

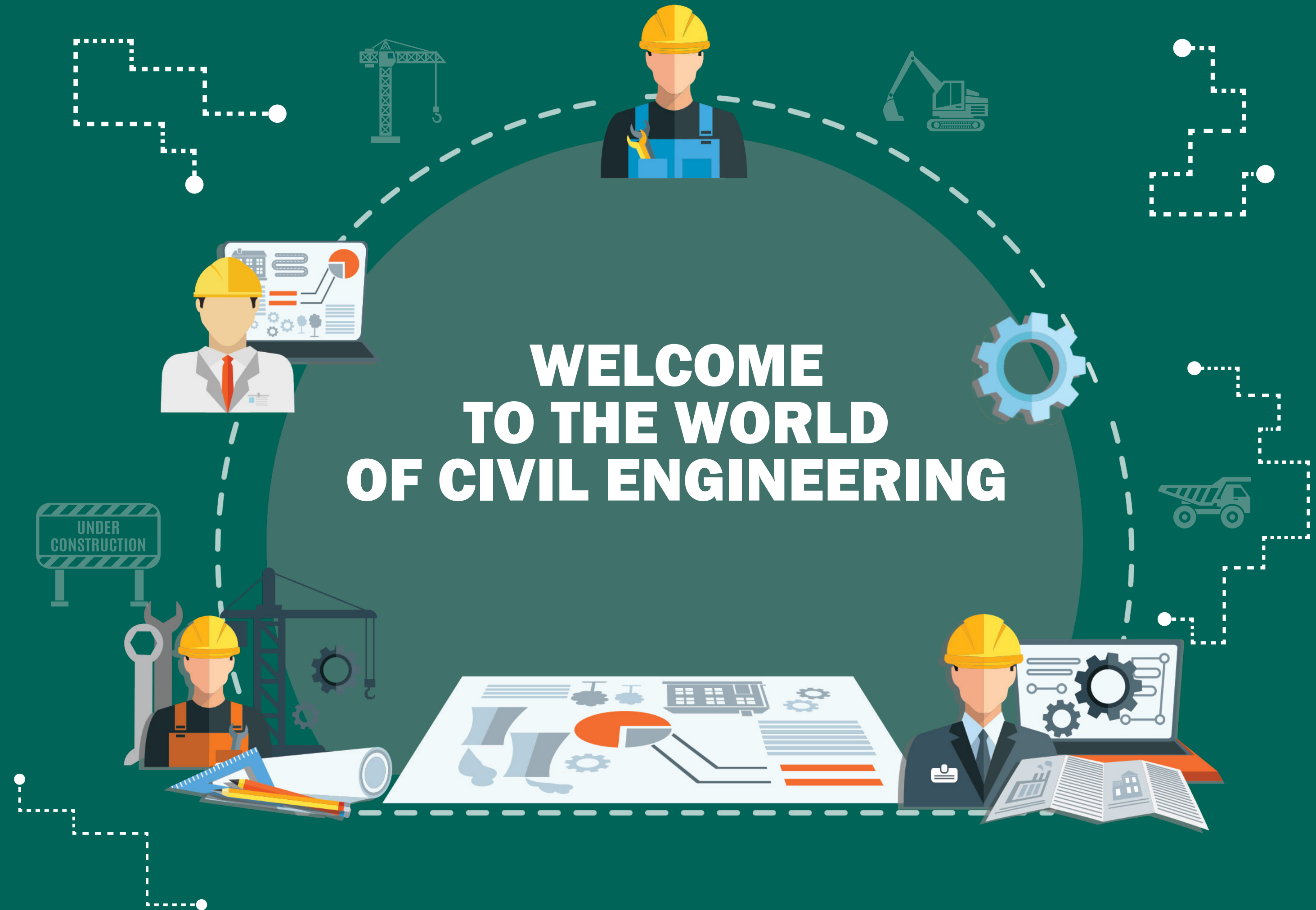
DEPARTMENT OF CIVIL ENGINEERING

STUDENT
MANUAL

20
21



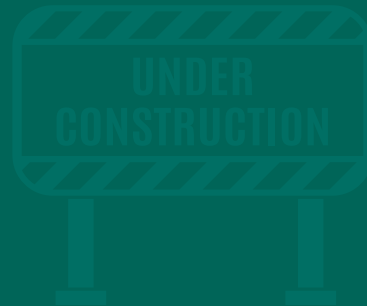
WELCOME TO THE WORLD OF CIVIL ENGINEERING





DEPARTMENT OF CIVIL ENGINEERING

- 02 Degrees and Minors Offered
- 02 Faculty and Staff
- 03 Lab Facilities
- 05 Bachelor of Engineering in Civil Engineering
- 11 Minor in Construction Management
- 12 Minor in Environmental Science
- 14 Master of Science in Civil & Environmental Engineering
- 18 Civil Engineering Program Flowchart



Degrees and Minors Offered

- Bachelor of Engineering (B.E.) in Civil Engineering
- Master of Science (M.S.) in Civil and Environmental Engineering
- Minor in Construction Management
- Minor in Environmental Science
- Minor in Climate Change and Sustainability Policy

Faculty and Staff

Civil Engineering Main Office



Dr. Caesar Abi Shdid
Chairperson
Office: Bassil 309
Extension: 2811
caesar.abishdid@lau.edu.lb



Ms. Stephany El Bitar
Senior Academic Assistant
Office: Bassil 309
Extension: 2483
stephany.elbitar@lau.edu.lb

Full-Time Faculty



Dr. Grace Abou Jaoude
Geotechnical Engineering
Office: Bassil 304
Extension: 2283
grace.aboujaoude@lau.edu.lb



Dr. Camille Issa
Structural Engineering
Office: Bassil 306
Extension: 2283
cissa@lau.edu.lb



Dr. Rita Awwad
Construction Engineering
Office: Bassil 302
Extension: 2437
rita.awwad@lau.edu.lb



Dr. Gebran Karam
Materials Engineering
Office: Bassil 305
Extension: 2368
gkaram@lau.edu.lb



Dr. Gabriel M. Bazi
Materials Engineering
Office: Bassil 203
Extension: 2851
gabrie.bazi@lau.edu.lb



Dr. John El-Khoury
Transportation Engineering
Office: Bassil 303
Extension: 2170
john.khoury@lau.edu.lb



Dr. Jean Chalita
Water Resources Engineering
Office: Bassil 308
Extension: 2373
jchalita@lau.edu.lb



Dr. Mazen Tabbara
Structural Engineering
Office: Bassil 307
Extension: 2376
mtabbara@lau.edu.lb



Dr. Moustapha Harb
Environmental Engineering
Office: Bassil 202
Extension: 3914
moustapha.harb@lau.edu.lb



Dr. Mahmoud Wazne
Environmental Engineering
Office: Bassil 301
Extension: 2518
mahmoud.wazne@lau.edu.lb



Contact Information

Byblos

Phone number: Extension 2483
Address: Bassil Hall, Office 309
Web: <http://soe.lau.edu.lb/ce/>
Email: cie_department@lau.edu.lb

Beirut

Phone number: Extension 1532
Address: Orme Gray Hall, Office 305
Web: <http://soe.lau.edu.lb/ce/>

Full-Time Staff



Mr. Hanna Boustany
Academic Computer Center Supervisor
Office: ELRC 2002
Extension: 2768
hanna.boustany@lau.edu.lb



Ms. Stephany El Bitar
Senior Academic Assistant
Office: Bassil 309
Extension: 2483
stephany.elbitar@lau.edu.lb



Ms. Salwa Najjar
Lead Engineering Lab Supervisor
Office: ELRC 2002
Extension: 2734
salwa.najjar@lau.edu.lb



Mr. Georges Shakour
Lead Engineering Lab Supervisor
Office: ELRC 2002
Extension: 2111
georges.chaccour@lau.edu.lb

Lab Facilities

Room	Laboratory Name
ELRC 2103	Stress Laboratory
ELRC 2104	Structural Engineering Laboratory
ELRC 2105	Construction Material Laboratory
ELRC 2106	Geotechnical Laboratory
ELRC 2201	Pavement Laboratory
ELRC 2204	Concrete Mixing Room
ELRC 2205	Environmental Laboratory
ELRC 2206	Fluids Laboratory
ELRC 2208	Computer Laboratory
ELRC 2209	Computer Laboratory
ELRC 2211	Transportation and Surveying Laboratory
ELRC 3102	Computer Laboratory
ELRC 3103	Computer Laboratory

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING



Overview

The Bachelor of Engineering degree program in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET (www.abet.org). ABET is the global accreditor of college and university programs in applied science, computing, engineering, and engineering technology.

ABET accreditation assures that programs meet standards to produce graduates ready to enter critical technical fields that are leading the way in innovation and emerging technologies, and anticipating, the welfare and safety needs of the public.

The Department of Civil Engineering is committed to providing students with a solid theoretical background, training in the latest design methods and proficiency in technological applications allowing graduates to pursue varied careers in design, construction, management and research.

The Department of Civil Engineering currently offers courses in five emphasis areas:

- Construction Engineering and Management
- Environmental and Water Resources Engineering
- Geotechnical Engineering
- Structural Engineering
- Transportation Engineering

Mission

The mission of the B.E. in Civil Engineering at LAU is to provide students with a quality and challenging education, through innovative teaching, professional practice and community service, enabling the students to enrich their lives and make valuable contributions to their communities.

The program aims to prepare graduates to be technically competent, talented, creative, and ethically responsible engineers who are effective professionals in today's work environment and are kept abreast of the latest technical software.

Program Educational Objectives

Within a few years of graduation, graduates of the B.E. in Civil Engineering will:

1. achieve success in their chosen career path, be it professional practice or graduate studies,
2. adapt to meet the changing requirements of the job market, and
3. be responsible citizen engineers.



Student Outcomes

Upon completion of the B. E. in Civil Engineering, students will acquire the following skills, knowledge and behaviors:

- (1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- (2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- (3) an ability to communicate effectively with a range of audiences
- (4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of solutions in global, economic, environmental, and societal contexts
- (5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- (6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- (7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Admission Requirements

Candidates for admission may apply to either of the two campuses (Beirut or Byblos) by sending an application to the campus they choose to join. Applicants may apply to LAU as regular or special, sophomore or transfer students. Applications are accepted within the set deadlines and students may join at the start of any semester (fall, spring or summer).

Application forms are available at the Admissions Offices or on the LAU website (www.lau.edu.lb under the "Admissions Office" link), or can be mailed to applicants upon request. Applicants will be evaluated by the School of Engineering Admissions Council and final acceptance will be based on each applicant's qualifications and the availability of places.

Graduation Requirements

A total of 150 credits are required for graduation, including the following:

- Fourteen courses with a separate industry standard software laboratory or physical laboratory sessions
- Six Technical Elective Track courses for emphasis depending on student's interests and current market needs
- An eight-week professional employment internship, and
- A minimum residency of four years, including three summer terms.

These courses are grouped into:

- Mathematics and Science Core Courses (18 credits)
- Civil Engineering Required Courses (83 credits)
- Other Engineering Required Courses (10 credits)
- Engineering Elective Signature Courses (3 credits)
- CIE Technical Elective Courses (18 credits)
- LAC Requirements (18 credits)

LAC Core Courses (6 credits)

- ENG202 Advanced Academic English (3 cr.)
- COM203 Fundamentals of Oral Communication (3 cr.)

LAC Elective Courses (12 credits)

- One course in social sciences (3 cr.)
- One course in philosophy, religion, or history (3 cr.)
- One course in literature (3 cr.)
- One course in arts (3 cr.)

Mathematics and Science Core Courses (18 credits)

- CHM205 Chemical Principles (3 cr.)
- MTH201 Calculus III (3 cr.)
- MTH206 Calculus IV (3 cr.)
- MTH304 Differential Equations (3 cr.)
- GNE331 Probability and Statistics (3 cr.)
- BIO200 Basic Biology (3 cr.)¹
- ¹ or BIO203 Introduction to Ecology (3 cr.)

Other Engineering

Required Courses (10 credits)

- COE201 Computer Proficiency (1 cr.)
- MEE211 Engineering Graphics (1 cr.)
- MEE392 Machine Shop (1 cr.)
- GNE301 Professional Communication (2 cr.)
- INE320 Engineering Economy (3 cr.)
- GNE303 Professional Ethics (2 cr.)

Engineering Elective

Signature Course (3 credits)

- GNE335 Introduction to Sustainable Engineering (3 cr.)
- GNE340 Engineering Entrepreneurship (3 cr.)
- GNE345 Civic Engagement (3 cr.)

Civil Engineering

Required Courses (83 credits)

- CIE200 Statics (3 cr.)
- CIE202 Mechanics of Materials (3 cr.)
- CIE212 Civil Engineering Programming (3 cr.)
- CIE302 Structural Analysis I (3 cr.)
- CIE303 Structural Analysis I-SOFT (1 cr.)
- CIE304 Stress Analysis (3 cr.)
- CIE305 Stress Analysis - LAB (1 cr.)
- CIE306 Concrete Structures (3 cr.)
- CIE307 Concrete Structures - SOFT (1 cr.)
- CIE308 Construction Materials (3 cr.)
- CIE309 Construction Materials - LAB (1 cr.)
- CIE320 Fluid Mechanics (3 cr.)
- CIE321 Fluid Mechanics - LAB (1 cr.)
- CIE322 Hydraulics 3) 3 cr.)

- CIE323 Hydraulics - SOFT (1 cr.)
- CIE361 Surveying (2 cr.)
- CIE362 Surveying Lab (1 cr.)
- CIE400 Steel Structures (3 cr.)
- CIE424 Water Distribution & Treatment (3 cr.)
- CIE425 Environmental Engineering - LAB (1 cr.)
- CIE426 Wastewater Collection & Treatment (3 cr.)
- CIE427 Environmental Engineering - SOFT (1 cr.)
- CIE434 The Civil Engineering Profession (2 cr.)
- CIE436 Detailing for Civil Engineers (2 cr.)
- CIE444 Soil Mechanics (3 cr.)
- CIE445 Soil Mechanics - LAB (1 cr.)
- CIE446 Foundation Engineering (3 cr.)
- CIE447 Geotechnical Engineering - SOFT (1 cr.)
- CIE460 Highway Engineering (3 cr.)
- CIE461 Transportation Engineering - SOFT (1 cr.)
- CIE465 Transportation Systems Engineering (3 cr.)
- CIE466 Traffic Simulation – SOFT (1 cr.)
- CIE480 Civil Engagement Management Fundamental (3 cr.)
- CIE485 Construction Planning & Scheduling (3 cr.)
- CIE486 Construction Planning & Scheduling - SOFT (1 cr.)
- CIE498 Professional Experience - Civil (6 cr.)
- CIE499 Capstone Design Project (3 cr.)

CIE Technical Elective Courses (18 credits)

A minimum of three courses have to be selected in one of the emphasis areas below

Construction Engineering & Management

- CIE 511 Pavement Design (3 cr.)
- CIE 583 Sustainable Construction (3 cr.)
- CIE 584 Quality Management Systems (3 cr.)
- CIE 585 Risk and Natural Hazard Management (3 cr.)
- CIE 586 Construction Decision Under Uncertainty (3 cr.)
- CIE 587 Construction Cost Engineering (3 cr.)
- CIE 588 Construction Estimating I (3 cr.)
- CIE 589 Construction Methods & Equipment (3 cr.)
- CIE 590 GIS and Remote Sensing (3 cr.)
- CIE 593 Construction Safety (3 cr.)

Environmental & Water Resources

- CIE 502 Design of Hydraulics Structures (3 cr.)
- CIE 520 Solid Waste Management (3 cr.)
- CIE 521 Hydrology (3 cr.)
- CIE 522 Environmental Impact Assessment (3 cr.)
- CIE 523 Water Resources Planning and Management (3 cr.)
- CIE 524 Air Quality Management (3 cr.)
- CIE 525 Environmental Policy & Management (3 cr.)
- CIE 526 Environmental Remediation (3 cr.)
- CIE 527 Environmental Microbiology (3 cr.)
- CIE 529 Hydrogeology (3 cr.)
- CIE 530 Irrigation and Drainage (3 cr.)
- CIE 533 Groundwater Engineering (3 cr.)
- CIE 534 Computational Hydraulics (3 cr.)
- CIE 535 Groundwater Hydrology and Pollution (3 cr.)

Geotechnical Engineering

- CIE 504 Case Histories in Structural and Geotechnical Engineering (3 cr.)
- CIE 510 Finite Element Method (3 cr.)
- CIE 511 Pavement Design (3 cr.)
- CIE 540 Advanced Geotechnical Engineering (3 cr.)
- CIE 544 Geotechnical Aspects of Earthquake Engineering (3 cr.)
- CIE 725 Geo-Environmental Engineering
- CIE 529 Hydrogeology (3 cr.)
- CIE 533 Groundwater Engineering (3 cr.)
- CIE 585 Risk and Natural Hazard Management (3 cr.)
- CIE 590 GIS and Remote Sensing (3 cr.)

Structural Engineering

- CIE 501 Prestressed Concrete Design (3 cr.)
- CIE 502 Design of Hydraulics Structures (3 cr.)
- CIE 504 Case Histories in Structural and Geotechnical Engineering (3 cr.)
- CIE 506 Structural Dynamics (3 cr.)
- CIE 507 Seismic Design of Structures (3 cr.)
- CIE 508 Applied Elasticity (3 cr.)
- CIE 509 Concrete Foundation Structures (3 cr.)
- CIE 510 Finite Element Method (3 cr.)
- CIE 512 Concrete Building Structures (3 cr.)
- CIE 513 Reinforced Masonry Design (3 cr.)
- CIE 516 Advanced Steel: Design & Behavior (3 cr.)
- CIE 518 Advanced Structural Analysis for Gravity and Lateral Loads (3 cr.)
- CIE 519 Advanced Reinforced Concrete Behavior (3 cr.)

Transportation Engineering

- CIE 511 Pavement Design
- CIE 521 Hydrology (3 cr.)
- CIE 561 Traffic Engineering (3 cr.)
- CIE 562 Airport Planning and Design (3 cr.)
- CIE 563 Transportation Planning & Land Use (3 cr.)
- CIE 564 Mass Transit Systems (3 cr.)
- CIE 566 Highway Design and Management (3 cr.)
- CIE 582 Infrastructure Management (3 cr.)

General Technical Electives

- CIE 596 Topics in Civil Engineering (3 cr.)
- CIE 598 Research Methods (3 cr.)
- CIE 599 Undergraduate Research (3 cr.)

Note that all technical electives require that the student has completed at least 120 credits in addition to their relevant prerequisites, and courses require a passing grade of D.

Sample Study Plan

Year One

Fall (16 credits)

- CHM205 Chemical Principles (3 cr.)
- CIE200 Statics (3 cr.)
- COE201 Computer Proficiency (1 cr.)
- MTH201 Calculus III (3 cr.)
- ENG202 Advanced Academic English (3 cr.)
- LAC Elective (3 cr.)

Spring (16 credits)

- MEE211 Engineering Graphics (1 cr.)
- CIE212 Computer Programming for Civil Engineers (3 cr.)
- CIE202 Mechanics of Materials (3 cr.)
- MTH206 Calculus IV (3 cr.)
- BIO200 Basic Biology (3 cr.)¹
- COM203 Fundamentals of Oral Communication (3 cr.)

¹or BIO203 Introduction to Ecology (3 cr.)

Summer (9 credits)

- MTH304 Differential Equations (3 cr.)
- LAC Elective (3 cr.)
- LAC Elective (3 cr.)

Year Two

Fall (15 credits)

- CIE308 Construction Materials (3 cr.)
- CIE309 Construction Materials - LAB (1 cr.)
- CIE302 Structural Analysis I (3 cr.)
- CIE303 Structural Analysis - SOFT (1 cr.)
- CIE320 Fluid Mechanics (3 cr.)
- CIE321 Fluid Mechanics - LAB (1 cr.)
- CIE361 Surveying (2 cr.)
- CIE362 Surveying Lab (1 cr.)

Spring (16 credits)

- CIE306 Concrete Structures (3 cr.)
- CIE307 Concrete Structures - SOFT (1 cr.)
- CIE322 Hydraulics (3 cr.)
- CIE323 Hydraulics - SOFT (1 cr.)
- CIE304 Stress Analysis (3 cr.)
- CIE305 Stress Analysis - LAB (1 cr.)
- CIE460 Highway Engineering (3 cr.)
- CIE461 Transportation Engineering - SOFT (1 cr.)

Summer (9 credits)

- GNE331 Probability & Statistics (3 cr.)
- GNE301 Professional Communication (2 cr.)
- INE320 Engineering Economy I (3 cr.)
- MEE392 Machine Shop (1 cr.)

Year Three

Fall (17 credits)

- CIE424 Water Distribution & Treatment (3 cr.)
- CIE425 Environmental Engineering - LAB (1 cr.)
- CIE444 Soil Mechanics (3 cr.)
- CIE445 Soil Mechanics - LAB (1 cr.)
- CIE465 Transportation Systems Engineering (3 cr.)
- CIE466 Traffic Simulation – SOFT (1 cr.)
- CIE480 Civil Engineering Management Fundamentals (3 cr.)
- GNE303 Engineering Ethics (2 cr.)

Spring (15 credits)

- CIE400 Steel Structures (3 cr.)
- CIE426 Wastewater Collection & Treatment (3 cr.)
- CIE427 Environmental Engineering - SOFT (1 cr.)
- CIE446 Foundation Engineering (3 cr.)
- CIE447 Geotechnical Engineering - SOFT (1 cr.)
- CIE485 Construction Planning & Scheduling (3 cr.)
- CIE486 Construction Planning & Scheduling - SOFT (1 cr.)

Summer (6 credits)

- CIE498 Professional Experience - Civil (6 cr.)

Year Four

Fall (16 credits)

- CIE434 The Civil Engineering Profession (2 cr.)
- CIE436 Detailing for Civil Engineers (2 cr.)
- CIEXXx Technical Elective (3 cr.)
- CIExxx Technical Elective (3 cr.)
- CIExxx Technical Elective (3 cr.)
- GNE3xxEngineering Signature Elective (3 cr.)

Spring (15 credits)

- CIE499 Capstone Design Project (3 cr.)
- CIExxx Technical Elective (3 cr.)
- CIExxx Technical Elective (3 cr.)
- CIExxx Technical Elective (3 cr.)
- LAC Elective (3 cr.)



Extracurricular Activities

- Civil Engineering students are regularly offered corporate sponsorship and internships abroad. A minimum number of students are sponsored yearly by the Dubai Contracting Company to participate in an intensive internship program in Dubai.
- The department also offers opportunities for excelling students to receive merit scholarships dedicated from generous donors. Under partnership agreements, some students are offered training experience, as well as best Achievement Awards, best Final Year Project Awards, and the best Term Paper Award. Students also regularly participate in sponsored field trips.
- The American Society of Civil Engineers Club at LAU stays abreast of the issues facing civil engineers and the civil engineering profession. The club also organizes trips to experience real life projects as well as seminars with professional speakers to discuss future opportunities for civil engineers in Lebanon, the Gulf region, and worldwide.



MINOR IN CONSTRUCTION MANAGEMENT

Overview

The minor in Construction Management (CM) is an interdisciplinary program that provides students with the fundamental knowledge and skills needed to pursue a career in the construction industry. Students in this minor take courses that emphasize theories and applications of planning, managing, directing, organizing, and controlling construction operations. The CM Minor is a natural extension for students majoring in Architecture, Business, Civil / Mechanical / Electrical Engineering, and similar fields. This minor will assist students in developing a competitive edge in the job market. The CM minor also provides students in the School of Arts and Sciences with a unique opportunity to add a professional focus to their degrees.

Program Objectives

A graduate with a minor in construction management shall be able to:

1. Successfully apply business and management skills in positions within the construction industry.
2. Manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.
3. Apply professional and ethical standards of behavior in dealing with stakeholders in the construction process.

Student Outcomes

To prepare students for all phases of planning, operation, and management of a construction project including:

1. Conduct accurate quantity surveys and prepare accurate cost estimates;
2. Prepare detailed and reliable project schedule; and
3. Manage contract execution including: cost control and safety management.

Curriculum

For a Minor in Construction Management, a student must complete a minimum of 19 credits, distributed as follows:

- Core Courses (10 credits)
- Elective Courses (9 credits)

Graduation and Course Requirements

Students must complete 19 credits: 10 core credits and 9 elective credits. Only ten transfer credits can be used toward a minor in the Department of Civil Engineering, and they must be equivalent to courses in the minor. Transfer courses are subject to review by the minor coordinator and subject matter expert. Prerequisite substitutions for non-civil engineering students are subject to review and approval by the Minor Coordinator.

Minor requirements

Core Courses (10 credits)

- CIE480 Civil Engineering Management Fundamentals (3 cr.)¹
- CIE485 Construction Planning & Scheduling (3 cr.)
- CIE486 Construction Planning & Scheduling – SOFT (1 cr.)
- CIE587 Construction Cost Engineering (3 cr.)²

¹ Industrial and Mechanical Engineering students may replace CIE480 with INE428.

² Non-Engineering students may replace CIE587 with ACC203 Financial Accounting.

Elective Courses (9 credits)

Other courses may be counted as elective courses upon the approval of the program coordinator.

- ACC204 Managerial Accounting (3 cr.)
- CIE308 Construction Materials (3 cr.)
- CIE582 Infrastructure Management (3 cr.)
- CIE583 Sustainable Construction (3 cr.)
- CIE585 Risk & Natural Hazard Management (3 cr.)
- CIE586 Construction Decisions under Uncertainty (3 cr.)³
- CIE 588 Construction Estimating I (3 cr.)
- CIE589 Construction Methods & Equipment (3 cr.)
- CIE593 Construction Safety (3 cr.)
- INE320 Engineering Economy (3 cr.)⁴

³ Industrial and Mechanical Engineering students may replace CIE586 with INE506.

⁴ Non-Engineering students may replace INE320 with FIN301 Managerial Finance.

Note that only ten transfer credits, equivalent to courses in the minor, may be used toward a Minor in the Department of Civil Engineering. Transfer courses are subject to review by the program coordinator and subject matter expert. Prerequisite substitutions for non-civil engineering students are subject to review and approval by the minor coordinator.



MINOR IN ENVIRONMENTAL SCIENCE

Overview

The Minor in Environmental Science is an interdisciplinary program administered jointly by the Department of Civil Engineering and the Department of Natural Sciences. The purpose of the program is to provide students with a broad conceptual framework for understanding environmental issues, from a global perspective.

Mission

The Minor in Environmental Science aims at providing a quality education to students interested in enriching their knowledge of existing global environmental issues and problems. It exposes them to important issues related to environmental problems and their causes. Concepts in environmental ethics, management and policies concerning the preservation of the environment are also provided. Additionally, the program covers topics related to the study of natural and non-natural chemical and microbiological substances in the environment and their transformations, and discusses methods of remediation to most environmental pollution issues.

Program Objectives

The Minor in Environmental Science aims at providing students with:

1. an understanding of the social, economic, political and legal framework of environmental issues,
2. sufficient background to be able to collect, analyze and formulate possible solutions to environmental problems,
3. an understanding of the intertwining effects and impacts of human activities on the world's vital natural resources, and
4. better job market opportunities.



Learning Outcomes

Upon completion of the Minor in Environmental Science, students will:

1. understand the underlying concepts and principles associated with environmental science,
2. identify sources of water, soil and air pollutants,
3. demonstrate familiarity with the practical/field dimensions of a range of environmental problems and issues,
4. understand the interrelationships between society, economy and environment,
5. critically review environmental impact assessment reports,
6. discuss remediation strategies of a variety of environmental contaminants, and recognize the potential harmful role of human beings in shaping the environment.

Curriculum

Students must complete a minimum of 18 credits, distributed as follows:

- Core Courses (9 cr.)
- Elective Courses (9 cr.)

Core Courses (9 credits)

- ENV200 Introduction to Environmental Science (3 cr.)
- ENV402/ CIE525 Environmental Policy & Management (3 cr.)
- ENV422/ CIE522 Environmental Impact Assessment (3 cr.)

Elective Courses (9 credits)

- BIO203 Introduction to Ecology (3 cr.)¹
- CHM340 Environmental Chemistry (3 cr.)
- CIE424 Water Distribution & Treatment (3 cr.)
- CIE426 Wastewater Collection & Treatment (3 cr.)
- CIE520 Solid Waste Management (3 cr.)
- CIE585 Risk & Natural Hazard Management (3 cr.)
- ENV423 / CIE527 Environmental Microbiology (3 cr.)
- ENV426/ CIE526 Environmental Remediation (3 cr.)
- ENV427 Environmental Physics (3 cr.)

¹ For Engineering students, this course may be replaced by ENV200.

For Biology students, this course may be substituted with BIO331 Ecology.

For Civil Engineering students, CIE courses are considered as CIE Technical Elective courses.

MASTER OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING

Overview

The M.S. in Civil and Environmental Engineering program imparts sound professional and academic training in civil engineering, giving students access to a variety of courses in their area of emphasis as well as the opportunity to conduct research, thus combining the theoretical and the applied aspects of civil engineering.

The program is designed to stimulate independent thinking and the acquisition of knowledge, as well as the application of acquired knowledge and skills to the solution of practical engineering problems. The program provides an in-depth experience within one or more particular fields of civil engineering, while exposing student to cross-disciplinary issues and topics that affect the engineering and management of systems.

The student completes the program with a thesis based on a research topic selected from one of the following emphasis areas:

1. Construction Engineering and Management
2. Environmental and Water Resources Engineering
3. Geotechnical Engineering
4. Structural Engineering
5. Transportation Engineering

Admission Requirements

Applicants for admissions to the program must hold a degree of Bachelor of Science in Engineering or Bachelor of Engineering, from a recognized university. A minimum cumulative Grade Point Average (GPA), on a 4.0 scale, of 2.75 and a minimum Major GPA of 2.75, or their equivalent, is required.

Bachelor of Science in Engineering holders, from a -120credit program, must complete an additional 12 credits of engineering courses prior to their enrollment in the Masters program. No credit toward the graduate degree is given for these courses.

Non-LAU applicants must submit, as part of their application package, the quantitative reasoning and analytical writing scores for the GRE general exam. GRE subject exams are not required for all applicants. GRE test scores must be recent, less than 5 years old.

Two letters of recommendation are required, with at least one letter completed by a full-time faculty who is familiar with the applicant's academic performance in coursework and research.

Mission

The mission of the graduate program in civil and environmental engineering at LAU is to provide students with a well-rounded set of career skills, empowering them to address a wide range of problems through exposure to an advanced body of knowledge and scholarly endeavors.

Program Objectives

The purpose of the graduate program in civil and environmental engineering is to:

1. train students to develop the methodology and necessary skills to explore emerging issues in engineering and science
2. provide students with an advanced background and a focused body of knowledge required for the present day professional practice in their chose field of study, and to prepare them to adapt to a changing profession
3. train the students in an active research environment, to equip them with the latest tools of research, and to prepare them for further study toward a doctoral degree

Learning Outcomes

Graduates of the M.S. in Civil & Environmental Engineering will be able to:

1. reinforce skills developed in the undergraduate program
2. use advanced analytical, computational, and/or experimental aspects of civil engineering
3. make critical judgments based on a sound knowledge base conduct research
4. and appreciate its importance in the evolution of civil engineering.

Curriculum

Graduation requires the completion of 30 credits, divided into 24 credits of coursework and a -6credit thesis. The coursework is distributed as follows:

- a minimum of -12credits of coursework in the emphasis area
- a maximum of -6credits of elective coursework from the list of graduate courses offered in Civil Engineering or in the School of Engineering
- a required -3credit course GNE 798 Research Methods for Engineers

Only one elective course can be selected from outside the School of Engineering based on the specific need for the student to take a course in a relevant field to the thesis work.

All courses in the student study plan must be selected in consultation with the student's advisor and approved by the Chairperson of the Department. Availability of courses in a specific emphasis area is contingent on adequate enrollment in that specific course/area.

Students must complete a minimum of one academic year of full-time graduate level study, or its equivalent in part-time study.

Transfer of Credits

Students with a Bachelor of Engineering may transfer up to 18 credits from their undergraduate program, provided that the transferred credits correspond to graduate courses in the M.S. in Civil & Environmental Engineering and the student has attained at least a grade of "B" in each of the courses to be transferred. Credits transfer is governed by the Academic Rules and Procedures for graduate programs.

List of Courses for each Emphasis Area

Construction Engineering & Management (12 credits)

Core Courses (6 credits)

- CIE 789 Cost Engineering & Control
- CIE 790 Construction Methods

Elective Courses (6 credits)

- CIE 766 Highway Design and Management
- CIE 780 Construction Decisions under Uncertainty
- CIE 781 Construction Estimating I
- CIE 782 Infrastructure Management
- CIE 783 Sustainable Construction
- CIE 784 Quality Management Systems
- CIE 793 Construction Safety

Environmental & Water Resources (12 credits)

Core Courses (6 credits)

- CIE 720 Solid Waste Management (3 cr.)
- CIE 721 Hydrology (3 cr.)

Elective Courses (6 credits)

- CIE 712 Design of Hydraulics Structures
- CIE 722 Environmental Impact Assessment
- CIE 723 Water Resources: Planning & Management
- CIE 724 Air Quality Management
- CIE 725 Geo-Environmental Engineering
- CIE 727 Environmental Microbiology
- CIE 728 Fate & Transport of Pollutants in the Environment
- CIE 729 Hydrogeology
- CIE 730 Irrigation & Drainage
- CIE 731 Urban Water Resources
- CIE 732 Advanced Environmental Engineering
- CIE 733 Groundwater Engineering
- CIE 734 Computational Hydraulics

Geotechnical Engineering (12 credits)

Core Courses (6 credits)

- CIE 740 Advanced Geotechnical Engineering
- CIE 744 Geotechnical Aspects of Earthquake Engineering

Elective Courses (-6credits)

- CIE 701 Finite Element Methods
- CIE 704 Case Histories in Structural & Geotechnical Engineering
- CIE 711 Pavement Design
- CIE 725 Geo-Environmental Engineering
- CIE 729 Hydrogeology
- CIE 733 Groundwater Engineering
- CIE 785 Risk & Natural Hazard Management
- CIE 788 GIS & Remote Sensing

Structural Engineering (12 credits)

Core Courses (6 credits)

- CIE 701 Finite Element Methods
- CIE 702 Concrete Building Structures

Elective Courses (-6credits)

- CIE 704 Case Histories in Structural & Geotechnical Engineering
- CIE 706 Structural Dynamics
- CIE 707 Seismic Design of Structures
- CIE 708 Applied Elasticity
- CIE 709 Concrete Foundation Structures
- CIE 710 Pre-Stressed Concrete Design
- CIE 712 Design of Hydraulics Structures
- CIE 713 Reinforced Masonry Design
- CIE 714 Advanced Structural Analysis for Gravity & Lateral Loads
- CIE 716 Advanced Steel: Design & Behavior
- CIE 719 Advanced Reinforced Concrete Behavior

Transportation Engineering (12 credits)

Core Courses (6 credits) (two out of the three)

- CIE 711 Pavement Design
- CIE 763 Transportation Planning and Land Use
- CIE 764 Mass Transit Systems

Elective Courses (-6credits)

- CIE 711 Pavement Design
- CIE 721 Hydrology
- CIE 761 Traffic Engineering
- CIE 762 Airport Planning and Design
- CIE 763 Transportation Planning and Land Use
- CIE 764 Mass Transit Systems
- CIE 766 Highway Design and Management
- CIE 788 GIS & Remote Sensing

Other Courses

- GNE 798 Research Methods for Engineers
- CIE 796 Special Topics Course
- CIE 891 Project Course
- CIE 899 Thesis

Recommended Study Plan

First Year

Fall (9 credits)

- GNE 798 Research Methods for Engineers (3 cr.)
- CIE Emphasis Course (3 cr.)
- SoE/CIE Elective Course (3 cr.)

Spring (9 credits)

- CIE Emphasis Course (3 cr.)
- CIE Emphasis Course (3 cr.)
- SoE/CIE Elective Course (3 cr.)

Second Year

Fall (6 credits)

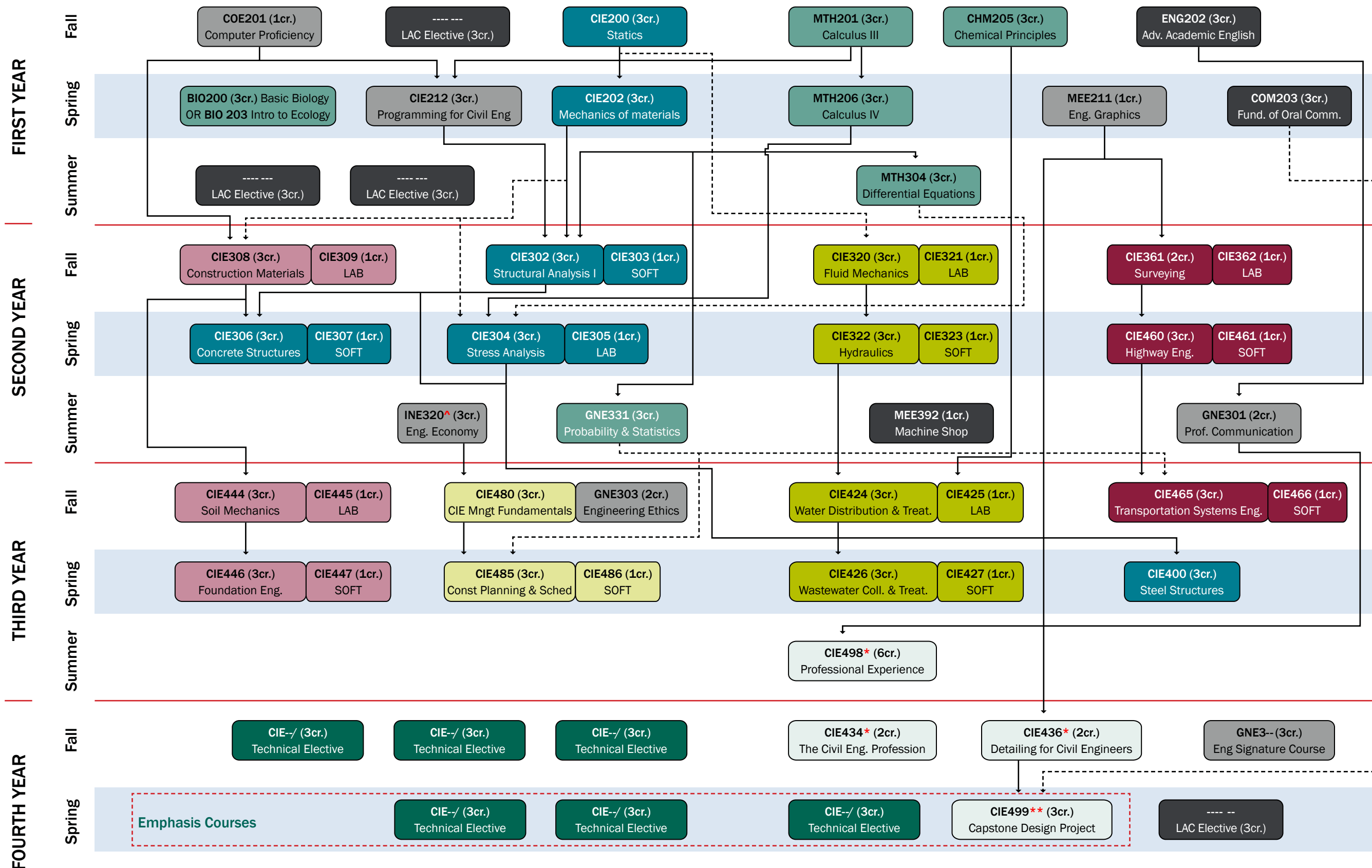
- CIE Emphasis Course (3 cr.)
- CIE Emphasis Elective Course/Elective Course Outside SoE (3 cr.)

Spring (6 credits)

- CIE 899 Thesis (6 cr.)



CIVIL ENGINEERING PROGRAM FLOWCHART



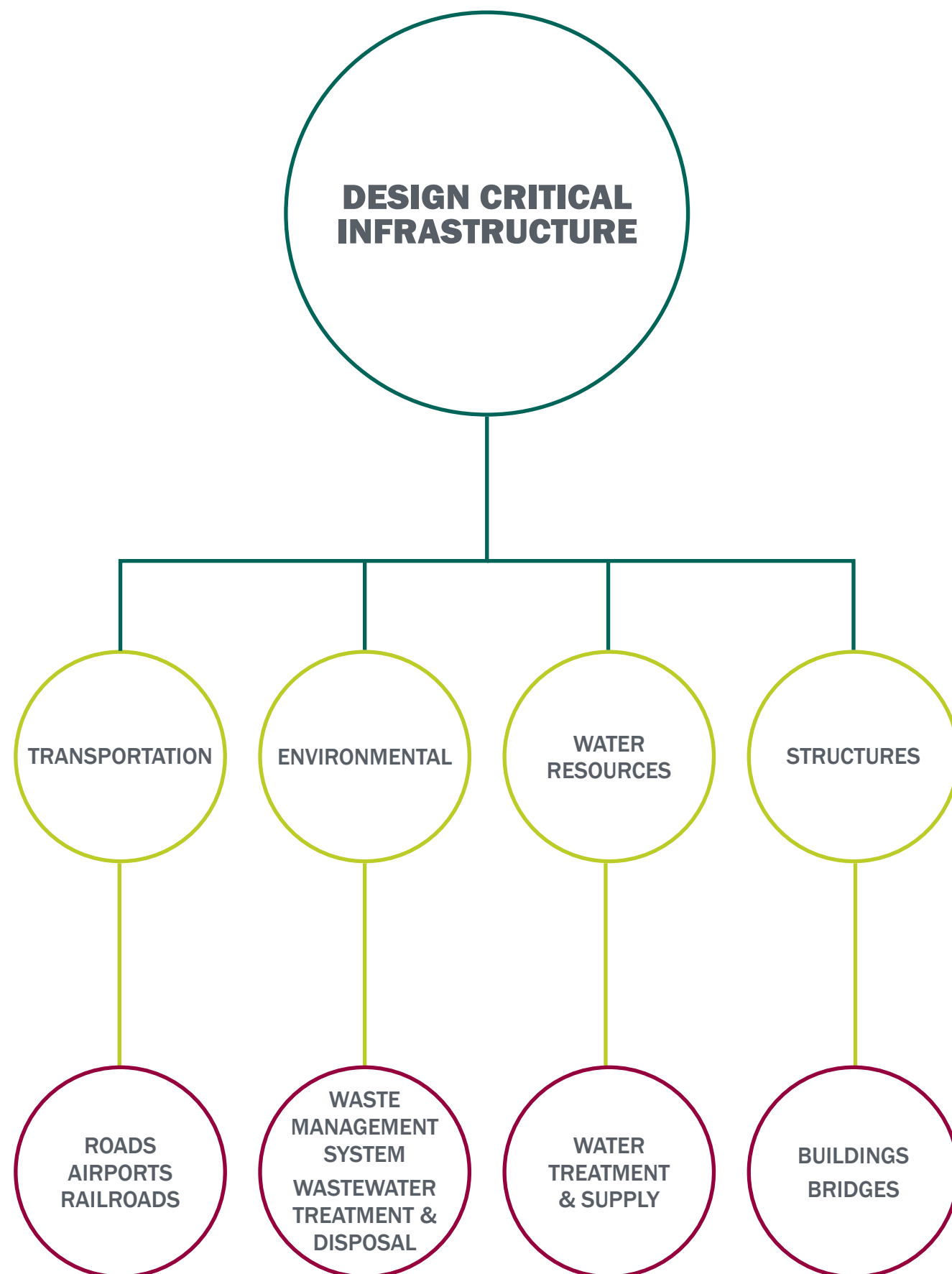
Collated blocks indicate co-requisite courses

Both arrows indicate a pre-requisite course

Effective Fall 2020

Elective courses: 120 credits + consent of instructor + pre-requisite if any (Check CIE Catalog)

*120 credits + consent of instructor, **150 credits + consent of instructor, ^90 credits



WHAT DO CIVIL ENGINEERS DO?



STRUCTURAL ENGINEERING



TRANSPORTATION ENGINEERING



GEOTECHNICAL & MATERIALS ENGINEERING



ENVIRONMENTAL ENGINEERING



WATER RESOURCES ENGINEERING



CONSTRUCTION ENGINEERING & MANAGEMENT



**EMBARK
EXPLORE
DISCOVER**



Lebamericanuni



LebaneseAmericanUniversity



LAU - Students



LebaneseAmericanUniv



Lebamuniv



Lebamuni



www.lau.edu.lb