, M.D., AUB; Surgery, General, Clinical
Bulbul, Mohammad, M.D., AUB; Surgery, Urology, Clinical
Dabbous, Ibrahim, M.D., AUB; Pediatrics, Clinical
Daouk, Majida, M.B.B.Ch., Ain Shams University; Internal Medicine, Nephrology
- ¹ Fahl, Muhieddine, M.B.B.Ch., Alexandria University; Diagnostic Radiology
 - Haddad, Maurice, M.D., Université Saint Joseph, Beirut; Diagnostic Radiology
 - Haddad, Raja, M.D., AUB; Surgery, Cardiothoracic, Clinical
 - Hamadeh, Ghassan, M.D., AUB; Family Medicine
 - Haroun-Bizri, Sania, M.D., Université Saint Joseph, Beirut; Anesthesiology
 - ² Houmeidan, Fadia, Ph.D., University of Birmingham; Physiology (Visiting)
 - ³ Hourani, Mukbil, M.D., AUB; Diagnostic Radiology
 - Hubaytar, Rafic, M.D., AUB; Internal Medicine, Respiratory, Clinical
 - Hubballah, Malek, M.D., AUB; Surgery, Neurosurgery, Clinical
 - Jabbour-Khoury, Samar, M.D., University of Damascus; Anesthesiology
 - ⁴ Jurjus, Abdo, Ph.D., AUB; Human Morphology
 - Kaid Bey, Sami, M.D., AUB; Internal Medicine, Cardiology, Clinical
 - Khalifeh, Riad, M.D., AUB; Internal Medicine, Neurology, Clinical
 - Khalil, Ali, M.D., AUB; Obstetrics and Gynecology, Clinical

* On tenure appointment.

¹ Deceased September 24, 1996.

² As of January 20, 1997.

³ As of September 1, 1996.

⁴ On leave of absence

FACULTY OF MEDICINE

Khaouam, Edward, M.D., Université Saint Joseph, Beirut; Ophthalmology, Clinical
Khoury, Ghattas, M.D., Madrid University; Surgery, General and Vascular, Clinical
Kibbi, Abdul Ghani, M.D., AUB; Dermatology
Louis, Faek, M.D., Université Saint Joseph, Beirut; Anesthesiology
Malak, Johnie, M.D., AUB; Dermatology, Clinical
Mansour, Ahmad, M.D., AUB; Ophthalmology, Clinical
Matta-Muallem, Mona, M.D., AUB; Dermatology, Clinical
Musallam, Salim, M.D., AUB; Pediatrics, Clinical
Najjar, Faysal, M.D., AUB; Surgery, General, Clinical
Nasr, Fuad, M.D., AUB; Internal Medicine, Rheumatology, Clinical
Nasrallah, Antoine, M.D., AUB; Internal Medicine, Cardiology, Clinical
Nassar, Sami, M.D., AUB; Surgery, Neurosurgery, Clinical
Noureddin, Baha, M.D., AUB; Ophthalmology
Nuwayri-Salti, Nuha, M.D., AUB; Human Morphology
Rubeiz, George, M.D., AUB; Internal Medicine, Cardiology
Rubeiz, Michel, M.D., AUB; Surgery, Plastic, Clinical
Saadeh, Faysal, Ph.D., AUB; Human Morphology
Saba, Maurice, M.D., AUB; Surgery, Neurosurgery, Clinical
Sabra, Ramzi, M.D., AUB; Pharmacology and Therapeutics
Salamoun, Samir, M.D., AUB; Ophthalmology, Clinical
Salem, Antoun, M.D., AUB; Internal Medicine, Gastroenterology, Clinical
Salem, Ziad, M.D., AUB; Internal Medicine, Hematology-Oncology, Clinical
Sawaya, Jabir, M.D., AUB; Internal Medicine, Cardiology, Clinical
Sfeir, Roger, M.D., AUB; Surgery, Vascular, Clinical
Sibai, Abdel-Nour, M.B.B.Ch., Ain Shams; D.A., London; Anesthesiology
Suidan, Fayez, M.D., AUB; Obstetrics and Gynecology, Clinical
Tabbarah, Zuhayr, M.D., AUB; Internal Medicine, Infectious Diseases, Clinical
Taha, Assaad Mohieddine, M.D., AUB; Ph.D., Medical College of Ohio; Surgery,
General, Physiology
Zaytoun, George, M.D., AUB; Otolaryngology & Head and Neck Surgery, Clinical

Honorary Assistant Professors

Moadie, Jean, M.D., AUB; Internal Medicine, Clinical

Assistant Professors

Abi-Saad, George, M.D., AUB; Surgery, General, Clinical
Abu-Musa, Antoine, M.D., AUB; Obstetrics and Gynecology
Akel, Samir, M.D., AUB; Surgery, Plastic, Clinical
Al-Awar, Ghassan, M.D., AUB; Internal Medicine, Infectious Diseases
Almawi, Wasim, Ph.D., Dal Housie University; Biochemistry
Atiyeh, Bishara, M.D., AUB; Surgery, Plastic, Clinical
Awwad, Jonny, M.D., AUB; Obstetrics and Gynecology
Awwad-Maroun, Marie, M.D., Université Saint Joseph, Beirut; Anesthesiology
Azar, Ghassan, M.D., AUB; Obstetrics and Gynecology, Clinical

- Azar, Sami, M.D., AUB; Internal Medicine, Endocrinology
 Bakri, Musbah, M.D., Université Saint Joseph, Beirut; Ophthalmology, Clinical
 Barada, Kassem, M.D., AUB; Internal Medicine, Gastroenterology
 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., AUB; Pediatrics
 Bizri, Abdul-Rahman, M.D., University of Damascus; Internal Medicine, Infectious Diseases
 Dabbous, Aliya, M.D., AUB; Anesthesiology
 1 Daher, Rose, Ph.D., Cleveland State University; Pathology and Laboratory Medicine
 2 Dandan, Imad, M.D., A.U.B.; Surgery, General
 3 Dbaibo, Ghassan, M.D., A.U.B.; Pediatrics
 Fayyad, Michel, M.D., AUB; Pediatrics
 Ghandour, Adel, M.B.B.Ch., Cairo University; Surgery, Cardiothoracic, Clinical
 Haddad, George E., Ph.D., University of Sherbrooke; Pharmacology
 Haddad, George F., M.D., AUB; Surgery, Neurosurgery, Clinical
 Haddad, Randa, M.D., AUB; Ophthalmology
 Hadi, Usama, M.D., AUB; Otolaryngology & Head and Neck Surgery, Clinical
 Haidar, Joud, M.D., Damascus University; Pathology and Laboratory Medicine
 Haidar, Rashid, M.D., AUB; Surgery, Orthopedic
 Hamdan, Abdullatif, M.D., AUB; Otolaryngology & Head and Neck Surgery, Clinical
 Hannoun, Antoine, M.D., AUB; Obstetrics and Gynecology
 Hussein, Maher, M.D., AUB; Surgery, General and Vascular, Clinical
 Jamaluddine, Ghassan, M.D., AUB; Internal Medicine, Respiratory
 Kanaan, Nabil, M.D., AUB; Family Medicine
 Kaspar, Hanna, M.D., AUB; Obstetrics & Gynecology, Pathology and Laboratory Medicine
 Khani, Munir, M.D., AUB; Psychiatry
 4 Khatib, Mohammad, B.S. Eng., M.S. Bio. Med. Eng., AUB; Ph.D., Case Western Reserve University; Anesthesiology
 Khoury, Maurice, M.D., AUB; Internal Medicine, Cardiology
 Kreidieh, Ibrahim, M.D., AUB; Surgery, General, Clinical
 Lakkis, Suhayl, M.D., AUB; Surgery, Orthopedic, Clinical
 5 Lteif, Antoine, M.D., Université Saint Joseph, Beirut; Anesthesiology
 Matar, Ghassan, Ph.D., AUB; Microbiology and Immunology
 Medawar, Walid, M.D., AUB; Internal Medicine, Nephrology
 Murad, Fadi, M.D., AUB; Internal Medicine, Gastroenterology
 Musharafieh, Ramzi, M.D., AUB; Surgery, Orthopedic
 Muwakkit, Samar, M.D., AUB; Pediatrics

¹ As of September 18, 1996.

² As of September 1, 1996.

³ As of July 1, 1996.

⁴ As of October 21, 1996.

⁵ As of October 1, 1996.

FACULTY OF MEDICINE

Nagalakshmi, Krishnan, Ph.D., University of Bombay; Radiotherapy
Natout, Mohammad Ali, M.D., AUB; Otolaryngology & Head and Neck Surgery, Clinical
Nauphal, Maud, M.D., Université Saint Joseph, Beirut; Anesthesiology
Obeid, Mounir, M.D., AUB; Surgery, Cardiothoracic
Ramadan, Fuad, M.D., Royal College of Surgeons, Ireland; Internal Medicine,
Respiratory, Clinical
Rebeiz, Nelly, M.D., AUB; Dermatology
Saab, Basim, M.D., AUB; Family Medicine
¹ Sabban, Marwan, Ph.D., Oxford University; Human Morphology
Saghir, Najj, M.D., Free University of Brussels; Internal Medicine, Hematology-
Oncology, Clinical
Salem-Shabb, Nina, M.D., AUB; Pathology
Salman, Salah, M.D., AUB; Dermatology
Sawaya, Raja, M.D., AUB; Internal Medicine, Neurology
Seoud, Muhieddine, M.D., AUB; Obstetrics and Gynecology
Shabb, Bassim, M.D., AUB; Surgery, Cardiothoracic
Shamat, Suleima, Doctorat d'Etat ès Sciences, Université Paris VII; Microbiology and
Immunology
Shamsuddin, Ali, M.B.B.Ch., Alexandria University; Internal Medicine, Hematology-
Oncology
Shbaklo, Zuheir, M.D., AUB; Dermatology, Clinical
Shucair, Mahmoud, M.D., University of Madrid; Internal Medicine, Endocrinology,
Clinical
Sidani, Mustafa, M.D., AUB; Surgery, General, Clinical
Siddik-Sayyid, Sahar, M.D., Université Saint Joseph, Beirut; Anesthesiology
Slim, Rima, Ph.D., Institut Pasteur, Paris; Biochemistry
Soubra, Maher, M.D., AUB; Surgery, Pediatrics, Clinical
Taha, Samar, M.D., AUB; Anesthesiology
Taher, Ali, M.D., AUB; Internal Medicine, Hematology-Oncology
Tawil, Ayman, M.D., AUB; Pathology and Laboratory Medicine
Tayyim, Ahmad, M.D., AUB; Surgery, Orthopedic
Usta, Ihab, M.D., AUB; Obstetrics and Gynecology
Usta, Julnar, Ph.D., AUB; Biochemistry
Uthman, Imad, M.D., AUB; Internal Medicine, Rheumatology
Wazzan, Wasim, M.B.B.Ch., Alexandria University; Surgery, Urology, Clinical
Younis, Khaled, M.D., AUB; Pediatrics
Zahed, Leila, Ph.D., University of London; Pathology and Laboratory Medicine, Genetics

Lecturers

Achram, Mitri, M.D., Université Saint Joseph, Beirut; Diagnostic Radiology
Afeich, Nadim, M.D., AUB; Surgery, Orthopedic, Clinical
Ariss, Timani-Majd, Université Saint Joseph, Beirut; Pediatrics

¹ As of January 20, 1997.

Ayyoub, Charles, M.B.B.S., University of Adelaide, South Australia; Pediatrics, Clinical
 Baddoura, Omar, M.D., Université Saint Joseph, Beirut; Surgery, Orthopedic, Clinical
 Farah, Nadim, M.D., AUB; Ophthalmology, Clinical
 Gharzuddine, Walid, M.B.B.Ch., Cairo University; Internal Medicine, Cardiology
 Jabir, Raif, M.D., AUB; Internal Medicine, Endocrinology, Clinical
 Kaddoura, Imad, M.B.B.Ch., Alexandria University; Surgery, Plastic, Clinical
 Kanj, Nadim, M.D., AUB; Internal Medicine, Respiratory
 Karam, Elie, M.D., AUB; Psychiatry, Clinical
 Karam, Nadim, M.D., AUB; Family Medicine, Clinical
 Masri, Abdul-Fattah, M.D., AUB; Internal Medicine, Rheumatology, Clinical.
 Mokhbat, Jack, M.D., Université Saint Joseph, Beirut; Internal Medicine, Infectious
 Diseases, Clinical
 Mroueh, Salman, M.D., AUB; Pediatrics
 Mufarrij, Nazih, M.D., AUB; Surgery, Neurosurgery, Clinical
 Munla, Nabil, M.D., Université Saint Joseph, Beirut; Pediatrics, Clinical
 Taha, Assad Mohammad, M.D., AUB; Surgery, Orthopedic, Clinical
 Yamout, Bassem, M.D., AUB; Internal Medicine, Neurology, Clinical
 Zarwi, Ahmad, M.D., University of Geneva; Psychiatry, Clinical

Instructors

Arnaout, Samir, M.D., Craiova University, Romania; Internal Medicine, Cardiology
 Aswad, Naji, M.D., AUB; Obstetrics and Gynecology, Clinical
 Daher, Rose, Ph.D., Cleveland State University; Pathology and Laboratory Medicine
 El-Zein, Yusef, M.D., University of Zaghreb; Diagnostic Radiology
 Farah, Suhayl, M.D., AUB; Internal Medicine, Gastroenterology, Clinical
 Haidar, Joud, M.D., Damascus University; Pathology and Laboratory Medicine
 Houry, Nabil, M.D., Université Saint Joseph, Beirut; Diagnostic Radiology
 Maalouf, Riad, M.D., AUB; Ophthalmology, Clinical
 Major, Stella, B.M.B.S., University of London; Family Medicine
 Makarem, Malek, M.D., University of Seville; Family Medicine, Clinical
 Makhoul-Akel, Madelaine, M.D., AUB; Family Medicine
 Musharafieh, Umayya, M.D., A.U.B.; Family Medicine
 Nabulsi-Khalil, Mona, M.D., AUB; Pediatrics
 Saad, Atef, M.D., AUB; Internal Medicine, Gastroenterology, Clinical
 Sharara, Nabil, M.D., AUB; Family Medicine
 Sukkarieh, Ismail, M.B.B.Ch., Cairo University; Internal Medicine, Gastroenterology,
 Clinical
 Usta, Jinan, M.D., AUB; Family Medicine

¹ As of October 15, 1996.

Clinical Associates

Abu-Raslan, Walid, M.B.B.Ch., Baghdad University; Pediatrics
Aghadjanian-Karam, Anne Marie; M.D., Université Saint Joseph, Beirut; Anesthesiology
Ammouri, Nabil, M.B.B.Ch., Ain Shams University; Diagnostic Radiology
Araj, Alia, M.D., AUB; Pediatrics
Ashkar, Khalil, M.D., AUB; Family Medicine
Awada, Ali, B.D.S., Cairo University; Otolaryngology & Head and Neck Surgery
Baddoura, Charles, M.D., Université Saint Joseph, Beirut; Psychiatry
Baladi, André, M.D., Université Saint Joseph, Beirut; Psychiatry
Bu-Haka, Rayyana, M.D., AUB; Pediatrics
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., AUB; Pediatrics
Halabi, Nadim, M.D., AUB; Internal Medicine, Neurology
Halabi, Nizar, M.D., Université Saint Joseph, Beirut; Psychiatry
Hallal, Mahmoud, M.B.Ch.B., Baghdad University, Internal Medicine, Gastroenterology
Hamasni, Shukri, M.B.B.Ch., Cairo University; Otolaryngology & Head and Neck
Surgery
Helou, Charles, M.D., University of Strasbourg, France; Ophthalmology
Hout, Jamal, M.D., AUB; Pediatrics
Imad, Zuhair, M.D., Rostov Medical Institute, USSR; Internal Medicine, Nephrology
Itani, Mohammad, M.D., AUB; Pediatrics
Jurdi-Noueihed, Fadi, M.D., AUB; Ophthalmology
Kabalan, Salim, M.D., University of Milan; Internal Medicine
Karam-Kaadi, Paulete, M.D. AUB; Dermatology
Karam, Sami, M.B.B.Ch., Cairo University; M.S., Northwestern University;
Otolaryngology & Head and Neck Surgery
Maalouf, Issam, M.D., AUB; Pediatrics
Mahfoud, Caroline, M.D., AUB; Pediatrics
Moallem, Shahrazad, M.D., Université Saint Joseph, Beirut; Anesthesiology
Mokdad, Ali, M.D., University of Zaghreb; Internal Medicine, Neurology
Mouradian, Emma, M.D., Yerevan Medical Institute; Anesthesiology
Nattout, Nizar, M.D., AUB; Surgery, Orthopedic
Ramadan, Hassan, M.D., AUB; Surgery
Rouhana, Corine, M.D., Université Saint Joseph, Beirut; Anesthesiology
Saad - Dibai, Nada, M.D., Université Saint Joseph, Beirut; Dermatology
Salameh-Karam, Huda, M.D., AUB; Internal Medicine
Saleh, Munzer, M.B.B.Ch., Alexandria University; Internal Medicine, Endocrinology
Sayyed, Khalid, M.D., AUB; Surgery, Urology
Shahin, Hassan, M.D., AUB; Ophthalmology
Sinno, Hassana, M.D., AUB; Anesthesiology
Sinnu, Khalil, M.D., AUB; Surgery, Urology
Soufi, Mustafa Sadek, Ph.D., University of California; Biochemistry

Takkoush, Muhammad, M.D., AUB; Anesthesiology
Torbey, Naji, M.D., AUB; Internal Medicine, Endocrinology
Yazbek-Karam, Vanda, M.D., Université Saint Joseph, Beirut; Anesthesiology
Zein, Camille, M.D., University of Studies of Rome; Internal Medicine, Endocrinology
Zoubair, Samir, M.D., AUB; Surgery, Urology

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. (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, Psychiatry, Microbiology and Immunology, Obstetrics and Gynecology, Ophthalmology, Otolaryngology & Head and Neck Surgery, Pathology and Laboratory Medicine, 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.

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 AUB. An applicant from outside AUB 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 92):

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.

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

The list of requirements for a student to be placed on the Dean's Honor List can be found on page 79 of this catalogue.

ACADEMIC REGULATIONS

A. ATTENDANCE

Regular attendance is required at lectures, laboratories, clerkships, and other assigned duties. No credit is given for work not performed. Students absent on account of illness or other valid reason 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

Students' 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 Year²					
Biochemistry 211 Basic Biochemistry	16	70	44	114	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
ID 206-207 Social and Preventive Medicine	16	34	46	80	4
ID 208 Nervous System	5	62	54	116	6
Epidemiology and Biostatistics 209 Medical Statistics	16	16	32	48	2
Physiology 210 General Physiology and Introductory Biophysics	16	48	16	64	3
			Total	931	41
Second Year²					
Microbiology 227	18	108	72	180	9
ID 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
Epidemiology and Biostatistics EB 226 Epidemiology	18	32	36	68	3
ID 223-224 Physical Diagnosis	36	36	72	108	3
			Total	964	45

¹ Weeks for First and Second years; months for Third, Fourth and Internship years.

² For courses given in other faculties, see Faculty concerned.

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	No. of Weeks or months ¹	Lecture & Clinical Recitation	Lab. or Clerkship Hours	Total Hours	Credits
Third Year²					
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 Year²					
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 ID Clerkship in Preventive Medicine and Public Health	0.5	10	80	90	--
Family Medicine 262 Clinical Clerkship	1	30	150	180	--
			Total	2246	

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
<i>1. Straight Internship</i>		
Internal Medicine 288, Pediatrics 288, Obstetrics and Gynecology 288, or Surgery 288	11	2882
Clinical Conferences		300
	Total	3182
<i>2. Mixed Internship</i>		
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

- ID 206-207 Social and Preventive Medicine.** 34.46; 4 cr.; annually. An integrated course stressing psychological and sociological aspects of medicine. N. Karam
- ID 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.
- ID 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 Department of Human Morphology.
- ID 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 Department of Physiology.

SECOND YEAR

- ID 221-222 Introduction to Medicine.** 108.72; 9 cr.; annually. See Department of Internal Medicine.
- ID 223-224 Physical Diagnosis.** 36.108; 3 cr.; annually. See Department of Internal Medicine.

GRADUATE

- FM 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.
- FM 302 Methods.** 16.64; 3 cr. Theory and practice of techniques used in the various disciplines of medical sciences. Basic Science Faculty.
- FM 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.
- FM 307 Biomedical Electronics.** 32.16; 3 cr.; alternate years. Introductory course in electricity and electronics as applied to biology and medicine. G. Tomey.
- FM 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.
- FM 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.

- FM 319-320 Integrated Research Seminars.** 16.0; 1 cr.; each. Participation of all Ph.D. students and professors. Basic Science Faculty.
- FM 330 Medical Pedagogy.** 3 cr. Tutorial in teaching methods and practical experience under supervision (open to Ph.D. candidates only). Basic Science Faculty.
- FM 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.; Dabbous, A.; Khatib, M. ¹ ; Lteif, A. ² ; 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.

- 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 patients and administration of anesthesia under supervision. Members of Faculty.
- 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.
- 269 Elective in Respiratory Therapy.** 0.180; 1 month. Rotation through the various fields covered by respiratory therapy. Members of Faculty.

¹ As of October 21, 1996.

² As of October 1, 1996.

DEPARTMENT OF BIOCHEMISTRY

Chairperson:	Durr, I.
Professor:	Durr, I.
Assistant Professors:	Almawi, W.; Slim, R.; Usta, J.
Associates:	Bazarbachi, A.; Dbaibo, G.; Salti, I.; Soufi, M.

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.

211 Basic Biochemistry. 70.44; 6 cr. Offered to medical students. Describes the living 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, W. Almawi, R. Slim, I. Salti, N. Cortas.

300 Basic Biochemistry. Similar to 211; offered to graduate students.

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. W. Almawi, J. Usta, R. Slim.

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.

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, W. Almawi, R. Slim.

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

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areas of glucocorticoids, human disorders and enzyme assays. I. Durr, W. Almawi, R. Slim, J. Usta.

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.

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.

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

Acting Chairperson:	Kibbi, A.G.
Professor:	Zaynoun, S. (Clinical)
Associate Professors:	Kibbi, A.G.; Malak, J. (Clinical); Matta-Muallem, M. (Clinical)
Assistant Professors:	Rebeiz, N.; Salman, S.; Shbaklo, Z. (Clinical)
Associates:	El-Saad-Dehaby, N.; Karam-Kaadi, P.

The Department of Dermatology participates in the undergraduate courses of Basic Histology (course 209) given to Med. I students, and Introduction to Medicine (course 221-222) given to Med. 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 care to patients. Residents in training are involved in daily general and specialty clinics including phototherapy, contact dermatitis, dermatologic surgery, and connective tissue clinics.

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.

287 Internship. 0.131-262; 1 month. Same as 267, offered to straight and rotating interns on an elective basis. Members of Faculty.

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

Acting Chairperson:	Haddad, M.
Professor:	Rizk, G.
Associate Professors:	Haddad, M.; Hourani, M. ¹
Lecturer:	Achram, M.
Instructor:	Khoury, N. ² ; El-Zein, Y.

The Department of Diagnostic Radiology offers elective clerkships to undergraduate students and a 3-year residency training program.

267 Introduction to Diagnostic Radiology. 22.158; 1 month. Elective open to fourth year medical students. Members of Department.

268 Advanced Elective in Diagnostic Radiology. 0.180; 1 month. Preequisite: 267. Elective open to fourth year medical students. It deals with special disciplines within diagnostic radiology. Members of Department.

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 and surgical grand round, medical, pediatric X-ray, radiology-pathology correlation, tumor, urology and ENT.

¹ As of September 1, 1996.

² As of October 15, 1996.

DEPARTMENT OF FAMILY MEDICINE

Chairperson:	Khogali, M.
Professor:	Khogali, M.
Associate Professor:	Hamadeh, G.
Assistant Professors:	Kanaan, N.; Saab, B.
Lecturer:	Karam, N. (Clinical)
Instructors:	Major, S.; Makarem, M. (Clinical); Makhlouf-Akel, M.; Musharafieh, U.; Shararah, N.; Usta, J.
Associate:	Ashkar, K.

The Department of Family Medicine offers clinical clerkship and speciality electives to medical students. It also offers clinical postgraduate training to MD graduates, including internship and residency training. The internship program is a 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 centers outside the AUB 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 AUB Community.

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 Faculty.

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 biopsychosocial 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 AUB.

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.

Conferences: Monday conferences, Journal Club, audio-digest, and video conference, Chairpersons Conference, Research Forum.

DEPARTMENT OF HUMAN MORPHOLOGY

Chairperson:	Saadé, N.
Professor:	Saadé, N.
Associate Professors:	Jurjus, A. ¹ ; Nuwayri-Salti, N.; Saadeh, F.
Assistant Professor:	Sabban, M. ²
Emeritus:	Mufarrij, A.
Associate:	Kibbi, A.G.

The Department of Human Morphology offers undergraduate courses to students in the Faculty of Medicine, and 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.

- 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.
- 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. Members of Faculty.
- 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.
- 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. Members of Department.
- 307 Gross Anatomy.** The same as 207. Offered to graduate students in the Department.
- 308 Neuroanatomy.** 28.39; 3 cr. Offered to graduate students. The neuroanatomy component of ID 208 Neuroscience. S. Atweh, S. Jabbur, N. Saadé.
- 309 Basic Histology.** Similar to 209, required of all graduate students of the Department.
- 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. Members of Department.

¹ On leave of absence.

² As of January 20, 1997.

- 312 Anatomy Tutorial.** 0.64; 2 cr. A guided literature review with special research problems. F. Saadeh, A. Jurjus.
- 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.
- 314-315 Seminar.** 0.32; 1 cr. Presentation and discussion of topics designated by members of the faculty. Members of Department.
- 316 Principles of Electron Microscopy.** 32.0; 2 cr.; alternate years. Lectures on, and demonstration of, basic techniques of electron microscopy. Members of Department.
- 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.
- 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.
- 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.
- 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.
- 397-398 M.S. Thesis.** Credit hours variable. Original research under staff supervision leading to the M.S. degree. Members of Department.
- FM 309 Biology of Nerve and Muscle.** See "Interdepartmental Teaching."
- 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.
Professors:	Alam, S.; Atweh, S.; Badr, K. ¹ ; Birbari, A.; Cortas, N.; Nassar, N.; Nasser, M.; Rebeiz, J.; Sabra, F. (Honorary); Salti, I.; Shammaa, M. (Clinical); Uthman, S. (Clinical) Uwaydah, M.
Associate Professors:	Daouk, M.; Hubayter, R. (Clinical); Kaid Bey, S. (Clinical); Khalifeh, R. (Clinical); Nasr, F. (Clinical); Nasrallah, A. (Clinical); Rebeiz, G.; Salem, A. (Clinical); Salem, Z. (Clinical); Sawaya, J. (Clinical); Tabbarah, Z. (Clinical)
Assistant Professors:	Al-Awar, G.; Azar, S.; Barada, K.; Bazarbachi, A.; Bizri, A.; Jamaledine, G.; Khoury, M.; Medawar, W.; Murad, F.; Ramadan, F. (Clinical); Saghir, N. (Clinical); Sawaya, R.; Shamseddine, A.; Shoucair, M.; Taher, A.; Uthman, I.
Lecturers:	Gharzuddine, W.; Jaber, R. (Clinical); Kanj, N.; Karam, E. (Clinical); Masri, A.F. (Clinical); Mokhbat, J. (Clinical); Yamout, B. (Clinical)
Instructors:	Arnaout, S.; Farah, S. (Clinical); Saad, A. (Clinical); Sukkariyeh, I. (Clinical)
Associates:	El-Imad, Z.; Halabi, N.; Hallal, M.; Mokdad, A.; Saleh, M.; Torbey, N.; Zein, C.
Emeriti:	Azar, J.; Shwayri, E.; Tabbara, R.

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.

ID 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 given in the form of lectures and discussion sessions, where students are introduced to clinical cases in the light of pathophysiology. Members of Faculty.

¹ Visiting July 1 - December 31, 1996.

- ID 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 followed by a practical session where the history and examination are demonstrated on actual patients. Members of Faculty.
- 246 Clinical Clerkship in Internal Medicine.** 120.540; 3 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.
- 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.
- 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.
- 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.

DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

Chairperson:	Abdel Noor, A.
Professors:	Abdel Noor, A.; Nabbut, N. ¹ ; Uwaydah, M.
Assistant Professors:	Chamat, S.; Matar, G.

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 for admission to the graduate program are stated in the chapter "Graduate Study" at the end of this catalogue.

- 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.
- 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, G. Al-Awar.
- 237 Microbiology for Nursing Degree Students.** 32.64; 3 cr. Fundamental aspects of medical microbiology for nursing students. N. Nabbut, S. Chamat, G. Matar.
- 260 Elective in Infectious Diseases.** 0.180, 1 month. Basic evaluation, diagnosis and management of infectious diseases. M. Uwayada.
- 261 Elective in Immunology.** 0.180, 1 month. Introduction to immunological research and its application to clinical practice. A. Abdelnoor.
- 301 Microbiology and Immunology.** Similar to 227; offered to graduate students.
- 310 Basic Immunology.** 32.32; 3 cr. Starts September 1, annually in the first semester. Offered selectively to graduate students. Covers section I (Immunology) of course 227 (301) and includes additional laboratory sessions. A. Abdelnoor.
- 311 Bacteriology.** 32.32; 3 cr. Offered selectively to graduate students. Covers section II of course 227 (301). N. Nabbut, M. Uwaydah.
- 312 Parasitology-Mycology.** 16.32; 2 cr. Offered selectively to graduate students. Covers section III of course 227 (301). Members of Department.
- 313 Virology.** 16.32; 2 cr. Offered selectively to graduate students. Covers section IV of course 227 (301). S. Chamat.
- 314 Tutorial in Immunology.** 32.0; 2 cr. A. Abdelnoor.
- 315 Tutorial in Bacteriology.** 32.0; 2 cr. N. Nabbut, M. Uwaydah.
- 316 Tutorial in Virology.** 32.0; 2 cr. S. Chamat.
- 317 Tutorial in Parasitology-Mycology.** 32.0; 2 cr. Members of Department.

¹ Retired September 30, 1996.

- 326 Applied and Advanced Immunology.** 32.64; 3 cr.; alternate years. Prerequisite: 227 (301) or 310. Immunological diseases and their laboratory diagnosis. A. Abdelnoor.
- 327 Applied and Advanced Medical Bacteriology.** 32.64; 3 cr.; alternate years. The epidemiology, pathogenesis, immune response, diagnosis and prevention of bacterial infections. N. Nabbut, M. Uwaydah.
- 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.
- 329 Applied and Advanced Virology.** 32.64; 3 cr. A treatise on epidemiology, pathogenesis, immune response, diagnosis and prevention of viral infections. S. Chamat.
- 330 Molecular Microbiology.** 32.64; 3 cr. Molecular applications on the identification of infectious agents. G. Matar.
- 331 Infection Control.** 16.0; 1 cr. A treatise on the prevention of infections in the laboratory. Members of Department.
- 390 Seminar.** Yearly. 0.32; 1 cr. Members of Department.
- 394 Journal Club.** Yearly. 0.32; 1 cr. Members of Department.
- 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); Suidan, F. (Clinical)
Assistant Professors:	Abu-Musa, A.; Awwad, J.; Azar, G. (Clinical); Hannoun, A.; Kaspar, H.; Seoud, M.; Usta, I.
Instructors:	Aswad, N. (Clinical)

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 recognised by the Arab Board of Medical Specialities.

- 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, Family Planning, Gynecologic Oncology, Fetal Maternal Medicine and Gynecologic Urology. Members of Department.
- 248 Elective in Obstetrics and Gynecology.** 0.180-360; 1-2 months. Exposure to selected subdisciplines, offered to fourth year students. Members of Department.
- 287 Internship.** 0.524; 2 months. Training in Clinical Obstetrics and Gynecology and in research, offered to rotating interns. Members of Department.
- 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:	Bakri, M. (Clinical); Haddad, R.
Lecturer:	Farah, N. (Clinical)
Instructor:	Maalouf, R. (Clinical)
Associates:	Helou, C.; Jurdi-Nuwayhid, F.; Shahin, H.

The Department of Ophthalmology offers clinical clerkships and specialty electives to medical students. It also offers clinical postgraduate training to MD 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 speciality 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.

- 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.
- 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 ophthalmic tests. Members of Department.
- 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: Zaytoun, G.
Associate Professor: Zaytoun, G. (Clinical)
Assistant Professors: Hadi, U. (Clinical); Hamdan, A. (Clinical); Natout, M.. (Clinical)
Associates: Awada, A.; Hamasni, S.; Karam, S.

The Department offers clerkships to undergraduate students and a four-year residency program.

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.

268 Elective in Otolaryngology. 0.180; 1 month. Exposure to otolaryngology and its allied fields. Members of Department.

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:	Alami, S.; Araj, G.; Habbal, M.; Mufarrij, A.; Rebeiz, J.; Zaatari, G.
Assistant Professors:	Daher, R. ¹ ; Haider, J.; Kaspar, H.; Salem-Shabb, N.; Taher, A.; Tawil, A.; Zahed, L.

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.

229 General 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.

ID 221-222 Introduction to Medicine. See Department of Internal Medicine.

260 Elective in Pathology. 0.180, 1 month. Open to clinical students. Members of Department

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. The elective is available in the various disciplines of Laboratory Medicine and may be oriented according to the interest of the individual candidate. Members of Department.

287 Internship. 0.180-360; 1-2 months. Same as 262. Offered to rotating interns. Members of Department.

Pathology Conferences. Med III, IV, and Staff in collaboration with the departments of Surgery, Internal Medicine, Pediatrics, Obstetrics and Gynecology, Radiology, Ophthalmology and Otolaryngology & Head and Neck Surgery.

Clinico-Pathological Conferences. On autopsy and surgical material. Med III, IV, and postdoctoral staff.

The following courses are offered for Medical Technology students:

LM 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.

LM 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.

¹ As of September 18, 1996.

- LM 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 Faculty.
- LM 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.
- LM 230 Clinical Hematology.** 0.128; 4 cr. Practical experience in clinical hematology and phlebotomy of 7 weeks duration. Members of Department.
- LM 240 Clinical Microbiology.** 0.128; 4 cr. Practical experience in clinical microbiology of 7 weeks duration. G. Araj.
- LM 250 Clinical Parasitology and Urinalysis.** 0.64; 2 cr. Practical experience in clinical microscopy pertaining to parasitology and urinalysis of 4 weeks duration. G. Araj.
- LM 260 Serology.** 0.64; 2 cr. Practical experience in clinical immunology and serodiagnostic techniques of 4 weeks duration. G. Araj.
- LM 270 Blood Banking.** 0.64; 2 cr. Practical experience in blood banking of 4 weeks duration. S. Alami.
- LM 280 Endocrinology, Cytogenetics and Histotechniques.** 0.64; 2 cr. Practical experience in endocrinology, cytogenetics and histotechniques of 4 weeks duration. Members of Department.
- LM 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.
- LM 333 Topics in Basic Hematology.** 32.0; 2 cr. Offered to graduate students. Lectures on recent advances in hematology. Members of Department.

DEPARTMENT OF PEDIATRICS

Chairperson:	Mikati, M.
Professors:	Mikati, M.; Najjar, S.
Associate Professors:	Dabbous, I. (Clinical); Musallam, S. (Clinical)
Assistant Professors:	Bitar, F.; Dbaibo, G. ¹ ; Fayyad, M.; Muwakkit, S.; Younis, K.
Lecturers:	Ariss-Timani, M.; Ayyoub, C. (Clinical); Mroueh, S.; Munla, N. (Clinical)
Instructor:	Nabulsi-Khalil, M.
Associates:	Araj, A.; Abu Reslan, W.; Bu-Haka, R.; Farah, A.; Hout, J.; Itani, M.; Maalouf, I.; Mahfoud, C.

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 fellowships in Neurology, Hematology-Oncology and Neonatology are offered.

- 246 Clinical Clerkship.** 35.360; 2 months. Clerkship offered to third year students. It consists of daily work in the hospital. Members of Department.
- 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.
- 268 Elective in Pediatrics.** 0.180-360; 1-2 months. Open to fourth year medical students; students at other levels can also be accepted for laboratory research electives. Exposure of students to laboratory research in developmental neuropharmacology and in epilepsy or to a special area of pediatrics of their choice, including pediatric cardiology, neurology and hematology-oncology, and neonatal intensive care. Members of Department.
- 287 Internship.** 0.786; 3 months in the hospital wards and newborn nursery. Members of Department.
- 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). Medicine III, IV, V, and staff.

¹ As of July 1, 1996.

DEPARTMENT OF PHARMACOLOGY AND THERAPEUTICS

Chairperson:	Simaan, J.;
Professors:	Cortas, N; Fawaz, G. (Honorary); Simaan, J.; Bekaily, G. (Adjunct)
Associate Professor:	Sabra, R
Assistant Professor:	Haddad, G.
Associate:	Mikati, M.

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.

- 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.
- 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.
- 300 Pharmacology and Toxicology.** Similar to 228; offered to graduate students.
- 303-304 Pharmacological Methods.** 0.96; 3 cr. (each). Prerequisite: 300. Methods of animal surgery, bioassay, and biochemistry. J. Simaan, R. Sabra, N. Cortas.
- 305-306 Enzymological Bioassays.** 0.96; 3 cr. (each). Prerequisite: Biochemistry 211. J. Simaan, R. Sabra, N. Cortas.
- 307-308 Tutorial in Pharmacology.** 0.96; 3 cr. (each). Introduction to research. J. Simaan, R. Sabra, N. Cortas.
- 309-310 Pharmacology Seminar.** 0.32; 1 cr. (each).
- 311-312 M.S. Thesis.** Credit variable. Original research under supervision, leading to M.S. degree. J. Simaan, R. Sabra, N. Cortas.
- 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.

DEPARTMENT OF PHYSIOLOGY

Chairperson:	Nassar, C.
Professors:	Bikhazi, A.; Birbari, A.; Jabbur, S.; Nassar, C.; Nasser, M.; Saadé, N.
Associate Professors:	Homeidan, F. ¹ ; 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. 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 courses in mathematics, biology, physics, and chemistry in the Faculty of Arts and Sciences as well as courses in Physiology.

- 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.
- 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. Garzuddine, M. Khoury, M. Nasser.
- 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. Mrueh, C. Nasser, I. Salti.
- 210 General Physiology: Cellular Mechanisms.** 48.16; 3 cr.; annually. Studies 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, S. Jabbur.

¹ Visiting from January 20, 1997.

FACULTY OF MEDICINE

- 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.
- 300 Homeostasis.** Similar to 200, offered to graduate students.
- 302 Cardiovascular Physiology.** Similar to 202, offered to graduate students.
- 304 Metabolism.** Similar to 204, offered to graduate students.
- 310 General Physiology: Cellular Mechanisms.** Similar to 210, offered to graduate students.
- 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.
- 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.
- 317 Perspectives in the Physiological Sciences.** 32.0; 2 cr.; annually. Selected readings and seminars in the history, philosophy, and methodology of the physiological sciences to give the student a broad view of the field of biology and its implications in every day life. Members of Department.
- 320 Membrane Transport.** 32.0; 2 cr.; alternate years. A study of membrane phenomena, covering membrane structure, diffusion, and mediated and active transport in both symmetrical and asymmetrical biological systems. Members of Department.
- 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.
- 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.
- 391-392 Projects in Physiology.** 0.64; 2 cr. A physiological literature survey covering a given subject in the field. Members of Department.
- 397-398 M.S. Thesis.** Credit hours variable. Original research under staff supervision. leading to the M.S. degree. Members of Department.
- FM 309 Biology of Nerve and Muscle.** See "Interdepartmental Teaching."
- ID 208 Nervous System.** See "Interdepartmental Teaching."
- 260 Elective in Physiology.** 0.180-360; 1-2 months. Covers one or more areas of physiology such as special physiologic techniques, experimental gastroenterology, experimental neuroscience, physiology of cardiac and vascular smooth muscle. Members of Department.

DEPARTMENT OF PSYCHIATRY

Chairperson: Khani, M.
Assistant Professor: Khani, M.
Lecturer: Zarwi, A.
Associates: Baddoura, C.; Baladi, A.; Halabi, N.

The Department of Psychiatry offers an undergraduate course to Med. II students and a clinical clerkship to Med. III students as well as clinical electives to interns and residents.

- 227 Psychopathology.** 32.36; 3 cr.; annually. Med. II students are introduced to normal and abnormal psychological mechanisms as well as the classification and pathophysiology of psychiatric illness. Members of Department.
- 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. Members of Department.

DEPARTMENT OF RADIOTHERAPY

Chairperson: Issa, P.
Professor: Issa, P.
Assistant Professor: Nagalakshmi, K.

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. P. Issa.

287 Internship. Elective in radiotherapy. 0.262-1.048; 1-4 months. Open to interns. P. Issa.

Weekly Conferences. Tumor conference, oncology conferences in otorhinolaryngology, pediatrics, and gynecology. The Department participates in the activities of the oncology section of the Department of Internal Medicine.

DEPARTMENT OF SURGERY

Chairperson:	Hemady, K.
Professors:	Comair, Y. ¹ ; Hemady, K. ; Khalil, I.; Khauli, R.
Associate Professors:	Abbas, J. (Clinical); Bikhazi, K. (Clinical); Bulbul, M. (Clinical); Haddad, R. (Clinical); Hubballah, M. (Clinical); Khoury, G. (Clinical); Najjar, F. (Clinical) ; Nassar, S. (Clinical); Rubeiz M. (Clinical); Saba, M. (Clinical); Sfeir, R. (Clinical) ; Taha, A.Muhieddine
Assistant Professors:	Abi Saad, G. (Clinical); Akel, S. (Clinical);Atiyyeh, B. (Clinical); Baroudi, H. (Clinical); Dandan. I. ² ; Ghandour, A. (Clinical); Haddad, G. (Clinical); Haydar, R.; Hussein, M. (Clinical); Lakkis, S. (Clinical); Musharrafiyyeh, R.; Obeid, M.; Shabb, B.; Sidani, M. (Clinical); Soubra, M. (Clinical); Tayim, A.;Wazzan, W. (Clinical)
Lecturers:	Afeich, N. (Clinical); Akel, S. (Clinical); Baddoura, O. (Clinical); Kaddoura, I. (Clinical) ; Kreidieh, I.; (Clinical); Mufarrij, N. (Clinical); Taha, A.Mohammad (Clinical)
Associates:	Natout, N.; Ramadan, H.; Sayyed, K.; Sinnu, K.; Zubeir, S.; Zaatari, A.
Emeriti:	Dagher, I.; Haddad, F.

The Department of Surgery offers undergraduate clerkships and internships to medical students. A 4-year residency program is planned to conform with the requirements of the American Board of Surgery, the Arab Board of General Surgery and the Royal College of Surgeons (Edinburgh). It is approved for Part I and Part II of the Exam for the Fellowship of the Royal College of Surgeons, and the Arab Board of General Surgery.

The Department of Surgery also offers a 4-year specialized training in Neurosurgery, and a 3-year program in Orthopedics, Plastic and Urologic surgery. The Orthopedic, Urology and Neurosurgery programs are approved by the Arab Board. Two years of post-graduate residency training in General Surgery is a requirement for applicants to Neurosurgery and 3 years for those applying to Plastic Surgery, Urology and Orthopedic Surgery.

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

¹ As of January 1, 1997.

² As of September 1, 1996.

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.

268 Elective in Surgery. 0.180-360; 1-2 months. Open to AUB and non AUB fourth-year 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. They are assigned to in-patient services and act as interns. Members of Department.

287 Mixed Internship. 0.524; 2 months. This position is open for AUB 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 not considered as first-year postgraduate residents. Members of Department.

288 Straight Internship. 0.2882; 11 months. Straight interns are considered post-graduate first-year residents 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 residency program. Members of Department.

Conference. 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. Also 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.

SCHOOL OF NURSING

FACULTY LIST 1996-97

Officers of the School

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President
Samir A. Makdisi	Deputy President
Samir S. Najjar	Dean, Faculty of Medicine and Medical Center
Joseph A. Simaan	Associate Dean, Faculty of Medicine and Medical Center
Selwa H. Makarem	Director, School of Nursing
Waddah N. Nasr	Registrar

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
Dumit Yazbik, Nuhad, R.N., B.S.N., AUB; Teaching Diploma in Health Education, MA Education, 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, Chartered Clinical Psychology

¹ Until December 19, 1996.

² As of December 20, 1996.

* Educational leave.

SCHOOL OF NURSING

Instructors

Arnaout Araman, Irene, R.N., B.S.N., AUB

Dumit Abi Abdallah, Myrna, R.N., B.S.N., M.P.H., AUB

Shehab, Dina, R.N., B.S.N., AUB

GENERAL INFORMATION

The School of Nursing, founded in 1905, was one of the first organized nursing schools 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 admissions policies and criteria that are adopted by the University. Admission will essentially depend on the secondary school records of students and on their SAT I scores. For further details, see the section "Admissions" on page 27 of this catalogue.

B. RN-BSN PROGRAM

The curriculum is designed to permit the graduate of a technical program in nursing who to pursue a Bachelor of Science in Nursing, if he or she meets 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.

Requirements are:

1. To be eligible for graduation with the degree of Bachelor of Science in Nursing, a student must have completed satisfactorily the prescribed program of study with a minimum of 115 credits after the Freshman class or equivalent, 95 credits for those entering as Registered Nurses. ADN graduates from other institutions will be evaluated and admitted according to the University admission requirements.
2. An overall average of 70, excluding Freshman courses.
3. A maximum of eight calendar years is allowed for graduation of students who begin as BSN I, six calendar years for BSN II, four calendar years for BSN III, and two calendar years for BSN IV. Students who fail to complete the degree program within the specified period must petition the Academic Committee for an extension of time.

Graduation with distinction

The requirements for graduation with honors or high honors, are as required by the university.

Licensing

Graduates are qualified for the licensing examination in Lebanon.

ENROLLMENT, RETENTION, PLACEMENT

Enrollment of students for the past three academic years has been as follows: 79, 79, 70. The retention rate for the academic year 1996-97 has remained at 94%. The School of Nursing is seeking additional financial aids 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

- a) 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.
- b) 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 (Withdraw) 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.
- c) No students may be excused from laboratory and field requirements. All missed laboratory and field requirements must be made up.

2. Examination and Quizzes

- a) 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.
- b) 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.
- c) Students taking courses in 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 nursing courses is 70 and in all other courses 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 before transferring to other departments.

E. PROMOTION

Students shall be promoted to the next higher level when they have taken and passed 30 or more credits beyond the requirements for the previous class. However, students who register in October, lacking 6 or fewer credits for completion of a class, will be registered in the next higher class. In order to be promoted, they must attain a minimum weighted average of 65 in the sophomore year and 70 in the following years.

F. FAILURES AND DEFICIENCIES

1. Placement on Probation

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

- a) If at the end of a semester or summer session the student fails in two or more courses.
- b) If the student does not attain the minimum required semester average:
 - 65 for BSN II
 - 70 per semester 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:

- a) passes all courses taken during the semester or summer session; and
- b) achieves the minimum required average for that semester; and
- c) 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

- a) A student may repeat any course with the consent of the advisor and course coordinator.
- b) All required courses which a student fails must be repeated.
- c) 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.
- d) When a course is repeated, the highest grade obtained will be considered in the calculation of the cumulative average.

4. Repeating the Year

The Academic Committee may require a student to repeat the year if he/she:

- a) fails in one third or more of credits load attempted during that year; or
- b) fails to remove probation within two semesters; or
- c) 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.

G. 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.

H. 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 may 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.

I. INCOMPLETE

Incomplete grades must be completed by the student within the first five weeks of the following academic term. 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.

J. 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 Award

(by order of importance)

1. Mary Crawford (Florence Nightingale) Award.
2. Ann Smith Award.
3. Poppy Haddad Award.
4. Henriette Sabra Award.
5. Hanneh Shahine Award.

Cash and certificate awarded to the 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.

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					
<i>First Semester</i>					
Chem. 101 General Chemistry I	16	48	48	96	4
Engl. 101 English Communication Skills I ²	16	80	--	80	5
Math 101 Calculus & Analytic Geometry I	16	48	--	48	3
Elective Humanity	16	48	--	48	3
			Total	<u>272</u>	<u>15</u>
<i>Second Semester</i>					
Biol. 103 Introductory Biology I	16	48	48	96	4
Engl. 102 English Communication Skills II ²	16	80	--	80	5
Math 102 Calculus and Analytic Geometry II	16	48	--	48	3
Elective Humanity	16	48	--	48	3
			Total	<u>272</u>	<u>15</u>
SECOND YEAR					
<i>First Semester</i>					
Chem 208 Brief Survey of Organic Chemistry ³	16	48	--	48	3
Chem. 209 Introductory Organic Laboratory	16	16	64	80	2
Biol. 210 Human Biology	16	48	--	48	3
Engl. 203 English Communication Skills III ²	16	48	--	48	3
SBS 201 Introduction to the Study of Society	16	48	--	48	3
SBS 202 General Psychology	16	48	--	48	3
			Total	<u>320</u>	<u>17</u>
<i>Second Semester</i>					
Anat. 245 Anatomy	16	32	32	64	3
Physl. 246 Physiology	16	64	32	96	5
Micro. 237 Microbiology	16	32	32	64	3
N 200 Introduction to Nursing Practice	16	48	--	48	3
Engl 204 English Communication Skills IV ²	16	48	--	48	3
			Total	<u>320</u>	<u>17</u>
<i>Summer Session</i>					
N 201 Nursing Care and Practice, Theory	8	48	--	48	3
N 202 Nursing Care and Practice, Practicum	8	--	144	144	3
N 203 Human Growth and Development	8	48	--	48	3
			Total	<u>240</u>	<u>9</u>

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. Students exempted from Engl. 203 do not need to replace the 3 credits for graduation.

³ Chem 200 is a prerequisite to Chem 208, 209 for applicants who fail the Chemistry test.

Semester	No. of Weeks	Lecture Hrs	Lab or Clinical Hrs ¹	Total Clock Hrs	Credit Hours
THIRD YEAR					
<i>First Semester</i>					
N 300 Nursing Care of Adults I, Theory	16	48	--	48	3
N 301 Nursing Care of Adults I, Practicum	16	--	144	144	3
N 304 Nursing Care of the Expectant Family, Theory	16	48	--	48	3
N 305 Nursing care of the Expectant Family, Practicum	16	--	144	144	3
N 310 Pathophysiology	16	32	--	32	2
Pharm. 240 Pharmacology	16	48	--	48	3
			Total	464	17
<i>Second Semester</i>					
N 302 Nursing care of Adults II, Theory	16	48	--	48	3
N 303 Nursing Care of Adults II, Practicum	16	--	144	144	3
N 306 Nursing Care of Children, Theory	16	48	--	48	3
N 307 Nursing Care of Children, Practicum	16	--	144	144	3
EB 204 Introductory Biostatistics	16	16	32	48	2
			Total	432	14
<i>Summer Session</i>					
Educ. 230 Instructional Procedures ²	8	48	--	48	3
CS 201 Ancient, Medieval and Renaissance Culture ²	8	48	--	48	3
Elective Humanities	8	48	--	48	3
			Total	144	9
FOURTH YEAR					
<i>First Semester</i>					
N 402 Mental Health and Psychiatric Nursing, Theory	16	48	--	48	3
N 403 Mental Health and Psychiatric Nursing, Practicum	16	--	144	144	3
N 400 Critical Nursing Care, Theory	16	48	--	48	3
N 401 Critical Nursing Care, Practicum	16	--	144	144	3
N 406 Nursing Research	16	48	--	48	3
			Total	432	15
<i>Second Semester</i>					
N 407 Community Health Nursing, Theory	16	48	--	48	3
N 408 Community Health Nursing, Practicum	16	--	144	144	3
N 409 Professional Nursing, Theory	16	48	--	48	3
N 410 Professional Nursing, Practicum	16	--	144	144	3
CS 202 Ancient, Medieval and Renaissance Culture	16	48	--	48	3
EB 208 Essentials of Epidemiology	16	32	--	32	2
			Total	464	17
			Grand Total	3360	145³

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 Engl. 203 will graduate with 112 credits.

CURRICULUM FOR RN-BSN

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
Biol. 210 Human Biology	16	48	32	48	3
Engl. 203 English Communications Skills III ²	16	48	--	48	3
SBS 201 Introduction to the Study of Society	16	48	--	48	3
			Total	272	14
Second Semester					
Anat. 245 Anatomy	16	32	32	64	3
Physl. 246 Physiology	16	64	32	96	5
Micro. 237 Microbiology or validate	16	32	32	64	3
Engl. 204 English Communication Skills IV ²	16	48	--	48	3
N 205 Nursing Process	16	16	--	16	1
			Total	288	15
Summer Session					
N. 203 Human Growth and Development	8	48	--	48	3
SBS 202 General Psychology ³	8	48	--	48	3
			Total	96	6
SECOND YEAR					
First Semester					
N 310 Pathophysiology	16	32	--	32	2
N 312 Maternal-Child Nursing	16	48	144	192	6
Pharm. 240 Pharmacology or validate	16	48	--	48	3
CS 201 Ancient, Medieval and Renaissance Culture ³	16	48	--	48	3
			Total	320	14

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)					
<i>Second Semester</i>					
N 302 Nursing Care of Adults I, Theory	16	48	--	48	3
N 303 Nursing Care of Adults I, Practicum	16	--	144	144	3
EB 204 Introductory Biostatistics	16	16	32	48	2
CS 202 Ancient, Medieval and Renaissance Culture	16	48	--	48	3
			Total	288	11
<i>Summer Session</i>					
Educ. 230 Instructional Procedures ²	8	48	--	48	3
Elective Humanity	8	48	--	48	3
			Total	96	6
THIRD YEAR					
<i>First Semester</i>					
N 402 Mental Health & Psychiatric Nursing, Theory	16	48	--	48	3
N 403 Mental Health & Psychiatric Nursing, Practicum	16	--	144	144	3
N 400 Critical Nursing Care, Theory	16	48	--	48	3
N 401 Critical Nursing Care, Practicum	16	--	144	144	3
N 406 Nursing Research	16	48	--	48	3
			Total	432	15
<i>Second Semester</i>					
N 407 Community Health Nursing, Theory	16	48	--	48	3
N 408 Community Health Nursing, Practicum	16	--	144	144	3
N 409 Professional Nursing, Theory	16	48	--	48	3
N 410 Professional Nursing, Practicum	16	144	--	144	3
EB 208 Essentials of Epidemiology	16	32	--	32	2
			Total	416	14
			Grand Total	2208	95³

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 exempted from Engl. 203 will graduate with 92 credits only.

CURRICULUM FOR ADN-BSN

(This program applies only to ADN graduates of AUB)

Semester	No of Weeks	Lecture Hrs	Lab or Clinical Hrs ¹	Total Clock Hrs	Credit Hrs
FIRST YEAR					
<i>First Semester</i>					
Biol 210 Human Biology	16	48	--	48	3
Engl 203 English Communication Skills III ²	16	48	--	48	3
CS 201 Ancient, Medieval & Renaissance Culture	16	48	--	48	3
N 400 Critical Nursing Care, Theory	16	48	--	48	3
N 401 Critical Nursing Care, Practicum	16	--	144	144	3
			Total	336	15
<i>Second Semester</i>					
Anat 245 Anatomy	16	32	32	64	3
Engl 204 English Communication Skills IV ²	16	48	--	48	3
EB 204 Introductory Biostatistics	16	16	32	48	2
CS 202 Ancient, Medieval & Renaissance Culture	16	48	--	48	3
N 402 Mental Health & Psychiatric Nursing	16	48	--	48	3
N 403 Mental Health & Psychiatric Nursing, Practicum	16	--	144	144	3
			Total	400	17
<i>Summer Session</i>					
Chem 208 Brief Survey of Organic Chemistry ³	16	48	--	48	3
Chem 209 Introductory Organic Laboratory ³	16	16	64	80	2
			Total	128	5
SECOND YEAR					
<i>First Semester</i>					
Educ. 230 Instruction Procedure, or Elective	16	48	--	48	3
N 406 Nursing Research	16	48	--	48	3
N 407 Community Health Nursing, Theory	16	48	--	48	3
N 408 Community Health Nursing, Practicum	16	--	144	144	3
			Total	288	12
<i>Second Semester</i>					
EB 208 Epidemiology	16	32	--	32	2
N 409 Professional Nursing, Theory	16	48	--	48	3
N 408 Professional Nursing, Practicum	16	--	144	144	3
Elective Humanities	16	48	--	48	3
			Total	288	11
			Grand Total	1424	60⁴

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 decided by placement test in the English Department, Faculty of Arts & Sciences.

³ If offered.

⁴ Students exempted from Engl. 203 will graduate with 57 credits only.

COURSE DESCRIPTIONS

- N 200 Introduction to Nursing Practice.** 3 cr. Pre- or co-requisites: English 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.
- N 201 Nursing Care and Practice, Theory.** 3 cr. Prerequisites: N 200, Anat 246, Physl. 246, Micro. 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.
- N 202 Nursing Care and Practice, Practicum.** 3 cr. Co-requisite: N 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.
- N 203 or SBS 229 Human Growth and Development.** 3 cr. Prerequisite: SBS 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.
- N 204 Nursing Informatics.** 2 cr. Elective. 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.
- N 205 Nursing Process.** 1 cr. This course is offered in the first year of the RN/BSN program. It is a data-collecting, decision-making process that incorporates evaluation and subsequent modification of planned care to promote the resolution of the patient's nursing problems.
- N 300 Nursing Care of Adults I, Theory.** 3 cr. Prerequisites: N 201, 202; pre- or co-requisites: N 310, Pharm 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.
- N 301 Nursing Care of Adults I, Practicum.** 3 cr. Co-requisites: N 300, Pharm 240. Provides opportunity for clinical application of concepts stated in Nursing 300 in support to clients and their families.
- N 302 Nursing Care of Adults II, Theory.** 3 cr. Prerequisites: N 300, N 301. This course is a continuation of N 301 and is based on the framework previously outlined in N 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.

- N 303 Nursing Care of Adults II, Practicum.** 3 cr. Co-requisite: N 302. Provides opportunity for the clinical application of the knowledge of concepts stated in N 302 in a variety of settings utilizing the nursing process.
- N 304 Nursing Care of the Expectant Family, Theory.** 3 cr. Pre- or co-requisites: N 300, N301, N 310 and Pharm 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.
- N 305 Nursing Care of the Expectant Family, Practicum.** 3 cr. Co-requisite: N 304. Clinical application of knowledge acquired in N 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.
- N 306 Nursing Care of Children, Theory.** 3 cr. Prerequisites: N 203, N 304, N305. 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.
- N 307 Nursing Care of Children, Practicum.** 3 cr. Co-requisite: N 306. Is essential so that 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.
- N 310 Pathophysiology.** 2 cr. Prerequisites: Biol 210, Anat 246, Physl 246, Micro 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.
- N 312 Maternal-Child Nursing.** 3.9; 6 cr. Focuses on human development from conception to birth, following through infancy to childhood. It examines the behavior of mothers and their families throughout the child-bearing experience with emphasis on preventive health care and its delivery in the community.
- N 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.
- N 401 Critical Care Nursing, Practicum.** 3 cr. Co-requisite: N 400. Focuses on the application of the theoretical content of N 400 in a variety of acute care settings.
- N 402 Mental Health and Psychiatric Nursing, Theory.** 3 cr. Prerequisites: SBS 201, SBS 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.
- N 403 Mental Health and Psychiatric Nursing, Practicum.** 3 cr. Co-requisite: N 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.

- N 406 Nursing Research.** 3 cr. Prerequisites: EB 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.
- N 407 Community Health Nursing, Theory.** 3 cr. Prerequisites: Educ. 230, Senior Standing. Co-requisite: N 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.
- N 408 Community Health Nursing, Practicum.** 3 cr. Co-requisite: N 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.
- N 409 Professional Nursing, Theory.** 3 cr. Prerequisites: N 400, N 401, N 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.
- N 410 Professional Nursing, Practicum.** 3 cr. Co-requisite: N 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.

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 as specified in the section on "Admissions" on page 27 of this catalogue.

CURRICULUM

FIRST YEAR

First Semester

	Credits
XR 101 Orientation	2
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
Total	<hr/> 61

Summer Session

XR 114 Clinical

Credits

SECOND YEAR

First Semester

XR 201 Special Procedures

6

XR 203 Radiologic Equipment

8

XR 205 Introduction to Principles of Diseases

6

Second Semester

XR 202 Special Procedures

6

XR 204 Radiologic Equipment

8

XR 206 Introduction to Principles of Diseases

6

XR 208 Electives and Projects

2

Total

42

Summer Session

XR 214 Clinical

Post-Certificate (Optional)

Credits

XR 220 Mammography

10

XR 222 Ultrasonography

12

XR 224 Computed Tomography

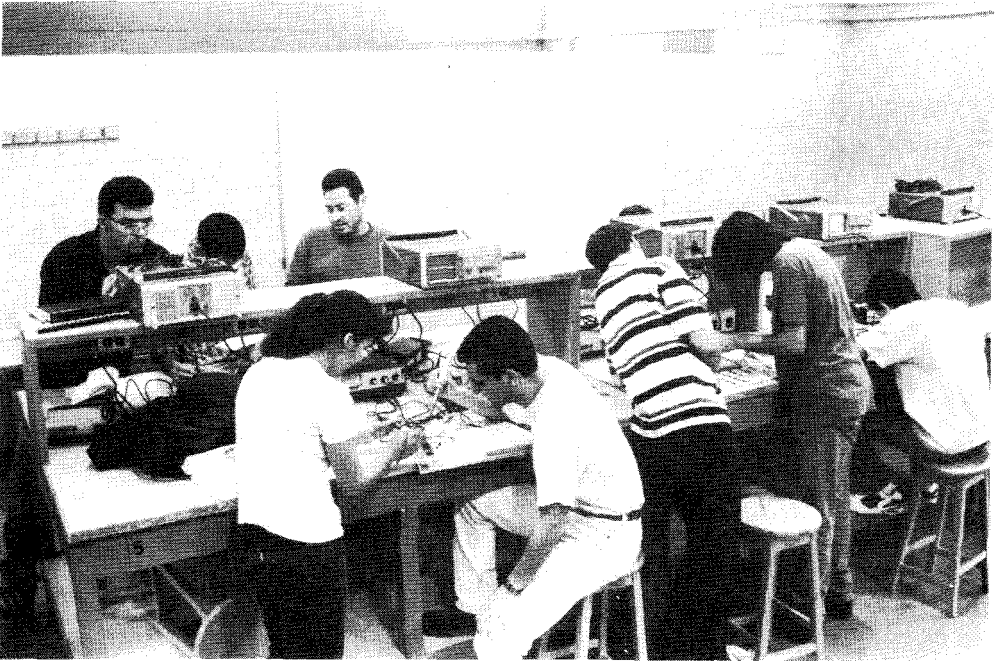
12

XR 226 Magnetic Resonance I

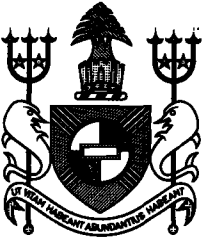
14

XR 228 Magnetic Resonance II

14



Laboratory classes are an important part of many courses in different faculties.



*Faculty of
Engineering and
Architecture*

FACULTY OF ENGINEERING AND ARCHITECTURE

FACULTY LIST 1996-97

Officers of the Faculty

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President of the University
Samir Makdisi	Deputy President
Nassir Sabah	Dean of the Faculty
Albert Kuran	Associate Dean of the Faculty
Moueen Salameh	Assistant Dean of the Faculty
Waddah N. Nasr	Registrar
Ghada Najm	Executive Officer

Professors Emeriti

- Abdoud-Klink, Sami, Ph.D., Rensselaer Polytechnic Institute; Civil and Environmental Engineering
- Hope, Edward, M.S., Massachusetts Institute of Technology; Ed.D., Columbia University; Civil and Environmental Engineering
- Ilya, Raja, Ph.D., University of Texas, Austin; Civil and Environmental Engineering
- Sakkal, Fateh, Ph.D., University of Manchester; Mechanical Engineering
- Sloane, Robert W., Ph.D., University of Glasgow; Engineering Sciences

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
- El-Hajj, Ali, Docteur Ingenieur, University of Rennes I; Electrical and Computer Engineering
- Harajli, Mohammad, Ph.D., University of Michigan, Ann Arbor; Civil and Environmental Engineering
- Azoury, Pierre, Ph.D., University of London; Mechanical Engineering
- * Sabah, Nassir, Ph.D., State University of New York, Buffalo; Electrical and Computer Engineering

Associate Professors

- Abdul Malak, M. Assem, Ph.D., University of Texas, Austin; Engineering Management

¹ Till December 19, 1996.

² As of December 20, 1996.

* On tenure appointment.

FACULTY OF ENGINEERING & ARCHITECTURE

Abed, Jamal, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design

Basha, Habib, Ph.D., University of California, Berkley; Civil and Environmental Engineering

Biln, John, DR.DES, Harvard University; Architecture and Design

Diab, Hassan, Ph.D., University of Bath; Electrical and Computer Engineering

Ghaddar, Nesreen, Ph.D., Massachusetts Institute of Technology; Mechanical Engineering

Hamad, Bilal, Ph.D., University of Texas, Austin; Civil and Environmental Engineering

Kabalan, Karim, Ph.D., Syracuse University; Electrical and Computer Engineering

Kaysi, Isam, Ph.D., Massachusetts Institute of Technology; Civil and Environmental 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

Moukalled, Fadl, Ph.D., Louisiana State University; Mechanical Engineering

Musfy, Leila, MFA Design, Cranbrook Academy of Art; Architecture and Design

Nuwayhid, Rida, Ph.D., University of London; Mechanical Engineering

Saade, Jean, Ph.D., Syracuse University; Electrical and Computer Engineering

Salameh, Moueen, Ph.D., Virginia Polytechnic Institute and State University; Engineering Management

Sinno, Nabih, B.Arch., AUB; Architecture and Design

Yehia, Mounir, Ph.D., Moscow Power Engineering Institute; Electrical and Computer Engineering

Adjunct Associate Professor

Makhlouf, Hanna, Ph.D., Carnegie Institute of Technology; Civil and Environmental Engineering

Assistant Professors

Abboud, Nadim, Ph.D., Virginia Polytechnic Institute and State University; Engineering Management

Abdel Malek, Karim, Ph.D., University of Pennsylvania; Mechanical Engineering

Akra, Mohamed, Ph.D., Massachusetts Institute of Technology; Electrical and Computer Engineering

Baaj, Hadi, Ph.D., University of Texas, Austin; 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

Ghandour, Marwan, M.S.Arch.B.D., Columbia University; Architecture and Design

Hijazin, Maher, Ph.D., University of Reading; Mechanical Engineering

Karaki, Sami, Ph.D., University of Manchester; Electrical and Computer Engineering

Karanouh, Nouha, CFC, Ecole des Arts Decorative, Geneva; Architecture and Design
 Kaysi, Ayman, Ph.D., University of Michigan, Ann Arbor; Electrical and Computer Engineering
 Mabsout, Munir, Ph.D., University of Texas, Austin; Civil and Environmental Engineering
 Mezher, Toufic, D.Sc., George Washington University; Engineering Management
 Moystad, Ole, Ph.D., Oslo School of Architecture; Architecture and Design
 Mrad, Fuad, Ph.D., Purdue University; Electrical and Computer Engineering
 Piasecki, Michael, Ph.D., University of Michigan, Ann Arbor; Civil and Environmental Engineering
 Rawas, Mohammad, Higher Diploma of Fine Arts, University of London; Architecture and Design
 Sadek, Salah, Ph.D., University of California, Berkley, Civil and Environmental Engineering

Visiting Assistant Professor

Lozanovska, Mirjana, Ph.D., Deakin University; 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 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 Khaled, Saad, D.P.L.G., University of Paris; Architecture and Design
- P Mougharbil, Imad, Ph.D., Aix-Marseille University; Electrical and Computer Engineering
- P Trabulsi, Samir, M.E., M.B.A., AUB; Architecture and Design

Lecturers

- P Alameddine, Hana, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design
- P Atweh, Mohammad, Ph.D., University of Maryland; Electrical and Computer Engineering
- P Azar, Kamal, Ph.D., Massachusetts Institute of Technology; Associated Studies
- Chéhab, Ali, M.S., Syracuse University; Electrical and Computer Engineering
- P Chéhayeb, Fadi, Ph.D., Massachusetts Institute of Technology; Electrical and Computer Engineering
- P Farhat, Khaldoun, Ph.D., Sheffield University; Electrical and Computer Engineering
- P Feghali, Antoine, Ph.D., Purdue University; Associated Studies

P Part-time.

FACULTY OF ENGINEERING & ARCHITECTURE

- p Hejase, Hassan, Ph.D., Syracuse University; Electrical and Computer Engineering
- P Jabr, Abdul Halim, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design
- P Kasamani, Jihad, M.E., AUB; Mechanical Engineering
- p Kassar, Abdul Nasser, Ph.D., University of Southwestern Louisiana; Associated Studies
- p Kerbage, Toufic, Ph.D., Copenhagen University; Associated Studies
- P Khoury, Bassam, Ph.D., University of Florida; Engineering Management
- P Krisht, Mohammad, Ph.D., University of Arizona; Electrical and Computer Engineering
- p Mohtar, Taan, M.S., University of Prague; Electrical and Computer Engineering
- p Murkus, Sami, B. Arch., AUB; Architecture and Design
- p Musfi, Karim, M.Arch., AUB; Architecture and Design
- p Nader, Halim, B.E., AUB; Civil and Environmental Engineering
- Nasri, Mohammad, S.M.Arch.S., Massachusetts Institute of Technology; Architecture and Design
- p Noueihed, Nazim, M.S., Mathematics, Hunter College; Associated Studies
- 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 Saab, Najib, B.Arch., AUB; Architecture and Design
- P Salameh-Lama, Fadi, Ph.D., Georgia Institute of Technology; Mechanical Engineering
- P Sawma, Hyam, B.Arch., AUB; Architecture and Design
- p Taha, Faleh, Doctorat Math., University of Paris VI; Electrical and Computer Engineering
- p Tannir, Akram, Ph.D., Georgia Institute of Technology; Civil and Environmental Engineering, Engineering Management
- P Usta, Jihad, MSc., Loughborough University of Technology; Architecture and Design

Instructors

- P Abdul-Sater, Mohammad, B.E., AUB; Electrical and Computer Engineering
- p Amadouni, Zareh, M.Arch., McGill University; Architecture and Design
- p Baladi, Victor, AA DIP., Architectural Association, London; Architecture and Design
- p El-Hout, Nasser, B.Sc., Iowa State University; Electrical and Computer Engineering
- P Farhat, Nadia, B.B.A., AUB; 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 Hasbini, Rola, B.Arch., AUB; Architecture and Design
- p Kanafani, Zaher, B.E., AUB; Electrical and Computer Engineering
- 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 Part-time.

- 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, Licence, Universite De Lyon; Electrical and Computer Engineering
- p Nahed, Eddy, B.E., AUB; Electrical and Computer Engineering
- p Shebaro, May, B.Arch., AUB; Architecture and Design
- p Tarazi, Mona, Masters, Columbia University; Architecture and Design

Assistant Instructors

- p Abdul-Rahman, Maha, B.Arch., AUB; Architecture and Design
- p Abu-Ayash, Zaher, B.Arch., AUB; Architecture and Design
- p Alaily, Nadia, B.Arch., AUB; Architecture and Design
- p Charif, Dima, B.D., Visual Communication Design, Nova Scotia College; Architecture and Design
- p Daouk, Rania, B.G.D., AUB; Architecture and Design
- p Daouk, Souraya, B.G.D., AUB; Architecture and Design
- p Eid, Alain, B.Arch., AUB; Architecture and Design
- p Ghattas, Rabi, B.E., AUB; Associated Studies
- p Hajj, Rahif, B.E., AUB; Associated Studies
- p Halabi, Jeanne D'Arc, B.Arch., AUB; Architecture and Design
- p Hamra, Khaled, M.S., University of Southwestern Louisiana; Electrical and Computer Engineering
- p Husseini, Dima, B.Arch., AUB; Architecture and Design
- p Itani, Lina, B.Arch., AUB; Architecture and Design
- p Jamaledine, Ziad, B. Arch., AUB; Architecture and Design
- p Kadri, Ziad, B.G.D., AUB; Architecture and Design
- p Khalil, Monah, B.E., AUB; Electrical and Computer Engineering
- p Khatib, Iyad, B.E., AUB; Electrical and Computer Engineering
- p Maad, Soha, B.E., AUB; Electrical and Computer Engineering
- p Salman, Johnny, B.Arch., AUB; Architecture and Design
- p Sharro, Karl, B. Arch., AUB; Architecture and Design
- p Shebaro, Mohammad, B.Arch., AUB; Architecture and Design
- p Shoucair, Farid, B.Arch., AUB; Architecture and Design
- p Yacoub, Paola, Masters, Architectural Association USA; Architecture and Design
- p Yamak, Lana, B.Arch., AUB; Architecture and Design
- p Zaraket, Fadi, B.E., AUB; Electrical and Computer Engineering

Research Assistants

Hanna, Saba, B.E., AUB; Geographic Information Systems Laboratory
Tawil, Mona, B.Sc., United Arab Emirates University; Multimedia Center

Associate

Acra, Aftim, M.P.H., University of North Carolina; Environmental Sciences

GENERAL INFORMATION

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 programs 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).

The objective of the Faculty of Engineering and Architecture is to provide a modern engineering, architecture and graphic design education of the highest quality that is adapted to the particular needs and problems of the Middle East. The undergraduate curricula, through a proper balance between advanced theoretical courses on the one hand, and laboratory work, projects and applied engineering courses on the other hand, and through a broad range of specialized elective courses, particularly in the final year, prepare the graduate equally well for professional work or for graduate study and continuing education. So that the future engineer, architect or graphic designer will have a broader outlook and be better able to appreciate the context for professional designs and to make appropriate strategy decisions, the curricula include a number of courses in the humanities, social sciences, the arts, communication skills, and the impact of technology on society, with special emphasis on socio-economic, environmental, and managerial aspects. In addition, every effort is made to encourage positive attitudes, foster traits of hard work, self discipline, and responsibility and instill the ideals of moral behavior, professional ethics, and service to mankind.

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), totalling 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 Freshman Science program, including chemistry, mathematics, and physics, in the Faculty of Arts and Sciences of this University, 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 "English Proficiency Requirement" in the section on "Admissions" in this catalogue.
2. Sit for the required SAT I 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 and must sit for the required SAT I, as specified in the section on "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 79 of this catalogue.

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, Failed
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 Academic 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 Academic 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 Academic 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 Academic 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.

D. Withdrawal From Courses

1. Selective withdrawal from any required course(s) is not permitted.
2. A student may petition the Academic 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 Academic 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.

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:

- a) 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.
- b) 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

- a) 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.
- b) 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.
- c) 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:
 - a) 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,
 - b) 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,
 - c) 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,
 - d) 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:
 - a) 60 or more in cultural and English courses.
 - b) 70 or more in major non-Engineering courses.
 - c) 75 or more in major Engineering courses.
 - d) 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:
 - a) A failed course must be repeated when next offered during the following evaluation period.
 - b) The last grade in a repeated course is used in calculating averages, except as applies for distinction and high distinction.
 - c) 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.
 - d) 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:
 - a) Pass or exemption from English 102.
 - b) 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:
 - a) A major course is failed three times irrespective of the credits assigned to the course.
 - b) A major course average of less than 60 is attained at the time of evaluation.
 - c) *If the student is not promoted after repeating the terms of the evaluation period.*
 - d) If the student is not promoted after incurring repetitions of the terms of two evaluation periods.
 - e) 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:
 - a) The student has attained a course average below 60.
 - b) The student had been dropped before.

3. Re-enrollment
 - a) 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.

 - b) 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 CE and ME, 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.

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 grades which are averaged for the admission requirement are the grades of all courses taken in the applicant's last two undergraduate years.
2. A student with an average of 77 or more, but less than 80, may be accepted on probation.

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 ET, and non-departmental courses are designated as Associated Studies with the prefix AS. 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
A121	History of Art and Architecture I	3	Fall	None
A122	History of Art and Architecture II	3	Spring	None
A223	History of Art and Architecture III	3	Fall	None
A224	History of Art and Architecture IV	3	Spring	None
A425	Evolution of Cities	3	Fall	None

FACULTY OF ENGINEERING & ARCHITECTURE

A426	Principles of Urban Planning and Design	3	Spring	A425
A10V	Painting and Life Drawing	3	Fall/Spring*	None
A11V	Sculpture	3	Fall/Spring*	None
A20C	Islamic Art and Architecture	3	Fall/Spring*	None
A61P	Landscaping and Site Planning	3	Fall	None
AS110	Technology and Society	3	Fall/Spring	None
AS509	Computer-Based Instruction	3	Fall	None
AS510	Advanced Computer-Based Instruction	3	Fall	AS 509
CE037	Surveying and Photogrammetry	4	Summer	None
CE055	Fluid Mechanics	3	Spring	None
CE064	Engineering Geology	3	Summer	None
CE084	Soil Mechanics	3	Spring	None
GD131	Drawing I	3	Fall	None
GD132	Drawing II	3	Spring	GD131
GD251	Photography I	3	Spring	None
GD335	Etching	3	Fall	None
GD336	Silk-Screen printing techniques	3	Spring	None
ME051	Physics of Energy Conversion	3	Spring	Math 201, Physics 211
EM075	Engineering Economy	3	Fall/Spring	None
EM105	Engineering Management I	3	Fall	None
EM115	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:	Sinno, N.
Associate Professors:	Abed, J.; Biln, J.; Kazzaz, T.; Musfy, L.; Sinno, N.
Assistant Professors:	Ghandour, M.; Karanouh, N.; Lozanovska, M.; Moystad, O.; Rawas, M.
Senior Lecturers:	Khaled, S.; Trabulsi, S.
Lecturers:	Alameddine, H.; Jabr, A.; Murkus, S.; Musfi, K.; Nasri, M.; Ouayda, N.; Saab, N.; Sawma, H.; Usta, J.
Instructors:	Amadouni, Z.; Baladi, V.; Ghaibeh, L.; Hakim, S.; Hasbini, R.; Labban, M.; Shebaro, M.; Tarazi, M.
Assistant Instructors:	Abdul-Rahman, M.; Abu-Ayash, Z.; Alayli, N.; Charif, D.; Daouk, R.; Daouk, S.; Eid, A.; Halabi, J.; Husseini, D.; Itany, L.; Jamaledine, Z.; Kadri, Z.; Shebaro, M.; Shoucair, F.; Salman, J.; Yacoub, P.; Yamak, L.

The Department of Architecture and Design offers a program in Architecture and a program in Graphic Design.

ARCHITECTURE

The program in Architecture is comprised of a total of 191 credit hours normally taken over fourteen terms within five calendar years. The degree requirements include 176 credit hours in professional studies, 9 credit hours in associated studies, and 6 credit hours of English. A student is listed under the class in which the major design course is taken.

Professional studies are taught within the Faculty of Engineering and Architecture and consist of the following:

1. **Mandatory Core Program:** 153 credit hours, with most courses offered annually. These courses represent the basic structure of the Architecture program, and include the major studio courses and the essential theoretical requirements.
2. **Architecture Electives:** 24 credit hours selected from periodic offerings in Architecture subjects covering the professional, technical, visual and cultural formation of the architect. Students choose these courses in consultation with their advisor.

Associated Studies cover interdisciplinary requirements selected from the offerings of other Faculties and consist of a total of 9 semester credit hours. Students are urged to study all available course offerings and to consult with the assigned advisor in order to compose a meaningful program which satisfies their interests and talents in the context of the chosen field of Architecture. Cross-registration for not more than 3 credit hours per

semester is allowed at other approved universities for electives in associated studies that are not offered at AUB.

ACADEMIC RULES AND REGULATIONS IN ARCHITECTURE

A. Course Loads

No withdrawals from Architecture courses are allowed after the drop-and-add period.

B. Evaluation of Academic Performance

Students are evaluated at the end of every Fall Semester (including the preceding Summer Term) and at the end of every Spring Semester. Evaluation of academic performance is based on:

- a) Grades in Architecture Design courses.
- b) The cumulative major course average.
- c) The cumulative general average.

1. Promotion

To qualify for clear promotion a student must:

- a) Make satisfactory progress towards the degree by earning a minimum of 12 credit hours in every full semester.
- b) Maintain a minimum cumulative average of 70 in the courses A100 Basic Design, and A101 Architecture Design I, and a minimum course grade of 70 in each Architecture Design course thereafter.
- c) Maintain a minimum cumulative major course average of 70.
- d) Maintain a minimum cumulative general average of 70.

2. Promotion on Probation

A student is promoted on probation if, by the end of a term of evaluation, the student:

- a) Fails in not more than five credit hours of major courses; or
- b) Fails to attain a minimum course grade of 70 but not less than 60 in any Architecture Design course; or
- c) Fails to attain a minimum major course average 70, but not less than 60; or
- d) Fails to attain a minimum cumulative general average of 70, but not less than 60.

3. Removal of Probation

Probation due to each of the above reasons will be removed upon fulfillment of the conditions specified in Section B.2, i.e., when the student:

- a) Repeats and passes the failed course(s) stipulated in Section B.2.a; or

- b) Attains a minimum cumulative average of 70 in any Architecture Design course in which less than 70 has been earned, and in the following Architecture Design course; or
- c) Attains a minimum cumulative major course of 70 at the end of the following term of evaluation.
- d) Attains a minimum cumulative general average of 70 at the end of the following term of evaluation.

C. Repetition

1. A student must repeat a term of evaluation and the previous term of evaluation if, by the end of that term, the student has:
 - a) Failed in more than five credit hours of major courses; or
 - b) Failed to attain a minimum cumulative average of 70 in the courses: A100 Basic Design and A101 Architecture Design I; or
 - c) failed to remove a probation at the end of one full term of probation (Fall or Spring).
2. A student must repeat or improve a final project in the following cases:
 - b) If a student attains a Final Jury grade of between 60 and 69 in the course A509 (Final Project Design), then, based on the decision of the jury panel, the student will be required to either improve the project during the following summer session or to repeat A509 (Final Project Design) in the following Fall or Spring Term. If the decision of the jury is to improve the project during the summer session, then the student will have to register for the session and will be juried again at its end.
 - c) If a student attains a Final Jury grade below 60 in the course A509 (Final Project Design), the student will be required to repeat courses A535 (Final Project Research) and A509 (Final Project Design) when next offered.
3. When repeating a term, a student will be exempted from repeating the courses in which the student has earned a grade of 72 or more.
4. 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 of 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.

D. Dropping From Faculty

1. A student is dropped from the Faculty for any of the following reasons:
 - a) A major course is failed three times.
 - b) A cumulative major course average, or a cumulative general average, below 60 is attained.
 - c) Failure to attain a minimum course grade of 70 in an Architecture Design course in a repeated term.
 - d) Failure to attain a minimum term average of 70 for any repeated term.
 - e) Failure to attain a minimum cumulative major course average, and a minimum cumulative general average, of 70 upon the completion of a required repetition.

2. A dropped student is not allowed to re-enroll in the Faculty if:
 - a) The student has attained a course average below 60.
 - b) The student had been dropped before.

3. Re-enrollment
 - a) To be eligible to apply for re-enrollment, a student who has 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 those complying with the sequence of the listed architectural electives.

 - b) If the dropped student is re-admitted to the Faculty, 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.

CURRICULUM FOR THE DEGREE OF BACHELOR OF ARCHITECTURE

FIRST YEAR	Credit hours
<i>Term I (Fall)</i>	
AS 010 Computer Literacy	0
A 100 Basic Design	4
A 111 Architectural Communication	4
A 121 History of Architecture I	4
A 151 Statics	3
English as required	3 (5)
	18 (20)
<i>Term II (Spring)</i>	
AS 020 Computer Literacy II	0
A 101 Architecture Design I	7
A 112 Descriptive Drawing	3
A 122 History of Art & Architecture II	4
A 152 Strength of Materials	3
	17
 SECOND YEAR	
<i>Term III (Summer)</i>	
A 241 Surveying/Regional Architecture	9
<i>Term IV (Fall)</i>	
A 202 Architecture Design II	7
A 223 History of Art & Architecture III	4
A 242 Building Construction I	3
A 253 Elements of Structure	3
	17
<i>Term V (Spring)</i>	
A 203 Architecture Design III	7
A 224 History of Art & Architecture IV	4
A 243 Building Construction II	3
A 254 Applied Structures	3
	17
 THIRD YEAR	
<i>Term VI (Summer)</i>	
A313 Computer Aided Design	3
A373 Training in CAD	3
Engl 206 English for Engineering & Architecture	3
	9

	Credit Hours
Term VII (Fall)	
A 304 Architecture Design IV	7
A325 Contemporary Architecture	3
A 331 Urbanism	3
A361 Building Services I	3
	16
Term VIII (Spring)	
A305 Architecture Design V	7
3 Electives (Architecture or Associated)	9
	16
FOURTH YEAR	
Term IX (Summer)	
A444 Construction Documents	6
A474 Training in Execution Drawings	3
	9
Term X (Fall)	
A 406 Advanced Architecture Design I	7
A432 Architecture Programming	3
A462 Building Services II	3
1 Elective (Architecture or Associated)	3
	16
Term XI (Spring)	
A 407 Advanced Architecture Design II	7
3 Electives (Architecture or Associated)	9
	16
FIFTH YEAR	
Term XII (Summer)	
A 575 Approved Experience	
Term XIII (Fall)	
A 508 Advanced Architecture Design III	7
A 533 Final Project Research	3
2 Electives	6
	16
Term XIV (Spring)	
A 509 Final Project Design	10
2 Electives	6
	16

Students are urged to schedule their elective coursework carefully in consultation with the assigned advisor in order to make the most effective use of the flexibility afforded by the curriculum.

**CURRICULUM FOR THE DEGREE OF BACHELOR OF ARCHITECTURE
(TO BE PHASED OUT IN 1999)**

THIRD YEAR	Credit Hours
<i>Term VI (Summer)</i>	
A 325 Regional Architecture	6
<i>Term VII (Fall)</i>	
A 304 Architecture Design IV	7
A 372 Environmental Science II	2
Architecture or Associated Electives	9*
	18
<i>Term VIII (Spring)</i>	
A 305 Architecture Design V	7
A 317 Computer Aided Design	3
A 373 Environmental Science III	2
Architecture or Associated Electives	6*
	18
FOURTH YEAR	
<i>Term IX (Summer)</i>	
A 444 Execution Drawings	9
<i>Term X (Fall)</i>	
A 406 Advanced Architecture Design I	7
A 425 Evolution of Cities	3
Architecture or Associated Electives	6*
	16
<i>Term XI (Spring)</i>	
A 407 Advanced Architecture Design II	7
A 426 Principles of Urban Planning and Design	3
A 434 Architectural Programming	2
Architecture or Associated Electives	6
	18
FIFTH YEAR	
<i>Term XII (Summer)</i>	
A 545 Approved Experience	
<i>Term XIII (Fall)</i>	
A 508 Advanced Architecture Design III	7
A 535 Final Project Program and Research	4
Architecture or Associated Electives	6*
	17
<i>Term XIV (Spring)</i>	
A 509 Final Project Design	10
Architecture or Associated Electives	3*
	13

* The asterisk denotes a number of elective credit hours that is variable. The number of credits can be adjusted to:

1. Increase or reduce the course load in selected terms.
2. Repeat failed coursework.
3. Develop more depth in areas of interest.

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.

- A100 Basic Design.** 4 cr.; annually. Basic understanding of the generic aspects of design processes with a particular emphasis on the conceptualization and generation of forms. T. Kazzaz and Faculty Members .
- A101 Architecture Design I.** 7 cr.; annually. Prerequisite: A100. Introductory design aiming at acquiring a basic comprehension of architectural space in the formal and experimental dimensions where students develop analytical and technical skills to perceive and understand space definition and spatial relationships. M. Ghandour and other Faculty Members.
- A111 Technical Drawing.** 4 cr.; annually. A course in descriptive geometry where students learn the theory and practice of the graphic description of forms. All types of orthogonal and paralline projections, intersections, perspective, shades, and shadows are covered. N. Sinno and other Faculty Members.
- A112 Descriptive Drawing.** 3 cr.; annually. Freehand drawing with application of perspectives and architectural rendering in different media. N. Sinno and other Faculty Members.
- A121 History of Art and Architecture I.** 4 cr.; annually. A survey and analysis of art production, architecture and urban morphology of antiquity. M. Ghandour.
- A122 History of Art and Architecture II.** 4 cr.; annually. Prerequisite: A121 or consent of instructor. Continuation of A121 to cover the development of architecture, art and the evolution of the city from the fourth to the fourteenth century. M. Ghandour.
- A151 Statics.** 3 cr.; annually. Introduction to the mathematical description of structural behavior, similar to CE 011 with increased emphasis on graphical analysis. Faculty Member.
- A152 Strength of Materials.** 3 cr.; annually. Prerequisite: A151. Introduction to the structure properties of the various materials used in construction: concrete, timber, steel. Faculty Member.
- A202 Architecture Design II.** 7 cr.; annually. Prerequisite: A101. Design studio emphasizing construction materials as a major design determinant, manipulation of architectural elements and space, application of theoretical concepts of transformation, typology and form hierarchies while observing freehand and technical representation. M. Nasri and other Faculty Members.
- A203 Architecture Design III.** 7 cr.; annually. Prerequisite: A202. Design studio that aims at investigating major parameters shaping design through experimental exercises and conclusive short projects. T. Kazzaz and other Faculty Members.

- A223 History of Art and Architecture III.** 4 cr.; annually. Prerequisite: A122 or consent of instructor. Continuation of A122 to cover the architecture, city and art of the fifteenth to the mid-eighteenth century. J. Abed.
- A224 History of Art and Architecture IV.** 4 cr.; annually. Prerequisite: A223 or consent of instructor. Continuation of A223 to cover the architecture, city and art of the mid-eighteenth century to the beginning of World War II. J. Abed.
- A241 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 the traditional and transitional architecture of the region. Students learn plane surveying, topographic mapping and route surveying. J. Abed, M. Ghandour, M. Nasri and other Faculty Members.
- A242 Building Construction I.** 3 cr.; annually. Introduction to the behavioral properties of building materials. Fundamentals of stone, timber and steel construction. Faculty Member.
- A243 Building Construction II.** 3 cr.; annually. Prerequisite: A242. This course covers 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. Faculty Member.
- A253 Elements of Structure.** 3 cr.; annually. Prerequisite: A152. Introduction to the physical properties, behavior and analysis of the basic structural elements. Faculty Member.
- A254 Applied Structural Principles.** 3 cr.; annually. Prerequisite: A253. Basic principles of structural design applied within the generic constraints of common structural systems and construction materials. Faculty Member.
- A304 Architecture Design IV.** 7cr.; annually. Prerequisite: A203. Design investigation into architectural projects that engage context in its major aspects as essential design parameters. Presentation of projects shall focus on specific rendering techniques. Faculty Members.
- A305 Architecture Design V.** 7 cr.; annually. Prerequisite: A304. A studio that aims at tackling architecture design on the basis of typology, both programmatic and formal. New rendering techniques are used in the presentation of projects. O. Moystad and other Faculty Members.
- A313 Computer Aided Design.** 3 cr.; annually. Introduction to the implementation of computers in architecture. Applications through CAD programs to small scale projects. M. Nasri.
- A325 Contemporary Architecture.** 3cr.; annually. A course in which students are exposed to the new architecture language of the end of the century. Lectures include discussion of leading architects vision and their works. Faculty Member.
- A331 Urbanism.** 3 cr.; annually. Prerequisite A224. 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. Faculty Member.
- A361 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. Faculty Member.

- A373 Training in CAD.** 3 cr.; annually. Students will be required to spend definite periods of time at offices where they get exposed to CAD applications. Reports on work done is evaluated in the light of involvement and achievement quality.
- A406 Advanced Architecture Design I.** 7 cr.; annually. Prerequisite: A305. A studio that introduces large scale complex design problems with realistic technical and legal constraints. J. Biln and other Faculty Members.
- A407 Advanced Architecture Design II.** 7 cr.; annually. Prerequisite: A406. Design studio presenting problems in large scale multi-functional projects in urban contextual and environmental conditions. J. Abed and other Faculty Members.
- A432 Architecture Programming.** 3 cr.; annually. Introduction to program analysis and preparation, including final topic selection by each student. N. Sinno.
- A444 Construction Documents.** 6 cr.; annually. Prerequisites: A243, A361, A362. Extension of selected studio projects into development of design details and working drawings. T. Kazzaz and other Faculty Members.
- A462 Building Services II.** 3 cr.; annually. Introduction to principles of electrical technology, lighting fundamentals and design, electrical distribution in buildings, electrical equipment and materials. Faculty Member.
- A474 Training in Execution Drawings.** 3 cr.; annually. Professional training in architecture offices where students practice and develop their knowledge in the production of execution drawings.
- A508 Advanced Architecture Design III.** 7 cr.; annually. Prerequisite: A407. Design studio presenting an investigation and study of problems in urban design applied through case studies. O. Moystad and other Faculty Members.
- A509 Final Project Design.** 10 cr.; annually. Prerequisite: A508 and A533. Individual resolution of the design problems initiated in the course A535, developed under the guidance and advice of a faculty member, presented and defended in formal public jury. All full-time Faculty Members.
- A533 Final Project Research.** 3 cr.; annually. Students choose a design topic with the guidance and approval of the faculty, and prepare, through a comprehensive research, a program for the course A509. All Faculty Members.

MANDATORY CORE PROGRAM (TO BE PHASED OUT IN 1999)

- A317 Computer Aided Design.** 3 cr.; annually. Introduction to the implementation of computers in architecture. Applications through CAD programs to small scale projects. Faculty Member.
- A325 Regional Architecture.** 6 cr.; annually. Descriptive analysis of the factors contributing to the distinctive aspects of indigenous architecture of the region. Research, field survey and documentation of the traditional and transitional architecture of the region. Faculty Member.
- A372 Environmental Science II.** 2 cr.; annually. Introduction to the different systems of heating, ventilation, and air conditioning. Load calculations and psychometrics. Passive and active solar designs. Faculty Member.

- A373 Environmental Science III.** 2 cr.; annually. Introduction to the principles of electrical technology, lighting fundamentals and design, electrical distribution in buildings, electrical materials and equipment. Faculty Member.
- A406 Advanced Architecture Design I.** 7 cr.; annually. Prerequisite: A305. A studio that introduces large scale complex design problems with realistic technical and legal constraints. J. Biln and other Faculty Members.
- A407 Advanced Architecture Design II.** 7 cr.; annually. Prerequisite: A406. Design studio presenting problems in large scale multi-functional projects in urban contextual and environmental conditions. J. Abed and other Faculty Members.
- A425 Evolution of Cities.** 3 cr.; annually. Prerequisites: A121, A122, A223, A224. A survey of urban morphology in terms of characteristic phases of development, with emphasis on environmental, cultural and economic factors governing urban growth. J. Biln.
- A426 Principles of Urban Planning and Design.** 3 cr.; annually. Prerequisite: A425. Basic principles of urban planning and design methodology, including a survey of the constraints typical of the various models of governmental and local authorities and the professional practices developed in response. J. Biln.
- A434 Architectural Programming.** 2 cr.; annually. Introduction to program analysis and preparation, including final topic selection by each student. N. Sinno.
- A444 Execution Drawing.** 9 cr.; annually. Prerequisites: A243, A361, A362. Extension of selected studio projects into development of design details and working drawings. T. Kazzaz and other Faculty Members.
- A508 Advanced Architecture Design III.** 7 cr.; annually. Prerequisite: A407. Design studio presenting an investigation and study of problems in urban design applied through case studies. O. Moystad and other Faculty Members.
- A509 Final Project Design.** 10 cr.; annually. Prerequisite: A508 and A535. Individual resolution of the design problems initiated in the course A535, developed under the guidance and advice of a faculty member, presented and defended in formal public jury. All Full-Time Faculty Members.
- A535 Final Project Program and Research.** 3 cr.; annually. Students choose a design topic with the guidance and approval of the faculty, and prepare, through a comprehensive research, a program for the course A509. All Faculty Members.

ARCHITECTURE ELECTIVES

The elective offerings within the Department of Architecture and Design are grouped in two blocks, each composed of two elective categories: Visual/Cultural and Professional/Technical.

Students are required to take 12 credits in each block, including a minimum of 3 credits within each category. Electives are chosen under the guidance and advice of the assigned advisor.

A. Visual Category

- A10V Painting and Life Drawing.** 3 cr.; alternate years. A sequence of media experimentation in painting to develop skills and light perception. N. Sinno.
- A11V Sculpture.** 3 cr.; alternate years. An investigative approach to the basic physical three-dimensional form development using various media. Faculty Member.
- A80V Special Topics.** 3 cr. Printmaking. Computer Graphics. Communication Skills.
- A90V Special Projects.** 3 cr.

B. Cultural Category

- A20C Islamic Art and Architecture.** 3 cr.; alternate years. Prerequisite: History of Architecture Sequence. The art and architecture of the Islamic world surveyed from its beginning to the present. Research papers and visual illustration of prominent architects and famous edifices. Faculty Member.
- A21C History of Western Art.** 3 cr.; alternate years. The history of Western art reviewed chronologically from the Renaissance period to the present day, with special emphasis on the relationship of history and visual thought. Faculty Member.
- A23C Modern Architecture in the Middle East.** 3 cr.; alternate years. Lecture and seminar course focusing on the development of architecture in the Middle East in the twentieth century. Research and visual illustrations of the works of prominent architects. Faculty Member.
- A25C 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 twentieth century, with emphasis on collage, assemblage, and photomontage. T. Kazzaz.
- A80C 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.
- A81C 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.
- A82C Recent Discourse in Architecture.** 3 cr.; alternate years. Examination of recent architectural discourse in a broad context. Attention will be paid to relationships between critical theory, cultural criticism, and theories of architecture. Concludes with a discussion of the problems of defining and accounting for the "objects" and "artifacts" of architecture. J. Biln.
- A83C Ornament.** 3 cr.; alternate years. Disjunctive discourse between culture/architecture, technology/tradition, surface/form, permanence/transience, transcendence/materialism, symbolism/practice, production/stagnation/consumption intersect at the site of ornament. M. Lozanovska.
- A84C Museology.** 3 cr.; alternate years. A 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.

- A85C On Art.** 3 cr.; alternate years. Study of the visual arts as a historically persistent form of human production. It does not discuss the 'isms' but rather the theory/ies that promote them. The nature, use, and meaning of the visual arts, with emphasis on contemporary cultural concerns. M. Ghandour.
- A86C Object Dialogues.** 3 cr.; alternate years. The city is an intelligent, evolutionary system, and its architecture is a matter of thought. The course addresses the architectural object in this light, and investigates architectural form in relation to material, structure and narrative. O. Moystad.
- A87C The Body in/of Architecture.** 3 cr.; alternate years. Exploration of a contemporary claim that there is a return to the body, as referent and figurative inspiration, in architectural production, both in design practice and theory. M. Lozanovska.
- A88C Writing in the Margins.** 3 cr.; alternate years. A historical and critical survey of architectural movements and architects between World War II and the 1980s that have shaped modern discourses in architectural production. J. Abed.
- A90C Special Projects.** 3 cr.

C. Professional Category

- A10P Principles of Interior Design.** 3 cr.; alternate years. Basic principles of interior design approach and methodology, including derivation of standards, planning and spatial conception, materials and technical considerations. Faculty Member.
- A50P Specifications and Quantity Surveying.** 3 cr.; alternate years. Preparation of specifications and quantities for new buildings and engineering and industrial works, including take off, abstracting, costing, and billing. Faculty Member.
- A61P Landscape and Site Planning.** 3 cr.; alternate years. Fundamentals of site design, site and master planning, including familiarization with the perceptual and technical aspects of landscape elements and exterior spaces. N. Sinno.
- A70P Engineering Economy.** 3 cr.; alternate years. Equivalent to EM075. Economic decision process in the design and implementation of real engineering projects. Investment, financing, depreciation, economic selection, and replacement. Faculty Member.
- A80P Special Projects.** 3 cr.; alternate years. Housing and community welfare. Evolution of cities in industrial countries. Rehabilitation and reconstruction of devastated areas. Faculty Member.
- A82P Designing Experiences.** 3 cr.; alternate years. A theory seminar combined with a design workshop in which selected theories of meaning, reception and architectural experience are discussed and experimented with in design. T. Kazzaz.
- A84P The Architecture of the High-Rise.** 3 cr.; alternate years. The seminar studies the typology of high-rise buildings. In so doing it focuses on the aspects of program, design and construction. T. Kazzaz.
- A85P 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 a professional analysis of major schemes developed in the twentieth century. T. Kazzaz.

- A86P Theory and Pragmatics of Dialogical Space.** 3 cr.; alternate years. Architectural environments are constantly changing through time. This change is a process whereby architectural form is incessantly being produced, a morphogenetic process. O. Moystad.
- A87P From Sidewalk to Cyberspace.** 3 cr.; alternate years. Public space is a basic reference to meaning and understanding in general. A city without public spaces renders the society it houses at odds with its understanding of itself. O. Moystad.
- A88P Sketch and Concept.** 3 cr.; alternate years. The role of the sketch in the development of the architectural concept is addressed as a method of investigation. O. Moystad.
- A89P Architecture and the Modern Project in the Non-Western World.** 3 cr.; alternate years. The establishing 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 experience of the post-colonial world. J. Abed.
- A90P Special Topics.** 3 cr.
- A95P From House to Apartment Building.** 3 cr.; alternate years. Investigation into the evaluation of Beirut residential architecture and urban structure from the turn of the century to the post-war period. Faculty Member.
- A98P Exhibit Architecture.** 3 cr.; alternate years. Trade shows, public space displays, museums, event exhibits, etc., and in-depth knowledge of graphics and signage in the built environment, are investigated in assignments and design problems. Faculty Member.
- A99P Projects and Contracts Management.** 3 cr.; annually. Introduction to the various concepts of how to manage construction projects from the initial stage until the completion phase. Faculty Member.

D. Technical Category

- A40T Building Systems.** 3 cr.; alternate years. Prerequisite: A 243. 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. Faculty Member.
- A41T 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. Faculty Member.
- A62T Advanced Computer-Aided Design.** 3 cr.; annually. Prerequisite: A317. Introduces the student to solid modeling, rendering, animation capabilities, software customization, and maximizes the student's use of architectural CAD in a professional environment. M. Nasri.
- A80T Special Topics.** 3 cr. Environmental health in buildings. Principles of acoustics. "Structuralism" in architecture.
- A90T Special Projects.** 3 cr.

ASSOCIATED ELECTIVES

Students may choose electives from other Faculties in accordance with the following list of approved sequences and courses. Any other elective would be subject to the approval of the Department.

Business Administration

Environmental Health

Mathematics

Physics

Political Studies and Public Administration

Civilization Sequence

History and Archaeology

Music

Social and Behavioral Sciences

Education

Literature

Philosophy

GRAPHIC DESIGN

The program in Graphic Design is comprised of a total of 151 credit hours taken over eleven terms within four calendar years, including three summers. The total credit hours are distributed as follows:

1. Mandatory Core Program: 115 credit hours, with courses offered annually, both didactic and studio types.
2. Associated electives: 24 credit hours selected from periodic offerings in the University, which are divided into two blocks:
 - a) The professional and technical block: 12 credit hours selected from offerings in architecture, economics and business and management.
 - b) The cultural block: 12 credit hours selected from offerings in the fine arts and social and behavioral sciences.
3. Free electives: 6 credit hours of free electives selected from the course offerings of other Faculties and Departments.
4. 6 credit hours of English, as English 203 and English 206.

Students are urged to consult with their assigned advisor in order to compose a meaningful selection which best satisfies the professional and cultural formation of the designer.

ACADEMIC RULES AND REGULATIONS IN GRAPHIC DESIGN

A. Course Loads

No withdrawals from Graphic Design courses are allowed after the drop-and-add period.

B. Evaluation of Academic Performance

Students are evaluated at the end of every Fall Semester (including the preceding Summer Term) and at the end of every Spring Semester. Evaluation of academic performance is based on:

1. Grades in all Design courses.
2. The cumulative major course average (*all GD courses*).
3. The cumulative general average.

1. Promotion

To qualify for clear promotion a student must:

- a) Make satisfactory progress towards the degree by earning a minimum of 12 credit hours in every full semester.
- b) Maintain a minimum cumulative average of 70 in the courses GD 100 Basic Design and GD 101 Introduction to Graphic Design and a minimum course grade of 70 in each Design course thereafter.
- c) Maintain a minimum cumulative major course average of 70.
- d) Maintain a minimum cumulative general average of 70.

2. Promotion on Probation

A student is promoted on probation if, by the end of a term of evaluation, the student:

- a) Fails in not more than five credit hours of major courses; or
- b) Fails to attain a minimum course grade of 70 but not less than 60, in the design course(s); or
- c) Fails to attain a minimum major course average of 70, but not less than 60;
- d) Fails to attain a minimum cumulative general average of 70 but not less than 60.

3. Removal of Probation

Probation will be removed upon fulfillment of the conditions specified in section B.2 above, i.e., when the student:

- a) Repeats and passes the failed course(s) stipulated in Section B.2.a; or
- b) Attains a minimum cumulative average of 70 in the Design course(s) in which less than 70 has been earned, and in the Design course(s) following; or
- c) Attains a minimum cumulative major course average of 70 at the end of the following term of evaluation.
- d) Attains a minimum cumulative general average of 70 at the end of the following term of evaluation.

C. Repetition

1. A student must repeat a term of evaluation and the previous term of evaluation if, by the end of that term, the student has:
 - a) Failed in more than 5 credit hours of major courses (in case of Term I, a failing student may register in the following term for elective courses).
 - b) Failed to attain a minimum cumulative average of 70 in the courses GD 100 Basic Design and GD 101 Introduction to Graphic Design; or
 - c) Failed to remove a probation at the end of a full term of probation (Fall or Spring).

2. When repeating a term, a student will be exempted from repeating the courses in which the student had 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 credit hours may be taken of Approved Experience.
 - c) The last grade in a repeated course is used for the purpose of averaging.
 - d) A maximum of 6 credit hours of new major courses, excluding Design courses, may be taken per term.
 - e) Repetition for the purpose of improving a course grade is not permitted.

D. Dropping from Faculty

1. A student is dropped from the Faculty for any of the following reasons:
 - a) A major course is failed three times.
 - b) A cumulative major course average or a cumulative general average below 60 is attained.
 - c) Failure to attain a minimum course grade of 70 in a Design course in a repeated term.
 - d) Failure to attain a minimum term average of 70 in a repeated term.
 - e) Failure to attain a minimum cumulative major course average and a minimum cumulative general average of 70 upon completion of a repeated term.
2. A dropped student is not allowed to re-enroll in the Faculty if:
 - a) The student has attained a course average below 60.
 - b) The student had been dropped before.
3. Re-enrollment:
 - a) To be eligible to apply for a re-enrollment, a student who has 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 those complying with the sequence of electives.
 - b) If the dropped student is re-enrolled, 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 aspects, students of Graphic Design are subject to the applicable regulations of the Faculty of Engineering and Architecture.

CURRICULUM FOR THE DEGREE OF BACHELOR OF GRAPHIC DESIGN

FIRST YEAR	Credit hours
<i>Term I (Fall)</i>	
AS 010 Computer Literacy I	0
GD 100 Basic Design	4
GD 111 Visual Communication	3
GD 121 History of Art and Architecture I	3
GD 131 Drawing I	3
GD 141 Color I	3
English as required	3 (5)
	<hr style="width: 100%; border: 0.5px solid black;"/> 19 (21)
 <i>Term II (Spring)</i>	
AS 020 Computer Literacy II	0
GD 101 Introduction to Graphic Design	4
GD 122 History of Art and Architecture II	3
GD 132 Drawing II	3
GD 142 Color II	3
GD 151 Photography I	3
	<hr style="width: 100%; border: 0.5px solid black;"/> 16
 SECOND YEAR	
<i>Term III (Summer)</i>	
GD 252 Photography II	2
Associated or Free Electives	6
	<hr style="width: 100%; border: 0.5px solid black;"/> 8
 <i>Term IV (Fall)</i>	
GD 202 Graphic Design I	3
GD 203 Typography I	3
GD 223 History of Art and Architecture III	3
GD 233 Illustration I	3
Electives	6
	<hr style="width: 100%; border: 0.5px solid black;"/> 18
 <i>Term V (Spring)</i>	
GD 204 Graphic Design II	3
GD 205 Typography II	3
GD 212 Visual Perception	3
GD 261 Computer Graphics I	3
GD 224 History of Art and Architecture IV	3
Electives	3
	<hr style="width: 100%; border: 0.5px solid black;"/> 18

THIRD YEAR

Credit hours

Term VI (Summer)

GD 334 Illustration II	3
English 206	3
Associated or Free Electives	3
	<hr/>
	9

Term VII (Fall)

GD 306 Graphic Design III	4
GD 307 Typography III	3
GD 362 Computer Graphics II	3
GD 335 Etching	3
Elective	3
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	16

Term VIII (Spring)

GD 308 Graphic Design IV	4
GD 309 Production and Paste-Ups	3
GD 363 Computer Graphics III	4
GD 336 Silk Screen Printing Techniques & Applications	3
Elective	3
	<hr/>
	17

FOURTH YEAR

Term IX (Summer)

GD 461 Approved Experience

Term X (Fall)

GD 409 Publication Design	4
GD 410 Portfolio Presentation	2
GD 411 Advertising Design	3
GD 464 Computer Graphics IV	4
Elective	3
	<hr/>
	16

Term XI (Spring)

GD 412 Senior Study	8
GD 413 Exhibit Design	3
Elective	3
	<hr/>
	14

COURSE DESCRIPTIONS

MANDATORY CORE COURSES

- GD 100 Basic Design I.** 4 cr.; annually. Designed for students with limited experience in the visual arts, this course is fundamental for the development of artistic and aesthetic sensitivity and deals with concepts and principles of visual organization and interaction. T. Kazzaz and other Faculty Members.
- GD 101 Introduction to Graphic Design.** 4 cr.; annually. A workshop that encourages the creativity of the student. It focuses on the development of an idea from concept to design and how a mental image is transferred to paper. L. Musfy and other Faculty Members.
- GD 111 Visual communication.** 3 cr.; annually. A course aiming at introducing the student to a new language. It focuses on developing skills in drawing, making use of drawing instruments and descriptive geometry. Faculty Member.
- GD 121 History of Art and Architecture I.** 3 cr.; annually. Same as A121. M. Ghandour.
- GD 122 History of Art and Architecture II.** 3 cr.; annually. Same as A122. Prerequisite: GD 121 or consent of instructor. M. Ghandour.
- GD 131 Drawing I.** 3 cr.; annually. A course in free-hand drawing with emphasis on skills development and education of the student's eye. Faculty Member.
- GD 132 Drawing II.** 3 cr.; annually. Prerequisite: GD 131 or consent of instructor. Continuation of GD 131 with further exploration of drawing leading to personal style development of technical skills. Faculty Member.
- GD 141 Color I.** 3 cr.; annually. Discovery and analysis of the dynamic interaction of color and its implications for designers and artists. Comparative study of color cycles. Faculty Member.
- GD 142 Color II.** 3 cr.; annually. Prerequisite: GD 141, of which it is a continuation. Color is studied in the context of formal problems of space, light, movement, rhythm and balance as well as by subjective emotional responses and the creation of moods. Faculty Member.
- GD 202 Graphic Design I.** 3 cr.; annually. Prerequisite: GD 101. Symbolic communication and further broadening of design capabilities. Through projects the student works towards developing and improving a personal style. L. Musfy and other Faculty Members.
- GD 203 Typography I.** 3 cr.; annually. The course includes the history and development of the letter form as a communication art. Students learn to identify letter forms, style, intensity and personality. L. Musfy and other Faculty Members.
- GD 204 Graphic Design II.** 3 cr.; annually. Prerequisite: GD 202. Continuation of symbolic communication by solving more problems in two-dimensional graphics. Emphasis on paper and innovative printing. Faculty Member.
- GD 205 Typography II.** 3 cr.; annually. Prerequisite: GD203 or consent of instructor. The art form of typography goes beyond printing and the student is encouraged to experiment with the letter to create designs. Faculty Member.

- GD 212 Visual Perception.** 3 cr.; annually. An investigation in visual literacy, introducing intuitive and psychological aspects of seeing and perceiving. Faculty Member.
- GD 223 History of Art and Architecture III.** 3 cr.; annually. Same as A223. Prerequisite: GD122 or consent of instructor. J. Abed.
- GD 224 History of Art and Architecture IV.** 3 cr.; annually. Same as A224. Prerequisite: GD223 or consent of instructor. J. Abed.
- GD 233 Illustration I.** 3 cr.; annually. The student learns how to produce convincing and realistic images with control. The focus is on form, space and color, and approaches to paper, medium and subject. Faculty Member.
- GD 251 Photography I.** 3 cr.; annually. A course that provides the student with practical camera assignments, exploring films and darkroom techniques. Workshop consists of assignments on seeing in color and printing in black and white. Faculty Member.
- GD 261 Computer Graphics I.** 3 cr.; annually. An introduction to computer graphics through lectures on fundamentals and hands-on studio design projects. Included are basic operations, editing, frames and pictures. N. Karanouh and other Faculty Members.
- GD 306 Graphic Design III.** 3 cr.; annually. Prerequisite: GD 204. Advanced course in graphic design in which students apply their skills and their knowledge in illustration and photography. Projects are conducted from real problem solving to production. Faculty Member.
- GD 307 Typography III.** 3 cr.; annually. The course emphasizes creative experimentation with the medium based on abstraction. Exploration of calligraphy and the Arabic letter. Faculty Member.
- GD 308 Graphic Design IV.** 4 cr.; annually. Prerequisite: GD 306. Problems and solutions that are studied in the context of the environment. Application of graphics in three dimensional forms. N. Karanouh and other Faculty Members.
- GD 309 Production and Paste-Ups.** 3 cr.; annually. This course covers the basic knowledge of mechanicals and paste-ups from the printer's point of view. Study of graphic arts terms, paper, finishing and binding. Plant visits will be conducted. L. Musfy.
- GD 334 Illustration II.** 3 cr.; annually. Prerequisite: GD 233 or consent of instructor. Communication using markers, sketching techniques and airbrush painting. Assignments cover a broad spectrum of complex subjects. N. Karanouh.
- GD 335 Etching.** 3 cr.; annually. The course is intended to develop skills applicable to specific design fields in printmaking. Etching is one type of artistic reproduction involving special techniques in metal engraving. Faculty Member.
- GD 336 Silk Screen Printing Techniques and Applications.** 3 cr.; annually. This is another course in printmaking which explores methods of screen printing. Students learn to build screens, mix inks, design posters and illustrations from photographic images to personal abstract creations. Faculty Member.
- GD 352 Photography II.** 2 cr.; annually. Prerequisite: GD 251, of which it is a continuation. Photographic principles are explored in depth; use of electronic portable accessories; working with the methods and materials using existing light; experimentation with color photography. Faculty Member.

- GD 362 Computer Graphics II.** 3 cr.; annually. Prerequisite: GD 261. A more advanced course in applied computer projects. Learning to operate and handle programs, create and edit drawings through assignments. N. Karanouh and other Faculty Members. .
- GD 363 Computer Graphics III.** 4 cr.; annually. Prerequisite: GD 362. Exploration of different programs in producing projects involving three dimensions, animation, simulation, video and sound. N. Karanouh and other Faculty Members.
- GD 409 Publication Design.** 4 cr.; annually. Prerequisites: GD 205, GD 308, GD 309. The student will design catalogs, brochures, books and magazines through the innovative use of photographs, lettering and illustrations. L. Musfi and other Faculty Members.
- GD 410 Portfolio Presentation.** 3 cr.; annually. The student will refine his/her current portfolio after review; a strategy for completion is devised. A final resume is written and follow-up and interviews are conducted to improve presentation techniques. Faculty Member.
- GD 411 Advertising Design.** 3 cr.; annually. Prerequisite: GD 309. The course covers designing for advertising campaigns. Principles of design and layout are applied to solutions of problems through the whole process of developing an idea from rough sketches to comprehensive production with texts, type and photos. L. Musfi and other Faculty Members.
- GD 412 Senior Study.** 8 cr.; annually. Prerequisites: GD 409, GD 411. Final project covering all areas learned. The student will choose a subject in consultation with faculty and will present a written statement prior to the production of his/her project. All full-time Faculty Members.
- GD 413 Exhibit Design.** 3 cr.; annually. The course is intended to make students acquire an in-depth knowledge of graphics and signage in the built environment. Assignments and design problems are critiqued in this context. Faculty Member.
- GD 464 Computer Graphics IV.** 4 cr.; annually. Prerequisite: GD 363, of which it is a continuation. Extends topics to morphing, including video production and editing. N. Karanouh and other Faculty Members.

ELECTIVES

- GD 80P Disjunctions in Design.** 3 cr; annually. Contemporary terminologies in various design fields in relation to narrative. A list of disjunctional words will be discussed upon which a theoretical design project will be developed. Faculty Member.
- GD 82P Arabesque.** 3 cr; annually. Artistic references, inspired Arabic and Islamic arabesques from the Omayyad to the Ottoman empires. Faculty Member.
- GD 87P Graphics in the Environment.** 3 cr; annually. History of posters, billboards and signage in Lebanon. Signage in the adaptation of typography in multilingual situations. Faculty Member.

ASSOCIATED ELECTIVES

1. The following list is indicative of the type of courses that students may choose from. The list may change according to course offerings.
2. Any prerequisites for a given elective must be fulfilled.
3. For electives to be taken outside the Faculty, enrollment in these courses will be subject to:
 - a) the course being offered anyway by the department concerned in any given term;
 - b) availability of places in the course.

Professional and Technical Electives (12 credit hours required)

Econ. 203	Survey of Economics. 3 cr.
B.Ad. 201	Introduction to Financial Accounting. 3 cr.
B.Ad. 231	Management of Organizations. 3 cr.
B.Ad. 241	Marketing Management. 3 cr.
A 313	Computer Aided Design. 3 cr.
A 20C	Islamic Art and Architecture. 3 cr.
A 10P	Principles of Interior Design. 3 cr.
GD 80P	Disjunctions in Design. 3 cr.
GD 82P	Arabesque. 3 cr.
GD 87P	Graphics in the Environment. 3 cr.

Cultural Electives (12 credit hours required)

CS/Music 240	Introduction to the Art of Music I. 3 cr.
CS/Music 241	Introduction to the Art of Music II. 3 cr.
CS/Theater 267	Voice and Acting in the Theater. 3 cr.
CS/Theater 274	Design in Theater. 3 cr.
CS/Theater 283	Workshop in Theater Production. 3 cr.
English 213	World Drama in English. 3 cr.
SBS 202	General Psychology. 3 cr.
SBS 219	Sensation and Perception. 3 cr.

**DEPARTMENT OF CIVIL AND ENVIRONMENTAL
ENGINEERING**

Chairperson: Ayoub, G.
 Professors: Ayoub, G.; Harajli, M.
 Associate Professors: Basha, H.; Hamad, B.; Kaysi, I.
 Assistant Professors: Baaj, M.; El-Fadel, M.; Mabsout, M.; Piasecki, M.; Sadek, S.
 Senior Lecturers: Ghannam, J.; Haddad, W.
 Lecturer: Nader, H.
 Instructor: Kevorkian, A.
 Associate: Acra, A.

**CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING:
MAJOR, CIVIL ENGINEERING**

	Credit Hours
Term I (Fall)	
AS 010 Computer Literacy I	0
CE 011 Statics	3
EE 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)	
AS 020 Computer Literacy II	0
EE 025 Structured Programming and Data Structures	3
ME 011 Engineering Graphics	3
ME 022 Dynamics	3
Math 202 Differential Equations	3
ET 021 Shop I	2
	14
Term III (Summer)	
AS 031 Cultural Course	3
CE 037 Surveying and Photogrammetry	4
CE 033 Science of Materials	2
CE 033L Materials Laboratory	1
	10
Term IV (Fall)	
AS 035 Probability and Statistics in Engineering	2
AS 045 Application of Analytical Methods in Engineering I	3
CE 041 Mechanics of Materials	3
EE 041 Electric Circuits I	3
ME 044 Thermodynamics	3
Cultural Course	3
	17

CIVIL & ENVIRONMENTAL ENGINEERING

	Credit Hours
Term V (Spring)	
AS 055 Application of Analytical Methods in Engineering II	3
CE 051 Structures I	3
CE 055 Fluid Mechanics	3
Basic Science Elective (Phys., Chem., Biol.)	3
Cultural Course	3
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	15
Term VI (Summer)	
AS 036 Application of Numerical Methods in Engineering	3
Engl 206 English for Engineering & Architecture	3
CE 064 Engineering Geology	3
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	9
Term VII (Fall)	
CE 071 Structures II	3
CE 073 Concrete I	3
CE 075 Applied Fluid Mechanics	3
CE 076 Water and Wastewater Networks	3
CE 077 Highway Engineering	3
CE 078 Fluid Mechanics Laboratory	1
	<hr style="width: 100%; border: 0.5px solid black;"/>
	16
Term VIII (Spring)	
CE 083 Concrete II	3
CE 084 Soil Mechanics	3
CE 085 Hydrology	3
CE 086 Water and Wastewater Treatment	3
CE 087 Transportation Engineering	3
CE 087L Transportation Laboratory	1
CE 088 Soil Mechanics Laboratory	1
	<hr style="width: 100%; border: 0.5px solid black;"/>
	17
Term IX (Summer)	
CE 090 Approved Experience	
Term X (Fall)	
AS 110 Technology and Society	3
CE 109 Construction Management	3
3 Electives	9
	<hr style="width: 100%; border: 0.5px solid black;"/>
	15
Electives of Term X	
CE 104 Soil Mechanics and Foundations	3
Graduate courses (500 series) in Civil Engineering or approved courses from other Departments	
Term XI (Spring)	
EM 075 Engineering Economy	3
CE 115 Specifications and Quantity Surveying	3
3 Electives	9
	<hr style="width: 100%; border: 0.5px solid black;"/>
	15
Electives of Term XI	
CE 112 Steel	3
CE 118 Computer Methods in Civil Engineering	3
CE 119 Project	3
Graduate courses (500 series) in Civil Engineering, or approved courses from other Departments	

COURSE DESCRIPTIONS

- CE 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.
- CE 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.
- CE 033L Materials Laboratory.** 1 cr.; annually. Concrete aggregate, cement and mix design. Asphalt concrete, asphalt, asphalt and aggregate combination. Steel. Photoelasticity. Coordinator: M. Harajli.
- CE 033E Science of Materials.** (CCE and EE students). 3 cr.; annually. Prerequisite: ME 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.
- CE 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. Coordinators: I. Kaysi and M. Baaj.
- CE 041 Mechanics of Materials.** 3 cr.; annually. Prerequisites: CE 011, CE 033. Tension, compression, shear, and bending moment diagrams. Torsion. Stress-strain relationships. Stresses in beams. Combined stresses. Mohr circle. Buckling of columns. M. Mabsout.
- CE 051 Structures I.** 3 cr.; annually. Prerequisites: CE 011, CE 033, CE 041. Influence lines, trusses, and beams. Cables. Deflection of beams and frames by double integration methods, singularity function approach, area moment theorems, conjugate beam, and conjugate structure. Introduction to indeterminate structures. M. Mabsout.
- CE 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.
- CE 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.
- CE 071 Structures II.** 3 cr.; annually. Prerequisite: CE 051. Energy theorems and applications to trusses, beams, and frames. Slope-deflection equations. Moment distribution influence lines in indeterminate structures. B. Hamad.
- CE 073 Concrete I.** 3 cr.; annually. Prerequisites: CE 011, CE 033L, CE 051. Mechanics and behavior of reinforced concrete. Ultimate strength theory of flexure, shear, and bond. Design of beam and one-way slabs. M. Harajli.
- CE 075 Applied Fluid Mechanics.** 3 cr.; annually. Prerequisite: CE 055. Fluid flow in pipes. Flow in open channels. Fluid measurements. Hydraulic machinery. Unsteady flow. Faculty Member.
- CE 076 Water and Wastewater Networks.** 3 cr.; annually. Prerequisite: CE 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.

- CE 077 Highway Engineering.** 3 cr.; annually. Prerequisite: CE 037. Principles of geometric design and highways. Highway location. Volume counts; capacity analysis. Vertical curves; superelevation; and design of intersections, rotaries, and interchanges. I. Kaysi.
- CE 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.
- CE 083 Concrete II.** 3 cr.; annually. Prerequisite: CE 073. Ribbed slabs; two-way slabs; and flat slabs. Columns. Foundations. Stairways. Cantilever retaining walls. B. Hamad.
- CE 084 Soil Mechanics.** 3 cr.; annually. Soil classification; soil hydraulics; consolidation. Stress-deformation and strength characteristics; failure theories. S. Sadek.
- CE 085 Hydrology.** 3 cr.; annually. Prerequisite: CE 075. The hydrologic cycle. Runoff cycle. Hydrograph analysis. Unit hydrographs. Stream flow routing. H. Basha.
- CE 086 Water and Wastewater Treatment.** 3 cr.; annually. Quality and methods of treatment of water and wastewater. G. Ayoub.
- CE 087 Transportation Engineering.** 3 cr.; annually. Prerequisite: CE 077. Fundamentals of transportation engineering. Airports, harbors, and terminal facilities. Grading operation and compaction. Construction practices. M. Baaj.
- CE 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.
- CE 088 Soil Mechanics Laboratory.** 1 cr.; annually. Laboratory course intended to familiarize students with the nature of soil behavior, both in the disturbed and undisturbed conditions. Laboratory tests include physical properties of soils, stress strain relationships, compressibility and shear strength. Coordinator: S. Sadek.
- CE 104 Soil Mechanics and Foundations.** 3 cr.; annually. Prerequisites: CE 084, CE 088. Excavating and stabilization. Stresses in soil and settlement analysis. Bearing capacity. Foundations on sand; foundations on clay; pile foundations. Retaining walls. S. Sadek.
- CE 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.
- CE 112 Steel.** 3 cr.; alternate years. Prerequisites: CE 051, CE 071. Design of trusses, beams, and frames with rolled and built-up sections. Design of connections, welded and riveted. B. Hamad.
- CE 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.

CE 118 Computer Methods in Civil Engineering. 3 cr.; alternate years. Prerequisites: EE 015, EE 025, AS 036. Program design. Revision of programming languages. Presentation of algorithms for CE problems. Using the computer for analysis, design and decision making. Coordinator: I. Kaysi.

CE 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 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 272).
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

- CE 501 Advanced Structural Analysis.** 3 cr.; annually. Prerequisites: CE 051, CE 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. Computer programming.* M. Mabsout.
- CE 502 Prestressed Concrete.** 3 cr.; alternate years. Prerequisite: CE 083. Materials characteristics. Prestress losses. Working strength design procedures. Composite construction. Ultimate flexural strength and behavior. Shear design. Continuous prestressed concrete members. M. Harajli.
- CE 503 Bridges.** 3 cr.; alternate years. Prerequisites: CE 071, CE 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.
- CE 504 Special Topics in Concrete.** 3 cr.; annually. Prerequisite: CE 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.
- CE 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.
- CE 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.
- CE 601 Advanced Mechanics of Solids.** 3 cr.; alternate years. Prerequisite: CE 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.
- CE 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.
- CE 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.
- CE 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.

- CE 606 Experimental Mechanics.** 3 cr. Prerequisites: CE 033M, CE 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.
- CE 607 The Finite Element Method.** 3 cr.; alternate years. Prerequisite: CE 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.
- CE 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.
- CE 609 Behavior of Reinforced Concrete Members.** 3 cr.; alternate years. Prerequisite: CE 083. Moment-curvature and force-deformation relationships. Ductility. Shear design. Truss analogy. Torsion in R/C members. Compression field theory. Reinforced concrete columns. Reinforced concrete slabs. B. Hamad.
- CE 610 Advanced Steel Design.** 3 cr. Prerequisite: CE 112. Stability. Column strength. Beam-columns joints. Composite steel-concrete construction. Plate buckling. Plate girders. Plastic design. Torsion. Combined torsion and bending. Faculty Member.

Geotechnical Sequence

- CE 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.
- CE 542 Applied Foundation Engineering.** 3 cr.; alternate years. Prerequisite: CE 104. Braced excavations, retaining structures, deep foundations, slope stability, computer applications. S. Sadek.
- CE 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.
- CE 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.
- CE 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.
- CE 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.
- CE 645 Soil Behaviour.** 3 cr. Prerequisites: CE 084, CE 088, CE 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

- CE 561 Pavement Design.** 3 cr.; alternate years. Prerequisites: CE 077, CE 087, CE 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.
- CE 562 Urban Transportation Planning I.** 3 cr.; alternate years. Prerequisite: CE 087. Introduction to methods and models used in transportation planning with emphasis on the urban context. I. Kaysi.
- CE 563 Traffic Engineering.** 3 cr.; alternate years. Prerequisites: CE 077, CE 087. Capacity, accidents, traffic demand, parking, and traffic control devices. Coordinator: M. Baaj.
- CE 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.
- CE 565 Design and Management of Transport Operations.** 3 cr.; alternate years. Prerequisite: AS 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.
- CE 566 Transportation Economics.** 3 cr.; alternate years. Prerequisite: EM 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.
- CE 567 Highway Pavement Materials.** 3 cr. Prerequisite: CE 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.
- CE 661 Urban Transportation Planning II.** 3 cr. Prerequisite: CE 562. Advanced topics in urban transportation planning. Transportation systems management techniques. Travel demand analysis and modeling. Urban public transit. Planning in the presence of uncertainty. Faculty Member.
- CE 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.
- CE 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.

- CE 664 Public Transportation.** 3 cr.; alternate years. Pre- or co-requisite: CE 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.
- CE 665 Airports and Seaports.** 3 cr. Prerequisite: CE 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.
- CE 666 Advanced Highway Engineering and Design.** 3 cr. Prerequisites: CE 077 or equivalent, CE 563. Advanced topics in highway engineering and design. Highway safety, maintenance, and financing. Computer-aided highway design. Faculty Member.
- CE 667 Traffic Flow Theory.** 3 cr.; alternate years. Prerequisites: AS 035 or equivalent, undergraduate calculus. Characteristics of traffic flow, density, and speed. Models describing traffic flows. Hydrodynamic analogue. Computer simulation models. M. Baaj.

Common Courses

- CE 598 Numerical Modeling.** 3 cr.; alternate years. Prerequisite: AS 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.
- CE 696 Special Projects.** 3 cr.
- CE 697 Seminar.** 0 cr. Coordinator: Faculty Member.
- CE 698 Special Topics.** 3 cr.
- CE 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: major, 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: Major, 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 (12 credit hours of core courses and 12 credit hours from basic courses in a specialty area and broad electives), as well as a 6 credit hour thesis accomplished on a full, or part-time, basis. A maximum of two broad electives may be taken. A minimum of one calendar year of residence is required for graduation.

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 (see pages 463 and 272).
2. All students admitted to the program are required to take, or have taken, the following courses, or their equivalents, as prerequisites:

CE 011	Statics. 3 cr.
ME 022	Dynamics. 3 cr.
ME 044	Thermodynamics. 3 cr.
Math 202	Differential Equations 3 cr.
CE 055	Fluid Mechanics. 3 cr.
CE 076	Water and Wastewater Networks. 3 cr.
CE 085	Hydrology. 3 cr.
CE 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.

Course Sequences

Core Courses

- CE 521 Groundwater Hydrology 3 cr.
- CE 527 Water and Wastewater Chemistry. 3 cr.
- CE 529 Surface Water Hydrology. 3 cr.
- CE 531 Sanitary Microbiology and Biological Processes. 3 cr.

Basic Courses in Environmental Engineering

- CE 523 Water and Sewage Works Design. 3 cr.
- CE 624 Advanced Water and Wastewater Reclamation and Reuse. 3 cr.
- CE 626 Industrial Waste Management. 3 cr.
- CE 628 Air Pollution and Control. 3 cr.
- CE 629 Solid Waste Management. 3 cr.

CE 634 Physical, Chemical and Biological Treatment Processes. 3 cr.

Basic Courses in Water Resources Engineering

CE 522 Hydraulic Structures. 3 cr.

CE 526 Transport Phenomena in Surface and Subsurface Waters. 3 cr.

CE 528 Hydraulics of Open Channels. 3 cr.

CE 536 Water Resources Systems: Planning and Management. 3 cr.

CE 622 Modeling of Hydrologic Systems. 3 cr.

CE 623 Computational Methods in Water Resources. 3 cr.

Broad Electives

EH 301¹ Introduction to Environmental Health

EH 312¹ Occupational Health

ME 805 Advanced Fluid Dynamics

EM 503 Introduction to Stochastic Processes

EM 513 System Analysis and Optimization

SIM 326² Surface Irrigation Engineering

SIM 328² Sprinkler and Drip Irrigation Engineering

SIM 330² Irrigation Project Planning and Management

SIM 367² Soils Conservation

Geol 318³ Hydrogeology

CE 525 Introduction to Coastal Engineering

CE 630 Special Topics in Environmental and Water Resources Sciences and Engineering

CE 635 Environmental Impact Assessment

CE 638 Residual Waste Management

Common Courses

CE 598 Numerical Modeling. 3 cr.

CE 696 Special Projects. 3 cr.

CE 697 Seminar. 0 cr.

CE 698 Special Topics. 3 cr.

CE 699 Thesis.

Course Descriptions

CE 521 Groundwater Hydrology. 3 cr.; annually. Prerequisite: CE 085 or CE 529 or equivalent. Properties of groundwater. Groundwater movement. General flow

¹Course offered in the Faculty of Health Sciences.

²Course offered in the Faculty of Agricultural and Food Sciences.

³Course offered in the Faculty of Arts and Sciences.

- equations. Steady-state well hydraulics. Unsteady well hydraulics. Seepage forces. Groundwater modeling. H. Basha.
- CE 522 Hydraulic Structures.** 3 cr.; alternate years. Prerequisite: CE 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. H. Basha.
- CE 523 Water and Sewage Works Design.** 3 cr.; alternate years. Prerequisites: CE 076, CE 086. Design of wastewater schemes, including design reports and literature search on the development of conventional treatment processes. G. Ayoub.
- CE 525 Introduction to Coastal Engineering.** 3 cr.; alternate years. Prerequisite: CE 075. Small amplitude wave theory. Finite amplitude wave theory. Cnoidal waves. Forces on structures. Morrison's equation. Energy spectrum. H. Basha.
- CE 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. M. Piasecki.
- CE 527 Water and Wastewater Chemistry.** 3 cr.; annually. Prerequisite: Chem 201 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. Thermodynamic and energy. Refractory, radioactive, toxic and hazardous compounds. M. El-Fadel.
- CE 528 Hydraulics of Open Channels.** 3 cr.; alternate years. Prerequisite: CE 075 or equivalent. Energy and momentum considerations. Critical flows and controls. Uniform flow computation. Gradually varied flow theory and analysis. Spatially varied flow. M. Piasecki.
- CE 529 Surface Water Hydrology.** 3 cr.; annually. Prerequisite: CE 085 or equivalent. Runoff process. Unit hydrographs. Overland flow. Floods. Applied statistics in hydrology. Reservoir and channel routing. Hydrologic design. Urban hydrology. H. Basha.
- CE 531 Sanitary Microbiology and Biological Processes.** 3 cr.; annually. Pre- or co-requisite: CE 527. 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. M. El-Fadel.
- CE 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.
- CE 537 Air Pollution and Control.** 3 cr. Prerequisite: Chem 201 or equivalent. Introduction to air pollutants, sources, measurement techniques, physical, chemical and biological effects on ecology. Common air pollutants in the Middle East, and their sources. Transport, dispersion, and diffusion of air pollutants. Air pollution control processes. Effectiveness of air pollution control legislation. Faculty Member.
- CE 538 Solid Waste Management.** 3 cr.; alternate years. Prerequisites: CE 527, CE 531. 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.
- CE 539 Environmental Impact Assessment.** 3 cr.; alternate years. 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.
- CE 598 Numerical Modeling.** 3 cr.; alternate years. Prerequisite: AS 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, M. Piasecki.
- CE 622 Modeling of Hydrologic Systems.** 3 cr.; alternate years. Prerequisite: CE 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.
- CE 623 Computational Methods in Water Resources.** 3 cr. Prerequisite: AS 036 or equivalent. Matrix methods. Spectral methods. Time series analysis. Method of characteristics. Linear programming. Finite difference method. Application to water resources problems. M. Piasecki.
- CE 624 Advanced Water and Wastewater Reclamation and Reuse.** 3 cr. Prerequisites: CE 527, CE 531. 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.
- CE 625 Air Pollution Control Processes.** 3 cr. Prerequisite: CE 628 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. Faculty Member.
- CE 626 Industrial Waste Management.** 3 cr.; alternate years. Prerequisite: CE 086 or CE 527. 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.
- CE 627 Air Pollution Modeling.** 3 cr. Prerequisite: CE 628 or consent of instructor. Mathematical models. Air pollution meteorology. Plume rise. Dispersion and atmospheric chemistry. Meteorological models. Gaussian, statistical, and other special application models. Faculty Member.
- CE 628 Principles of Air Pollution.** 3 cr. Prerequisite: Chem 201B or equivalent. Introduction to air pollutants, sources, measurement techniques, physical, chemical and biological effects on ecology. Common air pollutants in the Middle East. Transport, dispersion, and diffusion of air pollutants. Air pollution control processes. Effectiveness of air pollution control legislation. Faculty Member.
- CE 634 Physical, Chemical and Biological Treatment Processes.** 3 cr.; alternate years. Prerequisite: CE 527, CE 531 or equivalent. 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.

CE 638 Residual Waste Management. 3 cr. Prerequisite: CE 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.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Chairperson:	Khoury, S.
Professors:	Al-Alaoui, A.; El-Hajj, A.; Sabah, N.
Associate Professors:	Diab, H.; Kabalan, K.; Khoury, S.; Saade, J.; Yehia, M.
Assistant Professors:	Akra, M.; Chaaban, F.; Chedid, R.; Karaki, S.; Kayssi, A.; Mrad, F.
Senior Lecturers:	Chahine, H.; Mougharbel, I.
Lecturers:	Atweh, M.; Chehab, A.; Chehayeb, F.; Farhat, K.; Krisht, M.; Mohtar, T.; Othman, Z.
Instructors:	Abdul-Sater, M.; El-Hout, N.; Farhat, N.; Kanafani, Z.; Kassem, A.; Mehdi, M.; Moukhaiber, N.; Nahed, E.
Assistant Instructors:	Al-Hamra, K.; Maad, S.

The Department of Electrical and Computer Engineering offers an undergraduate program leading to the degree of Bachelor of Engineering and 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**

	Credit Hours
Term I (Fall)	
AS 010 Computer Literacy I	0
EE 011 Electric Circuits I	3
EE 015 Introduction to Structured Programming	3
ET 021 Shop I	2
ME 017 Engineering Mechanics	3
Math 201 Calculus and Analytic Geometry III	3
	14
Term II (Spring)	
AS 020 Computer Literacy II	0
EE 021 Electric Circuits II	3
EE 022 Basic Electronics	3
EE 024 Basic Electronics Laboratory	1
EE 025 Structured Programming and Data Structures	3
Math 202 Differential Equations	3
Cultural Course	3
	16
Term III (Summer)	
AS 036 Application of Numerical Methods in Engineering	3
AS 037 Probability and Statistics in Electrical Engineering	3
CE 033E Science of Materials	3
	9
Term IV (Fall)	
AS 045 Application of Analytical Methods in Engineering I	3
EE 042 Analog Electronics	3
EE 043C Discrete Mathematics	3
EE 044 Analog Electronics Laboratory	1
EE 049 Digital Systems Design	3
ME 011 Engineering Graphics	3
	16
Term V (Spring)	
AS 055 Application of Analytical Methods in Engineering II	3
EE 052 Digital Electronics	3
EE 054 Digital Electronics Laboratory	1
EE 055C Data Structures and Advanced Algorithms	3
EE 059 Microprocessor Systems	3
Cultural Course	3
	16
Term VI (Summer)	
AS 031 Cultural course	3
EE 066 Analog Signals and Systems Analysis	3
ME 067 Thermodynamics	3
	9

FACULTY OF ENGINEERING & ARCHITECTURE

	Credit Hours
Term VII (Fall)	
EE 073 Feedback Controls	3
EE 074C Microprocessor Laboratory	1
EE 075C Software Applications and Design	3
EE 078 Field Theory	3
EE 079C Computer Architecture	3
Engl 206 English for Engineering and Architecture	3
	16
Term VIII (Spring)	
EE 083C Electric Machines	3
EE 084 Control Systems Laboratory	1
EE 085C System Software	3
EE 086 Analog Communications	3
EE 088 Signal Transmission	3
Science Elective	3
	16
Term IX (Summer)	
EE 090 Approved Experience	
Term X (Fall)	
EE 104C Communications Laboratory I	1
EE 105C Computer Networks	3
EE 106C Digital Communications	3
EM 075 Engineering Economy	3
Elective	3
Elective	3
	16
Electives for Term X	
EM 105 Engineering Management I	3
Graduate courses in Electrical and Computer Engineering, or approved courses from other Departments	
Term XI (Spring)	
AS 110 Technology and Society	3
EE 114C Communications Laboratory II	1
EE 117 Project	3
Elective	3
Elective	3
Elective	3
	16
Electives for Term XI	
EE 115C Design and Application of Information Systems	3
EM 115 Engineering Management II	3
EE 118 Telephony	3
Graduate courses in Electrical Engineering, or approved courses from other Departments	

CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING: MAJOR, ELECTRICAL ENGINEERING

Term I (Fall)	Credit Hours
AS 010 Computer Literacy I	0
EE 011 Electric Circuits I	3
EE 015 Introduction to Structured Programming	3
ET 021 Shop I	2
ME 017 Engineering Mechanics	3
Math 201 Calculus and Analytic Geometry III	3
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	14
Term II (Spring)	
AS 020 Computer Literacy II	
EE 021 Electric Circuits II	3
EE 022 Basic Electronics	3
EE 024 Basic Electronics Laboratory	1
EE 025 Structured Programming and Data Structures	3
Math 202 Differential Equations	3
Cultural Course	3
	<hr/>
	16
Term III (Summer)	
AS 036 Application of Numerical Methods in Engineering	3
AS 037 Probability and Statistics in Electrical Engineering	3
CE 033E Science of Materials	3
	<hr/>
	9
Term IV (Fall)	
AS 045 Application of Analytical Methods in Engineering I	3
EE 042 Analog Electronics	3
EE 044 Analog Electronics Laboratory	1
EE 049 Digital Systems Design	3
ME 011 Engineering Graphics	3
ME 044 Thermodynamics	3
	<hr/>
	16
Term V (Spring)	
AS 055 Application of Analytical Methods in Engineering II	3
EE 052 Digital Electronics	3
EE 053E Electromagnetic Devices	3
EE 054 Digital Electronics Laboratory	1
EE 059 Microprocessor Systems	3
Cultural Course	3
	<hr/>
	16
Term VI (Summer)	
AS 031 Cultural Course	3
EE 063E Rotating Machinery	3
EE 066 Analog Signals and Systems Analysis	3
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	9

FACULTY OF ENGINEERING & ARCHITECTURE

	Credit Hours
Term VII (Fall)	
EE 073 Feedback Controls	3
EE 074E Electric Machines Laboratory	1
EE 078 Field Theory	3
2 Electives	6
Science Elective	3
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	16
Electives for Term VII	
EE 071E Fundamentals of Electric Power Engineering	3
EE 072E Theory of Semiconductor Devices	3
EE 077E Discrete Signals and Systems Analysis	3
EE 079C Computer Architecture	3
CE 055 Fluid Mechanics	3
An approved course from another department	
Term VIII (Spring)	
EE 086 Analog Communications	3
EE 088 Signal Transmission	3
Engl 206 English for Engineering and Architecture	3
2 Electives	6
Elective Laboratory	1
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	16
Electives for Term VIII	
EE 081E Power System Analysis	3
EE 082E Power Electronics	3
EE 083E Digital Control	3
ME 084 Applied Thermodynamics	3
An approved course from another department	3
Elective Laboratories for Term VIII	
EE 084E Power Electronics and Drives Laboratory	1
EE 089E Microprocessor Laboratory	1
Term IX (Summer)	
EE 090 Approved Experience	
Term X (Fall)	
AS 110 Technology and Society	3
EE 104 Control Systems Laboratory	1
4 Electives	12
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	16
Electives for Term X	
EE 101E Industrial Electrification	3
EE 102E Instrumentation	3
EE 103E Electric Drives	3
EE 105C Computer Networks	3
EE 106C Digital Communications	3
EE 107E Fiber Optics	3
EE 108 Microwave Transmission Systems	3
EE 109 Telephony I	3
EM 105 Engineering Management I	3
Graduate courses in Electrical and Computer Engineering, or approved courses from other Departments	

	Credit hours
Term XI (Spring)	
EM 075 Engineering Economy	3
EE 117 Final Year Project	3
3 Electives	9
Elective Laboratory	1
	16
Electives for Term XI	
EE 112E Power System Protection and Switchgear	3
EE 118 Telephony II	3
EE 119E Microelectronic Systems Design	3
EM 115 Engineering Management II	3
Graduate courses in Electrical and Computer Engineering, or approved courses from other Departments	
Elective Laboratories for Term XI	
EE 114E Power Systems Laboratory	1
EE 116 Communications Laboratory	1

COURSE DESCRIPTIONS

- EE 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. R. Chedid.
- EE 015 Introduction to Structured Programming.** 3 cr.; annually. Introduction to structured programming using C⁺⁺. Problem solving and algorithms. Building abstractions. Procedures and functions. Repetition and selection. Recursion. Files and text processing. Advanced data types: classes, sets and arrays. Enumerated types. Weekly laboratory assignments are an integral part of this course. A. El-Hajj, S. Karaki, M. Akra, A. Chehab.
- EE 021 Electric Circuits II.** 3 cr.; annually. Prerequisite: EE 011. Network Analysis for AC circuits. Power in a two-wire system with sinusoidal drivers. Resonance. Poly-phase systems. Fourier method of waveform analysis. Transformers. Two-port networks. RLC sinusoidal transients. M. Yehia, R. Chedid.
- EE 022 Basic Electronics.** 3 cr.; annually. Prerequisite: EE 011; co-requisite: EE 021. Introductory concepts. Semiconductor diodes and applications. Bipolar transistor operation and biasing. Field-effect transistor operation and biasing. AC Models. A. Kayssi.
- EE 024 Basic Electronics Laboratory.** 1 cr.; annually. Prerequisite: EE 011; co-requisites: EE 021, EE 022. Passive electronic components. Laboratory instruments. Voltage-divider circuits. Sources and Thevenin'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.
- EE 025 Structured Programming and Data Structures.** 3 cr.; annually. Prerequisite: EE 015. Introduction to object oriented programs. Internal representation of data. An in-depth study of recursion. Polymorphism, inheritance and overloading. Abstract

- data structures via pointers. Stacks, queues, lists, trees and graphs with applications. Weekly laboratory assignments. A. El-Hajj, S. Karaki, M. Akra, A. Chehab.
- EE 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. A. Chehab.
- EE 042 Analog Electronics.** 3 cr.; annually. Prerequisite: EE 022. Midrange AC amplifier design. Frequency response of AC amplifiers. Distortion and amplifier performance. Operational amplifier design with IC Op-Amps. Oscillators. Regulators. Filters. A. Kayssi.
- EE 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. K. Kabalan.
- EE 044 Analog Electronics Laboratory.** 1 cr.; annually. Co-requisite: EE 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.
- EE 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.
- EE 052 Digital Electronics.** 3 cr.; annually. Prerequisite: EE 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. Al-Alaoui.
- EE 052M Electronics.** 3 cr.; annually. Prerequisite: EE 041. *For non ECE students.* Semiconductor theory. Diodes and applications. Bipolar transistors. Amplifier circuits. Operational amplifiers. Feedback amplifiers. Logic elements. Digital devices. A. Chehab.
- EE 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.
- EE 054 Digital Electronics Laboratory.** 1 cr.; annually. Prerequisite: EE 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.
- EE 055C Data Structures and Advanced Algorithms.** 3 cr.; annually. Prerequisite: EE 025. Introduction to analysis of algorithms. Asymptotic notation, divide and conquer. Randomized algorithms. Median, order statistics. Sorting algorithms. Data structures. M. Akra.
- EE 059 Microprocessor Systems.** 3 cr.; annually. Prerequisite: EE 049. Microprocessor concepts. CPU instructions. Internal registers structure. 8085 and 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-art CPUs. H. Diab, F. Mrad.

- EE 063E Rotating Machinery.** 3 cr.; annually. Prerequisite: EE 053. DC machines: construction, types, steady-state performance of motors and generators, control. Synchronous and induction machines: construction, principle, parallel operation of alternators. F. Chaaban.
- EE 066 Analog Signals and Systems Analysis.** 3 cr.; annually. Prerequisite: AS 055. System and signal representations. Convolution. Fourier transform. Sampling theorem. Power and energy spectral densities. Hilbert transform. J. Saade.
- EE 071E Fundamentals of Electric Power Engineering.** 3 cr.; annually. Basic concepts: generation, transmission and distribution. Power system components and modeling. Power flow analysis. Frequency and voltage control. Fault analysis. Protection principles. M. Yehia.
- EE 072E Theory of Semiconductor Devices.** 3 cr.; annually. Prerequisites: EE 042, EE 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.
- EE 073 Feedback Controls.** 3 cr.; annually. Prerequisite: AS 045. Introductory Concepts. Mathematical models of systems. Transfer function, block diagrams and flow graphs. Performance, stability and compensation of continuous and discrete linear control system in time and frequency domains. K. Kabalan, F. Mrad.
- EE 074C Microprocessor Laboratory.** 1 cr.; annually. Prerequisite: EE 059. Experiments using the Z80 microprocessor: CMS trainer. Design and implementations of a controller board for interfacing to trainer. Troubleshooting techniques. Assembly language programming. H. Diab.
- EE 074E Electric Machines Laboratory.** 1 cr.; annually. Prerequisite: EE 063E. Single and three phase transformers, DC machines: series, shunt and compound machines. Three phase Synchronos generators and induction motors. F. Chaaban.
- EE 075C Software Applications and Design.** 3 cr.; annually. Prerequisite: EE 055C. Analysis, design, construction, maintenance and evolution of large software systems. Programming methodologies, project management techniques, file design. Introduction to database systems and programming languages. A. El-Hajj.
- EE 077E Discrete Signals and Systems Analysis.** 3 cr.; annually. Prerequisite: EE 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. Alaoui.
- EE 078 Field Theory.** 3 cr.; annually. Prerequisite: AS 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.
- EE 078M Electromechanical System.** 4 cr.; annually. Prerequisite: EE 041. *For ME students.* Magnetic circuits and transformers. DC and AC machines and their control. F. Chaaban.
- EE 079C Computer Architecture.** 3 cr.; annually. Prerequisite: EE 059. Computer interconnection structures. Microprocessor interfacing techniques. Serial/parallel

- communication. Processor/register organization. Instruction and arithmetic lining. CU operation. Hardwired/ microprogrammed control, micro-instruction sequencing/ execution. Bit-slice architecture. Controllers. Parallel processing. H. Diab.
- EE 081E Power System Analysis.** 3 cr.; annually. Prerequisite: EE 071. Power system modelling. Load flow studies. Reactive power compensation and voltage control. Economic operation. Symmetrical and unsymmetrical short circuit studies. Power system stability. M. Yehia.
- EE 082E Power Electronics.** 3 cr.; annually. Prerequisites: EE 052, EE 063E. Diodes. Transistors, thyristors: switching power supplies. Characteristics of switching mode rectifiers. Bridge structure invertors. AC current converters with RLC load. S. Karaki.
- EE 083C Electric Machines.** 3 cr.; annually. Prerequisite: EE 021. Magnetic circuits and transformers. Force and torque in electromagnetic systems. DC and AC machines. Special machines: stepper motors; linear motors. F. Chaaban.
- EE 083E Digital Control.** 3 cr.; annually. Prerequisite: EE 077E. Digital Signal Processing. Sampled data systems. Design of digital control systems using transform techniques. Design of digital control systems using state-space methods. Practice and applications of digital control. F. Mrad.
- EE 084 Control Systems Laboratory.** 1 cr.; annually. Prerequisite: EE 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. F. Mrad.
- EE 084E Power Electronics and Drives Laboratory.** 1 cr.; annually. Prerequisite: EE 063E or EE 078M. Single phase induction motors, stepper. Motor drives. Solid state drives for small-power motors. F. Chaaban.
- EE 085C System Software.** 3 cr.; annually. Prerequisite: EE 079C. Introduction to the design and construction of compilers, operating systems, assemblers, loaders, linkers and macroprocessors. A. El-Hajj.
- EE 086 Analog Communications.** 3 cr.; annually. Prerequisites: EE 066, AS 057. Introductory concepts. Amplitude modulation. Frequency modulation. Random processes and noise. Noise in CW modulation. Pulse analog modulation. K. Kabalan, J. Saade.
- EE 088 Signal Transmission.** 3 cr.; annually. Prerequisite: EE 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.
- EE 089E Microprocessor Laboratory.** 1 cr.; annually. Same as EE 074C. H. Diab.
- EE 101E Industrial Electrification.** 3 cr.; annually. Prerequisites: EE 063E, EE 071E. Medium and low voltage installations. Lighting. Practical applications of electric machines. Motor control centers. Emergency power supplies. Auxiliary systems. Faculty Member.
- EE 102E Instrumentation.** 3 cr.; annually. A design course for complete instrumentation systems. Measurements, sensors, data acquisition, component integration. Application areas for course projects include: industrial control, biomedical equipment, electronics, electronics packages. F. Mrad.
- EE 103E Electric Drives.** 3 cr.; annually. Prerequisite: EE 063E. Single-phase motors: starting, solid-state control, motor rating. DC machines: rectifiers and choppers.

Induction motor drives: voltage and frequency control. Synchronous machine drives: voltage- and current-fed inverters, cycloconverters. Motors, brushless dc drives. Design aspects. F. Chaaban.

- EE 104 Control Systems Laboratory.** 3 cr.; annually. Same as EE 084. F. Mrad.
- EE 104C Communications Laboratory I.** 1 cr.; annually. Prerequisite: EE 086. Sine-Cosine Oscillators. AM modulation. AM demodulation. FM modulation. Zero-crossing detector. PLLs. AM receiver stages. AM receiver. K. Kabalan.
- EE 105C Computer Networks.** 3 cr.; annually. Prerequisite: EE 079C. Network architecture. The OSI reference model. The physical, medium access, data link, network, transport, session, presentation and application layers. A. El-Hajj.
- EE 106C Digital Communications.** 3 cr.; annually. Prerequisite: EE 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. Synchronization. Information theoretic concepts. J. Saade.
- EE 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.
- EE 108 Microwave Transmission Systems.** 3cr.; 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.
- EE 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.
- EE 112E Power System Protection and Switchgear.** 3 cr.; annually. Prerequisites: EE 063E. Current and voltage transformers and protection. Overvoltage protection. Relays. Circuit breakers and fuses. Data transmission. Project. Faculty Member.
- EE 114C Communications Laboratory II.** 1 cr.; annually. Prerequisite: EE 106C. Binary and multilevel baseband data codes. Clock recovery and data regeneration. ASK, PSK modulators and receiver's operations. Performance of binary ASK system in white noise. J. Saade.
- EE 114E Power Systems Laboratory** 1 cr.; annually. Prerequisite: EE 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.
- EE 115C Design and Applications of Information Systems.** 3 cr.; annually. Hardware and software selection criteria. Case studies. Application software maintenance. Resource allocation. Scheduling. Staffing requirements processing organizations. Application. Faculty Member.
- EE 116 Communications Laboratory I.** 1 cr.; annually. Same as EE 104C. K. Kabalan.
- EE 117 Project.** 3 cr.; annually. Supervised project in groups of two to four students aimed at providing practical experience in some aspects of Computer, Communications, and Electrical Engineering. Faculty Members.

EE 118 Telephony II. 3 cr.; annually. Prerequisite: EE109. Networks and common channel signaling: integrated services digital network, cellular global system for mobile communication, signaling system no. 7. Components and Protocols. Faculty Member.

EE 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 PROGRAM

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. EE 700 Seminar (No credit). Coordinator: Al-Alaoui.
4. A thesis based on independent research: EE 799 Thesis (6 credit hours).

Course Descriptions

Core Courses

- EE 710C Advanced Computer Architecture.** 3 cr.; annually. Prerequisite: EE 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 computer architecture. H. Diab.
- EE 760C Stochastic Processes, Detection and Estimation.** 3 cr.; annually. Prerequisites: AS 057, EE 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.
- EE 770C Discrete Event Stochastic Processes and Queueing Theory.** 3 cr.; annually. Prerequisite: EE 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. Kaban.

Elective Courses

- EE 709C Computer Graphics.** 3 cr.; annually. Prerequisite: EE 079C. Interactive. Vector generation and point-plotting displays. Graphical input devices. Windowing. Clipping. Viewports. Zooming, geometrical transformations. 2D and 3D. Data structures. Advanced raster display architecture. Raster algorithms. Special graphics techniques. Application. H. Diab.
- EE 711C Computer System Analysis.** 3 cr. Prerequisite: EE 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 queueing theory. Faculty Member.
- EE 712C Advanced Computer Graphics.** 3 cr. Prerequisite: EE 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.
- EE 713C Modeling and Simulation.** 3 cr. Prerequisite: EE 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. Faculty Member.

- EE 714C Fault Tolerant Systems Design.** 3 cr. Prerequisites: EE 710C, EE 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.
- EE 731 Modern Distribution Systems.** 3 cr.; alternate years. Prerequisite: EE071E. Engineering-economic analysis of electric power supply systems. Computer-aided design techniques. Substation and distribution automation. Control centers. Information requirements and processing techniques. Distribution management systems. Demand side management. M. Yehia.
- EE 735C Time Series, System Analysis and Identification.** 3 cr. Prerequisites: EE 730S, EE 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.
- EE 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. A. Feghali.
- EE 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. M. Akra.
- EE 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.
- EE 761C Advanced Digital and Data Communications.** 3 cr.; alternate years. Prerequisites: EE 760C, EE 791C. Measures of information. Source coding. Channel coding. Channel capacity. Soft and hard decision decoding. Digital signalling over a channel with intersymbol interference. Fading multipath channels. Diversity techniques, and other topics. J. Saade.
- EE 762C Information Theory and Coding.** 3 cr. Prerequisite: EE 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. Faculty Member.
- EE 763C Recursive Estimation.** 3 cr. Prerequisites: EE 760C, EE 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.
- EE 764C Fuzzy Sets, Logic and Applications.** 3 cr.; alternate years. 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

- interferences. Possibility concepts. Applications: Fuzzy control, signal processing, pattern recognition, decision making and expert systems. J. Saade.
- EE 771C Data Communication Networks.** 3 cr.; alternate years. Prerequisite: EE 105C. Network topology. Data transmission fundamentals. Error control. Multilayer network architecture and protocols. Network management. Network security and privacy. Network performance measurements. A. Kayssi.
- EE 772C Local Area Networks.** 3 cr.; alternate years. Prerequisite: EE 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.
- EE 773C Neural Networks.** 3 cr.; alternate years. Prerequisite: EE 793. Perceptron, madalina, back propagation and adaptive neural networks. Transformation by layered networks, statistical neurodynamics, associative memory and neural learning. Applications to functional approximations, signal filtering and pattern classification. A. Al-Alaoui.
- EE 775C Client-Server Computing.** 3cr.; alternate years. Prerequisite: EE105C. 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.
- EE 791C Digital Signal Processing.** 3 cr.; alternate years. Discrete-time signals. Z-transform. Discrete and fast fouiver Transforms. finite impulse response and infinite impulse response digital filters. Effects of finite word length. A. Al-Alaoui.
- EE 792C Advanced Digital Signal Processing.** 3 cr. Prerequisites: EE 760C, EE 791C. Fast Fourier transform. Spectral analysis. Multirate signal processing with applications. Signal processing hardware. Applications to speech processing. Faculty Member.
- EE 793C Pattern Recognition.** 3 cr. Prerequisite: EE 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. Faculty Member.
- EE 794C Digital Image Processing.** 3 cr.; alternate years. Prerequisites: EE 760C, EE 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.
- EE 797 Special Topics.**
- EE 798 Special Project.** Assigned project, of not more than 3 credit hours, supervised by a 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 (EE 710E) and the other in the area of electrical power systems (EE 740E). These courses are outlined below.
2. Three technical elective courses (9 credit hours) in electric power engineering (course sequences EE 71xE - EE 78xE). Courses in these sequences are described below.
3. One elective course (3 credit hours) in the management and environmental areas (course sequence EE 79xE in the program and courses listed under the Electrical Engineering Sequence in the Engineering Management program). Courses in the sequence EE 79xE 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: EE 700 Seminar (no credit).
6. A thesis based on independent research: EE 799 Thesis (6 credit hours).

Course Descriptions

Core Courses

EE 710E Advanced Electric Machinery. 3 cr.; annually. Electromotive forces in ac machine windings, inductive and leakage reactances, d-q axis theory. Energy losses

and efficiency of electric machines, design approaches. Superconducting ac and dc machines. Numerical methods for machine analysis, concept of finite element method, computation of electromagnetic fields in electric machines. R. Chedid.

EE 740E Computer Analysis of Power Systems. 3 cr.; annually. 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

EE 711E Computer Aided Design of Electromagnetic Devices. 3 cr.; alternate years. Maxwell's equations. Theory of finite element method, energy functional and shape function. Boundary conditions. Computation of global machine parameters by finite elements, iterative procedure. Other numerical methods. Applications. R. Chedid.

EE 712E Magnets and Permanent Magnet Machines. 3 cr. Units and characteristics of magnetic materials, stability and losses, demagnetization. High energy magnets, state-of-the art. Types and topologies of permanent magnet (PM) machines, analysis of square-wave and sine-wave brushless dc drives, non-linear modelling, hybrid PM stepper motors. Computer aided analysis of PM machines. Faculty Member.

EE 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.

EE 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.

EE 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 Members.

EE 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 Members.

EE 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.

EE 742E Electric Power System Operation and Control. 3 cr. 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.

EE 743E Power System Transients and Dynamics. 3 cr. Synchronous machine models, nonlinear and linear multi-machine models. Excitation systems and turbine governor dynamics. Practical transient stability studies. Direct Liapunov's and pattern recognition methods for stability analysis. Power system stabilizers. Faculty Member.

EE 784 Renewable Energy Systems. 3 cr.; alternate years. Energy resources, wind, water, biomass, and solar. Scientific principles. Design and control aspects. R. Chedid.

EE 791E Management and Control Systems in the Power Industry. 3 cr. Energy balance, power reserves, management and control of power plants and networks; structure, hardware and software components of management and control systems. Long and short term optimization of power systems. M. Yehia.

EE 792 Environmental Aspects of Energy Systems. 3 cr.; alternate years. Prerequisites: Graduate standing and consent of instructor. World energy resources. Physical problems of the environment. Motor vehicle emissions and noise pollution. Pollution control systems in the power industry. Environmental impact in the power assessment. F. Chaaban.

EE 797 Special Topics.

EE 798 Special Project. Assigned project, of not more than 3 credit hours, supervised by a 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: EE 700 Seminar (no credit).
4. A thesis based on independent research: EE 799 Thesis (6 credit hours).

Course Descriptions

Core Courses

- EE 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.
- EE 720S Circuit Synthesis and Design.** 3 cr.; annually. 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.
- EE 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 systems. Pole shifting. Computer control. Design of controllers and observers. F. Mrad.

Elective Courses

1. Control Systems

- EE 731S Digital Control.** 3 cr. Prerequisites: EE 730S, EE 791C. Sampled data systems. Design of digital control systems using transform techniques. Design of digital control systems using state-space methods. Practice and applications of digital control. F. Mrad.
- EE 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.
- EE 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.
- EE 734S Stochastic Control.** 3 cr. Prerequisite: EE 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.

- EE 735S System Identification.** 3 cr. Prerequisite: EE 730S, EE 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.
- EE 736S Adaptive Control.** 3 cr.; alternate years. Prerequisite: EE 730S. 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.
- EE 737S Robotics.** 3 cr.; annually. Prerequisite: EE 730S. 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.
- EE 738S Non-Linear Control.** 3 cr. Prerequisite: EE 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

- EE 741S Optical Sources, Detectors and Systems.** 3 cr. Prerequisite: EE 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.
- EE 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.
- EE 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.
- EE 745S Light-wave Systems.** 3 cr. Prerequisites: EE 710S, EE 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.
- EE 747S Fiber-Optic Networks.** 3 cr. Prerequisites: EE 710S, EE 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

- EE 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.
- EE 702S Biomedical Engineering II.** 3 cr.; alternate years. Prerequisite: EE 701S. Respiratory system. Non-invasive diagnostic instrumentation. Nervous system. Biotelemetry. Clinical laboratory. X-ray and radioisotopes. Magnetic resonance.. Electrosurgery. Computers in medicine. N. Sabah.
- EE 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.
- EE 706S Neuroengineering II.** 3 cr.; alternate years. Prerequisite: EE 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

- EE 781S Modeling and Simulation of Semiconductor Devices.** 3 cr. Prerequisite: EE 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.
- EE 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.
- EE 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.
- EE 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.
- EE 785S Introduction to Analog VLSI Systems.** 3 cr. Prerequisite: EE 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.

EE 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.

EE 787S Computer-Aided Analysis and Design of VLSI Circuits and Systems. 3 cr. Prerequisite: EE 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

EE 797 Special Topics.

EE 798 Special Project. Assigned project, of not more than 3 credit hours, supervised by a Faculty member.

EE 799 Thesis. Every semester. Faculty Member.

DEPARTMENT OF MECHANICAL ENGINEERING

Chairperson:	Moukalled, F.
Professor:	Azoury, P.
Associate Professors:	Ghaddar, N.; Kuran, A.; Moukalled, F.; Nuwayhid, R.
Assistant Professors:	Abdel-Malek, K.; Darwish, M.; Hijazin, M.
Senior Lecturers:	Abi-Said, C.
Lecturer:	Hejase, H.; Kasamani, J.; Salameh-Lama, F.
Instructor:	Majzoub, M.

CURRICULUM FOR THE DEGREE OF BACHELOR OF ENGINEERING: MAJOR, MECHANICAL ENGINEERING

Term I (Fall)	Credit hours
AS 010 Computer Literacy I	0
EE 015 Introduction to Structured Programming	3
CE 011 Statics	3
Chem 201 Chemical Principles	3
Phys 211 Electricity and Magnetism	3
Math 201 Calculus and Analytic Geometry III	3
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	15
Term II (Spring)	
AS 020 Computer Literacy II	0
EE 025 Structured Programming and Data Structures	3
ME 011 Engineering Graphics	3
ME 022 Dynamics	3
Math 202 Differential Equations	3
ET 021 Shop I	2
	<hr/>
	14
Term III (Summer)	
AS 031 Cultural Course	3
AS 035 Probability and Statistics in Engineering	2
AS 036 Application of Numerical Methods in Engineering	3
CE 033 Science of Materials	2
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	10
Term IV (Fall)	
AS 045 Application of Analytical Methods in Engineering I	3
CE 041 Mechanics of Materials	3
EE 041 Electric Circuits	3
ME 044 Thermodynamics	3
ME 045 Engineering Materials	3
Cultural Course	3
	<hr/>
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FACULTY OF ENGINEERING & ARCHITECTURE

	Credit Hours
Term V (Spring)	
AS 055 Application of Analytical Methods in Engineering II	3
CE 055 Fluid Mechanics	3
EE 052M Electronics	3
ME 051 Physics of Energy Conversion	3
ME 056 Internal Combustion Engines	3
Cultural Course	3
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	18
Term VI (Summer)	
ME 061 ME Laboratory I	1
ME 062 Instrumentation and Measurements	2
ME 063 Machine Drawing	2
ME 065 Compressible Flow	3
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	8
Term VII (Fall)	
ET 071 Engine Shop	1
ME 072 Mechanics of Machines	4
ME 073 Hydrodynamics and Boundary Layers	3
EE 078M Electromechanical Systems	3
EM 075 Engineering Economy	3
Engl 206 English for Engineering and Architecture	3
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	17
Term VIII (Spring)	
ME 081 ME Laboratory II	1
ME 082 Engineering Vibrations	3
ME 083 Mechanical Design I	3
ME 085 Heat and Mass Transfer	4
ME 086 Applied Fluid Mechanics	3
ME 087 Dynamic System Analysis	3
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	17
Term IX (Summer)	
ME 090 Approved Experience	
Term X (Fall)	
ME 101 ME Laboratory III	1
ME 102 Automatic Controls	3
ME 103 Mechanical Design II	4
ME 105 Manufacturing Processes	3
Elective	3
Elective	3
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	17
Electives for Term X	
ME 106 Steam Turbines	3
ME 108 Computer Applications in Mechanical Engineering	3
Graduate courses in Mechanical Engineering, or approved courses from other Departments.	

Term XI (Spring)	Credit hours
AS 110 Technology and Society	3
ME 110 Project	3
ME 111 Mechanical Engineering Lab. IV	1
ME 114 Air Conditioning	3
ME 118 Computer-Aided Design	3
Elective	3
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	16
Electives for Terms XI	
ME 113 Water Services in Buildings	3
ME 118 Computer-Aided Design	3
ME 119 Aerodynamics	3
Graduate courses in Mechanical Engineering, or approved courses from other Departments.	

COURSE DESCRIPTIONS

ME 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.

ME 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. M. Hijazin and other Faculty Members.

ME 022 Dynamics. 3 cr.; annually. Prerequisite: CE 011. Principles of dynamics. Absolute and relative motion. Dynamics of particles and rigid bodies. Work and energy. Conservation of energy. Impulse and momentum. M. Darwish and other Faculty Members.

ME 044 Thermodynamics. 3 cr.; annually. Basic concepts. The First and Second Laws for systems and control volumes. Entropy. Ideal gases. Applications. M. Ghaddar, R. Nuwayhid.

ME 045 Engineering Materials. 3 cr.; annually. Prerequisite: CE 033. Physical and mechanical properties of materials. Treatment of materials. Selection and design guidelines of ferrous and nonferrous materials. M. Darwish.

ME 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.

ME 056 Internal Combustion Engines. 3 cr.; annually. Prerequisite: ME 044. Theoretical and actual cycles. Combustion and fuel-air analyses. Fuel systems. Turbocharging. P. Azoury and other Faculty Members.

ME 061 Mechanical Engineering Laboratory I. 1 cr.; annually. Prerequisites: ME 044, ME 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: F. Moukalled.

- ME 062 Instrumentation and Measurements.** 2 cr.; annually. Prerequisites: Physics 211, ME 022. General concepts. Measuring devices. Manipulation, transmission, and recording of data. M. Darwish, M. Hijazin.
- ME 063 Machine Drawing.** 2 cr.; annually. Prerequisite: ME 011. Sectional views of various machine components. Free-hand sketching. Working drawings. Assembly drawings. AutoCAD applied to machine drawing. Faculty Members.
- ME 065 Compressible Flow.** 3 cr.; annually. Prerequisite: ME 044. General one-dimensional flow of a perfect gas. Homenergetic and homentropic flow in nozzles and constant-area ducts. One-dimensional unsteady flow. N. Ghaddar.
- ME 067 Thermodynamics.** (CCE students). 3 cr.; annually. Essentially the same as ME 044 plus some aspects of statistical thermodynamics. R. Nuwayhid.
- ME 072 Mechanics of Machines.** 4 cr.; annually. Prerequisite: ME 022. Linkages, cams, and gears. Gear trains. Kinematics of machinery. Force analysis of machinery. Balancing. Introduction to synthesis. A. Kuran.
- ME 073 Hydrodynamics and Boundary Layers.** 3 cr.; annually. Prerequisite: CE 055. Viscous flow. Momentum integral approach. Blasius solution. Skin friction and drag coefficients. Potential flow. Flow around cylinders, ellipsoids, and aerofoils. F. Moukalled.
- ME 081 Mechanical Engineering Laboratory II.** 1 cr.; annually. Prerequisites: ME 044, ME 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: F. Moukalled.
- ME 082 Engineering Vibrations.** 3 cr.; annually. Prerequisite: ME 022. Linear single-degree-of-freedom systems, transient and steady forced vibration. Linear undamped multi-degree-of-freedom systems. A. Kuran.
- ME 083 Mechanical Design I.** 3 cr.; annually. Prerequisite: CE 041. Stress analysis. Deflections. Statistical considerations. Design for static and fatigue strengths. P. Azoury.
- ME 084 Applied Thermodynamics.** (EE students). 3 cr.; annually. Prerequisite: ME 044. Gas and vapor power and refrigeration cycles. Thermodynamics of some electric phenomena. Introduction to heat transfer. R. Nuwayhid.
- ME 085 Heat and Mass Transfer.** 4 cr.; annually. Prerequisite: ME 044. Principles of conduction, convection and radiation. Combined heat transfer. N. Ghaddar.
- ME 086 Applied Fluid Mechanics.** 3 cr.; annually. Prerequisite: CE 055. Nature of flow in turbomachines. Similarity laws and factors. Hydraulic impulse and reaction turbines. Pumps. Wind energy converters. F. Moukalled, M. Hijazin.
- ME 087 Dynamic System Analysis.** 3 cr.; annually. Prerequisites: ME 022, EE 041. Modelling and analysis of mechanical, electrical, electromechanical, thermal, and hydraulic systems. Simulation diagrams. Stability analysis. Faculty Member.
- ME 101 Mechanical Engineering Lab III.** 1 cr.; annually. Prerequisites: ME 044, ME 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: F. Moukalled.
- ME 102 Automatic Controls.** 3 cr.; annually. Prerequisites: ME 082, EE 052M. Representation of mechanical and electrical systems. Steady-state operation. The characteristic function. Root-locus and frequency-response methods. Faculty Member.

- ME 103 Mechanical Design II.** 4 cr.; annually. Prerequisite: ME 083. Design of various machine elements. Simple and creative design problems. P. Azoury.
- ME 105 Manufacturing Processes.** 3 cr.; annually. Prerequisite: ME 045. Casting processes. Forming processes. Joining and cutting. Selection of manufacturing processes. Quality control. Faculty Member.
- ME 106 Steam Turbines.** 3 cr.; annually. Prerequisite: ME 044. Steam power cycles. Combined cycles. Impulse and reaction steam turbines. Design aspects of steam turbines. The steam power plant. Future trends. R. Nuwayhid and other Faculty Members.
- ME 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.
- ME 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.
- ME 111 Mechanical Engineering Lab IV.** 1 cr.; annually. Prerequisites: ME 044, ME 062. Selected experiments covering the main fields of the Mechanical Engineering curriculum. Coordinator: F. Moukalled.
- ME 113 Water Services in Buildings.** 3 cr.; annually. Prerequisite: CE 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.
- ME 114 Air Conditioning.** 3 cr.; annually. Prerequisite: ME 085. Heating and cooling loads. Psychrometric processes. Design of piping and duct systems. Domestic hot and cold water systems. Equipment. F. Moukalled.
- ME 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.
- ME 118 Computer-Aided Design.** 3 cr.; annually. Prerequisite: ME 103. Computer design and optimization of mechanical elements and systems. Simulation programs and packages. M. Darwish.
- ME 119 Aerodynamics.** 3 cr.; annually. Prerequisite: ME 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, ME 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 272).

COURSE DESCRIPTIONS

A. Core Courses

ME 805 Advanced Fluid Mechanics. 3 cr.; alternate years. Prerequisites: CE 055, ME 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.

- ME 808 Advanced Engineering Design.** 3 cr.; alternate years. Prerequisite: ME 103. Optimization, kinematics and mechanics, and human factors. Design process. Integrated design problems. Product design. M. Darwish.
- ME 812 Advanced Dynamics.** 3 cr.; alternate years. Prerequisite: ME 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

- ME 818 Energy Conservation and Utilization.** 3 cr.; alternate years. Prerequisite: ME 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.
- ME 826 Solar Energy.** 3 cr.; annually. Prerequisite: ME 085. Fundamentals of solar radiation. Collectors and concentrators. Energy storage. Estimation and conversion formulas for solar radiation. M. Hijazin.
- ME 846 Wind Energy.** 3 cr.; annually. Prerequisite: ME 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. M. Hijazin.
- ME 864 Refrigeration.** 3 cr.; annually. Prerequisite: ME 114. Fundamental concepts and principles. Cold storage. Functions and specifications of refrigeration equipment. Applications. A. Kuran.
- ME 897A Special Projects in Applied Energy.** 3 cr.; alternate years. Faculty Members.
- ME 898A Special Topics in Applied Energy.** 3 cr.; alternate years. Faculty Members.

2. Materials and Manufacturing Sequence

- ME 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.
- ME 811 Elasticity and Plasticity.** 3 cr.; alternate years. Prerequisite: CE 041. Tensor analysis. The general state of stresses. Properties and deformation of solid materials. Elasticity. Plasticity. Matrix methods. Applications. Faculty Member.
- ME 832 Mechanics of Composite Materials.** 3 cr.; alternate years. Prerequisites: CE 041, ME 045. Anisotropic elasticity and laminate theory. Analysis of various members of composite materials. Energy methods. Failure theories. Micromechanics. Faculty Member.
- ME 837 Advanced Manufacturing Processes.** 3 cr.; alternate years. Prerequisite: ME 105. Powder metallurgy. Bonding and welding processes. Processing of ceramics and composite materials. Process planning. Designing for manufacture. CAM. Faculty Member.

- ME 838 Simulation of Manufacturing Processes.** 3 cr.; alternate years. Prerequisite: ME 105. Discretization methods. The finite volume method. Simulation of solidification and of injection. Applications. Faculty Member.
- ME 897B Special Projects in Materials and Manufacturing.** 3 cr.; alternate years. Faculty Members.
- ME 898B Special Topics in Materials and Manufacturing.** 3 cr.; alternate years. Faculty Members.

3. Thermal and Fluid Sciences Sequence

- ME 804 Advanced Thermodynamics.** 3 cr.; alternate years. Prerequisite: ME 044. Advanced thermodynamic concepts. Gas mixtures and multi-phase systems. Chemical reactions. Thermodynamic property relations. Chemical and phase equilibrium. Applications. N. Ghaddar.
- ME 814 Advanced Heat Transfer.** 3 cr.; alternate years. Prerequisites: CE 055, ME 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.
- ME 815 Computational Fluid Dynamics.** 3 cr.; alternate years. Prerequisites: AS 036, CE 055, ME 085. Discretization process in fluid dynamics. Numerical approaches and applications. Iterative and direct matrix methods. Numerical implementation of turbulence models. N. Ghaddar, F. Moukalled.
- ME 851 Unsteady Gas Flow.** 3cr.; alternate years. Prerequisites: ME044, ME065. 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.
- ME 855 Turbulent Flow and Transport.** 3 cr.; alternate years. Prerequisite: ME 073. Governing equations. Turbulence concepts. Turbulent shear flows. Modes of transition and hydrodynamic stability theories. Faculty Member.
- ME 897C Special Projects in Thermal and Fluid Sciences.** 3 cr.; alternate years. Faculty Members.
- ME 898C Special Topics in Thermal and Fluid Sciences.** 3 cr.; alternate years. Faculty Members.

4. Miscellaneous Courses

- ME 802 Noise and Vibration Control.** 3 cr.; alternate years. Prerequisites: ME 022, AS 055, ME 082. Fundamental concepts. Transmission of vibration in structures and interaction with sound fields. Noise and vibration control in buildings and machinery. Applications. N. Ghaddar.
- ME 803 Adaptive and Optimal Control.** 3 cr.; alternate years. Prerequisites: ME 087, ME 102. Dynamic programming. Pontrygin's minimum principle. Self-tuning and model reference control. Model following adaptive control. System identification and parameter estimation. Faculty Member.

- ME 822 Advanced Vibrations.** 3 cr.; alternate years. Prerequisite: ME 082. Multi-degree-of-freedom systems. Governing equations. Methods of analysis, including numerical procedures. Nonlinear and random vibrations. Faculty Member.
- ME 823 Robotics.** 3 cr.; alternate years. Prerequisites: ME 072, ME 087, ME 102. Manipulator kinetics. Manipulator and inverse kinematics. Trajectory generation. Position, velocity and force control. Intelligence of mechanical manipulators. Robot languages and systems. Faculty Member.
- ME 824 Nuclear Engineering.** 3 cr.; annually. Prerequisite: ME 051. Neutrons and their interactions. Fission. Slowing-down theory. Resonances. Nuclear reactor theory. The neutron diffusion equation. Criticality. Reactor kinetics. R. Nuwayhid.
- ME 831 Theory of Plates and Shells.** 3 cr.; alternate years. Prerequisite: CE 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.
- ME 841 Finite Element Method.** 3 cr.; alternate years. Prerequisites: CE 041, ME 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

- AS 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.
- AS 020 Computer Literacy II.** 0 cr.; annually. Memory management. Electronic spreadsheets and word processing. Coordinator: M. Salameh.
- AS 031 Cultural course.** 3 cr.; annually. Faculty Members.
- AS 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.
- AS 036 Application of Numerical Methods in Engineering.** 3 cr.; annually. Prerequisite: EE 025. Mathematical modelling of typical engineering systems. Interpretation of experimental engineering data using numerical techniques. Finite 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. Kaysi.
- AS 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.
- AS 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.
- AS 055 Application of Analytical Methods in Engineering II.** 3 cr.; annually. Prerequisite: AS 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.
- AS 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.
- AS 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.

- AS 510 Advanced Computer-Based Instruction.** 3 cr.; annually. Prerequisite: AS 509. Human-computer interaction. Hypermedia. Integrated performance support systems and artificial intelligence in instruction. A. Feghali.
- AS 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

- ET 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.
- ET 071 Engine Shop.** 1 cr.; annually. Prerequisite: ME 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.
Associate Professors:	Abdul-Malak, M.; Salameh, M.
Assistant Professors:	Abboud, N.; Mezher, T.
Senior Lecturer:	Jaber, M.
Lecturers:	Khoury, B.; Tannir, A.

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 this catalogue (see pages 463 and 272).
2. All students admitted into the EM program are required to take, or have taken, the following courses, or their equivalents, as prerequisites:
 - a) AS 035 Probability and Statistics in Engineering. 3 cr.

- b) EM 075 Engineering Economy. 3 cr.
 - c) EM 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

- EM 075 Engineering Economy.** 3 cr.; each semester. Prerequisite: AS 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.
- EM 105 Engineering Management I.** 3 cr.; annually. Prerequisite: AS 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.
- EM 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

- EM 501 Decision Analysis and Behavioral Decision Theory.** 3 cr.; annually. Prerequisite: AS 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. T. Mezher, N. Abboud.
- EM 502 Engineering Project Management.** 3 cr.; annually. Prerequisite: AS 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.
- EM 503 Introduction to Stochastic Processes.** 3 cr.; annually. Prerequisite: AS 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.

EM 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.

EM 505 Project Evaluation and Financing. 3 cr.; annually. Prerequisite: EM 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

EM 511 Stochastic Models in Operations Research. 3 cr.; annually. Prerequisite: EM 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.

EM 512 Linear Programming. 3 cr.; alternate years. Prerequisite: EM 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 and other Faculty Members.

EM 513 Systems Analysis and Optimization. 3 cr.; annually. Prerequisite: EM 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.

EM 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.

EM 515 Systems Simulation. 3 cr.; annually. Prerequisite: EM 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.

EM 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.

EM 517 Statistical Quality Control and Reliability. 3 cr.; alternate years. Prerequisite: AS 035. Control charts for variables and attributes; acceptance sampling plans;

- commonly used standards; reliability and life testing; and systems reliability concepts. N. Abboud and other Faculty Members.
- EM 518 Manufacturing Systems Analysis.** 3 cr.; alternate years. Prerequisites: EM 105 and EM 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 and other Faculty Members.
- EM 519 Inventory Theory.** 3 cr.; alternate years. Prerequisites: EM 115, EM 503. Deterministic and probabilistic treatment of continuous and periodic review inventory problems, the single period model, and dynamic inventory models. Multi-item problems, and multi-echelon techniques are also included. M. Salameh, N. Abboud.
- EM 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.
- EM 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.
- EM 522 Queueing Theory.** 3 cr.; alternate years. Prerequisite: EM 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

- EM 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.
- EM 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.
- EM 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.
- EM 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.

EM 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.

EM 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, and the process of ISO certification. T. Mezher.

3. Information Management and Human Factors Sequence

EM 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.

EM 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.

EM 554 Technology-Based Entrepreneurship and Innovation. 3 cr.; alternate years. Prerequisite: EM 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.

EM 555 Human Resource Management. 3 cr.; annually. Prerequisite: EM 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

EM 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.

EM 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.

EM 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.

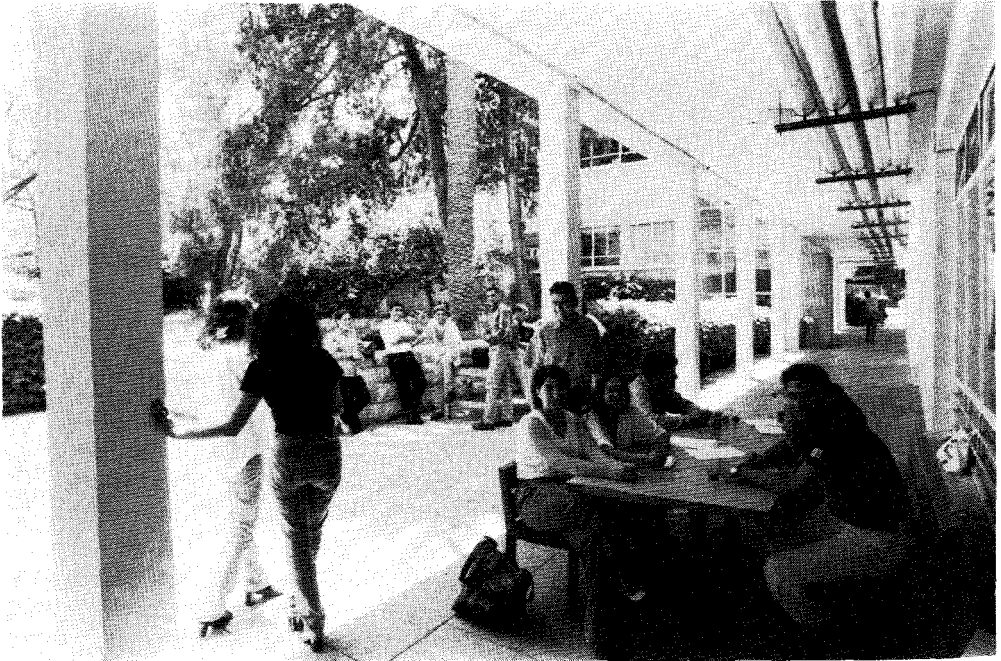
EM 574 Sustainable Development Management. 3 cr.; alternate years. Introduction to the concept of sustainable development. Topics include: the business of sustainable development, pricing the environment, energy and the marketplace, innovation process, technological cooperation, renewable resources, and leadership for sustainable development in developing countries. Case studies. T. Mezher.

EM 500 Seminar. 0 cr.

EM 597 Special Project. 3 cr. Supervised study that may involve special research work in the student's area of concentration.

EM 598 Special Topics. 3 cr. Advanced topics in Engineering Management. May be repeated for credit when topics vary.

EM 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.



Students outside the Agriculture building.



*Faculty of
Agricultural and
Food Sciences*

FACULTY OF AGRICULTURAL AND FOOD SCIENCES

FACULTY LIST 1996-97

Officers of the Faculty

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President
Samir Makdisi	Deputy President
Nuhad Dagher	Dean of the Faculty
Mohamad Farran	Director of AREC
Waddah Nasr	Registrar

Coordinators of Academic Programs

Riad Baalbaki	Coordinator of Undergraduate Studies, Agri-Program
Imad Toufeili	Coordinator of Undergraduate Studies, ND Program
Nahla Baba	Coordinator of Graduate Studies

Professor Emeritus

Talhok, 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
- Dagher, 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

Associate Professors

Abu Jawdeh, Youssef, Ph.D., Faculty of Agronomic Science, Belgium; Crop Production and Protection

Barbour, Elie, Ph.D., University of Minnesota; Animal Sciences

¹ Until December 19, 1996.

² As of December 20, 1996.

* On tenure appointment.

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
Toufeili, Imad, Ph.D., University of Reading; Food Technology and Nutrition

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
Baalbaki, Riad, Ph.D., Michigan State University; Crop Production and Protection
Betru, Teffera, Ed.D., Oklahoma State University; Agricultural Economics and Development
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
Sidahmed, Moatasim, Ph.D., University of California, Davis; Soils, Irrigation and Mechanization
Talhok, Salma, Ph.D., Ohio State University; Crop Production and Protection
Zurayk, Rami, Ph.D., Oxford University; Soils, Irrigation and Mechanization

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

Instructors

- Husseini-Salman, Salma, M.S., University of Arizona; Crop Production and Protection
- p Kanan, Salah, M.S., Mediteranean Agronomic Institute of Chania, Greece; Crop Production and Protection
- p Touma, Georgette, M.S., Eastern Illinois University; Food Technology and Nutrition

P Part-time.

Associates

- Abi Saab, Saab, Ph.D., All Union Scientific Research Institute for Stock Breeding, Moscow, USSR; Animal Sciences
 Al-Masri, Talih, Ph.D., Patrice Lumumba People's Friendship University; Crop Production and Protection
 Sayegh, Antoine, Ph.D., Oregon State University; Soils, Irrigation and Mechanization

Research Assistants

- Abdul Khalek, Nadine, M.S., AUB; Crop Production and Protection
 Abdul Samad, Rayan, B.E., AUB; Soils, Irrigation and Mechanization
 p Abi Ghanem, Daad, B.S., AUB; Animal Sciences
 Abi Said, Diana, M.S., AUB; Crop Production and Protection
 Abi Said, Mounir, M.S., AUB; Animal Sciences
 p Abul Khudud, Abir, B.S., AUB; Agricultural Economics and Development
 Adra, Nada, M.S., AUB; Food Technology and Nutrition
 p Al-Khatib, Ali, B.S., AUB; Crop Production and Protection
 p Antar, Nadine, B.S., AUB; Crop Production and Protection
 p Aoun, Rachad, B.S., AUB; Soils, Irrigation and Mechanization
 Baydoun, Mohammad, B.S., AUB; Animal Sciences
 Bedran, Munia, B.E., AUB; Soils, Irrigation and Mechanization
 p Birbari, Wajdi, M.S., AUB; Animal Sciences
 Darwish, Loyal, B.S., AUB; Soils, Irrigation and Mechanization
 Diryan, Basma, M.S., AUB; Food Technology and Nutrition
 Freiwat, Marlene, B.S., AUB; Crop Production and Protection
 Ghalayini, Aida, M.S.; AUB; Crop Production and Protection
 Haddad, Tharwat, M.S., AUB; Soils, Irrigation and Mechanization
 Hanna, Lucia, B.S., AUB; Crop Production and Protection
 p Hatem, Ghassan, B.S., AUB; Soils, Irrigation and Mechanization
 Hayek, Amal, M.S., AUB; Agricultural Economics and Development
 Hawi, Ziad, B.S., AUB; Crop Production and Protection
 p Husseini, Rania, B.S., AUB; Food Technology and Nutrition
 p Iskandarani, Nadia, B.S., AUB; Crop Production and Protection
 p Khalil, Rania, M.S., AUB; Animal Sciences
 p Kombargi, Wafic, B.S., AUB; Crop Production and Protection
 p Nemer, Nabil, B.S., AUB; Crop Production and Protection
 p Parmaksizian, Lori, B.S., AUB; Crop Production and Protection
 p Rahal, Rana, B.S., AUB; Agricultural Economics and Development
 p Ramadan, Lina, B.S., AUB; Agricultural Economics and Development
 p Shmoury, Mohamad, B.S., AUB; Crop Production and Protection
 Sobh, Hana, M.S., AUB; Crop Production and Protection
 Al-Tannir, Huda, M.S., Université Pierre Mendes-France; Animal Sciences
 p Tohme, Sonia, B.S., AUB; Crop Production and Protection

GENERAL INFORMATION

The Faculty of Agricultural and Food Sciences (FAFS) was established as the Faculty of Agricultural Sciences in 1952. Instruction is 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. 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:
 - a) Complete a minimum of 128 semester credit hours.
 - b) Complete a minimum of seven semesters of residency.
 - c) Achieve an overall minimum grade average of 70.
 - d) Be approved for graduation by the Faculty.

1. B.S. (in Nutrition and Dietetics), a student must:
 - a) Complete a minimum of 96 semester credit hours.
 - b) Complete a minimum of five semesters of residency.
 - c) Achieve an overall minimum average grade of 70.
 - d) 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:
 - a) Complete all Agr III and Agr IV required core courses listed in the catalogue, including 12 credits of elective courses in Agriculture.

 - b) Complete the following prerequisite courses: SIM 215 (Introd. to Soils), FTN 261 (Int. Biochemistry), Agr 224 (Agric. Microbiology), CPP 220 (Principles of Plant Physiology).

Applicants who have a B.S. degree in Biology, Chemistry, or Environmental Health 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.

- a) Complete at least five terms of residency at FAFS.
2. To obtain a second B.Sc. in Nutrition and Dietetics, a student must:
 - a) Complete all ND II and ND III required core courses listed in the Catalogue.
 - b) Additional prerequisite courses may be recommended by the Admission Committee and approved by the Academic Affairs Committee.
 - c) 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. 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)	

No grade below 40 is reported. All final course grades are expressed in multiples of 5 (100, 95, 90 ... 45, 40).

A change in grade can only take place if the faculty member submits all relevant evidence to the Academic Affairs Committee.

C. 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.

D. ATTENDANCE

1. Classes and Laboratories

- a) 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.
- b) 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 (Withdraw) 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.
- c) No student may be excused from laboratory and field work requirements. All missed laboratory or field work must be made up.

2. Examinations and Quizzes

- a) 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.
- b) 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.

E. 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.

F. 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.

G. 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:

- a) Two courses are failed in any one semester or summer session.
- b) One third or more of the total credits attempted are failed in any one semester.
- c) 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.
- d) 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:

- a) The total cumulative average is below 65 after completion of 40 credits or more, or below 70 after completion of 70 credits or more.

- b) 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:

- a) A required course is failed three times.
- b) 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.
- c) Academic probation is not removed by the end of the third term after he/she had been placed on probation.
- d) The requirements of a repeated year are not fulfilled on schedule.
- e) 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.

H. 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 79 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 (Agr) 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 AGRICOLE¹**

AGRICULTURE I	Credits
<i>First Semester</i>	
Agr 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
Engl 101 Communication Skills ²	(5)
Total	<u>14 + 5</u>
<i>Second Semester</i>	
AED 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
Engl 102 Communication Skills ²	(5)
Total	<u>13+5</u>
 AGRICULTURE II	
<i>First Semester</i>	
AED 241 Farm Management	3
FTN 261 Introductory Biochemistry	3
Agr 243 Genetics	3
CPP 220 Principles of Plant Physiology	3
Eng 203 Communication Skills or Elective ³	3
Total	<u>15</u>
<i>Second Semester</i>	
Agr 211 Agricultural Mechanics	2
Agr 224 Agricultural Microbiology	4
FTN 221 Basic Nutrition	3
SIM 215 Introduction to Soils	4
AED 225 Rural Social System	3
Total	<u>16</u>

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 twelve credits of elective courses in FAFS.

FACULTY OF AGRICULTURAL & FOOD SCIENCES

	Credits
AGRICULTURE III	
<i>First Semester</i>	
ASC 271 Animal Nutrition	4
ASC 275 Anatomy and Physiology of Farm Animals	3
CPP 221 Principles of Entomology	3
CPP 223 Principles of Plant Pathology	3
FTN 287 Food Processing	2
Total	15
<i>Second Semester (AREC)</i>	
ASC 222 General Livestock Production	4
CPP 222 Principles of Agronomy	4
CPP 224 General Horticulture	3
SIM 225 Agriculture Power	2
SIM 228 Irrigation Principles	4
Total	17
<i>Summer Session (AREC)</i>	
ASC 226 Poultry Production	3
SIM 226 Agricultural Machinery	2
Electives as Offered ¹	3
Total	8
 AGRICULTURE IV	
<i>First Semester</i>	
AED 235 Agricultural Extension in Development	3
Agr 295 Current Topics in Agricultural and Food Sciences	0
SIM 265 Soil Fertility	3
Electives as Offered ¹	9
Total	15
<i>Second Semester</i>	
Agr 296 Current Topics in Agricultural and Food Sciences	1
Math 208 Elementary Statistics	3
Agr 222 Agricultural Project	2
CPP 284 Weed Science	3
Electives as Offered ¹	6
Total	15

¹Three credits of electives should be in humanities; three credits should be in humanities and/or social sciences, and twelve credits of elective courses in FAFS.

CURRICULUM FOR THE B.S. DEGREE IN NUTRITION AND DIETETICS¹

NUTRITION & DIETETICS I	Credits
<i>First Semester</i>	
Biol 201 General Biology I	4
Chem 208 Survey of Organic Chemistry	3
Chem 209 Introductory Organic Laboratory	2
SBS 201 Introd. to the Study of Society	3
Eng 203 Communication Skills	3
Total	15
<i>Second Semester</i>	
Biol 202 General Biology II	4
Chem 200 Basic Chemistry	3
Chem 205 Introductory Chemistry Laboratory	2
Agr 224 Agricultural Microbiology	4
FTN 221 Basic Nutrition	3
Total	16
 NUTRITION & DIETETICS II	
<i>First Semester</i>	
FTN 261 Introductory Biochemistry	3
FTN 265 Food Chemistry	2
FTN 267 Food Analysis	2
SBS 216 Arab Culture and Society	3
Educ 215 Learning and Human Development	3
Elective ²	3
Total	16
<i>Second Semester</i>	
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
B.Ad. 231 Management of Organizations	3
Elective ²	3
Total	17

¹ A minimum of 96 credits are required for graduation.

² Minimum 8 credits selected from a suggested list of courses and 6 credits as free electives.

FACULTY OF AGRICULTURAL & FOOD SCIENCES

	Credits
NUTRITION AND DIETETICS III	
<i>First Semester</i>	
FTN 287 Food Processing	2
FTN 289 Food Processing Lab	1
FTN 274 Human Nutrition	4
FTN 290 Food Services Management	3
Agr 295 Current Topics in Agric. and Food Sciences	0
AED 212 Survey of Economics	3
Elective ¹	3
Total	16
<i>Second Semester</i>	
FTN 288 Technology of Food Products	3
FTN 293 Therapeutic Nutrition	3
FTN 294 Therapeutic Nutrition Lab.	2
FTN 299 Project in Nutrition and Food Science	2
Agr 296 Current Topics in Agric. and Food Sciences	1
Elective ¹	5
Total	16

¹ Minimum 8 credits selected from a suggested list of courses and 6 credits as free electives.

DEPARTMENT OF AGRICULTURAL ECONOMICS AND DEVELOPMENT (AED)

Chairperson:	Betru, T.
Professor:	Al-Hajj, F.
Assistant Professors:	Betru, T.; Darwish, R.; Hamdar, B.
Lecturer:	Khalil, Y.

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 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:

AED 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.

AED 213 Production Economics. 3.0; 3 cr. Prerequisite: Math 201, AED 212. An introduction to basic production economics theories and principles and their relevance to the agricultural sector. B. Hamdar.

AED 225 Rural Social Systems. 3.0; 3 cr. Examination of institutional and sociological problems of rural areas; influence of rural institutions on rural development. T. Betru.

AED 235 Agricultural Extension in Development. 3.0; 3 cr. Prerequisite: AED 225. Comparative study of developmental philosophy, objectives, and adaptation to developing countries; principles and methods of extension and adult teaching. T. Betru.

- AED 241 Farm Management.** 3.0; 3 cr. Prerequisite: AED 212 or Economics 203. Applying the principles and technique of management to the farm sector. R. Darwish.
- AED 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.
- AED 282 Adoption of Innovations.** 3.0; 3 cr. Prerequisites: AED 225, 235. The process of accepting new farming ideas and the factors affecting their adoption. T. Betru.
- AED 284 Rural Leadership.** 3.0; 3 cr. Prerequisites: AED 225, AED 235. The setting of principles and techniques of lay leadership in rural development, leadership practice in selected programs. T. Betru.
- AED 286 Agricultural Development.** 3.0; 3 cr. Prerequisites: AED 212, AED 241. Basic economic principles and policies of development. Domestic policies and problems encountered in the development process of Third World nations. R. Darwish.
- AED 299 Special Topics in the Agricultural Social Sciences.** 2 cr. Prerequisites: Fourth Year standing and consent of instructor. Members of Faculty.
- AED 300 Tutorial.** 1-3 cr. Special problem. Prerequisite: consent of instructor. Members of Faculty.
- AED 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. T. Betru.
- AED 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. T. Betru.
- AED 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. T. Betru.
- AED 315 Communication Strategies for Rural Development.** 3.0; 3 cr. Prerequisite: AED 225. Communication theories, concepts and organizational issues in rural development. T. Betru.
- AED 320 Project Planning and Management.** 3.0; 3 cr; alternate years. Project preparation, evaluation and management. R. Darwish.
- AED 322 Advanced Farm Management.** 3.0; 3 cr; alternate years. Prerequisites: AED 212, 241. R. Darwish.
- AED 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.
- AED 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.
- AED 326 Econometrics.** 3.0; 3 cr; alternate years. Prerequisites: Math 208, Math 209. Statistical concepts, econometric theory, linear and non-linear models, forecasting and prediction, and regression applications in economic analysis. R. Darwish, B. Hamdar.

- AED 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.
- AED 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.
- AED 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.
- AED 372 Agricultural Policy and Planning.** 3.0; 3 cr. Governmental programs and policies for agriculture and the food industry; implications for modernization. B. Hamdar.
- AED 373 Economics of Agricultural Development.** 3.0; 3 cr; alternate years. Prerequisite: AED 286. Extensive readings in economic and agricultural development with special reference to less developed nations. R. Darwish.
- AED 374 Operations Research Principles and Application.** 3.0; 3 cr. Prerequisite: Math 201. An introduction to the different optimization techniques in operations research and their relation to applied problems in different fields of agriculture. R. Darwish.
- AED 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.
- AED 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
- AED 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. T. Betru.
- AED 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.
- AED 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. T. Betru
- AED 391 Current Problems in Agricultural Social Sciences.** 3.0; 3 cr; alternate years. The examination of current topics in agricultural development. Members of Faculty.
- AED 395, 396 Graduate Seminar in Agricultural Social Sciences.** 1.0; 1 cr (each). Members of Faculty.
- AED 399 M.S. Thesis.**

DEPARTMENT OF ANIMAL SCIENCES (ASC)

Chairperson:	Sleiman, F.
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:

- ASC 222 General Livestock Production.** 3.3; 4 cr. Modern principles and practices in beef, sheep, and dairy production and reproduction. F. Sleiman.
- ASC 226 Poultry Production.** 2.3; 3 cr. Prerequisite: ASC 271. Modern principles and practices in poultry production with special emphasis on Middle Eastern conditions. M. Farran.
- ASC 241 Principles of Dairying.** 2.3; 3 cr. Prerequisite: ASC 222. Management, housing, feeding, breeding and record-keeping in dairy production. F. Sleiman.
- ASC 242 Sheep Production in Arid Regions.** 2.3; 3 cr. Prerequisite: ASC 222. Breeding, feeding and management of sheep under arid conditions. F. Sleiman, S. Hamadeh
- ASC 271 Animal Nutrition.** 4.0; 4 cr. Prerequisite: FTN 261. Structure and functioning of digestive systems of livestock and poultry. Bioenergetics, nutritional deficiencies, and nutrient requirements of farm animals. M. Farran, M. Uwayjan.
- ASC 275 Anatomy and Physiology of Farm Animals.** 3.0; 3 cr. Systematic anatomy and physiology of farm animals. E. Barbour.
- ASC 276 Animal Physiology Laboratory.** 0.3; 1 cr. Pre- or co-requisite: ASC 275. E. Barbour.
- ASC 277 Animal Breeding.** 2.0; 2 cr. Prerequisite: Agr 243 or Biology 223. Principles of permanent improvement of animal and poultry production. S. Hamadeh.
- ASC 278 Feeds and Feeding.** 2.3; 3 cr. Characteristics, conservation, and preparation of feeds. Feeding various classes of livestock. M. Uwayjan.
- ASC 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.
- ASC 300 Graduate Tutorial.** 1-3 cr. Prerequisite: Consent of instructor. Special problem. Members of Faculty.
- ASC 304 Preventive Immunology and Patterns of Animal Diseases.** 3.0; 3 cr. Prerequisite: Biology 224 or Agr 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.
- ASC 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.
- ASC 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.

- ASC 307 Poultry Production in Warm Regions.** 3.0; 3 cr. Prerequisite: ASC 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. Dagher.
- ASC 314 Advanced Animal Breeding.** 3.0; 3 cr. Prerequisites: ASC 277, Agr 301. Livestock quantitative and population genetics, recent advances in breeding practices and problems in livestock improvement. S. Hamadeh.
- ASC 329 Advanced Animal Physiology.** 2.3; 3 cr. Prerequisite: ASC 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.
- ASC 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.
- ASC 334 Advanced Poultry Nutrition.** 2.3; 3 cr. Prerequisite: ASC 271. Recent developments in poultry nutrition. Design and implementation of poultry nutrition experiments. M. Farran, N. Dagher.
- ASC 336 Ruminant Nutrition.** 3.0; 3 cr. Recent advances in the nutrition of cattle and sheep. F. Sleiman.
- ASC 388 Animal Production and Environmental Management.** 3.03; 3 cr. Prerequisites: ASC 275, ES 202. The course characterizes the impact of extensive and intensive livestock systems on the environmental sustainability of the two systems, in terms of technical and socio-economic constraints and feasible corrective environmental management strategies. S. Hamadeh, F. Sleiman.
- ASC 395, 396 Graduate Seminar in Animal Science.** 1.0; 1 cr. (each). Members of Faculty.
- ASC 399 M.S. Thesis.**

DEPARTMENT OF CROP PRODUCTION AND PROTECTION (CPP)

Chairperson:	Kawar, N.
Professors:	Kawar, N; Saad, A.
Associate Professors:	Abu Jawdah, Y.; Rubeiz, I.
Assistant Professors:	Abou-Fakhr-Hammad, E.; Baalbaki, R.; Haidar, M.; Talhok, S.
Lecturer:	Battikha, G.
Instructors:	Husseini-Salman, S.; Kanan, S.
Associate:	Al-Masri, T.
Professor Emeritus:	Talhok, 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.

- CPP 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.
- CPP 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.
- CPP 222 Principles of Agronomy.** 3.3; 4 cr. Principles and cultural practices of major field crops. R. Baalbaki.
- CPP 223 Principles of Plant Pathology.** 2.3; 3 cr. Fundamentals and practical aspects of plant diseases, their causes, and control. Y. Abu-Jawdeh.

- CPP 224 General Horticulture.** 2.3; 3 cr. Principles and practices in the production of fruits, ornamentals, and vegetables. I. Rubeiz.
- CPP 255 Plant Breeding.** 3.0; 3 cr. Prerequisites: Agr 243, CPP 222. Application of genetic principles and allied subjects to crop improvement. Members of Faculty.
- CPP 265 Landscape Horticulture.** 2.3; 3 cr. Prerequisite: CPP 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.
- CPP 275 Subtropical Fruit Production.** 2.3; 3 cr. Prerequisite: CPP 224. Techniques in nursery stock production, rootstocks, cultivars, and orchard cultural operations. S. Talhouk.
- CPP 277 Vegetable Production.** 3.4; 3 cr; summers only. Prerequisite: CPP 224. Classification, identification, and cultural practices of important vegetables of the area. Members of Faculty.
- CPP 278 Introductory Floriculture.** 2.3; 3 cr. Prerequisite: CPP 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.
- CPP 281 Deciduous Fruit Production.** 2.3; 3 cr. Prerequisite: CPP 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. I. Rubeiz.
- CPP 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.
- CPP 285 Plant Propagation.** 2.3; 3 cr. Prerequisite: CPP 224. Theory and practices of sexual and asexual propagation of horticultural crops including such techniques as grafting, tissue culture, layering and cutting. S. Talhouk.
- CPP 286 Forage Crops.** 3.0; 3 cr. Establishment and management of grass and legume crops for hay, silage, and pasture. Members of Faculty.
- CPP 287 Crop Production in Dry Regions.** 3.0; 3 cr. Prerequisite: CPP 222. General principles and practices, constraints, potentials and cultivation of specific crops in arid and semi-arid regions. R. Baalbaki.
- CPP 288 Range Management.** 2.0; 2 cr. Establishment and management of pastures and rangelands. Members of Faculty.
- CPP 289 Seed Technology.** 2.3; 3 cr. Prerequisite: CPP 222. Seed testing methods and techniques to measure seed quality for sowing purposes. R. Baalbaki.
- CPP 290 Entomological Techniques.** 1.6; 2 cr; summers only. Prerequisite: CPP 221. Technology and principles of handling insects. Their collection, rearing and preserving methods. N. Kawar.
- CPP 291 Crop Anatomy.** 2.3; 3 cr; summers. Structure and functions of plant tissues, their origin and differentiation. Organization and differentiation of plant organs with emphasis on crop plants. S. Talhouk.
- CPP 292 Applied Entomology.** 2.5; 3 cr. Prerequisite: CPP 221. Observation of insect pests in the field and greenhouses, with emphasis on recognition, evaluation and control. E. Abou-Fakhr-Hammad.
- CPP 293 Integrated Pest Management for Economic Crops.** 3.0; 3 cr. Prerequisites: CPP 221, CPP 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.
- CPP 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.
- CPP 296 Applied Plant Pathology.** 2.3; 3 cr. Prerequisite: CPP 223. Observation and study of plant diseases in the field with emphasis on recognition, evaluation and control. Y. Abu Jawdeh, A. Saad.
- CPP 298 Special Topics in Crop Production.** 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Directed study. Members of Faculty.
- CPP 299 Special Topics in Plant Protection.** 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Directed study. Members of Faculty.
- CPP 300 Graduate Tutorial.** 1-3 cr. Prerequisite: Consent of instructor. Research or advanced discussion of special problems. Members of Faculty.
- CPP 302 Biology and Control of Aphids and Mites.** 2.3; 3 cr. Prerequisite: CPP 221. Study of mites and aphids as to their systematics, characteristics, ecology, predator-parasite complex, economic importance and their management in the field. E. Abou-Fakhr-Hammad.
- CPP 303 Epidemiology of Plant Diseases.** 3.0; 3 cr; alternate years. Prerequisite: CPP 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.
- CPP 307 Advanced Crop Production.** 3.0; 3 cr. Prerequisite: CPP 222. Recent advances in the production and management of major field crops. R. Baalbaki.
- CPP 308 Advanced Economic Entomology.** 3.0; 3 cr. Prerequisite: CPP 221. Principles underlying chemical, biological, genetic and other methods of insect control, stressing the integrated pest management approach. E. Abou-Fakhr-Hammad.
- CPP 309 Advances in Vegetable Crops.** 3.0; 3 cr. Prerequisite: CPP 277. Recent advances in vegetable production. I. Rubeiz.
- CPP 311 Transmission of Plant Diseases by Invertebrates.** 3.0; 3 cr; alternate years. Prerequisites: CPP 221, CPP 223. Insects, mites, and nematodes as transmitters of infectious and non-infectious plant diseases; morpho-biological adaptations favoring transmission. N. Kawar, A. Saad.
- CPP 312 Advanced Principles and Methods in Plant Pathology.** 2.3; 3 cr; alternate years. Prerequisite: CPP 223. Principles of plant infection, physiology of host-parasite relationships, and modern methods of research. Y. Abu Jawdeh.
- CPP 314 Grain Legumes.** 3.0; 3 cr. Prerequisites: CPP 220, CPP 222. Role of legumes in the farming systems of the Mediterranean areas, and production, improvement, physiology, nitrogen fixation and utilization of seed legumes. Members of Faculty.
- CPP 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.

- CPP 317 Plant Parasitic Fungi and Bacteria.** 2.3; 3 cr; alternate years. Prerequisite: CPP 223. Morphology, taxonomy, and identification of fungi and bacteria parasitic to crops. A. Saad.
- CPP 318 Plant Virology.** 2.3; 3 cr. Prerequisite: CPP 223. Fundamental and practical aspects of plant virology including isolation, characterization, identification and control of plant pathogenic viruses. Y. Abu Jawdeh.
- CPP 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.
- CPP 320 Toxicology of Pesticides.** 3.0; 3 cr. Prerequisite: CPP 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.
- CPP 321 Horticultural Production in Greenhouses.** 2.3; 3 cr. Prerequisites: CPP 224, CPP 277, SIM 265. Principles of production of horticultural crops in plastic covered greenhouses in semi-arid environment. Greenhouse management, plant nutrition and fertilizer application, drip irrigation and fertigation, reclamation for salinity and sodicity. I. Rubeiz.
- CPP 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. I. Rubeiz.
- CPP 326 Advanced Fruit Production.** 3.0; 3 cr. Prerequisite: CPP 275 or CPP 281. Applied studies; history, principles, and practices of fruit production. S. Talhouk.
- CPP 327 Biotechnology in Horticulture.** 2.3; 3 cr. Prerequisite: Agr 243. Overview of basic concepts in molecular biology, introduction to techniques and their use in plant biotechnology. S. Talhouk.
- CPP 329 Insect Ecology.** 3.0; 3 cr. Prerequisite: CPP 221. The effect of physical and biological factors on the life, adaptation, and survival of insect populations. N. Kawar, E. Abou-Fakhr-Hammad.
- CPP 331 Advanced Plant Breeding.** 3.0; 3 cr. Prerequisite: Agr 243. Principles, techniques, and problems in crop improvement. Members of Faculty.
- CPP 335 Mode of Action of Herbicides,** 3.0; 3 cr. Prerequisite: CPP 284. Absorption, translocation, selectivity and mechanisms of toxic action of herbicides and their fate in plants and soils. M. Haidar.
- CPP 337 Advanced Crop Physiology.** 3.0; 3 cr. Principles, concepts and advanced theories of plant functions, including hormones, photosynthesis, reproductive physiology, environmental stresses, and pollution effects. R. Baalbaki.
- CPP 339 Advances in Weed Science.** 3.0; 3 cr. Prerequisite: CPP 284. A survey of development and progress in weed science which reviews recent proceedings of symposia and conferences, significant scientific papers and research reports in the discipline. M. Haidar.
- CPP 340 Crop Evolution.** 3.0; 3 cr. Genetic diversity and germplasm collections; centers of origin, evolution and domestication of economic plants. Members of Faculty.
- CPP 345 Plant Disease Control.** 3.0; 3 cr. Prerequisite: CPP 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.

CPP 347 Biological Control of Crop Pests. 3.0; 3 cr. Prerequisite: CPP 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.

CPP 352 Insect-Plant Interactions. 3.0; 3 cr. Prerequisite: CPP 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.

CPP 354 Weed Ecology. 3.0; 3 cr. Prerequisite: CPP 284. Principles and concepts of weed ecology, including evolution, interference, modeling, mechanisms governing weed population dynamics, and alternative weed management systems. M. Haidar.

CPP 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.

CPP 395, 396 Graduate Seminar in Crop Production and Protection. 1.0; 1 cr (each). Members of Faculty.

CPP 399 M.S. Thesis.

**DEPARTMENT OF FOOD TECHNOLOGY AND NUTRITION
(FTN)**

Chairperson:	Tannous, R.
Professors:	Baba, N.; Hallab, A.; Tannous, R.
Associate Professors:	Miski, A.; Toufeili, I.
Research Associate:	Shadarevian, S.
Instructor:	Touma, G.

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:

- FTN 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.
- FTN 261 Introductory Biochemistry.** 3.0; 3 cr. Prerequisite: Chemistry 208. Chemistry of biological compounds, their enzymatic degradation and intermediary metabolism. I. Toufeili.
- FTN 265 Food Chemistry.** 2.0; 2 cr. Prerequisite: Chemistry 208. Chemical composition, physical and sensory properties of foods. I. Toufeili.
- FTN 267 Food Analysis.** 1.3; 2 cr. Prerequisites: Chemistry 205, Chemistry 209, FTN 265. Laboratory methods for chemical analysis of nutrients and chemicals in food products. S. Shadarevian, I. Toufeili.

- FTN 274 Human Nutrition.** 3.3; 4 cr. Prerequisites: FTN 221. Nutrient requirements and deficiencies at different stages in the life span. A. Miski, S. Shadarevian.
- FTN 287 Food Processing.** 2.0; 2 cr. Prerequisites: FTN 261, Agr 224. Principles of food spoilage, food preservation, and the different methods of food processing. R. Tannous.
- FTN 288 Technology of Food Products.** 2.3; 3 cr. Prerequisites: FTN 287, FTN 289. Technology of processing major foods and their products; includes processing food products in the Pilot Plant. R. Tannous.
- FTN 289 Food Processing Laboratory.** 0.6; 1 cr. Pre- or co-requisite: FTN 287. Laboratory exercises in the Pilot Plant in food preservation and processing. R. Tannous.
- FTN 290 Food Service Management.** 2.3; 3 cr. Prerequisites: BusAdmin 231, FTN 221. Techniques of management of food production and service; training and supervision. Clinical learning experiences, self-study modules, reports and discussion. Members of Faculty.
- FTN 292 Diet Therapy in Inborn Errors of Metabolism.** 3.0; 3 cr. Prerequisite: FTN 274. The course deals with congenital defects that require special diet manipulations and possible nutritional support. Members of Faculty.
- FTN 293 Therapeutic Nutrition.** 3.0; 3 cr. Prerequisite: FTN 274. Process of assessing nutritional status, identifying nutritional needs; nutritional care in various diseases. N. Baba.
- FTN 294 Therapeutic Nutrition Laboratory.** 0.6; 2 cr. Co-requisite: FTN 293. Self-study modules, case studies, reports and discussions. Members of Faculty.
- FTN 297 Food Microbiology.** 3.0; 3 cr. Prerequisite: Agr 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.
- FTN 298 Dietetics Internship 01936.** Training for eleven months in the Dietary Department of the AUB Medical Center.
- FTN 299 Special Topics in Nutrition and Food Sciences.** 2 cr. Prerequisites: Third year standing. Directed study. Members of Faculty.
- FTN 300 Graduate Tutorial.** 1-3 cr. Directed study. Members of Faculty.
- FTN 302 Dairy Technology.** 2.3; 3 cr; alternate years. Prerequisite: FTN 288. The chemistry, technology, and processing of milk and milk products. Members of Faculty.
- FTN 304 Traditional Methods of Food Processing.** 2.3; 3 cr; alternate years. Prerequisite: FTN 288. Scientific basis of common traditional processing and preservation methods used in developing countries. R. Tannous.
- FTN 306 Food and Nutrition Problems.** 3.0; 3 cr. Prerequisite: FTN 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.
- FTN 308 Advanced Therapeutic Nutrition.** 3.0; 3 cr. Prerequisite: FTN 274. Advances in nutritional care, metabolic changes and dietary management of diseases. N. Baba.
- FTN 310 Advanced Food Biochemistry.** 3.0; 3 cr; alternate years. Prerequisite: FTN 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.

FTN 311 Advanced Nutrition: Macro Nutrients. 3.0; 3 cr. Prerequisites: FTN 221 or 274, FTN 261. Advances in carbohydrate, protein, lipid, fiber and ethanol nutrition and metabolism. N. Baba.

FTN 314 Advanced Nutrition: Mineral Elements. 3.0; 3 cr. Prerequisites: FTN 221, FTN 274. Advanced nutritional, biochemical and physiological aspects of macro and micro mineral elements, and toxic elements in humans and animals. A. Miski.

FTN 315 Advanced Nutrition: Vitamins. 3.0; 3 cr. Prerequisites: FTN 221, FTN 274. Advanced nutritional, biochemical and physiological aspects of vitamins and vitamin-like substances in humans and animals. A. Miski.

FTN 370 Advanced Food Science. 3.0; 3 cr. Prerequisite: FTN 287. Advances in sensory analysis, processing operations and technology of food products. I. Toufeili, R. Tannous.

FTN 391 Laboratory Methods in Nutrition and Food Science. 1.6; 3 cr. Prerequisite: FTN 267. Principles of animal experiments, analytical techniques, and instrumentation used in nutrition research studies. Members of Faculty.

FTN 395, 396 Graduate Seminar in Nutrition and Food Science. 1.0; 1 cr (each). Members of Faculty.

FTN 399 M.S. Thesis.

DEPARTMENT OF SOILS, IRRIGATION AND MECHANIZATION (SIM)

Chairperson:	Nimah, M.
Professors:	Nimah, M.
Assistant Professors:	El-Awar, F.; Sidahmed, M.; Zurayk, R.

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:

- SIM 215 Introduction to Soils.** 3.4; 4 cr. Origin, properties, classification, and management of soil with emphasis on soil behavior in relation to irrigated agriculture, ecology, and the environment. R. Zurayk.
- SIM 225 Farm Power.** 1.3; 2 cr. Internal combustion engines; power trains; drawbar performance; stability and safe operation tractors. M. Sidahmed.
- SIM 226 Farm Machinery.** 1.3; 2 cr. Functional requirements, principles of operation, performance evaluation, and selection of farm machinery. M. Sidahmed.
- SIM 228 Irrigation Principles.** 3.4; 4 cr. Surveying, land preparation, water measurement, conveyance and application, pumping, drainage, soil-water relationships, and introduction to farm irrigation methods. M. Nimah.
- SIM 260 Applied Engineering in Agriculture.** 3.0; 3 cr. The physical laws which govern common mechanical, thermal, electrical, and fluid systems in agriculture. Engineering aspects of practical systems used routinely in agriculture; small engines, electric motors, refrigeration and heat pumps, fans and pumps. Alternative energy sources for agriculture. M. Sidahmed.
- SIM 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.
- SIM 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.
- SIM 263 Pesticides 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.

- SIM 265 Soil Fertility.** 3.0; 3 cr. Prerequisite: SIM 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. R. Zurayk.
- SIM 270 Environment Control in Agriculture.** 3.0; 3 cr. Materials and design characteristics of farm structures. Basics of heat and mass transfer. Design of environment control systems for animals, plants, and storage of agricultural materials and products. M. Sidahmed.
- SIM 273 Plant-Soil-Water Relationships.** 3.0; 3 cr. Prerequisite: SIM 228. Physical relationships of soil moisture and plant growth, soil physical properties, crop water use and irrigation requirement determination. M. Nimah.
- SIM 277 Basic Hydrology.** 3.0; 3 cr. Applied methods in hydrologic analysis and design. Hydrologic cycle components including precipitation, infiltration, ground water, and surface runoff. Basic considerations of reservoir flow routing and management. F. El-Awar.
- SIM 299 Special Topics in Soils, Irrigation and Mechanization.** 2 cr. Prerequisites: Fourth Year Standing and consent of instructor. Directed study. Members of Faculty.
- SIM 300 Graduate Tutorial.** 1-3 cr. Special topics in soils, irrigation, and mechanization. Members of Faculty.
- SIM 305 Irrigation Distribution System Design.** 3.0; 3 cr. Prerequisite: SIM 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.
- SIM 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.
- SIM 310 Advanced Soil Physics.** 3.0; 3 cr. Prerequisite: SIM 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 modelling soil water extraction and evaporation. M. Nimah.
- SIM 312 Fertilizer Technology and Use.** 3.0; 3 cr. Prerequisite: SIM 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. R. Zurayk.
- SIM 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.
- SIM 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.
- SIM 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.
- SIM 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.
- SIM 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. R. Zurayk.
- SIM 326 Surface Irrigation Engineering.** 3.0; 3 cr. Prerequisites: SIM 261, SIM 262. Principles of design, operation, and evaluation of surface irrigation systems. Irrigation field design, and field measurement techniques. M. Nimah.
- SIM 328 Sprinkler and Drip Irrigation Engineering.** 3.0; 3 cr. Prerequisites: SIM 261, SIM 262. Fundamentals of design, operation, evaluation, and selection of pressurized irrigation systems. Pipe line economics, pump hydraulics, and pumping plant design considerations. M. Nimah.
- SIM 330 Irrigation Project Planning and Management.** 3.0; 3 cr. Principles and practices of planning, development, and management of irrigation projects. Project evaluation bases, and interrelations of agricultural, engineering, and economic considerations in project adoption. Members of Faculty.
- SIM 334 Land Resources in Arid and Semi-Arid Regions.** 3.0; 3 cr. Applied principles of agro-ecological land resources assessment. Agricultural development and management on a sustainable basis. Land resources inventory. New approach to land evaluation and to land resources management. Members of Faculty.
- SIM Water Conservation.** 3.0; 3 cr. Deals with environmental climatological conditions in relation to water availability and management. Drought prediction and management are studied. Structural and non-structural water conservation measures are analyzed. M. Nimah, F. El-Awar.
- SIM 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.
- SIM 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.
- SIM 371 Design of Agricultural Machinery Components.** 3.0; 3 cr. Fundamentals of mechanical design. Design and selection of machine elements for agricultural machinery, including stress and deflection analysis, and static and fatigue strength of mechanical elements. M. Sidahmed.
- SIM 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.
- SIM 373 Fluid Power System.** 2.3; 3 cr. Basic principles of fluid power systems. Hydraulic fluids. Fluid power system components and circuits: hydraulic pumps, actuators, directional, flow, and pressure control valves. Design and analysis of hydraulic systems. Agricultural machine hydraulics. M. Sidahmed.
- SIM 374 Theory of Agricultural Machines.** 3.0; 3 cr. Prerequisite: SIM 225. Fundamentals of machine theory. Analysis of fundamental mechanisms and linkages

in agricultural machines. Theory of operation of agricultural machines in relation to the material being processed. Analysis of tractor implement systems. M. Sidahmed.

SIM 375 Soil Mechanics in Tillage and Traction. 3.0; 3 cr. Prerequisite: SIM 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.

SIM 395, 396 Graduate Seminar in Soils, Irrigation and Mechanization. 1.0; 1 cr. (each). Members of Faculty.

SIM 399 M.S. Thesis.

GENERAL COURSES IN AGRICULTURE

- Agr 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. N. Kavar.
- Agr 211 Agricultural Mechanics.** 0.6; 2 cr. Fabrication methods applicable to agricultural equipment and structures. Members of Faculty.
- Agr 222 Agricultural Project.** 0.6; 2 cr. Prerequisite: Agr. III standing and eligible to enroll in the regular program at AREC. Directed study with field and laboratory work. Members of Faculty.
- Agr 224 Agricultural Microbiology.** 3.3; 4 cr. A course that covers basic and applied microbiology. The basic microbiology includes: bacteriology, virology, parasitology and immunology. The applied microbiology includes: veterinary, soil and water, and food microbiology. E. Barbour.
- Agr 243 Genetics.** 3.0; 3 cr. Principles of inheritance, with an introduction to modern genetics. S. Hamadeh.
- Agr 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.
- Agr 295 and 296 Current Topics in Agricultural and Food Sciences.** 1.0; 1 cr. Prerequisite: ND III or Agr. IV standing. Each student is required to give at least one presentation on a chosen subject. F. Sleiman.
- Agr 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

- ECM 311 Ecosystem Management I: Physical Resources.** 3 cr. Physical resources in land ecosystems. Soils in the ecosystem. Soil conservation. Principles of soil chemistry and microbiology. Soil pollution and contamination. Contaminant transport in soil. Water resources and their degradation. Water quality. Water conservation. watershed management.
- ECM 312 Ecosystem Management II: Biological Resources.** 3 cr. Biological resources in ecosystems. Plant and animal biodiversity. Collection and conservation of wild types. Imbalance in ecosystems. Preservation of endangered species. interactions between the physical and biologic environment: biotic and abiotic cycles. Plant response to environmental stress.
- ECM 314 Agricultural Pollutants.** 3 cr. Prerequisite: CPP 220. Fate of petrochemicals in the environment. Effect on terrestrial and aquatic systems. Contamination, monitoring residues, methodologies and risk assessment models and research.

ECM 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.

For ES courses given by FAFS, see under “Interfaculty Environmental Sciences Graduate Program,” page 478.

All FAFS courses are open to students from other faculties, on condition that:

- a) The student has taken the prerequisite courses.
- b) There is available space in the course, with priority given to students in the major.
- c) The student has approval from his/her Faculty to take the course.





*Faculty of
Health Sciences*

FACULTY OF HEALTH SCIENCES

FACULTY LIST 1996-97

Officers of the Faculty

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President
Samir Makdisi	Deputy President
Makhluf J. Haddadin	Acting Dean of the Faculty
Mona Katul	Executive Officer
Waddah Nasr	Registrar

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
P Zurayk, Huda, Ph.D., Johns Hopkins University; Epidemiology and Biostatistics

Visiting Professor

³ Dyson, Tim, B.S., M.Sc., London School of Economics; Population Studies

Associate Professors

Hijal-Shaar, Khuzama, Ph.D., University of London; Epidemiology and Biostatistics
Jurdi, May, Ph.D., AUB; Environmental Health

¹ Until December 19, 1996.

² As of December 20, 1996.

^P Part-time.

³ March 22 - April 10, 1997.

Visiting Associate Professor

- ¹ Makhoulf-Obermeyer, Carla, Ph.D., Harvard University; Health Behavior and Education

Assistant Professors

- Kassak, Kassem, Ph.D., University of Minnesota; Health Services Administration
² Kulczycki, Andrzej, Ph.D., University of Michigan; Population Studies
Navaneetham, Kannan, Ph.D., Bombay University; Population Studies
Nuwayhid, Iman, M.D., AUB; Dr.P.H., Johns Hopkins University; Environmental Health

Lecturers

- ^P Asrawi, Fadi, Ph.D., University of Southern California; Health Services Administration
Deeb, Mary, Ph.D., Johns Hopkins University; Epidemiology and Biostatistics
^P Geha, Mounah, Ph.D., Century University (L.A.); Environmental Health
^P Ghattas, Renee, M.B.A., AUB; Health Services Administration
^P Karam, Nadim, M.D., AUB; M.P.H., Johns Hopkins University; Health Services Administration
^P Mansour, Lamia, Ph.D., Leeds University; Environmental Health
^P Milki, Raif, D.E.S.T., Delft Technical University-Holland; Environmental Health

Visiting Senior Lecturer

- ³ Campbell, Oona, Ph.D., Johns Hopkins University; Epidemiology and Biostatistics

Visiting Lecturer

- ⁴ Afifi, Larry, Ph.D., University of Iowa; Health Behavior and Education

Instructors

- El-Eter, Imad, M.S., University of Baghdad; Population Studies
^P El-Kak, Faysal, M.S., M.D., AUB; Health Behavior and Education
⁵ Ghorayeb, Françoise, M.P.H., AUB; Health Behavior and Education

¹ November 10 - December 7, 1996.

² As of February 17, 1997.

^P Part-time.

³ First semester.

⁴ February 16 - March 14, 1997.

⁵ On leave July 1 - October 31, 1996.

- Hajjar, Haytham, M.P.H., AUB; Health Services Administration
- ¹ P Jabbour, John, M.P.H., AUB; Epidemiology and Biostatistics
- P Kadi, May, M.P.H., AUB; Environmental Health
- 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
- Kobeissi, Hanaa, M.P.H., AUB; Health Services Administration
- P Melhem, Nada, M.S., AUB; Environmental Health
- Mohammed Ali, Arabia, M.P.H., AUB; Health Services Administration
- ² P Moukheiber, Lina, M.P.H., University of Tennessee; Health Behavior and Education
- Naffah, Nadine, M.P.H., AUB; Health Services Administration
- P Ramadan, Mahassen, M.P.H., AUB; Medical Laboratory Technology
- Saksouk, Sultaneh, M.S., AUB; Medical Laboratory Technology
- Sha'ya, Monique, M.P.H., AUB; Epidemiology and Biostatistics
- ³ Sibai, Abla, M.S., AUB; Epidemiology and Biostatistics
- ² Tamim, Hani, M.P.H., Emory University; Epidemiology and Biostatistics
- P Tohme, Rima, M.P.H., AUB; Health Services Administration

Research Assistants

Freiha, Rita, M.P.H., AUB; Epidemiology and Biostatistics

Harb, Hilda, M.P.H., AUB; Epidemiology and Biostatistics

Jbara, Tania, M.P.H., AUB; Epidemiology and Biostatistics

Kabakian, Tamar, M.P.H., AUB; Epidemiology and Biostatistics

Khayyat, Rita, M.P.H., AUB; Epidemiology and Biostatistics

Kodeih, Amal, B.S., AUB; Population Studies

Melhem, Nadine, M.P.H., AUB; Population Studies

Moudallal, Nada, M.S., AUB; Population Studies

Shaar, Dania, M.P.H., AUB; Epidemiology and Biostatistics

Sinno, Zeina, M.P.H., AUB; Environmental Health

Preceptors

- El Hout, Ayman, M.B.A., AUB; Health Services Administration
- ⁴ Ghosn, Ghosn, B.B.A., AUB; Health Services Administration
- Hajj, Marina, M.D., AUB; M.B.A., I.N.S.E.A.D.; Health Services Administration
- Kuntz, Dieter, M.H.A., University of Toronto; Health Services Administration

¹First semester.

² Second semester.

³On leave October 1, 1996 - February 7, 1997.

⁴Until December 31, 1996.

FACULTY OF HEALTH SCIENCES

Mouro, Gladys, R.N., M.S.N., University of Pennsylvania; Health Services Administration

Muallem-Nassar, Saydih, M.P.H., AUB; Health Services Administration

Otayek, Joseph, M.B.A., I.N.S.E.A.D.; Health Services Administration

Saab, Rula, M.P.H., AUB; Health Services Administration

Sadek, Imad, M.P.H., AUB; Health Services Administration

¹ Wakim, Janine, M.P.H., M.B.A., Columbia University; Health Services Administration

Associates

Gaur, Seema, M.A., Kurukshetra University, India; Population Studies

Imad, Azmi, M.S., University of London; Environmental Health

Zuhairy, Khaled, M.P.H., AUB; Environmental Health

¹ First semester.

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, sanitarians 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 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 27 of this catalogue.

UNDERGRADUATE PROGRAM

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 grade of 70 or more in at least 12 credit hours and an average of 70 or more in chemistry or mathematics, and must be accepted by the Faculty of Health Sciences.

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 PROGRAM

A. Master of Public Health

Students may be admitted, according to their background, to one of the following alternatives:

Alternative I: 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, students in this group will be enrolled for a 9-month program requiring the successful completion of at least 33 credit hours of academic course work.

Alternative II: 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 in an academic program of 50 credit hours offered over a period of two years.

A candidate engaged in a health-related occupation and wishing to enroll in the MPH program as a part-time student, may do so provided he/she is accepted in the one-year program and completes the requirements within a period to be determined by the Faculty, and consistent with core courses and prerequisites. If admitted, the candidate may be allowed to take equivalent courses in a graduate program to enable him/her to graduate with the MPH degree.

Undergraduate prerequisites for entering the program consist of HSA 203 and HSA 206. In addition, HSA 251 is required of applicants to the one-year program and HSA concentration. All candidates to the MPH program with no Biology background must take either Biology 274 or Microbiology 237 as a prerequisite to the Master's program.

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: Economics 211 and 212 or Economics 203, Sociology 201 and Biostatistics 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 program thus contains a core of 21 credit hours of graduate courses in addition to 6 credit hours of electives and a thesis, both in the field of specialization.

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 (Withdraw) 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 undergraduate programs require a passing grade of 70 (see individual curricula).

C. POLICY ON TRANSFER OF CREDITS TO THE UNDERGRADUATE PROGRAMS

A transfer student will be accepted to the undergraduate programs after he/she:

1. Completes all Sophomore required courses.
2. Obtains a minimum cumulative average of 80.
3. Obtains a minimum grade of 80 in each of the 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 course in the FHS, provided that 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 a minimum grade of 75 will be considered for transfer of credits by the Academic Committee.
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 shall be deemed of comparable standing, such as 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 of the department along with the supporting documents 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 (Withdraw) will be inscribed on their records.

Withdrawal from the Program

To maintain their student status, students must register every semester, excluding the summer session, unless required by the program. If they do not register, they 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. In order to be promoted, students must attain a minimum weighted average of 65 during the first year and 70 in the following years.
2. In the M.P.H. 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. FAILURE AND DEFICIENCIES

Placement on Probation

Students will be placed on probation for any one of the following reasons:

1. If at the end of a semester or summer session they fail in two or more courses.
2. If they do not attain the minimum required yearly or semester average:
Undergraduate: 65 for the first year and 70 for the second and third year.
Graduate: 75 for the M.P.H., and 80 in the M.S. programs.

Undergraduate students in their freshman or sophomore year will be placed on probation at the end of their first semester at the University 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 those consecutive courses totalling 12 credits.

Removal of Probation

Action to remove probation at the end of a semester or summer session will be taken if:

1. The student passes all courses taken during the semester or summer session in question; and
2. The student achieves the minimum required average for that semester; and
3. The student achieves the minimum yearly average required if the semester/session in question is the last session of a student's year.

Repeating Courses

1. A student may repeat any course with consent of the advisor and course coordinator.
2. All required courses which 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, only the grade obtained the last time the course was taken will be considered in the calculation of the 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.

H. DISMISSAL FROM THE FACULTY OF HEALTH SCIENCES

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 credit 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 judgement 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.

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 10th 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 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

A student engaging in academic misconduct, such as cheating in examinations or plagiarism, will be referred by the department concerned 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 79 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 with a minimum of 94 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 with a minimum of 98 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 AND POPULATION STUDIES

See under "Graduate Studies" at the end of this catalogue.

**MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCES (MAJOR:
ENVIRONMENTAL HEALTH)**

See under "Graduate Studies" at the end of this catalogue.

GRADUATION WITH DISTINCTION

Students may be awarded their BS degrees 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 graduation 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

I. Concentration in Environmental Health

	Lecture Hrs/Week	Lab Hrs/ Week	Semester Credit Hrs
FIRST YEAR			
<i>First Semester</i>			
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
Engl 203 English Communication Skills III ¹	3	0	3
EH 201 Man and His Environment	2	0	2
			14
<i>Second Semester</i>			
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
EH 204 Solid Wastes Management	2	0	2
			14
SECOND YEAR			
<i>First Semester</i>			
HSA 201 Introduction to Health Care Systems	3	0	3
HSA 206 Computer Literacy	2	2	3
HBE 203 Communication and Group Dynamics for Health Professionals	2	2	3
EH 203 Food Hygiene	3	0	3
HBE 237 Theories and Methods of Health Education I	2	0	3
Elective	3	0	3
			18

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.

FACULTY OF HEALTH SCIENCES

	Lecture Hrs/Week	Lab Hrs/ Week	Semester Credit Hrs
<i>Second Semester</i>			
EB 204 Introductory Biostatistics	2	2	3
HBE 238 Theories and Methods of Health Education II	1	4	3
EH 206 Environmental Toxicology	3	0	3
EH 211 Environmental Microbiology I	2	2	3
EH 214 Sanitation of Food Establishments	2	0	2
HSA 202 Introduction to Organization and Management	3	0	3
			17
<i>Summer Session</i>			
EH 213 Field Training ¹	--	--	5
THIRD YEAR			
<i>First Semester</i>			
EH 205 Quality and Treatment of Water and Wastewater	3	0	3
EH 207 Occupational Hygiene	2	0	2
EB 223 Survey Methods I	2	2	3
EB 227 Basic Demographic Techniques	1	2	2
EH 295 Environmental Health Project	0	6	2
EH 212 Environmental Microbiology II	2	3	3
			15
<i>Second Semester</i>			
EB 208 Essentials of Epidemiology	1	2	2
EH 209 Examination of Water and Wastewater	1	3	2
FTN 221 Basic Nutrition	3	0	3
EB 224 Survey Methods II	2	2	3
EH 217 Air Pollution	2	0	2
PH 201 Seminar	0	6	2
Elective ²	3	0	3
			17

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
<i>First Semester</i>			
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
Engl 203 English Communication Skills III ¹	3	0	3
SBS 201 Introduction to the Study of Society	3	0	3
			15
<i>Second Semester</i>			
Physiol 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
EB 204-A Introductory Biostatistics	2	2	3
Engl 204 English Communication Skills IV	3	0	3
SBS 202 General Psychology	3	0	3
			19
SECOND YEAR			
<i>First Semester</i>			
LM 201 Clinical Chemistry I	2	0	2
MLT 219 General Microbiology	2	3	3
Microbiol 221 Clinical Parasitology I	2	2	3
LM 205 Clinical Pathology I	4	0	4
Agric 261 Biochemistry	3	0	3
HSA 206 Computer Literacy	1	2	2
			17
<i>Second Semester</i>			
LM 202 Clinical Chemistry II	2	0	2
LM 206 Clinical Pathology II	4	0	4
MLT 220 Systematic Bacteriology	2	5	4
MLT 259 Diagnostic Serology	1	0	1
Microbiol 222 Clinical Parasitology II	2	2	3
LM 210 Cytology & Histological Techniques	2	0	2
			16
<i>Summer Session</i>			
Elective ³	3	0	3
Practical Training in Laboratory Medicine	-	-	4
			7

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.

³ A student may choose any humanities or social science course with the consent of the advisor.

FACULTY OF HEALTH SCIENCES

THIRD YEAR⁴	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs
<i>First Semester</i>			
LM 231 Selected Topics in Laboratory Medicine	2	0	2
HSA 201 Introduction to Health Care Systems <i>or</i> HSA 202 Intro. to Organization & Management	3	0	3
Practical Training in Laboratory Medicine	-	-	8
			<hr style="width: 100%; border: 0.5px solid black;"/> 13
<i>Second Semester</i>			
LM 232 Selected Topics in Laboratory Medicine	2	0	2
EB 208 Essentials of Epidemiology	1	2	2
Practical Training in Laboratory Medicine	-	-	8
			<hr style="width: 100%; border: 0.5px solid black;"/> 12

Practical Training in Laboratory Medicine: Total period of 9 months (October-June), to cover practical experience and application of theoretical knowledge in the following areas of laboratory medicine, for the periods and credits indicated:

	Duration	Credits
LM 220 Clinical Chemistry	7 weeks	4
LM 230 Clinical Hematology	7 weeks	4
LM 240 Clinical Bacteriology	7 weeks	4
LM 250 Clinical Parasitology & Urinalysis	4 weeks	2
LM 260 Serology	4 weeks	2
LM 270 Blood Banking	4 weeks	2
LM 280 Phlebotomy, Endocrinology, Cytogenetics and Histo Techniques	4 weeks	2
		<hr style="width: 100%; border: 0.5px solid black;"/> 20

⁴ 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.

MASTER OF PUBLIC HEALTH

Core Required

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs	Academic Quarter
EB 301 Principles of Epidemiology	2	2	3	a,b
EB 305 Biostatistics I	2	2	3	a,b
HSA 301 Foundations of Health Administration I	3	0	3	a,b
EH 311 Public Health Microbiology	3	2	3	a,b
HBE 301 Determinants of Health Behavior	3	0	3	a,b
EH 301 Introduction to Environmental Health	3	0	3	a,b
EB 306 Computer Literacy	1	2	2	a,b

Group Required or Elective

1. Required for the MPH Area of Concentration in Health and Hospital Administration

HBE 309 Research Design in Public Health	2	0	2	c,d
HSA 310 Management and Organization Theory	3	0	3	c,d
HSA 311 Management Information Systems for Health Care	2	0	2	c,d
HSA 312 Health Planning and Project Management	3	0	3	c,d
HSA 340 Accounting	3	0	3	Summer
HSA 341 Financial Management in Health Institutions	3	0	3	f,g
HSA 351 Health Economics	2	0	2	c,d
HSA 355 Orientation to Health Care Facilities	1	2	3	Summer
HSA 361 Practicum	16 wks	0	5	f,g
HSA 362 Practicum	16 wks	0	5	h,i
EB 366 Statistical Methods in Survey Research	1	2	3	c,d

2. Required for the MPH Area of Concentration in Epidemiology and Biostatistics

	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs	Academic Quarter
EB 302 Epidemiology, Prevention and Control of Infectious Diseases	2	2	2	c,d
EB 304 Epidemiology of Chronic (non-infectious) Diseases	1	2	2	c,d
EB 366 Statistical Methods in Survey Research	1	2	3	c,d
EB 367 Advanced Methods in Epidemiology	1	2	2	f,g
EB 308 Biostatistics II	2	2	3	a,b
EB 350 Practicum	8 wks	0	2	Summer
EB 351 Practicum	16 wks	0	4	f,g
EB 352 Practicum	16 wks	0	4	h,i

3. Required for the MPH Area of Concentration in Environmental Health

EH 302 Principles of Environmental Assessment	2	0	2	f,g
EH 303 Pollution of Marine Environment	2	0	2	c,d
EH 304 Advanced Water and Wastewater Quality and Treatment	3	0	3	c,d
EH 306 Management of Hazardous Wastes	3	0	3	c,d
EH 308 Tutorial	-	-	1-3	anytime
EH 312 Occupational Health	2	3	3	f,g
EH 350 Practicum	8 wks	0	2	Summer
EH 351 Practicum	16 wks	-	4	f,g
EH 352 Practicum	16 wks	0	4	h,i
EH 395 Environmental Health Project	3	0	3	h,i
PH 301 Journal Club	1	0	1	f,g

ELECTIVES¹	Lecture Hrs/Wk	Lab Hrs/Wk	Semester Credit Hrs	Academic Quarter
EB 391 Nosocomial Infections	2	0	2	b
EB 392 Health Determinants in Population	3	0	3	d
HBE 302 Health Education and Behavioral Change	2	2	3	c,d
HBE 303 Effective Communication and Group Process in Health Professions	2	2	3	c,d
HBE 306 Advanced Seminars in Health Behavior and Education	2	2	3	f,g,h,i
HBE 307 Family Health Behavior	2	2	3	c,d
HBE 309 Research Design in Public Health	2	0	2	c,d
HSA 321 Foundations of Health Administration II	2	0	3	a,b
HSA 331 Quantitative Techniques for Health Administration	2	0	2	c,d
HBE 350 Practicum in Health Behavior and Education	--	--	4	Summer
HBE 351 Practicum in Health Behavior and Education	--	--	8	f,g
HBE 352 Practicum in Health Behavior and Education	--	--	8	h,i
HBE 316 Tutorial in Health Behavior and Education	1-3	0	1-3	--
HSA 320 Health Care Systems	2	0	2	c,d
HSA 303 Seminars in Health Administration	1-2	0	1-2	a,b
HSA 304 Seminars in Health Administration	1-2	0	1-2	c,d
HSA 307 (a) Tutorial	1	0	1	anytime
HSA 307 (b) Tutorial	2	0	2	anytime
HSA 334 Health Services Research	2	0	2	--
EH 308 Tutorial in Environmental Health	--	--	1-3	--
EB 316 Tutorial in Epidemiology and Biostatistics	--	--	1-2	--
EH 312 Occupational Health	2	3	3	c,d

¹ Consent of Department is required.

C. MASTER OF SCIENCE IN POPULATION STUDIES

Core Required Courses

POP 301 Demographic Techniques I. 3 cr.
POP 302 Demographic Techniques II. 3 cr.
POP 311 Data Collection and Analysis I. 3 cr.
POP 315 Population and Development. 3 cr.
POP 318 Population Theory and Policy. 3 cr.
POP 320 Mother and Child Health/Family Planning. 3 cr.
POP 333 Population Movements. 3 cr.
POP 399 M.S. Thesis

Electives¹

Electives for the Concentration in Population

POP 312 Data Collection and Analysis II. 3 cr.
POP 319 History of Population Thought. 3 cr.
POP 325 Population and Health. 3 cr.
POP 340 Population, Environment, and Development. 3 cr.
POP 350 Seminar on Contemporary Population Issues. 3 cr.

Electives for the Concentration in Health Sciences

EB 301 Principles of Epidemiology. 3 cr.
EB 326 Epidemiology. 3 cr.
EB 308 Biostatistics II. 3 cr.
EB 366 Statistical Methods in Survey Research. 3 cr.
EB 394 Epidemiology of Birth Defects. 3 cr.
HBE 301 Determinants of Health Behavior. 3 cr.
HBE 302 Health Education and Behavioral Change. 3 cr.
POP 325 Population and Health. 3 cr.
HSA 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.

¹ Electives other than those listed must be approved by the Department.

DEPARTMENT OF ENVIRONMENTAL HEALTH (EH)

Chairperson:	Jurdi, M.
Associate Professor	Jurdi, M.
Assistant Professor:	Nuwayhid, I.
Instructors:	Kadi, M.; Kambris, M.; Melhem, N.
Lecturers:	Geha, M.; Mansour, L.; Milki, R.
Research Assistant:	Sinno, Z.
Associates:	Imad, A.; Zuhairy, K.

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:

- a) In some government agencies (e.g. Ministry of Health, municipalities, health centers, etc.);
- b) In the private sector, which offers a variety of job opportunities (industry, research institutions, universities, schools, private business, etc.); or
- c) 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.

- EH 201 Man and His Environment.** 2.0; 2 cr. An introductory course intended to orient the student to the field of environmental health—its scope, associated problems, and control programs at the national and international levels. Member of Department.
- EH 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.
- EH 204 Solid Wastes Management.** 2.0; 2 cr. Solid wastes—sources, characteristics, quantities, collection, transport, treatment, and disposal, including integrated management approaches. M. Jurdi.
- EH 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.
- EH 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.
- EH 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.
- EH 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.
- EH 211 Environmental Microbiology I.** 2.2; 3 cr. Fundamental aspects of microbiology. Member of Department.
- EH 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. Member of Department.
- EH 213 Field Training.** 5 weeks, 5 cr. Practical training under supervision. Member of Department.
- EH 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.
- EH 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.
- EH 218 Project.** 0.6; 2 cr. A project on atmospheric pollution. A written report is required. Member of Department.
- EH 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.
- EH 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.
- PH 201 Seminar.** 0.6; 2 cr. Selected topics in global environmental issues. M. Jurdi.
- PH 301 Journal Club.** 1 cr. I. Nuwayhid.
- EH 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.
- EH 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.
- EH 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. Member of Department.
- EH 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.
- EH 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.
- EH 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.
- EH 308 Tutorial.** 1-3 cr. Special environmental health projects of interest to the students are offered. A written report is required. M. Jurdi, I. Nuwayhid.
- EH 310 Toxicology.** 3.0; 3 cr. Prerequisites: Biol 201B, Chem 201B. Reviews of the essentials of toxicology: dose response, toxicokinetics (adsorption, distribution, metabolic conversion, elimination), and the molecular basis for toxic 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.
- EH 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. Member of Department.

- EH 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.
- EH 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.
- EH 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.
- EH 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.
- EH 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. M. Jurdi, I. Nuwayhid.
- EH 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.

DEPARTMENT OF EPIDEMIOLOGY AND BIostatISTICS (EB)

Chairperson:	Hijal-Shaar, K.
Professor:	Zurayk, H.
Associate Professor:	Hijal-Shaar, K.
Visiting Senior Lecturer:	Campbell, O. ¹
Lecturer & Coordinator of MPH:	Deeb, M.
Instructors:	Jabbour, J. ¹ ; Sha'ya, M.; Sibai, A. ² ; Tamim, H. ³
Research Assistants:	Freiha, R.; Harb, H.; Jbara, T.; Kabakian, T., Khayyat, R., Shaar, D.

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.

EB 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.

EB 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.

EB 208 Essentials of Epidemiology. 1.2; 2 cr. A course in the basic principles of epidemiology for B.S. students. Important 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. K. Shaar and Members of Department.

¹ First semester.

² On leave October 1, 1996 - February 7, 1997.

³ Second semester.

- EB 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.
- EB 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. Member of Department.
- EB 224 Survey Methods II.** 2.2; 3 cr. Prerequisite: EB 223, of which it is a continuation. It involves the execution of a survey investigation in the field of health. Member of Department.
- EB 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.
- EB 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. K. Shaar.
- EB 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.
- EB 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.
- EB 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. K. Shaar.
- EB 302 Epidemiology, Prevention, and Control of Infectious Diseases.** 2.2; 2 cr. Prerequisite: EB 301. Normally offered to medically trained and interested 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.
- EB 304 Epidemiology of Chronic (Non-Infectious) Diseases.** 1.2; 2 cr. Prerequisite: EB 301. Offered to interested MPH students. 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. Member of Department.
- EB 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.
- EB 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.
- EB 308 Biostatistics II.** 2.2; 3 cr. This course is a continuation of EB 305 and is offered to interested 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.
- EB 316 Tutorial.** 1-2 cr. Member of Department.
- EB 325 Medical Statistics.** 1.2; 2 cr. Similar to EB 225; offered to graduate students. M. Deeb.
- EB 326 Epidemiology.** 2.3; 3 cr. Similar to EB 226; offered to graduate students. K. Shaar.
- EB 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. Deeb, K. Shaar.
- EB 366 Statistical Methods in Survey Research.** 1.2; 3 cr. Prerequisite: EB 305. Offered to interested 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.
- EB 367 Advanced Methods in Epidemiology.** 1.2; 2 cr. Prerequisite: EB 301. Offered to interested students and designed to illustrate 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. K. Shaar.
- EB 380 (381) Journal Club.** 1-2 cr. Member of Department.
- EB 390 Directed Reading and Research.** Credit hours vary. Member of Department.
- EB 391 Nosocomial Infections.** 2.0; 2 cr. Offered to interested 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.
- EB 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. Member of Department.
- EB 394 Epidemiology of Birth Defects.** 3.0; 3 cr. Prerequisite: EB 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.
- EB 399 M.S. Thesis.** Credit hours vary.

DEPARTMENT OF HEALTH BEHAVIOR AND EDUCATION (HBE)

Coordinator:	Kanj, M.
Visiting Associate Professor:	Makhlouf-Obermeyer, C. ¹
Visiting Lecturer:	Affi, L. ²
Instructors:	El-Kak, F.; Ghorayeb, F. ³ ; Kanj, M.; Moukheiber, L. ⁴

Departmental courses are designed to introduce students to culturally specific indices of health behavior, status, and change. A multidimensional approach emphasizing interaction between a variety of sociocultural foci is utilized to understand health behavior dynamics. Students work with individuals, groups and communities in analysis design, implementation, and evaluation of health behavior and health education projects.

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 Diploma in Health Education to undergraduate students.

The following courses are offered by the Department.

HBE 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.

HBE 203 Communication for Health Professionals. 2.2; 3 cr. Introduction to communication theory and practice and small group interaction skills. The course deals with social and psychological factors which determine the effectiveness of communication and small group work as it relates to increasing positive health behavior and group effectiveness. Member of Department.

HBE 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. Member of Department.

HBE 237 Theories and Methods of Health Education I. 2.0; 3 cr., annually. Introduction to the principles and practice of health education with applications to school,

¹ From November 10 - December 7, 1996.

² From February 16 - March 14, 1997.

³ On leave July 1 - October 31, 1996.

⁴ Second semester.

community and patient care settings. Subjects include: determinants of health behavior; behavioral diagnoses and assessment of health actions; principles of health behavioral change; design of health education materials. Member of Department.

HBE 238 Theories and Methods of Health Education II. 1.4; 3 cr., every semester.

Prerequisite: HBE 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 HBE 237 in actual field experience. Member of Department.

HBE 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 planned change (health education) as ways of affecting these factors. Member of Department.

HBE 302 Health Education and Behavioral Change. 2.2; 3 cr. Prerequisite: HBE 301, graduate standing. Principles of planned change. Topics include the relationship between health and human behavior; natural and planned change in the health-related behavior of the individual, group, or community; principles and methods of health education design and evaluation. Member of Department.

HBE 303 Effective Communication and Group Process in Health Professions. 2.2; 3 cr. Prerequisites: HBE 301, HBE 302, graduate standing. Theory and practice in the study of human relations, with emphasis on group interaction and the effective use of health communication. Member of Department.

HBE 306 Advanced Seminars in Health Behavior and Education. 2.2; 3 cr. Prerequisite: Graduate standing. Focus on analytical and critical examination of current issues in the fields of health behavioral sciences or health education. Member of Department.

HBE 307 Family Health Behavior. 2.2; 3 cr. Prerequisite: HBE 302. 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.

HBE 309 Research Design in Public Health. 2.0; 2 cr. This course introduces students to the scientific study of health. Theory development, research design, methodology, data collection procedures and data analysis strategies are taught. Emphasis is placed on the role of social research methods for the study of health behavior. K. Shaar.

HBE 316 Tutorial in Health Behavior and Education. 1-3.0; 1-3 cr. Guided study in particular topics in health behavior and health education as defined by instructor and student. Member of Department.

HBE 350, 351, 352 Practicum in Health Behavior and Education. 20 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 8 cr.; Spring 8 cr. Members of Department.

**DEPARTMENT OF HEALTH SERVICES ADMINISTRATION
(HSA)**

Acting Chairperson:	Kassak, K.
Assistant Professor:	Kassak, K.
Lecturers:	Asrawi, F.; Ghattas, R.; Karam, N.
Instructors:	Hajjar, H.; Mohammad Ali, A.; Kobeissi, H.; Tohme, R.
Preceptors:	El-Hout, A.; Ghosn, G. ¹ ; Hajj, M.; Kuntz, D.; Mouro, G.; Muallem-Nassar, S.; Otayek, J.; Saab, R.; Sadek, I.; Wakim, J. ²

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.

HSA 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.

HSA 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.

HSA 203 Medical Terminology. 1.0; 1 cr. This course provides the student 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.

HSA 206 Computer Literacy. 2.2; 3 cr. This course introduces students to computer hardware and software and to fundamental usage of popular microcomputer software

¹ Until December 31, 1996.

² First semester.

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.

HSA 212 Introduction to Health Planning. 3.0; 3 cr. Prerequisite: HSA 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.

HSA 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.

HSA 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.

HSA 303 and 304 Seminars in Health Administration. 1-2.0; 1-2 cr. (each). K. Kassak.

HSA 307 (a) Tutorials in Health Administration. 1.0; 1 cr. K. Kassak.

HSA 307 (b) Tutorials in Health Administration. 2.0; 2 cr. K. Kassak.

HSA 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.

HSA 311 Management Information Systems for Health Care. 2.0; 2 cr. Prerequisite: HSA 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. K. Kassak.

HSA 312 Health Planning and Project Management. 3.0; 3 cr. Prerequisite: HSA 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.

HSA 320 Health Care Systems. 2.0; 2 cr. Prerequisite: HSA 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 and position papers related to the health care systems in the region. Member of Department.

HSA 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.

HSA 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.
- HSA 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.
- HSA 340 Accounting.** 3.0; 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.
- HSA 341 Financial Management in Health Institutions.** 3.0; 3 cr. Prerequisite: HSA 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.
- HSA 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. K. Kassak.
- HSA 355 Orientation to Health Care Facilities.** 1.2; 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.
- HSA 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.
- HSA 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 in these settings. Credits are allocated as follows: Fall 5 cr.; Spring 5 cr. Members of Department.

MEDICAL LABORATORY TECHNOLOGY PROGRAM (MLT)

Coordinator: Khatib, R.
Instructors: Khatib, R.; Ramadan, M.; Saksouk, S.

In addition to faculty members in the Department of Laboratory Medicine, Faculty of Medicine.

The MLT 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.

MLT 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.

MLT 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.

MLT 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 MLT program, see the section under that Department.

DEPARTMENT OF POPULATION STUDIES (POP)

Chairperson:	Saxena, P.
Professor:	Saxena, P.
Visiting Professor:	Dyson, T. ¹
Assistant Professors:	Kulczycki, A. ² ; Navaneetham, K.
Instructor:	El-Eter, I.
Research Assistants:	Kodeih, A., Melhem, N.; Moudallal, N.
Associate:	Gaur, S.

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 and 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 inside and outside the Faculty. In addition, it aims at enhancing population research of high academic quality in areas of data collection, demographic analysis, population and development and population policy.

POP 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, K. Navaneetham.

POP 302 Demographic Techniques II. 2.2; 3 cr. Prerequisite: POP 301. Advanced methods of demographic estimates and projections. Fertility schedules. Indirect techniques of estimation from incomplete data. Stable population models and their applications. Method of estimation and projection of population. P. Saxena, K. Navaneetham.

POP 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, K. Navaneetham.

¹ March 22 - April 10, 1997.

² As of February 17, 1997.

- POP 312 Data Collection and Analysis II.** 2.2; 3 cr. Prerequisite: POP 311. Design of censuses and sample surveys. Sampling Techniques. Organization of field operations. Application of advanced multivariate techniques in the analysis of data. Presentation of results. This course includes field operation and use of relevant computer packages. P. Saxena.
- POP 315 Population and Development.** 3.0; 3 cr. Determinants and consequences of fertility, mortality and population growth. Economic and sociological approaches to these determinants. Effects of education, women's work and other social and economic factors on fertility. Effect of health improvement on mortality. Types of internal and international migration and their determinants. K. Navaneetham.
- POP 318 Population Theory and Policy.** 3.0; 3 cr. Demographic transition and development. Biological theories. Sociological approaches to fertility theory. Migration theories. The rationale, organization and management of family planning programs. Urbanization policies. Policies of international migration with special reference to the Middle East. K. Navaneetham.
- POP 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.
- POP 320 Mother and Child Health/Family Planning.** 3.0; 3 cr. Factors affecting the health of mothers and children. Natural fertility and development. The relationship between fertility and mother and child health. The nature of family planning programs and their effect on fertility and family welfare. Family planning and human rights. Abortion and sterilization. P. Saxena and other Members of Department.
- POP 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.
- POP 333 Population Movements.** 3.0; 3 cr. Types of population movements: internal and international. Urban growth with particular reference to the Middle East. Determinants and consequences of rapid urbanization. Internal and intra-regional migration and economic consequences. The social and political consequences of non-Arab migration to the region. Issues in labor migration. A. Kulczycki.
- POP 340 Population, Environment and Development.** 3.0; 3 cr. Effects of population growth and distribution on environmental conditions. Opposite effects of environmental factors on human health and well being. Interrelationships between population, environment and development and comprehensive policies aimed at establishing optimal balance. Member of Department.
- POP 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.
- POP 399 M.S. Thesis.** 6 cr.



Meeting at West Hall: a focal point for many student activities.

*Division of
Education
Programs*

DIVISION OF EDUCATION PROGRAMS

FACULTY LIST 1996-97

Officers of the Division

Robert M. Haddad ¹	President of the University
David S. Dodge ²	Acting President
Samir Makdisi	Deputy President
Makhluf J. Haddadin	Vice President for Academic Affairs
Munir Bashshur	Director
Waddah Nasr	Registrar
Hala K. Azar	Executive Officer

Professors

- * Bashshur, Munir, Ph.D., University of Chicago; Education
- ³ Haddad, Fuad, Ph.D., University of Chicago; Education
- Jurdak, Murad, Ph.D., University of Wisconsin; Education, and Science and Mathematics Education Center

Associate Professors

- BouJaoude, Saouma, Ed.D., University of Cincinnati; Education, and Science and Mathematics Education Center
- Ghusayni, Raouf, Ph.D., Stanford University; Education
- Theodory, George, Ph.D., University of California, Berkeley; Education

Assistant Professors

- 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
- Ghaith, Ghazi, Ph.D., Indiana University; Education
- Mukallid, Samar, Ph.D., Columbia University; Education

¹ Until December 19, 1996.

² As of December 20, 1996.

* On tenure appointment.

³ Seconded to Sharjah for second semester.

DIVISION OF EDUCATION PROGRAMS

Osta, Iman, Doctorat, University of Grenoble; Education, and Science and Mathematics
Education Center
Yaghi, Hussein, Ph.D., University of Southern California; Education

Lecturers

- ** Abboud, Shehadeh, M.A., AUB; University Orientation Program
Al-Amine, Adnan, Doctorat, Sorbonne University; Education
Bashour, Najla, Doctorat, Saint Joseph University; Education
Dallal, Kamel, Ph.D., University of Southern Mississippi; Education
Faddoul, Simon, Ed.D., Univeristy of Cincinnati; Education
Merhej, Waltraud, M.D., University of Vienna; Education
Skaf, Asaad, Ph.D., Cairo University; Education

Instructors

A'raj, Suad, M.A., University of Toledo; Education
Artinian, Rubina, Diplome de Fin d'Etudes, Conservatoire National de Musique;
Education
Awdeh, Ahmed, M.A., AUB; University Orientation Program, and Office of Tests and
Measurements
Baalbaki, Rula, M.A., AUB; University Orientation Program
Badran, Hector, License, Lebanese Univeristy; Education
El Homaissi, Fack, Diplome d'Etudes Supérieures; Education
Hasan, Naemeh, M.A., AUB; 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
Lakkis, Khadijeh, M.A., AUB; University Orientation Program
Peltekian, Katia, M.A., Dalhousie University; University Orientation Program
Shaaban, Reem, M.A., AUB; University Orientation Program

Test Development Specialists

Barudi, Salim, M.A., -AUB; Office of Tests and Measurements
Safar, Mona, M.A., AUB; Office of Tests and Measurements

** 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

See page 455.

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.; Haddad, F.; Jurdak, M.
Associate Professors:	BouJaoude, S.; Ghusayni, R.; Theodory, G.
Assistant Professors:	Abu Saba, M.; Bouzeineddine, A.; Ghaith, G.; El-Hassan, K.; Mukallid, S.; Osta, I.; Yaghi, H.
Lecturers:	Al-Amine, A.; Bashour, N.; Dallal, K.; Faddoul, S.; Merhej, W.; Skaf, A.
Instructors:	Artinian, R.; Badran, H.; El Homaissi, F.; Hasan, N; Kanj, 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.

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 scores and secondary school performance. Detailed information regarding admission is given in the section "Admission" on page 27 of this catalogue and in the section "Admission to Sophomore Class" on page 40 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.): CS 201, 202, 203, 204, English 203, 204, Arabic 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.):
 - **Core specialization courses** (9 crs.): Educ. 218, 225, 231.
 - **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).
 - **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 (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.)

215
230
an elective

Block B (12 cr. hrs.)

For students concentrating on teaching Arabic and Social Studies: 231, 240, 251, 268
For students concentrating on teaching English and Social Studies: 231, 245, 251, 268
For students concentrating on teaching Math and Sciences: 231, 252, 257, 268
For students concentrating on teaching Fine Arts: 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 (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.)

211 or 216
215
230
an elective

Block B (9 cr. hrs.)

Two Methods courses from the sequence 237-256 inclusive
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.)

SBS 202:	General Psychology (or equivalent)
Educ 225:	Human Development and Special Education

DIVISION OF EDUCATION PROGRAMS

Requirements: (21 cr.hrs.)

Basic Courses (9 cr. hrs.):

Educ. 215, Educ. 221, Educ. 222

Methods Courses (12 cr. hrs.):

Educ. 280, Educ. 281, Educ. 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.)

May be taken concurrently with the Bachelor degree

Educ 211 or 216

Educ 212

Educ 213

Educ 226

Educ 230

Block B (6 cr.)

Can only be taken after the Bachelor degree

Educ 214 (Management in practice)

Educ 224 Instructional Supervision (Practicum)

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, Education 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: Education 315, Education 321 and one of the following Education Courses: 301, 302, 303, 314, 316, 326 or 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

- 211 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.
- 212 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.
- 213 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.
- 215 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.
- 216 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. F. Haddad.
- 217 Measurement and Evaluation for Classroom Teachers.** 3.0; 3 cr; annually. Prerequisite: 215. Introduction and practice in the construction, use, and interpretation of classroom tests. K. El-Hassan.

DIVISION OF EDUCATION PROGRAMS

- 218 Children's Literature.** 3.0; 3 cr; 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.
- 219 Computers in Education.** 3.0; 3 cr; annually. General knowledge about micro-computers; basic 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.
- 220 Instructional Media and Techniques.** 2.2; 3 cr; annually. Systematic approach to instruction, selection and use of media, with practical experience. H. Yaghi.
- 221 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.
- 222 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.
- 223 Introduction to Guidance and Counselling.** 3.0; 3 cr; annually. Prerequisite: 215. An introduction to the field of guidance and counseling. The role of the counselor in school and community settings is emphasized. M. Abu-Saba.
- 225 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.
- 226 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.
- 227 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.
- 230 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.
- 271-272 Mathematics for Elementary Teachers.** 3 cr. (each), annually. 271 is pre-requisite for 272. An in-depth study of mathematical concepts and skills in pre secondary mathematics curriculum.. I. Osta.
- 273-274 Science for Elementary Teachers.** 3 cr. (each), annually. An in-depth study of science concepts and skills in pre-secondary science curriculum. S. BouJaoude.
- 290 Senior Tutorial.** 1-3 cr; annually.

METHODS COURSES

- 214 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.
- 224 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.
- 228 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.
- 229 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.
- 231 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.
- 237 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.
- 238 Theories and Methods of Health Education II.** 1.4; 3 cr; annually. Prerequisite: 237. 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 Ed 237 in video microteaching and actual field experience. M. Kanj.
- 240 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.
- 241 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.
- 242 The Teaching of Arabic II.** 1.3; 3 cr; second semester, alternate years. Prerequisite: 241. A practicum of classroom observation and supervised practice teaching of Arabic language and literature at the secondary level. Faculty Member.
- 243 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 microteaching practices. G. Ghaith.

- 244 The Teaching of English as a Foreign Language II.** 1.4; 3 cr; second semester, annually. Prerequisite: 243. Preparation and evaluation of teaching materials through individual and group projects. Guided and supervised practice teaching in schools. G. Ghaith.
- 245 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.
- 249 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.
- 250 Teaching of Social Studies II.** 1.4; 3 cr; second semester, alternate years. Prerequisite: 249. A practicum of classroom observation and supervised practice teaching of social studies or history, geography and civics in neighboring schools. Faculty Member.
- 251 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.
- 252 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. I. Osta.
- 253 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.
- 254 The Teaching of Mathematics II.** 1.4; 3 cr; second semester, annually. Prerequisite: 253. 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.
- 255 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.
- 256 The Teaching of Science II.** 1.4; 3 cr; second semester, annually. Prerequisite: 225. Review of various science curriculum projects and programs. Curriculum planning. Microteaching and practicum in classroom observation and teaching. S. BouJaoude.
- 257 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. S. BouJaoude.
- 266 Secondary Education Practicum.** 0.6; 3 cr. Members of Faculty.
- 267 Practicum in Elementary School.** 0.12; 6 cr. Observation and practice in classroom situations under the guidance of experienced teachers. A. Bou-Zeineddine.
- 268 Practicum in Elementary School.** 0.6; 3 cr. Observation and practice in classroom situations under the guidance of experienced teachers. A. Bou-Zeineddine.
- 280 Methods and Materials for Children with Mild Mental Retardation I.** 2.2; 3 crs; 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.

- 281 Methods and Materials for Children with Mild Mental Retardation II.** 4.4; 6 crs; annually. Prerequisite: 280. 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.
- 283 Practicum in Education of Children with Mental Retardation.** 0.6; 3 cr; second semester, annually. Prerequisites: 280 and 281. Supervised student-teaching in special institutions and other appropriate settings. S. Mukallid.
- 290 Special Topics.** 1-3 cr.

GRADUATE COURSES

- 301 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. F. Haddad.
- 302 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. F. Haddad.
- 303 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.
- 305 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 implications. Psychological bases of concept-learning in science and the contributions of research to science education. S. BouJaoude.
- 306 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. Includes tryouts in actual school situations of some of these innovations. S. BouJaoude.
- 307 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.
- 308 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.

- 309 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.
- 310 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.
- 311 Seminar in Supervision of Instruction.** 3.0; 3 cr; annually. Prerequisite: 213. 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.
- 313 Management and Organization Theories in Education.** 3.0; 3 cr; annually. Prerequisite: 213. 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.
- 314 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.
- 315 Psychology of Education (Advanced).** 3.0; 3 cr; annually. Prerequisite: 215. A comprehensive analysis of instructional theory, measurement skills, cognitive development, learning theory and methods of applying behavior modification in the classroom. S. Mukallid.
- 316 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.
- 317 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, adjustment, interests, and attitudes. Theoretical approaches to measurement, basic problems in test construction and use, and functions and limitations of existing instruments. K. El-Hassan
- 318 Test Construction in Education.** 3.0; 3 cr; alternate years. Prerequisite: 317. Development of testing techniques and skills for appraisal of the cognitive and affective objectives of instruction. K. El-Hassan.
- 320 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.
- 321 General Research Methodology in Education.** 3.0; 3 cr; annually. Prerequisite: 227 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.
- 322 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.
- 324 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.
- 325 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.
- 326 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.
- 327 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 in such societies. The teacher as an agent of change in rural communities. Focus on developing countries, particularly the Middle East. Faculty Member.
- 328 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.
- 329 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.
- 330 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.
- 331 Field Experience in Guidance and Counseling.** 1.4; 3 cr; annually. Prerequisite: 330 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.
- 332 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.
- 335 Curricula and Methodologies in Elementary Education: Language Arts and Social Studies.** 3.0; 3 cr; alternate years. Prerequisites: 231, 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.
- 336 Curricula and Methodologies in Elementary Education: Science and Mathematics.** 3.0; 3 cr; alternate years. Prerequisites: 252, 257. Recent curricular and methodological developments in elementary science and mathematics. Current research and resulting trends and advanced instructional practices applicable to the elementary classroom. Faculty Member.

DIVISION OF EDUCATION PROGRAMS

390 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.

389 M.A. Project. 3 cr.

398 M.A. Project. 0 cr.

399 M.A. Thesis.

SCIENCE AND MATHEMATICS EDUCATION CENTER (SMEC)

Director	BouJaoude, S.
Professor:	Jurdak, M.
Associate Professor:	BouJaoude, S.
Assistant Professor:	Osta, I.

The functions of the Science and Mathematics Education Center are:

1. Teaching of science and mathematics education courses in collaboration with the Department of Education.
2. Research and development in the fields of science and mathematics education.
3. Production of textbooks, experimental curricula, and instructional materials in science and mathematics.
4. Consultation in science and mathematics to schools, institutions, or governments regarding curriculum planning, textbooks, laboratories, equipment, and methods of evaluation.
5. 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.
Instructor:	Audeh, A.
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 offer program and teacher evaluation to AUB departments.
3. To conduct in-service training workshops in testing and evaluation.
4. To offer consultation to schools, institutions, or governments regarding testing and evaluation.
5. To conduct validity and reliability studies.
6. To prepare technical reports.

UNIVERSITY ORIENTATION PROGRAM

Director:	Baalbaki, R.
Lecturer:	Abboud, S.
Instructors:	A'raj, S.; Baalbaki, R.; Karkanawi, L.; Kudayh, R.; Lakkis, K.; McMaster, H.; Peltekian, K.; Shaaban, R.

PURPOSE

The University Orientation Program (UOP) offers an intensive English language program designed to prepare students who are deficient in language skills for successful performance in the regular University program. Students who do not meet the English entrance requirements are eligible to enroll in the Program.

DESCRIPTION OF THE PROGRAM

All UOP students must take the full English program which includes the following:

1. *Reading*: This component is designed to help the students develop both intensive and extensive reading skills and build up their vocabulary repertoire.
2. *Writing*: In this component, students are exposed to all forms of written discourse and given ample opportunity to practice using these forms to produce acceptable college-level writing.
3. *Speaking*: This component is designed to improve students' communicative competence, i.e., the ability to express themselves appropriately in a variety of situations.
4. *Listening*: This component is designed to develop the students' aural abilities through exposure to a variety of spoken discourse.

ADMISSION

Regular students qualifying for general admission to AUB are recommended to the UOP by the Admission Committees of their Faculty. Special students apply directly to UOP and are accepted according to vacancies and eligibility requirements set by the Admissions Committee of the Program. In either case, the course followed will be based on entrance and placement examinations.

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 and/or academic incompetence.

METHODS

The Faculty members 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 level of the students. Individual abilities and/or linguistic deficiencies of the students are addressed by the Program.

EVALUATION

Special examinations are administered regularly. Practice tests, quizzes, a midterm and a final exam are given to help assess the students' progress in mastering English. Entrance to full University status from the UOP is by examination. 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.

***Extension
Programs***

AUB EXTENSION PROGRAMS

Shehadeh Abboud

Director

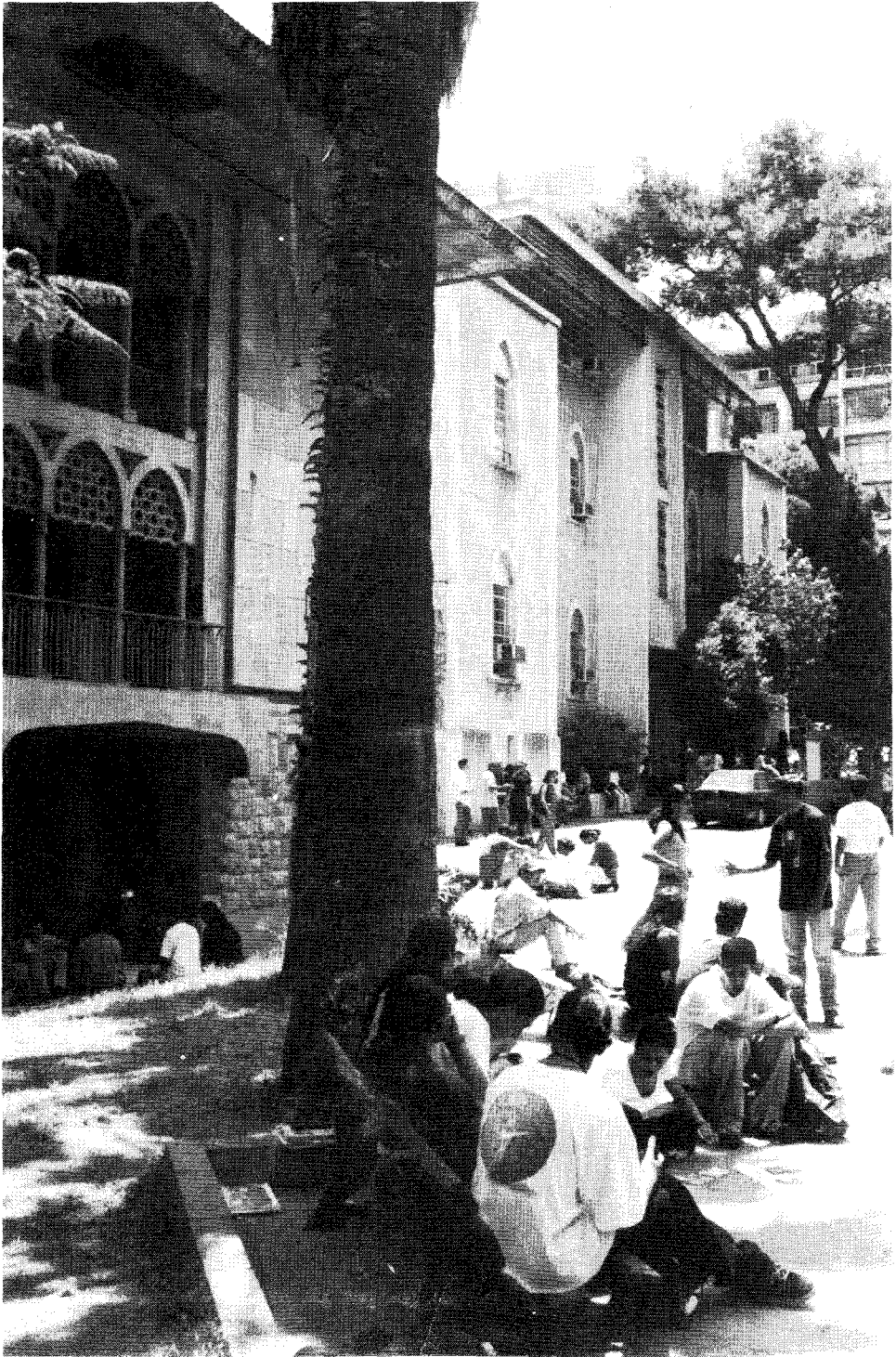
The Office of the Vice-President for Research and External Programs administers the Extension Programs at the University to provide higher learning opportunities for young people who assume positions in government, business and educational institutions. These include on-campus in-service training programs and short courses, part-time evening courses, seminars, special summer courses, or individualized training for specialized personnel. Such educational activities are designed to provide opportunities which extend the services of the University beyond the regular academic programs. They are adult education in nature and do not carry any credit or transfer of credit towards any degrees.

EVENING COURSES

A variety of evening non-credit courses of general interest is offered every semester for the benefit of the community. Instructors are members of the AUB faculty or persons from outside the University who have special skills in different fields. These courses include English language (all levels), Business English, Arabic for Non-Arabic Speakers, Translation, Computer Literacy, Office Automation, Graphic Design, and the like.

Other evening courses could, upon demonstrable demand, include the following: Elementary German, Spanish, Japanese, Italian, Environmental and Health Education for Elementary and Intermediate Teachers, Management of Social Services Associations, Cognitive Skills, Industrial Marketing, Communication and Sales Management, Advertising and Promotion Management, Commercial Banking, Office Management, Accounting, Advertising Art, Silk and Glass Painting.

Trainees, sponsored individuals or small groups, may be accepted for limited and specified periods of specialized and supervised training. They are not candidates for a university degree or a certificate 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.



Graduate Study

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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.)

GRADUATE STUDY

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.)
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.)*

* Interdisciplinary program.

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 15 for applicants for the second semester.

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.

* Interdisciplinary program.

** Temporarily frozen.

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 77 or its equivalent in the major field of study.

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 courses with an average of at least 80, based on a minimum of 18 credits in the intended field of study, which may include courses taken by the applicant at the undergraduate level, the department or the academic unit may recommend to the Faculty Graduate Committee the admission of the applicant to the graduate program, with the Faculty of Arts and Sciences requiring the GRE or GMAT. The supplementary courses must be completed within four successive semesters.

In all cases, a score of 550 in EEE or 600 in TOEFL is required for admission of new applicants to graduate or prospective graduate work from recognized institutions of higher learning. An applicant whose EEE score is within the range of 500-549 or whose TOEFL score is within the range of 575-599 may be admitted and required to take remedial English courses determined by the applicant's performance on the English Placement Test (for detailed information on the English Placement Test, see the section on "Admissions" in this catalogue).

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 thesis topic and committee	For Master's candidates	June 20	Oct. 20	Feb. 1
	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

The interfaculty Graduate Environmental Sciences Program (GESP) leads to the MS degree in Environmental Sciences with three majors: Environmental Technology, Ecosystem Management and Environmental Health. The program draws on the resources of various departments of the Faculties of Agricultural and Food Sciences, Engineering and Architecture, and Health Sciences and provides opportunities for study and research in the general field of the environment.

The program is administered by an Interfaculty Coordinating Committee with the Graduate Committees of the three 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 appropriate Faculty Graduate Committee and accepted by the Interfaculty Coordinating Committee of the program.
3. Meet prerequisite courses specified below to ensure that students have the necessary background in the physical and natural sciences, mathematics, statistics, and computer science.

Degree Requirements

Requirements for the MS degree in Environmental Sciences, both thesis and non-thesis, are tabulated below.

	Environmental Technology		Ecosystem Management		Environmental Health	
	Thesis	Non-thesis	Thesis	Non-Thesis	Thesis	Non-thesis
Core courses	18	18	18	18	18	18
Mandatory courses	0	0	6	6	6	6
Electives in major of specialization	6	12	0	9	0	6
Other approved electives	6	9	6	6	6	9
Thesis	6		6		6	
Project		3		3		3
TOTAL	36	42	36	42	36	42

Course Requirements

UNDERGRADUATE PREREQUISITES			<i>Credit hours</i>	<i>Faculty responsible</i>
Biol	200	Basic Concepts of Biology	4	FAS
Chem	202	Basic Chemistry	3	FAS
Chem	205	Introductory Chemistry Laboratory	2	FAS
Phil	209	Environmental Ethics	3	FAS
ES ¹	201	Introduction to Environmental Science and Technology	3	FEA/FHS
ES	202	The Environment and Sustainable Development	3	FAFS
Math	201	Calculus and Analytic Geometry III	3	FAS
Math	202	Differential Equations	3	FAS
Math	208	Elementary Statistics for the Sciences	3	FAS
Math	209	Computers and Programming for the Sciences	3	FAS
Phys	204	Classical Physics for Medical Sciences	3	FAS
EH	211	Environmental Microbiology	3	FHS
Geol	204	Earth Science Process	3	FAS
Geol	205	Earth Resources and Energy	3	FAS

¹ Descriptions for courses marked ES can be found on page 478.

GRADUATE STUDY

CORE COURSES			<i>Credit hrs</i>	<i>Faculty</i>
ES	301 ¹	Statistical Methods	3	FHS/FAFS
ES	305	Research Design	3	FHS/FAFS
ES	310	Environmental Degradation and Remediation	3	FEA/FHS
ES	311	Methods of Environmental Sampling and Analysis	3	FEA
ES	330	Natural Resources Management	3	FAFS
ES	350	Environmental Impact Assessment	3	FHS

Environmental Technology major

The courses in this major are grouped in three sub-specialties, as indicated below.

			<i>Credit hrs</i>	<i>Faculty</i>
<i>Air Pollution</i>				
CE	625	Air Pollution Control Processes	3	FEA
CE	627	Air Pollution Modeling	3	FEA
CE	628	Principles of Air Pollution	3	FEA
<i>Water and Wastewater</i>				
CE	521	Groundwater Hydrology	3	FEA
CE	527	Water and Wastewater Chemistry	3	FEA
CE	529	Surface Water Hydrology	3	FEA
CE	531	Sanitary Microbiology and Biological Processes	3	FEA
CE	536	Water Resources Systems: Planning and Management	3	FEA
CE	634	Physical, Chemical and Biological treatment processes	3	FEA
<i>Wastes</i>				
CE	538	Solid Waste Management	3	FEA
CE	626	Industrial Waste Management	3	FEA
CE	626	Hazardous Waste Management	3	FEA

Ecosystem Management major

MANDATORY COURSES			<i>Credit hrs</i>	<i>Faculty</i>
ECM ²	311	Ecosystem Management I: Physical Resources	3	FAFS
ECM	312	Ecosystem Management II: Biological Resources	3	FAFS

¹ Course is equivalent to Agr. 301 Statistical Methods in Agriculture

² Descriptions for courses marked ECM can be found under the general Agriculture courses, on page 389 of this catalogue.

ELECTIVES			<i>Credit hrs</i>	<i>Faculty</i>
AED	375	Resource Economics I	3	FAFS
AED	376	Resource Economics II	3	FAFS
AED	384	Rural Social Change, Development, and the Environment	3	FAFS
ASC	388	Animal Production and Environmental Management	3	FAFS
CPP	352	Insect-Plant Interactions	3	FAFS
CPP	388	Integrated Pest Management	3	FAFS
ECM	314	Agricultural Pollutants	3	FAFS
ECM	316	Sustainable Agriculture	3	FAFS
SIM	309	Drainage of Agriculture Lands	3	FAFS
SIM	318	Soil and Salinity Management	3	FAFS
SIM	321	Systems Analysis in Water Resources	3	FAFS
SIM	334	Land Resources in Arid and Semi-Arid Regions	3	FAFS
SIM	355	Water Conservation	3	FAFS
SIM	367	Soil Conservation	3	FAFS

Environmental Health major

MANDATORY COURSES			<i>Credit hrs</i>	<i>Faculty</i>
EH	310	Toxicology	3	FHS
EH	311	Public Health Microbiology	3	FHS
ELECTIVES				
EH	302	Principles of Environmental Assessment	3	FHS
EH	303	Pollution of Marine Environment	3	FHS
EH	304	Advanced Water and Wastewater Quality and Treatment	3	FHS
EH	306	Management of Hazardous Wastes	3	FHS
EH	307	Management of Municipal Wastes	3	FHS
EH	312	Occupational Health	3	FHS
EH	313	Indoor and Outdoor Air Quality	3	FHS
EH	314	Monitoring of Work Hazards	3	FHS
EH	320	Food Quality and Control	3	FHS
HBE	301	Determinants of Health Behavior	3	FHS
HBE	303	Effective Communication and Group Process in Health Professions	3	FHS
HSA	312	Health Planning and Project Management	3	FHS
POP	340	Population, Environment, and Development	3	FHS

GRADUATE STUDY

Other Approved Electives

			<i>Credit hrs</i>	<i>Faculty</i>
CPP	320	Toxicology of Pesticides	3	FAFS
CPP	329	Insect Ecology	3	FAFS
CPP	347	Biological Control of Crop Pests	3	FAFS
CPP	354	Weed Ecology	3	FAFS
EB	302	Epidemiology, Prevention, and Control of Infectious Diseases	2	FHS
EB	304	Epidemiology of Chronic (non-infectious) Diseases	2	FHS
EB	366	Statistical Methods in Survey Research	3	FHS
EE	792	Environmental Aspects of Energy Systems	3	FEA
EH	308	Tutorial in Environmental Health	2-3	FHS
EH	395	Environmental Health Project	3	FHS
HSA	351	Health Economics	3	FHS
ME	802	Noise and Vibration Control	3	FEA
ME	818	Energy Conservation and Utilization	3	FEA
ME	826	Solar Energy	3	FEA
ME	846	Wind Energy	3	FEA
POP	333	Population Movements	3	FHS
SBS	316	Problems of Social Change and Development	3	FAS
SIM	312	Fertilizer Technology and Use	3	FAFS
UP ¹	641	Environmental Impact of Urban Growth	3	FEA

Environmental Science course descriptions

ES 201 Introduction to Environmental Science and Technology. 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.

ES 202 The Environment and Sustainable Development. 3 cr. Introduction to sustainable development: concepts, goals, ecological, economic and social aspects. Fundamental environmental issues in sustainable development: natural resources management, population, food production, energy. International organizations and efforts. Standards and policies. Emerging technological applications and their impact. Resolution of environmental conflicts.

ES 301 Statistical Methods. 3 cr. Prerequisite: Math 208 or equivalent. Review of basic statistical concepts. Comparisons involving sample means. Regression and correlation analysis. Analysis of variance (ANOVA) and covariance (ANCOVA). Chi square and other nonparametric tests.

ES 305 Research Design. 3 cr. Prerequisite: ES 301. Principles of research design. Non-experimental observational studies. Survey research instrumentation and analysis.

¹ For course description, see next page.

Factorial design and analysis. Model testing and validation. Presentation of research results. Ethical issues in research.

- ES 310 Environmental Degradation and Remediation.** 3 cr. Prerequisites: ES 201, ES 202. Quality of air, water, and food: assessment, modeling, standards, and control strategies. Solid waste management. Hazardous waste management. Natural and man-made disasters and the environment.
- ES 311 Methods of Environmental Sampling and Analysis.** 3 cr. Prerequisites: Biol 201B, Chem 201B. Theory and practice of sampling techniques and instrumental methods used in environmental sciences and technology, with emphasis on the determination of pollution substances in water, air, and soil by modern analytical techniques. Adaptation of procedures to specific environmental matrices through case studies and practical application.
- ES 330 Natural Resources Management.** Prerequisites: ES 201, ES 202. 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.
- ES 350 Environmental Impact Assessment.** 3 cr. Prerequisites: ES 201, ES 202. 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.
- UP 641 Environmental Impact of Urban Growth.** 3 cr. Prerequisite: graduate standing. 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.

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:

FTN 261 or Biol. 220	Introductory Biochemistry	3cr.
FTN 221	Basic Nutrition	3cr.
Physiology 246	Physiology for Nursing Degree Students and Undergraduates	5cr.

The following courses are required core courses:

FTN 311	Advanced Nutrition: Macro Nutrients	3cr.
FTN 314	Advanced Nutrition: Mineral Elements	2cr.
FTN 315	Advanced Nutrition: Vitamins	3cr.
FTN 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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AUB Catalogue © American University of Beirut 1997

Editorial and DTP:	Alison Walley
Cover Design:	François Harik, GD '98 (Graphic Design Program)
Photographs:	Nabil Ismail
Campus Map:	John Walley

Designed by Francois Herik

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