



# **Faculty of Engineering and Architecture**

# Faculty of Engineering and Architecture (FEA)

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## Historical Background

As early as 1913 the University recognized the need for engineering education and training in the Middle 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, to conform to sound developments in engineering and architecture education, and to meet the evolving needs of the region. In 1986 a new undergraduate major in computer and communications engineering was added within the Department of Electrical and Computer Engineering. In 1992 a new major in graphic design was added within the Department of Architecture and Design. In 2006 the name of the Electrical Engineering degree was changed to Electrical and Computer Engineering.

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 as follows: In 1990, the degree of Master of Engineering Management; between 1991 to 1993, four programs leading to the degree of

Master of Engineering, with majors in computer and communications engineering; electric power engineering; electronics, devices and systems, and environmental and water resources engineering; in 1994, the degree of Master of Mechanical Engineering (major, applied energy, or materials and manufacturing, or thermal and fluid sciences). In 1998 two additional programs were added, the degree of Master of Urban Design and the degree of Master of Urban Planning.

In 2006 PhD programs were approved in three departments of FEA: Civil Engineering (PhD in Civil Engineering and in Environmental and Water Resources Management), Electrical and Computer Engineering (PhD in Electrical and Computer Engineering), Mechanical Engineering (PhD in Mechanical Engineering).

## Mission

The Faculty of Engineering and Architecture (FEA) at the American University of Beirut is a leading professional school in the Middle East. The FEA offers educational programs of the highest standards, promotes research and creative scholarly activities of its faculty and students, and provides services to the community at large, while addressing the needs of Lebanon and the region. The FEA undergoes continuous improvement to maintain a challenging and intellectually stimulating environment, and prepares its students to be life-long learners, innovators, and professionals capable of being leaders in their chosen careers, committed to personal integrity and civic responsibility.

## Vision

The Faculty of Engineering and Architecture is a world-class professional school that attracts eminently qualified faculty of international caliber and outstanding students. The FEA contributes to the development of Lebanon and the region by providing undergraduate and graduate education of the highest quality, promoting strong research programs, and rendering expert services to the community.

## Undergraduate Programs

The Faculty of Engineering and Architecture offers programs of study leading to the degree of Bachelor of Architecture (BArch), Bachelor of Fine Arts in Graphic Design (BFA), and the degree of Bachelor of Engineering (BE), with majors in civil engineering, computer and communications engineering, electrical and computer engineering, and mechanical engineering. The curriculum of the BArch degree extends over 14 terms (ten 16-week semesters and four eight-week summer terms), totaling 192 weeks. Although the program is completed in five calendar years, it is equivalent to a program of six academic years that does not include summers. The curriculum of the BE degree and that of the BFA degree is each divided into 11 terms (eight 16-week semesters and three eight-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. 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 changes in the curriculum, course content, and regulations as it deems appropriate, and without prior notice.

## Admission to First Year

Admission is by selection of the most promising, eligible applicants. All candidates for admission to the Faculty of Engineering and Architecture must have completed the pre-professional educational requirements of the candidate's country and the approved freshman program in the Faculty of Arts and Sciences of this University described in this catalogue, or a program recognized as equivalent. The certificates recognized for admission to the first year in the Faculty of Engineering and Architecture are listed under Secondary Certificates in the section on Admissions in this catalogue. Holders of the technical baccalaureate (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

- demonstrate an acceptable level of proficiency in English, as specified under Admissions in this catalogue
- sit for the required SAT I tests as specified in the relevant section, Admissions, in this catalogue
- satisfy the Faculty of Engineering and Architecture requirements on character recommendation 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 of Transfer Students

Students attending recognized institutions of higher learning, including AUB, may apply for transfer to any of the engineering, architecture, or graphic design majors in the FEA. These students are eligible for consideration for admission to any of Terms I through VI (Term VIII for architecture) depending on availability of places and subject to the following conditions:

- Have completed the equivalent of the sophomore class at the college or university from which they are transferring
- Have attained a minimum cumulative average of 2.7 out of 4.0 (75 out of 100 for AUB students)
- Have taken at least 12 credits of math and basic science courses at the sophomore level or higher and attained a total average in these courses of at least 3.0 out of 4.0 (77 out of 100 for AUB students) (for engineering and architecture majors only). Students applying for transfer to architecture or graphic design majors are recommended to submit portfolios of their work.
- Have satisfied the university admissions English requirements

Applications of transfer students are evaluated and approved by the departments and the Admissions Committee of the faculty. The term in which the student is placed, and the complete program of study in the major in which s/he is admitted, are determined by the department concerned depending on the number of credits completed at the institution from which the student is transferring.

## Special Students Not Working for a Degree

Refer to p.41 in this catalogue.

## Residence Requirements

Students of the Faculty of Engineering and Architecture must meet the following minimum residence requirements:

- Engineering or Graphic Design Majors: A student must register in residence at the Faculty of Engineering and Architecture for the last four regular semesters and should complete at least 50 credits during this period.
- Architecture Major: A student must register in residence at the Faculty of Engineering and Architecture for the last five regular semesters and should complete at least 65 credits during this period.

## Humanities/Social Sciences Distribution Requirements

Students in the engineering majors are expected to satisfy the following distribution requirements of humanities/social sciences courses:

- Two English courses, one of them English 206 - (6 credits)
- One Arabic course as determined by the Arabic Placement Test - (3 credits). Students who are exempt from Arabic should normally replace this requirement by taking ARAB 200, 203, or any other 3-credit course in humanities.
- One course on ethics - (3 credits)
- Three humanities courses - (9 credits)
- Two social sciences courses - (6 credits)

FEA students are allowed to select humanities/social sciences elective courses from the following list, subject to confirmation by the department offering the course:

### Humanities

- ARAB: 229 through 241; 243 through 247; 249
- AROL: 201 through 231; 235; 236
- CVSP: 201 through 208; 230; 250; 251

FAAH: 218,219,221\*,222\*,223\*,224\*; 225A; 225B, 225C; 226A; 226B,226C; 227A; 227B; 227C; 228A; 228B; 228C; 229A; 229B; 229C; 235; and 238

FAAH/MUSIC 240; 241; 245, 247; 248; 260; and 261  
FAAH/THEATER 265; and 270

- ENGL: 210 through 215; 219; 221 through 226; 229; 240 through 243
- HIST: All 200 level courses up to 274
- PHIL: 201; 206; 209; 210; 213 through 219; 221 through 224; 230 through 232; 249

Engineering students are also allowed to select humanities elective courses from the following:

- ARCH: 020 through 029; 121\*; 122\*; 223\*; 224\*; 325
- GRDS: 325

\* The following courses are equivalent and credits can be given to either of them: FAAH 221 and ARCH 121; FAAH 222 and ARCH 122; FAAH 223 and ARCH 223; FAAH 224 and ARCH 224.

**Social Sciences**

- ECON: All 200 level courses (excluding ECON 203 and 213)
- EDUC: 211; 212; 213; 215; 216; 218; 221; 222; 223; 225; 226
- PSPA: All 200 level courses up to 278
- SOAN: All 200 level courses up to 242 (sociology-anthropology)
- PSYC: All 200 level courses up to 251 (psychology)

**Graduation Requirements**

To be eligible for graduation with the bachelor's degree, a student must have

- satisfied promotion requirements throughout the program
- passed all the required courses and approved experience
- attained a minimum cumulative course average of 70
- attained a cumulative average of 70 or more in major courses as specified by the department
- met the residence requirements
- satisfied the faculty as to the adequacy of the student's professional development and conduct

**Academic Rules and Regulations**

For information on Categories of Students, Correct Use of Language, Grading System, Graduation with Distinction and High Distinction, and Placement on the Dean's Honor List, see pp.51–65 in this catalogue.

**Class Status**

The class status of students is as follows:

First Year	Terms I and II
Second Year	Terms III, IV, and V
Third Year	Terms VI, VII, and VIII
Fourth Year	Terms IX, X, and XI
Fifth Year (architecture)	Terms XII, XIII, and XIV

A student's status is changed to that of a higher year if his/her cumulative number of failed, withdrawn, or unregistered credits from the regular credit hour requirements does not exceed seven.

**Change of Major within the Faculty**

All changes of major are subject to approval by the department to which the change is requested. The receiving departments determine new study plans for students accepted to a new major.

## Minor in Information Technology

The Minor in Information Technology is open to all AUB students, except students majoring in Computer and Communications Engineering, Electrical and Computer Engineering, or Computer Science. Students may apply by completing a minor application form available from the ECE Department. The minor will be indicated on the transcript of the student who completes all the requirements, and who obtains an average in the minor courses of 70 or more.

The IT minor program consists of six courses: Three core courses and three electives.

### Core Courses

ITEC 240, ITEC 241, ITEC 242

### Elective Courses

EECE 230, EECE 321, EECE 330, EECE 430, EECE 431, EECE 432, EECE 433, EECE 450

## Minor in Biomedical Engineering

The Minor in Biomedical Engineering is open to all AUB students. Students who have completed at least 60 credits at the sophomore level and higher, and who have a cumulative average of 70 or more, may apply by completing a minor application form available from the ECE Department. The minor will be indicated on the transcript of the student who completes all the requirements described below, and who obtains an average in the minor courses of 70 or more.

The minor requirements are divided into a set of core courses, and a set of elective courses.

### For Engineering students, the requirements are as follows:

- EECE 401 [1 cr.]
- BIOL 201 [4 cr.]
- BIOL 202 or PHYL 246 [4 cr.]
- One core course [3 cr.] chosen from EECE 601, EECE 603, or MECH 633
- One elective course from List A below [3 cr.]
- One elective course from Lists A, B, or C below [3 cr.]

Minimum number of credits: 18

### For Biology students, the requirements are as follows:

- EECE 401 [1 cr.]
- BIOL 201 [4 cr.]
- BIOL 202 [4 cr.]
- (EECE 210 [3 cr.] (or equivalent) and EECE 601 [3 cr.]  
or (CIVE 210 [3 cr.] (or equivalent) and MECH 634 [3 cr.]
- One elective course from lists A or B below [3 cr.]

Minimum number of credits: 18

### For other students, the requirements are as follows:

- EECE 401 [1 cr.]
- BIOL 201 [4 cr.]
- BIOL 202 or PHYL 246 [4 cr.]
- (EECE 210 [3 cr.] (or equivalent) and EECE 601 [3 cr.]  
or (CIVE 210 [3 cr.] (or equivalent) and MECH 634 [3 cr.]
- One elective course from lists A, B, or C below [3 cr.]

Minimum number of credits: 18

**Elective Courses**

List A: EECE 601, EECE 602, EECE 603 (unless the student takes EECE 694, in which case either EECE 694 or 603 counts toward the minor), EECE 604, EECE 605, MECH 633, MECH 634

List B: MECH 624, MECH 631, MECH 532, MECH 640, MECH 606, MECH 607, MECH 641/EECE 661, EECE 693, EECE 694 (unless the student takes EECE 603, in which case either 694 or 603 counts toward the minor)

List C: BIOL 202, BIOL 223, BIOL 225, BIOL 244, BIOL 263, BIOL 268, PHYL 202, PHYL 246

## Minor in Engineering Management

The Engineering Management Program offers a minor in engineering management that can be pursued by undergraduate engineering and architecture students, as well as by students from related majors, starting as early as the fall semester of their third year of enrollment. To satisfy the requirements of the minor, a student must earn 18 credits of course work from the engineering management course offerings.

- At least nine of the total requirement of 18 credits must be fulfilled from the six undergraduate courses offered by the program, which must include ENMG 400—Engineering Economy.
- The other nine credits can be satisfied by taking courses either from the list of undergraduate courses, or from the elective graduate courses that are unrestricted to undergraduate student registration.

A minimum grade of 70 is required for a course to count toward the fulfillment of a minor in engineering management.

## Graduate Programs

### Master's Degree

The Faculty of Engineering and Architecture offers graduate programs of study leading to the degree of Master of Engineering (ME), with majors in civil engineering; computer and communications engineering; environmental and water resources engineering; electrical and computer engineering; and mechanical engineering. It also offers the degrees of Master of Engineering Management (MEM), Master of Urban Design (MUD), Master of Urban Planning (MUP), and Master of Science in Environmental Technology.

The requirements for the master's degrees in the faculty are those specified for the master's degree in the section on Graduate Studies in this catalogue, with the following interpretations and additions:

### Deadlines

Early applications received by the Office of Admissions prior to the deadlines stated below (and indicated on the application form) are reviewed, and the departments and the graduate studies committee render decisions normally within six weeks. Potential students are given one month to decide on accepting admissions and assistantships or they may lose the latter.

- Applications for admission to graduate study should be received by the following dates of every year for early consideration:

summer or fall admission	April 30
spring admission	November 1

- Applications are considered complete upon receipt of at least two letters of recommendation from professors or supervisors of the applicants, and an official transcript covering at least the end of the first semester of the senior year or its equivalent. In addition, applicants to the Electrical and Computer Engineering graduate program are required to sit for the GRE General Test.
- All applications may include an application for graduate assistantships if desired. All applications for graduate assistantships received at a later date (rolling basis) will be considered, pending availability.

## Process of Admission

- The Office of Admissions forwards applications for graduate admission to the dean's office. The dean's office in turn forwards the applications to the departments. The graduate faculty adviser, the departmental representative on the graduate studies committee, and the chairperson consider each case individually.
- Recommendations for admission and the departmental acceptance letters are forwarded to the graduate studies committee from the dean's office.
- The faculty graduate studies committee meets in 'special sessions for admission' and recommends to the dean's office cases to be admitted.
- The dean's office forwards the admission list and the departmental acceptance letters to the university Office of Admissions upon their receipt from the graduate studies committee.
- The Office of Admissions prepares and sends the admission packages.
- Potential students are given one month from the notification date to confirm acceptance of admissions and assistantships or they lose the latter.

## Criteria for Admission to Master's Programs

Admission to graduate study offered by departments of FEA is merit-based and limited to applicants who hold a bachelor's degree from AUB or from an approved institution in an appropriate field as specified by the department and whose undergraduate or graduate study is, in the opinion of the graduate studies committee and the department in which the applicant proposes to study, of sufficient quality and scope to indicate high promise of success in graduate studies in FEA. Admission to graduate study is in one of three categories. The minimum admission standards in all categories are described below. Additional requirements specific to each graduate program within FEA are included in the departmental listings.

## **Admission as a Regular Student**

An applicant is admitted as a regular student if s/he meets the following minimum admission requirements: An average of 80 for the last two years at AUB or the equivalent at other universities as determined by the faculty, adequate English proficiency as established by the University (see p. 622 of the Graduate Studies section), and at least two letters of recommendation from faculty or supervisors familiar with the academic ability of the applicant. An applicant whose last semester's grades are not included in the application is admitted provided that s/he has maintained an average of 80 for the last two years. The average in all three categories is to be calculated based on all required courses (including elective and cultural courses) taken during the last two years of the student's undergraduate studies. If the number of credits taken during the last two years is fewer than 60, previous terms will be considered until this number is at least 60.

## **Admission on Probation**

An applicant is admitted on probation if s/he meets the following minimum admission requirements: An average for the last two years of 75 at AUB or the equivalent at other universities as determined by the faculty, adequate English proficiency as established by the University (see p. 622 of the Graduate Studies section), and at least two letters of recommendation from faculty familiar with the academic ability of the applicant. A student whose last semester's grades are not included in the application is admitted on probation provided that s/he has maintained an average of 75 for the last two years of undergraduate study. In addition, an applicant who does not meet the above minimum requirements but appears to have reasonable potential for success as a graduate student, as manifested by appropriate practical experience or a high score on a relevant standardized exam such as the GRE, may be admitted on probation. A student admitted on probation has to complete nine credits of graduate level courses during the first two semesters of graduate studies, has to pass all courses, and has to attain a minimum cumulative average of 80 to receive regular student status. If the student fails to meet any of these conditions, s/he will be dropped from the program.

## Admission as a Prospective Master's Student

This category is reserved for students applying to graduate study in a field other than that of their undergraduate major. An applicant is admitted as a prospective graduate student if s/he meets the following minimum admission requirements: An average of 75 for the last two years at AUB or the equivalent at other universities, as determined by the faculty, in their undergraduate study; demonstrated competence in courses related to the field being sought; adequate English proficiency as established by the University (see p. 622 of the Graduate Studies section), and at least two letters of recommendation from faculty members familiar with the academic ability of the applicant. The graduate studies 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 graduate studies committee the supplementary undergraduate courses the applicant must take before consideration for admission to graduate work. Upon the completion of the supplementary undergraduate courses with an average of at least 80, the department or the academic unit may recommend to the graduate studies committee the admission of the applicant to the graduate program. The supplementary courses must be completed within four consecutive semesters, excluding summers.

## Academic Evaluation

- A student admitted on probation must complete nine credits of graduate level courses during the first two semesters of graduate studies, must pass all courses, and must attain a minimum cumulative average of 80 to receive regular student status. If the student fails to meet any of these conditions, s/he will be dropped from the program.
- A student is placed on probation if s/he attains a cumulative average of 70 or more, but less than 80. This probation is 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.
- A student is dropped from the graduate program if s/he 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.)
- A student is dropped from the graduate program if s/he attains a cumulative average of less than 70 or fails two courses in one term.
- A student who accumulates two consecutive failures in the seminar course will be dropped from the faculty.
- A student dropped from a graduate program will not be allowed to re-enroll in the same program at any future date.

## Regulations for Master's Students Taking Undergraduate Courses

- Master's students required to take undergraduate courses must obtain a grade of at least 70 in each undergraduate course taken.
- 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.
- Failure to meet the requirements stipulated above will result in the student being dropped from the graduate program.

## English Requirements

- Applicants to the graduate program, other than AUB graduates, must sit for the English Entrance Examination (EEE) or TOEFL.
- Applicants must score a minimum of 500 on the EEE, or 575 on the TOEFL, in order to be admitted to a graduate program. Those scoring 550 on the EEE, or 600 on the TOEFL, will be admitted without any additional English requirements, while those scoring in the range of 500–549 on the EEE, or 575–599 on the TOEFL, must take the English Placement Test. Applicants placed in ENGL 102 will lose their acceptance. Applicants placed in ENGL 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

- satisfied promotion requirements throughout the program
- completed the credit hours of course work required by the program
- passed the comprehensive examination
- completed thesis or project requirements, as appropriate
- met the residence requirements specified for the master's degree in the section on Graduate Studies in this catalogue

## Comprehensive Examination

The comprehensive examination should be taken as soon as the student completes most of the course requirements and not later than the second week of the term in which the student is expected to graduate. A student who does not pass the comprehensive examination may take it a second time after a period of at least three months.

## **Curricula and Courses**

The curricula and courses offered in each department are presented in detail below. All courses offered by a department have the initials of that department or program as prefixes to the course number.

In all engineering departments the first digit of the three-digit number indicates the year (2 for the first year, 3 for the second year, 4 for the third year, and 5 for the fourth year); the second digit indicates the sequence, and the third digit indicates the course in the sequence.

## **Courses Open to Students from Other Faculties**

Students of other faculties are allowed to take for credit any course offered by the faculty, provided space is available, prerequisites are satisfied, and the student has prior approval of their faculty and the department offering the course.

## **Doctor of Philosophy (PhD) Programs**

The Faculty of Engineering and Architecture offers graduate programs of study leading to the PhD degree with specializations in civil engineering, electrical and computer engineering, environmental and water resources engineering, and mechanical engineering.

Offering Phd programs is contingent on their final approval by New York State Education Department.

## **Criteria for Admission to PhD Programs**

Candidates for a doctoral degree program are expected to have an outstanding academic record. Specific requirements for each program are on the faculty webpage.

Qualified PhD students with outstanding records will have their tuition fees fully covered by AUB, and will be entitled to a substantial stipend.