2023 BYLAW BRIEF FOR INTERNATIONAL CREDIT HOURS PROGRAMS

2023-2024

Education & Student Affairs Sector

Faculty of Engineering – Ain Shams University

https://eng.asu.edu.eg/education/undergraduates/bylaws

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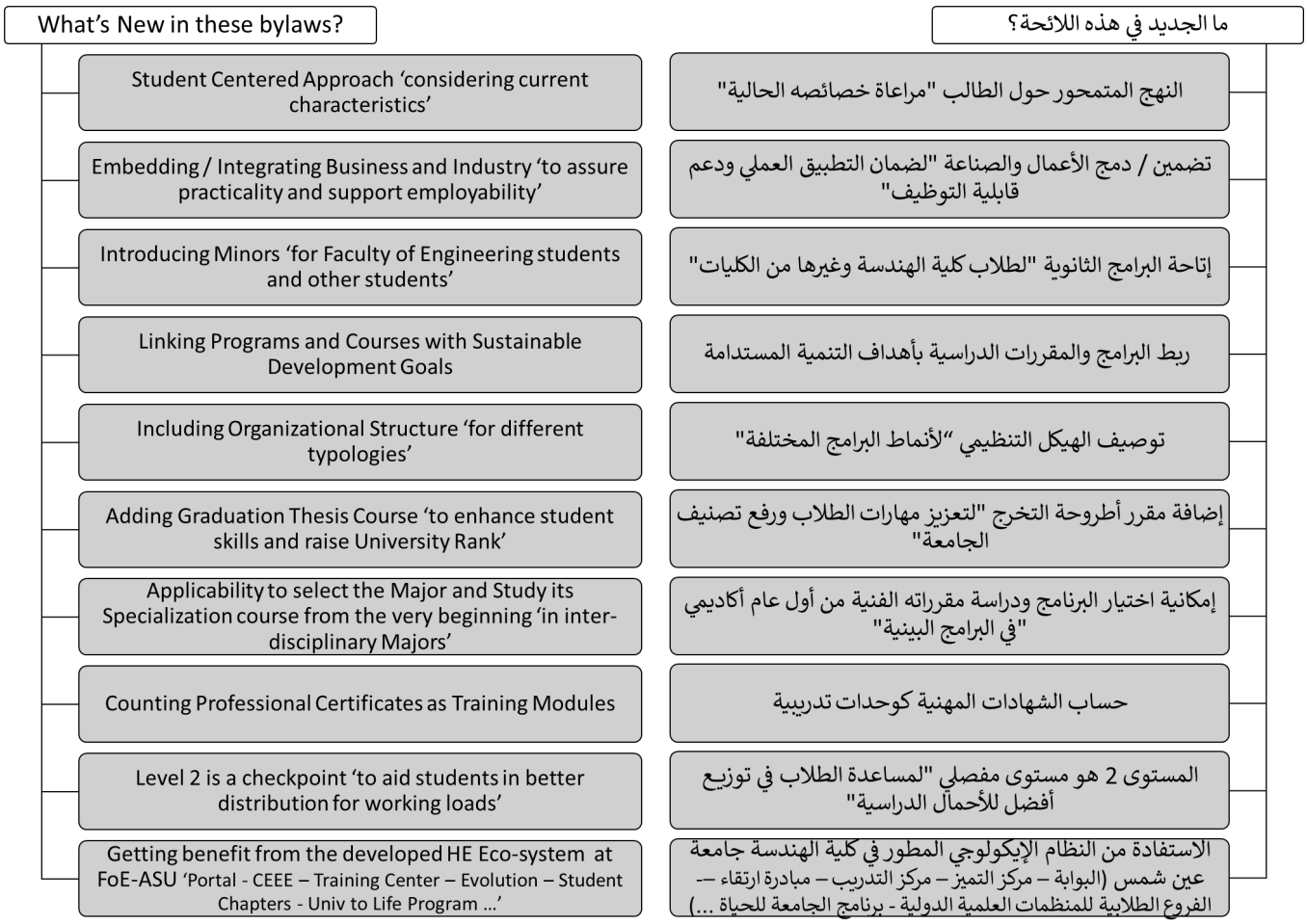
Introduction

No matter how prestigious your college is, it is ultimately the students who bring it to life. They inspire professors to excel in their teaching, drive organizational change, and represent their alma mater worldwide after graduation. Student satisfaction is closely tied to program quality, faculty teaching, campus facilities, student support, individual learning, and the overall university experience. It can be measured through academic experiences, support services, campus life, and faculty engagement. Ultimately, student satisfaction leads to student fulfillment, academic success, employability, loyalty, alumni contributions, and university reputation enhancement.

In this context, we are dealing with Generation Z, also known as "Zoomers," who have distinct characteristics that require a shift in educational approaches. Courses should be designed with backward design and learner-centered methodologies to meet their needs and adapt to changing expectations, diverse classrooms, and evolving job markets. Hence, the Faculty of Engineering at Ain Shams University, as dedicated educators, and human capital, has introduced a block-based academic system. This approach allows a single course to be taught using various pedagogical methods, ensuring student interactivity. It also promotes extracurricular activities and practical field training, bridging the gap between academics and the job market.



Article (1): Offered Programs

FoE - ASU offers variant typologies of Engineering Programs in the Credit-Hour system. Each program is administrated by a Program Executive Committee. The programs are divided according to their nature into 3 typologies: Specialized Majors, Inter-Disciplinary Majors, and Minors. They are carefully selected to satisfy the needs of the labour market in Egypt, as well as the needs of the regional labour market, which recruits many graduates from Egyptian Universities.

List of Undergraduate Major Programs offered by FoE - ASU

Engineering Major Programs	Specialized Majors	Mechanical Engineering	1	Design and Production Engineering Program
			2	Mechanical Power Engineering Program
			3	Automotive Engineering Program
			4	Mechatronics and Robotics Engineering Program
		Architectural Engineering	5	Architectural Engineering Program
		Electrical Engineering	6	Electrical Power and Machines Engineering Program
			7	Electronics and Communications Engineering Program
			8	Computer and Systems Engineering Program
		Civil Engineering	9	Structural Engineering Program
			10	Water Engineering and Hydraulic Structures Program
			11	Utilities and Infrastructure Program
	Inter-Disciplinary Majors	12	Materials Engineering Program	
		13	Manufacturing Engineering Program	
		14	Mechatronics Engineering and Automation Program	
		15	Landscape Architecture Program	
		16	Environmental Architecture and Urbanism Program	
		17	Housing Architecture and Urban Development Program	
		18	Communication Systems Engineering Program	
		19	Energy and Renewable Energy Engineering Program	
		20	Computer and Artificial Intelligence Engineering Program	
		21	Building Engineering Program	
		22	Civil Infrastructure Engineering Program	

List of Undergraduate Minors offered by FoE - ASU

Industrial and Engineering Management
Manufacturing
Manufacturing Management
Manufacturing Technologies
Biomedical Materials Engineering
Corrosion Engineering
Petrochemicals Engineering
Refrigeration and Air Conditioning
Future Energy Technologies
Autotronics
Mechatronics and Embedded System Engineering
Basic Architectural Design for Non-Architects
Specialized Environmental Architectural Design
Real Estate Management and Development
Smart Cities and Spatial Informatics
Urbanization and Development
Urban Studies
Fundamentals of Electrical Power Engineering
Electric Vehicles
Sustainable Energy
Digital Electronics
Photonics
Telecommunication Systems and Networks
Software Systems
Artificial Intelligence
Data Science
Computer Gaming
Structural Design Engineering
Construction Material Engineering for Non-Civil Engineers
Construction Management for Non-Civil Engineers
Construction Management Engineering for Civil Engineering
Construction Engineering for Non-Civil Engineers
Holistic Approach Design of Buildings
Bridge Engineering: Design and Construction
Highway Design and Construction
Sanitary and Environmental Engineering
Surveying
Transportation Engineering

Ain Shams University awards, based on the request of the Faculty Council of Engineering, the Bachelor of Science Degree in Engineering as follows:

1. **Bachelor of Science in Mechanical Engineering**
   - Design and Production Engineering Program
   - Mechanical Power Engineering Program
   - Automotive Engineering Program
   - Mechatronics and Robotics Engineering Program
   - Materials Engineering Program
   - Manufacturing Engineering Program
   - Mechatronics Engineering and Automation Program
2. **Bachelor of Science in Architectural Engineering**
   - Architectural Engineering Program
   - Landscape Architecture Program
   - Environmental Architecture and Urbanism Program
   - Housing Architecture and Urban Development Program
3. **Bachelor of Science in Electrical Engineering**
   - Electrical Power and Machines Engineering Program
   - Electronics and Electrical Communication Engineering Program
   - Computer and Systems Engineering Program
   - Communication Systems Engineering Program
   - Energy and Renewable Energy Engineering Program
   - Computer and Artificial Intelligence Engineering Program
4. **Bachelor of Science in Civil Engineering**
   - Structural Engineering Program
   - Water Engineering and Hydraulic Structures Program
   - Utilities and Infrastructure Program
   - Building Engineering Program
   - Civil Infrastructure Engineering Program

This awarded degree includes the Minors the student has obtained., and in case that the student is enrolled in another faculty in the university, the awarded degree includes what the student obtained from Engineering Minors.

Part III: Admission Regulations

Article (14): Enrolment Requirements and Scholarship System

- FoE - ASU is a faculty in a Public University. As stipulated in the Constitution, the university guarantees offering Specialized Majors for Free (Full scholarship). To enroll in any of these Specialized Majors and benefitting from this scholarship, the student – according to the general conditions stipulated in the executive regulations in Article (75) of the Universities Organizing Law -has to:
  1. meet the admission requirements determined by the Supreme Council of Universities.
  2. have a high school completion certificate (Mathematics section) or its equivalent.
  3. fulfill the internal rules approved by the Faculty Board regarding the admission of students to these programs.
- Interdisciplinary Majors and Minors have separate tuition fees approved by faculty board each year.
- Students who are not enrolled directly to the FoE-ASU, through the National Coordination Office, can enrol in the Inter-Disciplinary Majors, provided that they meet the requirements approved by the University Council within the framework of the Supreme Council of Universities regulating in this matter.
- Students who are enrolled directly FoE - ASU, through the National Coordination Office, can give up joining Specialized Majors and join the Inter-Disciplinary Majors paying the separate Tuition Fees.
- Students enrolled in any engineering faculties in other public universities can transfer to the FoE - ASU in accordance with the rules approved by University Council within the framework of the Supreme Council of Universities regulating in this matter.
- The Council of FoE - ASU can award extra scholarships (Faculty Scholarship) for students who have achieved a minimum GPA, or students with special financial challenges, according to the rules announced by the Faculty Council every year.
- In case that any of the top 30 students in the Egyptian General Secondary School (Mathematics section) enroll in any Inter-disciplinary Major, he will be treated as a full scholarship student, provided that he maintains GPA of no less than 3.3 in each main semester, otherwise the other rules will apply.
- If the student enrolled in any Inter-disciplinary Major registers courses equivalent to less than 12 credit hours in any main semester without an acceptable excuse, the student has to pay separate tuition fees for this semester decided by the Faculty Council at the year of this semester equivalent to the difference between what was registered and the minimum hours in Main semester (12 credit hours).
- Any credit hour that is registered in the summer semester has separate Tuition Fees decided by the Faculty Council at the year of registering the course.
- Students registered in any of the faculties of Ain Shams University can join one Minor or more. By any means, those enrolled in a faculty other than FoE – ASU are not awarded a Bachelor Degree from the FoE-ASU.
- Any student not enrolled to FoE - ASU can register any number of courses paying the Tuition Fees decided by the Faculty Council every year at the year of registering the course. This student is given a ttranscript of the courses he has registered in, showing his grades. By any means, he is not awarded a Bachelor Degree from the FoE-ASU.

Article (17): Enrolment to Programs

- The Faculty Council establishes general rules for admission to the programs considering the student preferences and the principle of equal opportunities as the basis for the admission of students to the offered programs, taking into consideration the available capacity.
- Free Education students who are enrolled in the Specialized Programs can transfer to the Inter-Disciplinary Programs provided that they achieve a minimum GPA of 3.85 without paying the extra fees associated with the Inter-Disciplinary Programs. They can keep this scholarship as long as they maintain the minimum GPA of 3.85.
- Considering Enrolment Requirements, students enrolled in the Inter-Disciplinary Majors can transfer to the Specialized Majors provided that they achieve a minimum GPA of 3.7. The Programs Administration Board can lower this limit based on the available capacity of the Specialized Majors.
- Student can register in one Minor or more after passing 80% of the hours of the first and second levels provided that he fulfils its (their) requirements, and in accordance with Faculty rules. As for university students from outside the Faculty, they can register in one or more Minor programs of the programs they are allowed to register in as described in Part VI and in accordance with Faculty rules.
- Students enrolled to the Inter-Disciplinary Majors enjoy the following advantages:
  - Program Selection on Admission to the Faculty without internal coordination.
  - The possibility of registering courses from the higher level without special conditions related to GPA or passing specific credit hours.
  - The possibility of registering courses outside the study plan.
  - The possibility of obtaining a Faculty Scholarship considering the rules announced by the Faculty council each year.
  - Guaranteed a maximum number of 80 students in the lecture rooms and 40 students in the tutorial classes.
  - The possibility of obtaining a double degree in partnership with a foreign university after applying the related announced rules.
- Students enrolled to the Minors enjoy the following advantages:
  - Obtaining a Minor in one of the engineering disciplines in addition to his major, which helps expand his perceptions, satisfy his desires, and improve his chances in the labor market.
  - Guaranteed a maximum number of 80 students in the lecture rooms and 40 students in the tutorial classes.

Article (19): Study Levels

- Whenever the student completes 25% of the Program requirements (36 Credit Hours), he will be transferred from one level to the next. The following Table shows the student status based on the completed number of achieved Credit Hours.

Study Levels and relation to the achieved Credit Hours.

Study Level	Student Status	Achieved Credit Hours
1	Freshman	0% to less than 25% CH
2	Sophomore	25% to less than 50% CH
3	Junior	50% to less than 75% CH
4	Senior	75% to less than 100% CH

Article (21): Program Study Duration

- The minimum allowed study duration is eight main semesters.

- The maximum allowed study duration is eight academic years, which does not include frozen semesters (suspension of registration - medical excuse - etc..) for reasons accepted by the Faculty of Engineering Council, after which the student is dismissed from the programs.
- In case that a student registers for a Minor, one academic year is added to the maximum allowed study duration specified in the previous point.
- The Faculty Council has the right to allow the student to register for an additional two consecutive main semesters in addition to summer semester, with condition that he passes at least 75% of the total credit hours of the program and of verifying the possibility of achieving graduation requirements. In case that the student is unable to fulfil the graduation requirements in this additional period, the student's position will be submitted to the University Council to take the appropriate decision with condition that he passes at least 85% of the total credit hours for the program.

Article (22): Terms of Course Registration

- The student may register courses in the main semesters with a maximum total Credit Hours according to the following rules (after approval of the Academic Advisor):
  - Up to 21 Credit Hours or 8 courses, whichever is greater for a student with a Cumulative GPA larger than or equal to 3.0
  - Up to 18 Credit Hours or 7 courses, whichever is greater for a student with a Cumulative GPA larger than or equal to 2.0, but less than 3.0
  - Up to 14 Credit Hours or 5 courses, whichever is greater for a student with a Cumulative GPA less than 2.0
- The student may register courses in the summer semester in a maximum total Credit Hours according to the following rules (after approval of the Academic Advisor):
  - Up to 9 Credit Hours or 3 courses, whichever is greater for a student with a Cumulative GPA larger than or equal to 3.0
  - Up to 8 Credit Hours or 2 courses, whichever is greater for a student with a Cumulative GPA less than 3.0
- A student may register one additional course beyond the limits mentioned above in after the approval of the academic advisor, if it will lead to his graduation at the end of this semester only if the course is offered in this semester. For the Inter-disciplinary Majors, the course will be available even if it is not offered in this semester.
- In case that the student registers for a Minor with the Major he is enrolled in, and there is one (or more) common course(s) between the two programs:
  - If the course is compulsory in the Major or was registered in the Major before registering in the Minor, the grade for this course is calculated in the cumulative GPA in the Major.
  - If the course is elective in both programs, taking into consideration the rules of registration and the scholarship system, the student has to determine the consideration of the course in any of the two programs, while selecting another elective course in the other program, at the beginning of the course registration semester. Otherwise, the grade for this course will be calculated in the cumulative GPA in the Major.
  - If the course is compulsory in the Minor and elective in the Major, taking into account the registration rules and the scholarship system, the grade for this course is calculated in the cumulative GPA in the Minor, the student has to choose another elective course in the Major.
  - In case that the grade of this course is counted while calculating the cumulative GPA in the Major, for the Minor, the student has to choose another course from the pool of courses if the course is elective, or the Executive Director of the Minor has to specify another course that helps the student to obtain the required competencies.
- Degree -either Major or Minor- and Non-Degree students can register courses as audit in some courses without calculating them in the GPA provided that there is a vacancy in these courses, and after paying the applicable

academic service fees approved by the Faculty council. Audit students are not eligible to enter the course final exam.

Article (23): Degree Awarding Requirements

- To obtain the Bachelor of Science Degree in Engineering, the student must successfully complete the required Credit Hours in one of the Majors according to the requirements stipulated in Part V, with a GPA at graduation of at least 2.0.
- The student must pass all zero-credit courses in his Program.
- The graduation project is an essential part of all the programs requirements for graduation. It is determined by the research plans of the academic departments related to the program, the student will not graduate unless he fulfils the project pass requirements. The student must pass at least 70% of the total credit hours of the program to register for the graduation project courses in Senior level.
- The student must perform Field Training in accordance with the rules stipulated in these bylaws.
- The student can study a number of courses in another University which has a cooperation agreement with Ain Shams University regarding the transfer of Credits. This requires prior approval from FoE - ASU. The Credit Hours of these courses are included in the student's graduation requirements, provided that the Credit Hours of these courses do not exceed 40% of total Credit Hours for the program.

Article (24): Field Training

- The student must perform Field Training for 8 weeks in an industrial or service facility related to the student's program and must be under the full supervision of the faculty. It is also possible to perform the training inside the faculty in a similar environment.
- The training follow-up will be handled by the academic advisor.
- Identifying a company official contact person.
- The student must submit a technical report to his academic advisor at the end of the training period.
- The training is divided into periods of 4 weeks at the end of the Sophomore and Junior levels. (Can be in the Senior level as well – open during the semester)
- Inter-disciplinary Majors students can start field training after passing a number of credit hours that are not less than 70% of the credit hours of the freshman level, provided that the period calculated for training does not exceed two weeks.
- By any means, training for a period 6 weeks at any level is allowed for only one time during the study duration.
- The field training is evaluated on pass / fail basis and does not count in the cumulative GPA calculation.
- The Inter-disciplinary Major student should pay the supervision fees for the field training at a rate of 2 Credit Hours each academic year during which the student is trained.
- The Faculty Council issues - based on the recommendation of the Education and Student Affairs Committee - a list of internationally recognized professional certificates (OSHA - NDT - LEED AP - IASP - IPMAC - CCNA ...etc) and the corresponding working load. In case that the student obtains one of these certificates, it will be calculated as a training program with the equivalent duration of the corresponding working load.

Article (25): Adding and Dropping a course

- The student may add courses in the first week of the main semesters, or the first three days of the summer semester.

- The student can drop courses with refundable fees, if applicable, until the end of the second week of the main semesters or the end of the first week of the summer semester.
- Adding or Dropping course(s) must not violate the minimum and maximum number of Credit Hours registered per semester.

Article (26): Withdrawal from a course

- The student may withdraw from any course within the first ten weeks of the main semesters or the first five weeks for the summer semester.
- The student does not fail the withdrawn course, provided that the withdrawal application and approval are finalized within the time limit mentioned in the previous point.
- The student gets a (W) grade in his academic record for the withdrawn course and is allowed to register that course (with full attendance and performing all activities including examinations) in a following semester.
- For Inter-disciplinary Major students, the tuition fees for this course will not be refunded for withdrawn courses. The next time the student registers this course, he will have to pay its fees in full. The student, who withdraws from a whole semester without registering any course must pay the minimum tuition fees which is equivalent to 12 CHs unless the withdrawal is with an acceptable excuse from the Education and Student Affairs Committee.

Article (27): Incomplete course

- If a student does not attend the final exam of the course in a semester with an excuse that is accepted by the Student Affairs Committee and approved by the Faculty Council of Engineering, the course is considered Incomplete.
- The student will temporarily get a grade (I) in the course until the exam is carried out in that course. If the student fails to attend the final exam at the next available date at the beginning of the next main semester, the student will get a grade (F) in that course. Grade (I) will not count in the student's cumulative GPA.

The student takes the exam at the beginning of the next main semester according to the detailed academic calendar approved by the Faculty Council and announced before the start of each academic year, after paying re-examination fees equivalent to one Credit Hour with the exception of students of specialized Majors in the main semesters. The marks of this final exam are added to the semester-work marks to calculate the overall grade of this course.

Article (28): Course Repeating

- The student can repeat a course for improvement if his grade satisfies the minimum passing requirement, according to the following rules:
  - The student gets the higher grade of the course after repeating. This grade is the one that will be accounted for in the cumulative GPA, on condition that the improvement should be shown in the student's transcript.
  - The maximum number of times that the student can repeat for repeating is five times during his study duration, except for improving courses with the purpose of getting out of the academic probation or satisfying the graduation requirements.
  - It is not allowed for student to improve if he completed the program's total study hours.
  - For the elective course, the student is allowed to change it in the following semesters. This is subject to the approval of the academic advisor and the requirements of his program.
  - In case that the student fails in the repetition, the previous grade for the course is cancelled and is not counted after that, the student is considered to have failed and gets an F grade.
  - The student should pay the full credit hours fees for the improving course.
- If the student fails a course (gets F grade), he should repeat the course (full attendance and performing all activities), according to the following rules:

- The maximum grade of the repeated course is B+.
- The student gets the grade of the course after repeating. This grade is the one that will be accounted for in the cumulative GPA, on condition that the repeating should be shown in the student's transcript.
- The student should pay the full credit hours fees for the repeated course, with the exception of students of specialized Majors at a maximum of one time for each course within the study plan.

- If a student repeats a course, he is required to repeat all course assessment criteria and will be completely re-evaluated. The course grade is calculated from scratch.

Article (29): Enrolment Suspension

The Faculty Council may suspend a student's enrolment for four consecutive or separate main semesters during study duration in the faculty if he presents an excuse that prevents him from attending regularly in studies, which has been investigated by the Education and Student Affairs Committee. In case of necessity, the University Council may increase the period of suspension of enrolment.

Article (30): Student Evaluation

- The marks of each course are distributed as percentages of the total mark, divided into Course Activities, Mid-Term Assessment, Technical Assessment, and Final Assessment.
- With considering Article (18), the student must attend at least 75% of tutorial and laboratory hours for the course, otherwise he is considered failed, in this case he is not allowed to attend the technical assessment or final assessment of the course (if any).
- The Faculty Council may, based on the study of the Executive Committee of the program and after taking the opinion of the relevant department council and according to the nature of the courses, decide to decide to hold the exam in all or part of the course in a way that allows it to be corrected electronically. This will be presented to the University's Education and Student Affairs Council for approval and submitted to the Supreme Council for approval.
- For the student to pass a course, the minimum mark that must be earned in the final assessment is 40% of the total final assessment marks, otherwise the student will fail the course irrespective of the total marks he earned in the course and he will get an F grade in this course.
- The student fails the course if he obtains an F grade (less than 60% of the course marks) or was not allowed to attend the final assessment because of exceeding the absence percentage or cheating … etc. or did not attend the final assessment without submitting a prior excuse that is accepted by the Education and Student Affairs Committee and approved by the Faculty Council of Engineering.
- Zero-Credit courses are marked as Pass or Fail. The student gets a grade but does not contribute to the cumulative GPA. To pass the course, the student should get at least 60% of the course total marks.

Article (32): Study Dismissal and Academic Warning

- A student gets an academic warning if his Cumulative GPA at any main semester is less than 2.0.
- If the student's cumulative GPA exceeds 2.0 in any semester, then the number of consecutive academic warnings is reset.
- The student will be dismissed from FoE - ASU study if he does not register in any courses for more than two main semesters during his study period without an excuse acceptable to the college.
- The student will be dismissed from FoE - ASU study if he obtains a GPA of less than 1.0 in the first three consecutive main semesters.

- For first-level students in specialized programs, the student will be dismissed from FoE - ASU study if he obtains a GPA of less than 2.0 in four consecutive main semesters.
- As long as it does not contradict what was stipulated in the previous point, a student will be dismissed from FoE - ASU if he gets Semester GPA less than 2.0 in six consecutive semesters excluding Summer Semesters.
- The student will be dismissed from FoE - ASU if he fails to achieve the graduation requirements during the maximum study duration, or the rules stipulated in Article (21) of these bylaws do not apply to him.
- The student who is exposed to study dismissal due to his inability to raise his GPA to at least 2.0 will be offered an additional and final chance to register in 2 consecutive main semesters and a summer semester to raise his GPA to at least 2.0 and achieves the graduation requirements, provided that he has successfully completed at least 75% of the total number of credit hours required for graduation and there is a chance for the student to raise his GPA to at least 2.0.

Article (34): Declaration of Honour

For a student to achieve the declaration of honour, he / she has to fulfil the following conditions:

- Maintain a cumulative GPA of 3.3 throughout his study at the Program and any semester GPA should be higher than or equal 3.3.
- Does not fail any course throughout his study at the Program.
- Did not get any penalty throughout his study at the Faculty.

Article (35): Minimum Number of Students for Course Opening (Elective courses or Courses out of program's study plan)

- The minimum number of students required to open a course out of program's study plan is 10 students, or 75% of the number of students registered in this program level, whichever is less.
- The minimum number of students required to open an elective course is 5 students or 25% of the number of students in this program level, whichever is less.
- Course opening in these cases is subject to the availability of teaching staff and the proper allocation of resources.

University Requirements

In Egypt, the university is considered a core of Human Thinking at its highest level, and the source of investment and development of human resources. It is responsible for the progress of the Arabian Civilization, sustaining the Historical Heritage of the Egyptian Society, and conserving its traditions. It is also concerned with the education of Religion, Morals and Nationalism (Egyptian National Law for Universities, Law 49 for Year 1972). Therefore, Ain Shams University graduate should be:

1. Aware of national, regional and international contemporary issues, to have an intellectual and enlightened personality and to interact effectively in the community through different communication skills.

To achieve this goal, Ain Shams University has designed a number of courses planned to build the student personality, develop his skills, and increase his awareness of different topics. These courses are called University Requirements. The Faculty of Engineering Ain Shams University has selected some of these courses to be offered within the Engineering Programs. These courses are:

List of University requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ASU041	Technical English Language*	0	4	100	2	2	0	4
ASUx11	Societal Issues**	0	2	50	2	0	0	2
ASUx31	Graduation Thesis	2	3	75	2	0	0	2
-	ASU Elective (1)	2	3	75	2	0	0	2
-	ASU Elective (2)	2	3	75	2	0	0	2
-	ASU Elective (3)	2	3	75	2	0	0	2
-	ASU Elective (4)	3	4	100	3	0	0	3
Total		11	18	450	13	0	0	13
Pool of ASU Elective (1), ASU Elective (2), ASU Elective (3) Courses								
ASUx12	Selected Topics in Contemporary Issues	2	3	75	2	0	0	2
ASUx13	Climate Change, Energy and Water Issues***	2	3	75	2	1	0	2
ASUx21	History of Civilizations	2	3	75	2	0	0	2
ASUx22	Literature and Arts	2	3	75	2	0	0	2
ASUx23	Music Appreciation	2	3	75	2	0	0	2
ASUx24	Egyptian Identity and Other Cultures	2	3	75	2	0	0	2
ASUx32	Critical Thinking***	2	3	75	2	1	0	2
ASUx42	Innovation and Entrepreneurship***	2	3	75	2	1	0	2
ASUx43	Introduction to Marketing***	2	3	75	2	1	0	2
ASUx44	Introduction to Accounting***	2	3	75	2	1	0	2
ASUx45	Business Administration	2	4	100	2	0	0	2
ASUx46	Legislations and Professional Ethics***	2	3	75	2	1	0	2
ASUx47	Professional Ethics	2	3	75	2	0	0	2
ASUx48	Scientific Research***	2	3	75	2	1	0	2
MDP112	Principles of Computer Graphical Representation	2	3	75	1	2	1	4
ARC131	History of Arts and Architecture	2	3	75	1	2	0	3
ARC142	Fundamentals of Computer Graphics	2	3	75	1	2	1	4
UPL121	Community Participation in Development	2	3	75	1	2	1	4
Pool of ASU Elective (4) Courses								
ASUx41	Report Writing and Communication Skills	3	4	100	2	2	0	4
CSE141	Introduction to Computer Programming	3	4	100	2	1	2	5

* A placement test in Technical English Language will be conducted for some admitted students to the Faculty of Engineering according to regulations announced by the Faculty Council. If the student passes this test, then he will be exempted from taking the Technical English Language Course. The Technical English Language course is a pre-requisite for all Faculty requirements courses.

** Based on the rules of the university, the student has to pass this course in any main semester before the graduation.

*** Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Faculty Requirements

All Majors offered at FoE - ASU are Engineering Programs. The graduates have the privilege of being Engineers and are automatically enrolled in the Egyptian Engineering Syndicate (EES). The graduates are also entitled to take the Fundamentals of Engineering Exam offered by the National Council of Examiners for Engineering and Surveying (NCEES), based on the agreement between EES and NCEES.

According to the National Academic Reference Standards (NARS-2018), The Engineering Graduate must be able to (A-Level):

2. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
3. Develop and conduct appropriate experimentation and/or simulation, analyse and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
4. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.
5. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
6. Practice research techniques and methods of investigation as an inherent part of learning.
7. Plan, supervise and monitor implementation of engineering projects.
8. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.
9. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
10. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
11. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

In addition, ASU – FoE Graduate must be able to:

12. Adapt and/or mitigate with changing circumstances and environments that are related to engineering issues.
13. Relate engineering issues to Sustainable Development Goals and deal with ecosystems related to them on the local or global level.

To achieve these Competencies, a set of courses must be completed as a Faculty Requirement. These courses are divided into Basic Science Courses and Basic Engineering Courses.

List of Faculty requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
PHM011	Basic Mathematics*	0	4	100	2	2	0	4
ENG2xx	Field Training	0	8	200	0	8	12	20
PHM111	Mathematics (1)	3	5	125	2	2	0	4
PHM112	Mathematics (2)	3	5	125	2	2	0	4
PHM113	Probability and Statistics**	2	3	75	2	1	0	2
PHM121	Vibration and Waves	3	5	125	2	2	1	5
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5
PHM141	Engineering Chemistry	3	5	125	2	1	2	5
DEP39x	Graduation Project (1)***	1	2	50	1	0	0	1
-	Mechanics (1) Elective	3	5	125	2	2	0	4
-	Mechanics (2) Elective	3	5	125	2	2	0	4
-	Engineering Technology Elective	2	3	75	1	2	0	3
-	Engineering Drawing Processing Elective	2	4	100	1	2	0	3
-	Structures and Properties of Materials Elective	2	3	75	2	0	0	2
-	Spatial Perception and Design Elective	2	3	75	1	2	0	3
-	Engineering Economy and Project Management Elective	2	3	75	2	0	0	2
Total		34	64	1600	24	28	16	67
Pool of Mechanics (1) Elective Courses								
PHM131	Statics	3	5	125	2	2	0	4
CES111	Fundamentals of Structural Mechanics (1)	3	5	125	2	2	0	4
Pool of Mechanics (2) Elective Courses								
PHM132	Dynamics	3	5	125	2	2	0	4
CES112	Fundamentals of Structural Mechanics (2)	3	5	125	2	2	0	4
Pool of Engineering Technology Elective Courses								
MDP181	Production Engineering	2	4	100	1	1	2	4
MDP182	Manufacturing Processes**	2	4	100	2	0	1	2
ARC151	Basics of Conventional Construction Systems	2	4	100	1	3	0	4
ECE121	Communication Systems Engineering Fundamentals**	2	3	75	2	1	0	2
CES253	Properties and Testing of Materials**	2	3	75	2	1	0	2
CSE142	Introduction to Software Engineering**	2	4	100	2	1	0	2
Pool of Engineering Drawing Processing Elective Courses								
MDP111	Engineering Drawing	2	4	100	1	2	1	4
ARC141	Architectural Representation	2	5	125	0	5	0	5
ARC143	Building Engineering Drawing	2	4	100	1	3	0	4
CSE381	Image Processing**	2	4	100	2	1	0	2
CEI231	Civil Drawing	2	4	100	1	3	0	4
Pool of Structures and Properties of Materials Elective Courses								
PHM123	Introduction to Physical Electronics**	2	3	75	2	1	0	2
PHM221	Quantum Physics**	2	3	75	2	0	1	2
MDP151	Engineering Materials**	2	4	100	2	0	1	2
MDP251	Structure and Properties of Materials**	2	4	100	2	0	1	2
EPM113	Properties of Electrical Materials**	2	5	125	2	1	0	2
CES251	Structures and Properties of Construction Materials**	2	3	75	2	1	0	2
CES263	Soil Mechanics and Properties of Construction Materials	2	3	75	1	2	0	3
Pool of Spatial Perception and Design Elective Courses								
MDP461	Materials for Energy Solution**	2	4	100	2	1	0	2
MDP483	Lean Manufacturing System**	2	3	75	2	1	0	2
ARC111	Fundamentals of Architecture Design	2	5	125	0	5	0	5
ARC217	Fundamentals of Architectural Engineering	2	5	125	1	1	2	4
EPM456	Renewable Resources Interfacing**	2	4	100	2	1	0	2
ECE441	Antenna Engineering and propagation**	2	4	100	2	1	0	2
CSE121	Introduction to Logic Design**	2	5	125	2	1	0	2
CEP111	Projection and Engineering Graphics	2	4	100	1	2	1	4
Pool of Engineering Economy and Project Management Elective Courses								
MDP333	Industrial Project Management**	2	3	75	2	1	0	2
MDP432	Engineering Economy**	2	3	75	2	1	0	2
MEP441	Project Management and Engineering Economy	2	3	75	2	0	0	2
MEA432	Project Management for Mechanical Engineering**	2	3	75	2	1	0	2
ARC371	Architectural Projects Management and Economics**	2	3	75	2	1	0	2
UPL272	Society and Housing Economics	2	3	75	1	2	0	3

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
UPL471	Urban Economics	2	3	75	1	2	0	3
EPM111	Engineering Economy and Investments**	2	3	75	2	1	0	2
EPM314	Project Management for Electrical Engineering**	2	3	75	2	1	0	2
EPM315	Projects Economy and Management**	2	3	75	2	1	0	3
CSE432	Software Project Management**	2	3	75	2	1	0	2
CES371	Project Management Essentials in Construction**	2	3	75	2	1	0	2
CEI324	Engineering Economics and Management	2	3	75	2	0	0	2

* A placement test in Mathematics will be conducted for all admitted students except some High School Degrees which are determined by the Faculty Council. If the student passes this test, then he will be exempted from taking Basic Mathematics Course.

** Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

*** The code for the Graduation Project (2) depends on the program, it is mentioned in the study plan or each program.

Discipline Requirements

According to the National Academic Reference Standards (NARS-2018), each discipline graduate (Mechanical – Architectural – Electrical – Civil), has to meet specific competences.

Mechanical Engineering Requirements

In addition to the Competencies for all Engineering Programs the Basic Mechanical Engineering graduate must be able to (B-Level):

14. Model, analyse and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.
15. Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field.
16. Select conventional mechanical equipment according to the required performance.
17. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain mechanical equipment and systems.

To achieve these Competencies, a set of courses must be completed as a Basic Mechanical Engineering Requirement.

List of Basic Mechanical Engineering Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
MDP211	Machine Construction	3	5	125	2	2	1	5
MDP212	Mechanics of Materials*	2	4	100	2	1	0	2
MDP213	Mechanics of Machines	4	7	175	3	2	1	6
MDP311	Machine Elements Design	4	6	150	2	2	3	7
MDP312	Mechanical Vibrations	3	5	125	2	2	1	5
MDP252	Metallurgy and Material Testing	3	4	100	2	1	2	5
MDP281	Manufacturing Technology	4	6	150	3	2	1	6
MEP211	Thermal Physics	4	6	150	3	2	1	6
MEP212	Fluid Mechanics	4	6	150	3	2	1	6
MEP311	Heat Transfer	4	6	150	3	2	1	6
MCT411	Hydraulics and Pneumatics Control*	2	4	100	2	0	1	2
MCT331	Mechatronic Systems Integration*	2	4	100	2	0	1	2
EPM214	Electrical Circuits and Machines	4	6	150	3	2	0	5
ECE212	Introduction to Electronics*	2	4	100	2	1	0	2
CSE232	Fundamentals of Computer Programming*	2	4	100	2	0	1	2
DEP491	Graduation Project (2)**	2	4	100	1	2	0	3
-	General Mechanical Elective Course	3	5	125	2	2	0	4
-	Mechanical Control Elective Course	3	5	125	2	2	0	4
-	Measurements and Sensors Elective Course	3	5	125	2	2	0	4
Total		61	101	2525	45	31	15	86
Pool of General Mechanical Elective Courses								
MDP351	Casting and Welding	3	5	125	2	2	1	5
MEP313	Applied Thermodynamics	3	5	125	2	2	1	5
MEA311	Automotive Engineering	3	5	125	2	2	0	4
MCT441	Design of Autonomous Systems	3	5	125	2	2	1	5
Pool of Mechanical Control Elective Courses								
MEP331	Automatic Control	3	5	125	2	2	1	5
MCT311	Control Systems Design (1)	3	5	125	2	2	1	5
MCT341	Control and Automation	3	5	125	2	2	1	5
Pool of Measurements and Sensors Elective Courses								
MDP381	Measuring Instruments and Metrology	3	5	125	2	0	3	5

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
MEP332	Measurements and Instrumentation	3	5	125	2	0	3	5
MCT332	Engineering Measurements and Sensors	3	5	125	2	2	1	5

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

** The code for the Graduation Project (2) depends on the program, it is mentioned in the study plan or each program. Distribution of the contact hours may vary according to the program.

Architectural Engineering Requirements

In addition to the Competencies for all Engineering Programs the Basic Architectural Engineering graduate must be able to (B-Level):

14. Create architectural, urban and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of: history and theory, related fine arts, local culture and heritage, technologies and human sciences.
15. Produce designs that meet building users' requirements through understanding the relationship between people and buildings, and between buildings and their environment; and the need to relate buildings and the spaces between them to human needs and scale.
16. Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of: structural design, construction, technology and engineering problems associated with building designs.
17. Transform design concepts into buildings and integrate plans into overall planning within the constraints of: project financing, project management, cost control and methods of project delivery; while having adequate knowledge of industries, organizations, regulations and procedures involved.
18. Prepare design project briefs and documents; and understand the context of the architect in the construction industry, including the architect's role in the processes of bidding, procurement of architectural services and building production.

To achieve these Competencies, a set of courses must be completed as a Basic Architectural Engineering Requirement.

List of Basic Architectural Engineering Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ARC211	Principles of Architecture Design Studio	3	6	150	1	4	0	5
ARC212	Principles of Visual Design and Design Methods	3	5	125	2	2	0	4
ARC213	Creativity Design Studio	3	6	150	1	4	0	5
ARC311	Building Type and Legislations Design Studio	3	5	125	1	4	0	5
ARC312	Architectural Technology Design Studio	3	6	150	1	4	0	5
ARC231	History of Arts and Architecture (1): Ancient Civilizations	2	4	100	2	0	0	2
ARC331	History of Arts and Architecture (2): Islamic and Western Architecture	2	4	100	2	0	0	2
ARC241	Visual Communication in Architecture	3	5	125	1	4	1	6
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4
ARC251	Building (1): Conventional Construction Systems	3	5	125	2	3	0	5
ARC252	Building (2): Finishing Works	3	5	125	2	3	0	5
ARC351	Building (3): Advanced Construction and Working Drawing Standards	3	5	125	1	5	0	6
ARC352	Working Design (1): Systems Coordination and Building Information	3	6	150	1	4	1	6
ARC362	Daylighting and Control of Thermal Environment	3	3	75	2	2	0	4
UPL211	Principles of Urban Design and Landscape	3	4	100	1	4	0	5
UPL311	Context and Place Design Studio	3	5	125	1	4	0	5
UPL312	Urban and Landscape Design Studio	3	5	125	1	4	0	5
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4
CES213	Structural Analysis for Architects	2	3	75	1	2	0	3
CES315	Concrete and Steel Structures	3	5	125	2	2	0	4
MEP341	Technical Installations*	2	3	75	2	1	0	2
DEP491	Graduation Project (2)**	3	4	100	1	4	0	5
	ARCH Elective (1)	2	3	75	2	0	0	2
	ARCH Elective (2)	2	3	75	1	2	0	3
Total		67	113	2825	35	69	3	106
Pool of ARCH Elective (1) Courses								
UPL212	Placemaking and Place Identity*	2	3	75	2	1	0	3
UPL271	Human Behavior and the Built Environment*	2	3	75	2	1	0	3
UPL231	Site Analysis	2	3	75	1	2	0	3
UPL241	Horticulture and Garden Design*	2	3	75	2	1	0	3

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
UPL281	Introduction to Geographic Information Systems	2	3	75	1	0	3	4
Pool of ARCH Elective (2) Courses								
ARC321	Modern Art Movements	2	3	75	1	2	0	3
ARC345	Model Making and digital fabrication	2	3	75	1	2	0	3
ARC341	Photography and Architecture	2	3	75	1	2	0	3
ARC342	Data Modeling and Programming for Architects	2	3	75	1	2	0	3
ARC343	Media and Filmmaking for Architects	2	3	75	1	2	0	3
ARC344	Digital Graphics and Animation	2	3	75	1	2	0	3

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

** The code for the Graduation Project (2) depends on the concentration, it is mentioned in the study plan or each concentration.

Electrical Engineering Requirements

In addition to the Competencies for all Engineering Programs the Basic Electrical Engineering graduate must be able to (B-Level):

14. Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power systems.
15. Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
16. Design and implement elements, modules, sub-systems or systems using technological and professional tools.
17. Estimate and measure the performance of an electrical/electronic system and circuit under specific input excitation and evaluate its suitability for a specific application.
18. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.

To achieve these Competencies, a set of courses must be completed as a Basic Electrical Engineering Requirement.

List of Basic Electrical Engineering Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
PHM224	Physics of Semiconductors and Dielectrics	3	5	125	2	2	0	4
EPM211	Electric Circuits (1)	3	5	125	2	2	1	5
EPM212	Electromagnetic Fields	3	5	125	2	2	0	4
EPM213	Electrical Measurements	3	5	125	2	2	1	5
EPM221	Energy Conversion and Renewable Energy	3	5	125	2	2	1	5
ECE211	Electronics	3	5	125	2	2	1	5
ECE251	Signals and Systems Fundamentals	3	5	125	2	2	0	4
CSE211	Logic Design	3	5	125	2	2	0	4
CSE231	Computer Programming*	2	4	100	2	0	1	2
CSE271	System Dynamics and Control Components	3	5	125	2	2	1	5
DEP491	Graduation Project (2)**	2	4	100	1	2	0	3
-	Elective Course for Advanced Mathematics	3	5	125	2	2	0	4
-	Elective Course for Electrical Systems	3	5	125	2	2	0	4
-	Elective Course for Circuits	3	5	125	2	2	0	4
-	Elective Course for Control	3	5	125	2	2	0	4
-	Elective Course for Transmission and Communications	3	5	125	2	2	0	4
-	Elective Course for Networks	3	4	100	2	2	0	4
-	Elective Course for Embedded Systems	3	5	125	2	2	1	5
-	Elective Course for Automation and Organization	3	5	125	2	2	0	4
Total		58	97	2425	39	38	7	83
Pool of Advanced Mathematics Elective Courses								
PHM311	Discrete Mathematics	3	4	100	2	2	0	4
PHM312	Complex Variables, Special Functions and Partial Differential Equations	3	5	125	2	2	0	4
EPM433	Statistical Methods in Power System Planning	3	4	100	2	2	0	4
Pool of Electrical Systems Elective Courses								
EPM332	Power Systems Analysis (1)	3	5	125	2	2	1	5
ECE352	Analog and Digital Communication Systems	3	5	125	2	2	1	5
CSE451	Parallel and Distributed Systems	3	5	125	2	2	0	4
Pool of Circuits Elective Courses								
EPM311	Electric Circuits (2)	3	5	125	2	2	1	5
ECE311	Digital Circuits	3	5	125	2	2	1	5
CSE413	Digital Systems Testing and Verification	3	5	125	2	2	0	4
Pool of Control Elective Courses								
EPM371	Automatic Control Systems Design	3	5	125	2	2	1	5
CSE371	Control Engineering	3	5	125	2	2	0	4
Pool of Transmission and Communications Elective Courses								
EPM331	Electrical Power Transmission Systems	3	5	125	2	2	0	4
ECE351	Fundamentals of Communication Systems	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
Pool of Networks Elective Courses								
EPM333	Electrical Distribution Networks	3	4	100	2	2	0	4
ECE353	Telecommunication Networks	3	4	100	2	2	0	4
CSE351	Computer Networks	3	4	100	2	2	1	5
Pool of Embedded Systems Elective Courses								
EPM471	Microcontroller Applications in Power Engineering	3	5	125	2	2	1	5
CSE411	Real-Time Embedded Systems Design	3	5	125	2	2	1	5
Pool of Automation and Organization Elective Courses								
EPM472	Industrial Automation Systems	3	4	100	2	2	0	4
CSE312	Computer Organization	3	5	125	2	2	0	4

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.
** The code for the Graduation Project (2) depends on the program, it is mentioned in the study plan or each program. Distribution of the contact hours may vary according to the program.

Civil Engineering Requirements

In addition to the Competencies for all Engineering Programs the BASIC CIVIL Engineering graduate must be able to (B-Level):

14. Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics and Fluid Mechanics.
15. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbours; or any other emerging field relevant to the discipline.
16. Plan and manage construction processes; address construction defects, instability and quality issues; and maintain safety measures in construction and materials.
17. Deal with biddings, contracts and financial issues including project insurance and guarantees; and assess environmental impacts of civil engineering projects.

To achieve these Competencies, a set of courses must be completed as a Basic Civil Engineering Requirement.

List of Basic Civil Engineering Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
PHM212	Differential Equations for Civil Engineering*	2	4	100	2	1	0	2
CES211	Structural Mechanics (1)	4	6	150	3	2	0	5
CES212	Structural Mechanics (2)	3	5	125	2	2	0	4
CES221	Concrete Design (1)*	2	3	75	2	1	0	2
CES321	Concrete Design (2)*	2	4	100	2	1	0	2
CES323	Design of Concrete Floors and Halls	4	6	150	2	4	0	6
CES341	Design and Behavior of Steel Structures (1)	3	5	125	2	2	0	4
CES351	Concrete Technology	3	5	125	2	2	1	5
CES252	Materials Testing and Properties*	2	4	100	2	0	1	2
CES261	Geology and Geotechnical Engineering (1)	3	4	100	2	2	1	5
CES361	Geotechnical Engineering (2)	3	5	125	2	2	1	5
CEP211	Introduction to Plane Surveying	3	5	125	2	1	2	5
CEP212	Introduction to Topographical Surveying	3	5	125	2	2	1	5
CEP221	Highways and Transportation Engineering	3	5	125	2	2	0	4
CEI211	Fluid Mechanics	3	4	100	2	2	1	5
CEI212	Hydraulics	3	4	100	2	1	2	5
CEI231	Civil Drawing	2	4	100	1	3	0	4
CEI241	Engineering Hydrology*	2	4	100	2	1	0	2
DEP491	Graduation Project (2)**	3	4	100	2	2	0	4
-	Civil Engineering Elective (1)	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
-	Civil Engineering Elective (2)	3	5	125	2	2	0	4
Total		59	96	2400	42	37	10	84
Pool of Civil Engineering Elective (1) Courses								
CEP332	Highways Construction Material and Pavement Design	3	5	125	2	2	0	4
CES362	Foundation Engineering (1)	3	5	125	2	2	0	4
CES365	Foundation Engineering of Water Structures	3	5	125	2	2	0	4
CES461	Foundation Engineering (2)	3	5	125	2	2	0	4
Pool of Civil Engineering Elective (2) Courses								
CEP351	Water and Wastewater Networks	3	5	125	2	2	0	4
CEI321	Irrigation and Drainage Engineering	3	5	125	2	2	0	4

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

** The code for the Graduation Project (2) depends on the program, it is mentioned in the study plan or each program. Distribution of the contact hours may vary according to the program.

Program 12: Materials Engineering Program "MTRL"

Program Description

The program aims to supply the students with the basic and global concepts of science and technology in order to comprehend the relation between materials' structure and its properties and applications, which will open the field to develop and manufacture materials with special properties that suits the required application. This will help in developing various industries and setting specifications and criteria for quality assurance. Materials engineering applications incorporates different metals, ceramics, polymers, composite materials, semiconductors and other materials that could be used in electronics, communication, environmental, medicine, biotechnology, nanotechnology and other applications. Now this field attracts global attention which makes it important to be included into the higher educational system in Egypt.

Career Prospects

Materials engineers have versatile opportunities in manufacturing, petrochemical, ore extraction, consulting firms, research entities and educational institutes or other similar organizations. Possible jobs are Material engineer, design engineer, metallurgist, product developer, research assistant, quality engineer, biomedical engineer, patent examiner and technical sales engineer.

Duties of material engineer are: material selection, material design, processing, testing and characterization of materials and data, quality control, training and documentation.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water & Sanitation
☒ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☐ GOAL 11: Sustainable Cities & Communities	☒ GOAL 12: Responsible Consumption & Production
☒ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

There are no specified concentrations in this Program.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Also, the student has the chance to get some credit hours from Clausthal University of Technology in Germany according to the agreement between both universities.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Materials Engineering Program graduate must be able to:

14. Apply general math, science and engineering skills to the solution of engineering problems related to materials,
15. Analyse the relationship between structure, properties, processing and design of materials and their final impact on the product design and performance,
16. Understand systems applicable to the material engineering discipline by applying the concepts of: Thermodynamics, Fluid Mechanics, heat and mass transfer and engineering chemistry, solid Mechanics, material processing, material Properties, measurements, and mechanical Design
17. Develop, prepare and characterize new materials by applying concepts of homogeneity and polymorphism, phase transformation, crystalline structures and reaction kinetics,
18. Select, Model, analyse, design, treat and test material systems of monolithic composite and hybrid materials in engineering systems such as mechanical, biomedical, electronic, communication and advanced building systems,
19. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain industrial equipment and systems.
20. Have the experimental and computational skills for a professional career as team member or leader in multidisciplinary engineering projects using organization tools,
21. Be aware of the value of sustainable learning and environmental/social issues surrounding materials.

Graduate Attributes

The graduates from Materials Engineering Program:

- Apply analytic critical and systemic thinking to identify, diagnose, and solve materials-related challenges.
- Uphold high ethical standards in their professional practice, considering the social and environmental impacts of materials and processes.
- Possess the skills to design and develop materials and processes that minimize resource consumption, waste generation, and environmental impacts.
- Master a wide spectrum of materials engineering knowledge and specialized skills, specifically in the realm of environmental aspects and sustainability.
- Commit to continuous learning, staying updated with emerging materials science and engineering advancements and adapting to changing technological and global demands.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Materials Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	13	0	0	13
	Faculty of Engineering Requirements	34	67	1675	26	24	19	69
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
PHM222	Modern Physics and Quantum Mechanics	3	5	125	2	2	1	5
PHM142	Introduction to Organic Chemistry	2	4	100	1	2	1	4
PHM241	Electrochemistry*	2	4	100	2	0	1	2
PHM242	Reaction Kinetics and Chemical Analysis	2	4	100	1	2	1	4
PHM243	Polymer Chemistry*	2	3	75	2	0	1	2
MDP211	Machine Construction	3	5	125	2	2	1	5
MDP411	Introduction to Finite Elements	3	5	125	2	2	0	4
MDP432	Engineering Economy*	2	3	75	2	1	0	2
MDP253	Phase Transformation and Heat Treatment	4	6	150	3	2	0	5
MDP351	Casting and Welding	3	5	125	2	2	1	5
MDP352	Additive Manufacturing	3	4	100	2	2	0	4
MDP353	Failure Analysis	3	5	125	2	2	1	5
MDP354	Modern Iron and Steel Making	3	5	125	2	2	0	4
MDP356	Composites Technology and Techniques	3	5	125	2	0	3	5
MDP451	Non-destructive Testing of Materials (1)	3	5	125	2	2	1	5
MDP452	Materials and Process Selection*	2	3	75	2	1	0	2
MDP453	Non-Ferrous Engineering Metals	3	4	100	2	2	0	4
MDP454	Petrochemicals and Polymer Products*	2	3	75	2	0	1	2
MDP261	Crystalline Structures of Materials	3	5	125	2	2	1	5
MDP262	Materials Testing and Behavior	3	5	125	2	0	3	5
MDP263	Thermodynamics of Materials*	2	3	75	2	0	1	2
MDP361	Polymers Materials	3	5	125	2	1	2	5
MDP362	Corrosion	3	5	125	2	2	1	5
MDP464	Introduction to Biomaterials	3	4	100	2	2	1	5
MDP465	Glass and Ceramics and Binding Materials	3	4	100	2	2	1	5
MDP471	Quality Control	3	5	125	2	2	0	4
MEP214	Basics of Thermal Fluid Physics	2	5	125	2	0	1	2
MEP218	Fundamentals of Heat Transfer	3	5	125	2	2	1	5
EPM214	Electrical Circuits and Machines	4	6	150	3	2	0	5
-	MTRL Elective (1)	3	5	125	2	2	0	4
-	MTRL Elective (2)	3	5	125	2	2	0	4
-	MTRL Elective (3)	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
-	MTRL Elective (4)	3	5	125	2	2	0	4
MDP491	MTRL Graduation Project (2)	2	4	100	1	2	0	3
MDP492	MTRL Graduation Project (3)	2	6	150	0	0	6	6
Total		144	250	6250	108	77	50	228
Pool of MTRL Elective (1) Courses								
MDP363	Surfactants and Lubricating Materials	3	5	125	2	2	0	4
MDP364	Polymer Processing	3	5	125	2	2	0	4
MDP365	Painting Materials	3	5	125	2	2	0	4
MDP366	Rubber and Sealing Materials	3	5	125	2	2	0	4
Pool of MTRL Elective (2) Courses								
MDP455	Corrosion Prevention and Control	3	5	125	2	2	0	4
MDP456	Non-destructive Testing of Materials (2)	3	5	125	2	2	0	4
MDP372	Selected Topics in Mechanical Engineering	3	5	125	2	2	0	4
MDP486	Materials Inspection	3	5	125	2	2	0	4
Pool of MTRL Elective (3) Courses								
MDP466	Manufacturing Engineering of Multifunctional & Biomedical Materials	3	5	125	2	2	0	4
MDP467	Materials for Medical Applications	3	5	125	2	2	0	4
MDP468	Advanced Biomedical Materials	3	5	125	2	2	0	4
Pool of MTRL Elective (4) Courses								
MDP457	Nuclear Materials for Reactor Systems	3	5	125	2	2	0	4
MDP458	Advanced Concrete for Nuclear Reactors and Extreme Environmental Conditions	3	5	125	2	2	0	4
MDP462	Sustainable Manufacturing Processes	3	5	125	2	2	0	4
MDP463	Advanced Nanomaterials for Nuclear Energy	3	5	125	2	2	0	4
MDP473	Engineered Materials for Nuclear Waste Management and Final Geological Disposal	3	5	125	2	2	0	4

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM131	Statics	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
MDP111	Engineering Drawing	2	4	100	1	2	1	4	
MDP432	Engineering Economy	2	3	75	2	1	0	2	
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	13	10	4	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM132	Dynamics	3	5	125	2	2	0	4	PHM131
PHM142	Introduction to Organic Chemistry	2	4	100	1	2	1	4	PHM141
MDP151	Engineering Materials	2	4	100	2	0	1	2	
MDP182	Manufacturing Processes	2	4	100	2	0	1	2	
Total		17	30	750	13	9	4	23	
Semester (3)									
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4	PHM112
PHM241	Electrochemistry	2	4	100	2	0	1	2	PHM141
PHM242	Reaction Kinetics and Chemical Analysis	2	4	100	1	2	1	4	PHM142
MDP333	Industrial Project Management	2	3	75	2	1	0	2	
MDP261	Crystalline Structures of Materials	3	5	125	2	2	1	5	MDP151
MEP214	Basics of Thermal Fluid Physics	2	5	125	2	0	1	2	
-	ASU Elective (4)	3	4	100	3	0	0	3	
Total		17	30	750	14	7	4	22	
Semester (4)									
PHM243	Polymer Chemistry	2	3	75	2	0	1	2	PHM142
MDP211	Machine Construction	3	5	125	2	2	1	5	MDP111
MDP253	Phase Transformation and Heat Treatment	4	6	150	3	2	0	5	MDP261
MDP262	Materials Testing and Behavior	3	5	125	2	0	3	5	MDP151

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
MDP263	Thermodynamics of Materials	2	3	75	2	0	1	2	
MEP218	Fundamentals of Heat Transfer	3	5	125	2	2	1	5	MEP214
-	ASU Elective (2)	2	3	75	2	0	0	2	
Total		19	30	750	15	6	7	26	
Semester (5)									
PHM222	Modern Physics and Quantum Mechanics	3	5	125	2	2	1	5	PHM112 AND PHM122
MDP351	Casting and Welding	3	5	125	2	2	1	5	MDP151 AND MDP182
MDP352	Additive Manufacturing	3	4	100	2	2	0	4	
MDP361	Polymers Materials	3	5	125	2	1	2	5	PHM243
MDP362	Corrosion	3	5	125	2	2	1	5	PHM241
EPM214	Electrical Circuits and Machines	4	6	150	3	2	0	5	PHM122
Total		19	30	750	13	11	5	29	
Semester (6)									
MDP411	Introduction to Finite Elements	3	5	125	2	2	0	4	PHM213
MDP353	Failure Analysis	3	5	125	2	2	1	5	MDP262
MDP354	Modern Iron and Steel Making	3	5	125	2	2	0	4	MDP253 AND MDP263
MDP356	Composites Technology and Techniques	3	5	125	2	0	3	5	MDP361
MDP471	Quality Control	3	5	125	2	2	0	4	PHM113
MDP391	MTRL Graduation Project (1)	1	2	50	0	2	0	2	MDP182
-	ASU Elective (3)	2	3	75	2	0	0	2	
Total		18	30	750	12	10	4	26	
Semester (7)									
MDP451	Non-destructive Testing of Materials (1)	3	5	125	2	2	1	5	MDP351
MDP464	Introduction to Biomaterials	3	4	100	2	2	1	5	
MDP465	Glass and Ceramics and Binding Materials	3	4	100	2	2	1	5	
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	MTRL Elective (1)	3	5	125	2	2	0	4	
-	MTRL Elective (2)	3	5	125	2	2	0	4	
MDP491	MTRL Graduation Project (2)	2	4	100	1	2	0	3	MDP391
Total		19	30	750	13	12	3	28	
Semester (8)									
MDP452	Materials and Process Selection	2	3	75	2	1	0	2	
MDP453	Non-Ferrous Engineering Metals	3	4	100	2	2	0	4	MDP253
MDP454	Petrochemicals and Polymer Products	2	3	75	2	0	1	2	PHM142
MDP461	Materials for Energy Solution	2	4	100	2	1	0	2	
-	MTRL Elective (3)	3	5	125	2	2	0	4	
-	MTRL Elective (4)	3	5	125	2	2	0	4	
MDP492	MTRL Graduation Project (3)	2	6	150	0	0	6	6	MDP491
Total		17	30	750	12	8	7	24	

* Only if applicable according to regulations announced by the Faculty council based on article (15).

Course Tree for 'Materials Engineering' Program

Program 13: Manufacturing Engineering Program "MANF"

Program Description

Nowadays there are rising needs to modernize manufacturing industry to cope with the global challenges of producing cost effective products, competing at international markets and adapting to rapidly changing technologies for modern industry. Manufacturing Engineering is a complex discipline that requires a great deal of diverse and specialized knowledge. Manufacturing engineers are required by companies involved in manufacturing any kind of products, ranging from machines, equipment and robotics to all consumer products. The Program provides a broad technical background for students, in addition to proficiency in engineering methods, problem-solving and decision-making skills to a variety of manufacturing engineering issues. The aim of the program is to graduate manufacturing engineers who will be responsible for the design, selection of materials, specifications and the improvement of production processes and equipment. Responsibility for design and enhance of manufacturing systems, production management and control, as well as plant maintenance are also required by manufacturing engineers.

Career Prospects

Manufacturing Engineering Program Graduates may seek jobs at companies involved in manufacturing any kind of products, ranging from machines, equipment and robotics to all consumer products. They often have their choice of challenging positions such as manufacturing engineer, production manager, design engineer, quality specialist, process analyst, maintenance engineer, operations manager, continuous improvement engineer, or technical sales engineer.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☒ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☐ GOAL 11: Sustainable Cities & Communities	☒ GOAL 12: Responsible Consumption & Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

There are no specified concentrations in this Program.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Manufacturing Engineering Program graduate must be able to:

14. Understand and Operate physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Fluid Mechanics, Instrumentation and Control Theory and Systems.
15. Model and analyse physical systems applicable to the specific discipline by applying the concepts of: Material Properties, solid Mechanics, Material Processing, Measurements, and Mechanical Design.
16. Design mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field.
17. Understand, select and plan various materials processing technologies to produce different types of products.
18. Design for manufacturability of optimal products, process and the equipment, tooling and environment necessary for their manufacture to meet desired needs within realistic constraints.
19. Apply knowledge, problem solving techniques, and hands-on skills in assessment of design, operation and continuous improvement of manufacturing systems, including automated manufacturing processes, process controls, manufacturing operations management, and systems integration as well as smart or digital manufacturing.
20. Understanding of the creation of competitive advantage through manufacturing planning, strategy, and control.
21. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain industrial equipment and systems.

Graduate Attributes

The graduates from Manufacturing Engineering Program:

- Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- Behave professionally and adhere to engineering ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools and languages with various audiences. to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business administration and entrepreneurial skills.
- Work with mechanical design and manufacturing systems.
- Use of mathematics and physical and engineering sciences and systems analysis tools in components and machines and produce design and manufacture.

- Use the computer graphics for design, communication and visualization.
- Analyze multi-disciplinary mechanical, electrical, thermal and hydraulic systems.
- Demonstrate the ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy.
- Understand the engineering relationships between the management tasks of planning, organization, leadership, control, and the human elements in production, research and service organizations.
- Underlining the key roles of safety dimensions, sustainable technology, environmental friendliness, and cleaner production measures in manufacturing, materials, managerial and economic alternatives as reflected in the program course structure.
- Students will learn engineering sciences and demonstrate the application of this knowledge to electro-mechanical systems.
- Analyze and investigate the inter-disciplinary characteristics of mechanical, electrical and hydraulic systems.
- Graduates should have wide choices leading to specialization in mechanics, electronics, design, computer software or other areas.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Manufacturing Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	13	0	0	13
	Faculty of Engineering Requirements	34	66	1650	26	24	19	69
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
MDP211	Machine Construction	3	5	125	2	2	1	5
MDP213	Mechanics of Machines	4	7	175	3	2	1	6
MDP311	Machine Elements Design	4	6	150	2	2	3	7
MDP314	Product Design and development*	2	3	75	2	1	0	3
MDP334	Principles of Operations Management	3	5	125	2	2	0	4
MDP336	Work Study and Plant Layout	3	5	125	2	2	0	4
MDP432	Engineering Economy*	2	3	75	2	1	0	2
MDP341	Industrial Technologies*	2	3	75	2	1	0	3
MDP152	Metallurgy and Mechanics of Material	3	4	100	2	1	2	5
MDP351	Casting and Welding	3	5	125	3	0	1	4
MDP355	Metal Forming Technologies	3	5	125	2	2	0	4
MDP367	Heat Treatment and Industrial Furnaces*	2	4	100	2	0	1	2
MDP471	Quality Control	3	5	125	2	2	0	4
MDP474	Quality Assurance and Six Sigma*	2	3	75	2	1	0	2
MDP475	Selected Topics in Manufacturing Engineering	3	4	100	2	2	0	4
MDP282	Machining Technologies and Machines	3	5	125	2	1	2	5
MDP383	Metrology	3	4	100	2	2	1	5
MDP384	Computer Aided Manufacturing	3	5	125	2	1	2	5
MDP385	Manufacturing Technologies	3	6	150	2	0	3	5
MDP482	Die Design	3	4	100	2	2	1	5
MDP487	Professional Legislations and Engineering Ethics*	2	5	125	2	1	0	2
MEP213	Thermal and Fluid Physics	4	6	150	3	2	1	6
MEP216	Thermodynamics*	2	4	100	2	1	0	2
MCT211	Automatic Control	3	5	125	2	2	1	5
MCT232	Engineering Measurements	3	5	125	2	2	0	4
MCT342	Industrial Robotics	3	5	125	2	2	1	5
EPM214	Electrical Circuits and Machines	4	6	150	3	2	0	5
ECE212	Introduction to Electronics*	2	4	100	2	1	0	2
-	MANF Elective (1)	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
-	MANF Elective (2)	3	5	125	2	2	0	4
-	MANF Elective (3)	3	5	125	2	2	0	4
-	MANF Elective (4)	3	5	125	2	2	0	4
MDP491	MANF Graduation Project (2)	2	4	100	1	2	0	3
MDP492	MANF Graduation Project (3)	2	6	150	0	0	6	6
Total		144	250	6250	110	76	46	226
Pool of MANF Elective (1) Courses								
MDP441	Design of Jigs and Fixtures	3	5	125	2	2	0	4
MCT231	Basics of Mechatronics	3	5	125	2	0	3	6
EPM252	Power Electronics and Motor Drives	3	5	125	2	1	2	5
Pool of MANF Elective (2) Courses								
MDP331	Operations Research	3	5	125	2	2	0	4
MDP442	System Design	3	5	125	2	2	0	4
MCT431	Industrial Communications and Networks Systems	3	5	125	2	1	2	5
MCT343	Mechatronics Applications and Recent Directions	3	5	125	2	2	0	4
Pool of MANF Elective (3) Courses								
MDP332	Manufacturing Modeling and Simulation	3	5	125	2	2	0	4
MDP485	Advanced Manufacturing Technology and Prototyping	3	5	125	2	2	0	4
MCT415	Design of Hydraulic and Pneumatic Control systems	3	5	125	2	1	2	5
Pool of MANF Elective (4) Courses								
MDP335	Production Planning and Scheduling	3	5	125	2	2	0	4
MDP433	Maintenance Planning and Scheduling	3	5	125	2	2	0	4

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM131	Statics	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
MDP111	Engineering Drawing	2	4	100	1	2	1	4	
-	ASU Elective (1)	2	3	75	2	0	0	2	
-	ASU Elective (2)	2	3	75	2	0	0	2	
Total		18	30	750	13	9	4	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM132	Dynamics	3	5	125	2	2	0	4	PHM131
MDP333	Industrial Project Management	2	3	75	2	1	0	2	
MDP151	Engineering Materials	2	4	100	2	0	1	2	
MDP152	Metallurgy and Material Testing	3	4	100	2	1	2	5	
MDP182	Manufacturing Processes	2	4	100	2	0	1	2	
Total		18	30	750	14	8	5	24	
Semester (3)									
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4	PHM112
EPM214	Electrical Circuits and Machines	4	6	150	3	2	0	5	PHM122
MDP211	Machine Construction	3	5	125	2	2	1	5	MDP111
MDP282	Machining Technologies and Machines	3	5	125	2	1	2	5	MDP182
MEP213	Thermal and Fluid Physics	4	6	150	3	2	1	6	
Total		19	30	750	14	10	4	27	
Semester (4)									
MDP213	Mechanics of Machines	4	7	175	3	2	1	6	PHM132
MDP351	Casting and Welding	3	5	125	3	0	1	4	MDP151 AND MDP182
MEP216	Thermodynamics	2	4	100	2	1	0	2	PHM225
MCT211	Automatic Control	3	5	125	2	2	1	5	PHM213
MCT232	Engineering Measurements	3	5	125	2	2	0	4	PHM113
ECE212	Introduction to Electronics	2	4	100	2	1	0	2	PHM122
Total		17	30	750	14	8	3	23	

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (5)									
MDP311	Machine Elements Design	4	6	150	2	2	3	7	MDP211 AND MDP182
MDP336	Work Study and Plant Layout	3	5	125	2	2	0	4	PHM113
MDP367	Heat Treatment and Industrial Furnaces	2	4	100	2	0	1	3	MDP252
MDP432	Engineering Economy	2	3	75	2	1	0	3	
MDP383	Metrology	3	4	100	2	2	1	5	MDP282
MDP355	Metal Forming Technologies	3	5	125	2	2	0	4	MDP252
-	ASU Elective (3)	2	3	75	2	0	0	2	
Total		19	30	750	14	9	5	28	
Semester (6)									
MDP334	Principles of Operations Management	3	5	125	2	2	0	4	MDP432
MDP341	Industrial Technologies	2	3	75	2	1	0	2	MDP336
MDP384	Computer Aided Manufacturing	3	5	125	2	1	2	5	MDP282
MDP385	Manufacturing Technologies	3	6	150	2	0	3	5	MDP282
-	ASU Elective (4)	3	4	100	3	0	0	3	
-	MANF Elective (1)	3	5	125	2	2	0	4	
MDP391	MANF Graduation Project (1)	1	2	50	0	2	0	2	MDP182
Total		18	30	750	13	8	5	25	
Semester (7)									
MDP471	Quality Control	3	5	125	2	2	0	4	PHM113
MDP475	Selected Topics in Manufacturing Engineering	3	4	100	2	2	0	4	
MDP482	Die Design	3	4	100	2	2	1	5	MDP355
MDP483	Lean Manufacturing System	2	3	75	2	1	0	2	MDP336
MCT342	Industrial Robotics	3	5	125	2	2	1	5	MDP213
-	MANF Elective (2)	3	5	125	2	2	0	4	
MDP491	MANF Graduation Project (2)	2	4	100	1	2	0	3	MDP391
Total		19	30	750	13	13	2	27	
Semester (8)									
MDP314	Product Design and development	2	3	75	2	1	0	2	
MDP474	Quality Assurance and Six Sigma	2	3	75	2	1	0	2	PHM113
MDP487	Professional Legislations and Engineering Ethics	2	5	125	2	1	0	2	
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	MANF Elective (3)	3	5	125	2	2	0	4	
-	MANF Elective (4)	3	5	125	2	2	0	4	
MDP492	MANF Graduation Project (3)	2	6	150	0	0	6	6	MDP491
Total		16	30	750	12	7	6	22	

* Only if applicable according to regulations announced by the Faculty council based on article (15).

Course Tree for 'Manufacturing Engineering' Program

Program 14: Mechatronics Engineering and Automation Program "MCTA"

Program Description

The Mechatronics and Automation program integrates multidisciplinary fields of science that includes a mechanical engineering, Electronics, computer Science and control Engineering to enhance the safety, performance, efficiency, and the ability of solving real life problems associated with mechanical systems, industrial automation, mechatronic in automotive applications, mechatronic in healthcare and biomedical devices, Nano/micro mechatronic systems.

Career Prospects

The graduate of the program is expected to get a job in one of the following positions:

1. Automobiles Industry
2. Robotics Industry
3. Automation
4. Oil Industry
5. System design
6. Embedded system
7. Bionics system design
8. Sales engineer for robotics and automation

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☒ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☐ GOAL 11: Sustainable Cities & Communities	☒ GOAL 12: Responsible Consumption & Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

The program provides five different fields in which the students in this program can specialize. These five fields are: Autotronics, Bio-Mechatronics, Nano-Mechatronics, Industrial Mechatronics, and Robotics and Artificial Intelligence. Each concentration includes 5 compulsory courses.

1. Autotronics: The concentration is to incorporate elements of mechanical, electrical, electronics, software and safety engineers as applied to the design, manufacture and operation of automobiles.

2. Bio-Mechatronics: The concentration aims to integrate parts of biological organisms, mechanical elements, and electronics for improving the quality life of humans. It also encompasses the field of robotics and neuroscience.

3. Nano-Mechatronics: The concentration is to how to integrate electrical and mechanical functionality on the nanoscale.

4. Industrial Mechatronics: The concentration of this area is to integrate control systems, electrical, electronic systems, computers, and mechanical systems in automated manufacturing processes.

5. Robotics and Artificial Intelligence: The concentration of this area is to integrate Artificial Intelligence with the industrial manipulators and mobile robots to perform tasks that require intelligence, perception, and decision-making.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Mechatronics Engineering and Automation Program graduate must be able to:

14. Synthesize and integrate mechatronic subsystems to create custom solutions for different engineering problems while dealing with technical uncertainties.
15. Integrate a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline.
16. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment.
17. Put the necessary specifications describing the different variants of mechatronic equipment such as Robotics, CNC machines, CAD/CAM systems, pneumatic and hydraulic equipment, etc. for purpose of purchasing and contracting.
18. Write the necessary software for the equipment and the control of the mechatronic systems.
19. Competence in the safe use and operation of hand tools and machine tools that are used during the implementation phases of mechatronic systems.
20. Distinguish the layout and the key parameters to the field of the concentration within the mechatronics and automation engineering as listed below.

Concentration	Competence
Autotronics	20a. Create and/or re-design mechatronic components/systems in the fields of Automobiles
Bio-Mechatronics	20b. Develop mechanical, electrical, electronic, programming and communication elements necessary for improving the quality life of humans
Nano-Mechatronics	20c. Assess the characteristics and performance of mechatronic components, systems and fabrication processes for Nano scale systems
Industrial Mechatronics	20d. Design mechatronic components that can be used in the synthesis of industrial automation
Robotics and Artificial Intelligence	20e. Design robotic components with the aid of Artificial Intelligence to perform tasks that require intelligence and decision making

Graduate Attributes

The graduates from Mechatronics Engineering and Automation Program:

- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
- Use the basic theoretical and practical knowledge of mechatronic and automation system components in his/her practical field.
- Use the state-of-the-art technologies of the multidisciplinary specialization of Mechatronics and automation engineering program to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability.
- Identify, formulate and solve fundamental engineering problems.
- Design a system, component, or process to find affordable and reliable solutions, to improve the daily quality of life.
- Conduct Research and Development (R&D) activities to create innovative mechatronic solutions having direct impact on industrial, commercial, and social scales
- Solve problems in the areas of integrated mechanics, electronics, computers and software systems.
- Analyze and investigate the inter-disciplinary characteristics of mechanical, electrical and hydraulic systems.
- Design, develop, and maintain safety critical mechatronic systems.
- Apply the learned management and business skills to effectively contribute and compete in local, regional and international markets.
- Engage in self- and life- long learning.
- Work within a multidisciplinary team during the analysis, design and implementation phases of mechatronics engineering projects

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Mechatronics Engineering and Automation Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	12	1	2	15
	Faculty of Engineering Requirements	34	68	1700	26	24	20	70
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
MCT211	Automatic Control	3	5	125	2	2	1	5
MCT312	Automation*	2	4	100	2	1	0	2
MCT414	Modern Control*	2	3	75	2	1	0	2
MCT415	Design of Hydraulic and Pneumatic Control systems	3	5	125	2	1	2	5
MCT231	Basics of Mechatronics	3	5	125	2	0	3	5
MCT232	Engineering Measurements	3	5	125	2	2	0	4
MCT333	Design of Mechatronic Systems (1)	3	5	125	2	0	3	5
MCT334	Design of Mechatronic Systems (2)	3	5	125	2	0	3	5
MCT431	Industrial Communications and Networks Systems	3	5	125	2	1	2	5
MCT342	Industrial Robotics	3	5	125	2	2	1	5
MCT343	Mechatronics Applications and Recent Directions	3	5	125	2	2	0	4
MCT441	Design of Autonomous Systems	3	5	125	2	2	1	5
MCT261	Computer Aided Drawing	2	4	100	1	0	3	4
MDP211	Machine Construction	3	5	125	2	2	1	5
MDP214	Theory of Machines	3	4	100	2	0	3	5
MDP311	Machine Elements Design	4	6	150	2	2	3	7
MEP213	Thermal and Fluid Physics	4	6	150	3	2	1	6
EPM218	Electrical Circuits and Power Machines	3	6	150	2	2	1	5
EPM252	Power Electronics and Motor Drives	3	5	125	2	2	1	5

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ECE221	Electronic Materials	3	5	125	2	2	0	4
CSE241	Object-Oriented Computer Programming	3	5	125	2	1	2	5
CSE243	Data Structures and Problem Solving	3	5	125	2	1	2	5
CSE322	Introduction to Embedded Systems	3	5	125	2	0	2	4
CSE323	Advanced Embedded Systems Design	3	5	125	2	0	2	4
CSE382	Introduction to Machine learning	3	5	125	2	2	0	4
CSE482	Computer Vision	3	5	125	2	2	0	4
-	MCTA Elective (1)	3	5	125	2	2	1	5
-	MCTA Elective (2)	3	4	100	2	2	0	4
-	MCTA Elective (3)	3	5	125	2	2	1	5
-	MCTA Elective (4)	2	4	100	2	0	0	2
-	MCTA Elective (5)	3	4	100	2	2	0	4
MCT492	MCTA Graduation Project (2)	2	3	75	1	2	0	3
MCT494	MCTA Graduation Project (3)	3	6	150	0	6	0	6
Total		144	250	6250	103	75	61	237
Pool of MCTA Elective Courses for 'Autotronics' Concentration								
MCT351	Automotive Embedded Networking	3	5	125	2	2	1	5
MCT451	Autotronics	3	5	125	2	2	1	5
MCT361	Selected Topics in Autotronics*	2	4	100	2	0	1	3
MEA312	Automotive Theory	3	5	125	2	2	1	5
MEA322	Automotive Design	3	5	125	2	2	1	5
MEA441	Engine Management Systems	3	5	125	2	2	0	4
Pool of MCTA Elective Courses for 'Bio-Mechatronics' Concentration								
MCT345	Rehabilitation Robots	3	5	125	2	2	1	5
MCT346	Introduction to Biomechanics	3	5	125	2	2	1	5
MCT347	Locomotion and Gait Analysis	3	5	125	2	1	2	5
MCT348	Fundamentals of Biomedical Engineering	3	5	125	2	2	1	5
MCT352	System Physiology	3	5	125	2	2	1	5
MCT362	Selected Topics in Bio-Mechatronics*	2	4	100	2	1	0	3
Pool of MCTA Elective Courses for 'Nano-Mechatronics' Concentration								
MCT445	Material Properties and Characterization	3	4	100	2	2	1	5
MCT446	MEMS Devices	3	4	100	2	2	1	5
MCT447	MEMS Systems	3	5	125	2	2	1	5
MCT448	MEMS/NEMS Characterization: Systems and Methods	3	5	125	2	2	1	5
MCT449	MEMS/NEMS Fabrication and Packaging	3	5	125	2	2	1	5
MCT463	Selected Topics in Nano Mechatronics*	2	4	100	2	1	0	3
Pool of MCTA Elective Courses for 'Industrial Mechatronics' Concentration								
MCT443	Hybrid Control Systems	3	5	125	2	2	1	5
MCT456	Industrial Mechanisms and Robotics	3	5	125	2	2	1	5
MCT462	Selected Topics in Industrial Mechatronics*	2	4	100	2	1	0	3
MDP485	Advanced Manufacturing Technology and Prototyping	3	5	125	2	2	0	4
MEP424	Turbomachinery	3	5	125	2	2	1	5
CSE365	Internet of Things	3	5	125	2	2	0	4
Pool of MCTA Elective Courses for 'Artificial Intelligence and Robotics' Concentration								
MCT442	Advanced Robotics Analysis and Control	3	5	125	2	2	1	5
MCT454	Mobile Robotic Systems	3	5	125	2	2	1	5
MCT455	Perception and Learning for Robotics	3	5	125	2	2	1	5
MCT457	Vision for robotic systems	3	4	100	2	2	1	5
MCT464	Selected Topics in Robotics and Artificial intelligence*	2	4	100	2	0	1	3
CSE388	Computational Intelligence	3	5	125	2	2	0	4

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

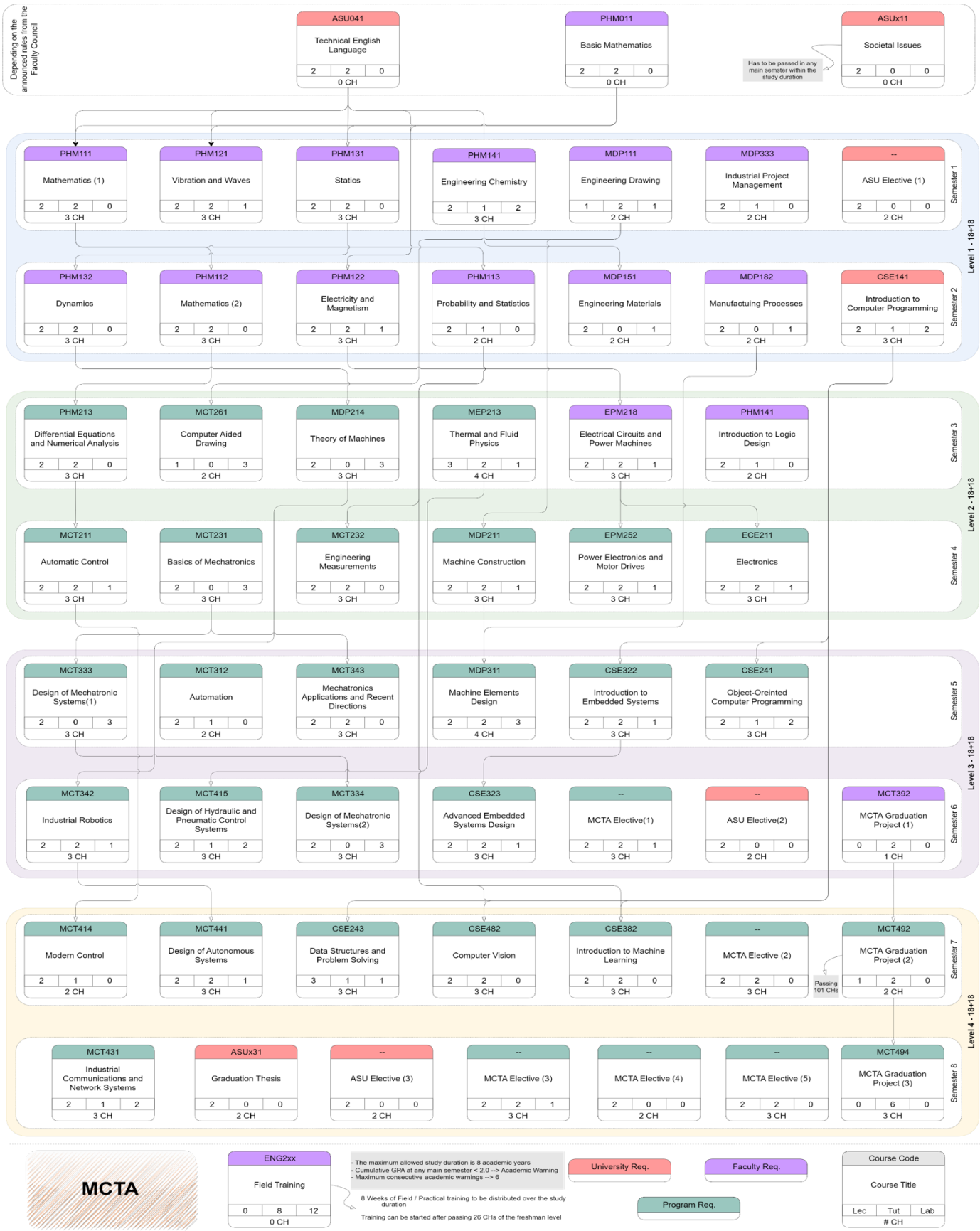
Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM131	Statics	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
MDP111	Engineering Drawing	2	4	100	1	2	1	4	
MDP333	Industrial Project Management	2	3	75	2	1	0	2	
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	13	10	4	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM132	Dynamics	3	5	125	2	2	0	4	PHM131
MDP151	Engineering Materials	2	4	100	2	0	1	2	
MDP182	Manufacturing Processes	2	4	100	2	0	1	2	
CSE141	Introduction to Computer Programming	3	4	100	2	1	2	5	
Total		18	30	750	14	8	5	24	
Semester (3)									
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4	PHM112
MCT261	Computer Aided Drawing	2	4	100	1	0	3	4	MDP111
MDP214	Theory of Machines	3	4	100	2	0	3	5	PHM132
MEP213	Thermal and Fluid Physics	4	6	150	3	2	1	6	
EPM218	Electrical Circuits and Power Machines	3	6	150	2	2	1	5	PHM122
CSE121	Introduction to Logic Design	2	5	125	2	1	0	2	
Total		17	30	750	12	7	8	26	
Semester (4)									
MCT211	Automatic Control	3	5	125	2	2	1	5	PHM213
MCT231	Basics of Mechatronics	3	5	125	2	0	3	6	
MCT232	Engineering Measurements	3	5	125	2	2	0	4	PHM113
MDP211	Machine Construction	3	5	125	2	2	1	5	MDP111
EPM252	Power Electronics and Motor Drives	3	5	125	2	2	1	4	EPM218
ECE211	Electronics	3	5	125	2	2	1	5	EPM218
Total		18	30	750	12	10	7	29	
Semester (5)									
MCT312	Automation	2	4	100	2	1	0	2	
MCT333	Design of Mechatronic Systems (1)	3	5	125	2	0	3	5	MCT231
MCT343	Mechatronics Applications and Recent Directions	3	5	125	2	2	0	4	MCT231
MDP311	Machine Elements Design	4	6	150	2	2	3	7	MDP211 AND MDP182
CSE322	Introduction to Embedded Systems	3	5	125	2	0	2	4	CSE141
CSE241	Object-Oriented Computer Programming	3	5	125	2	1	2	5	CSE141
Total		18	30	750	12	6	10	27	
Semester (6)									
MCT415	Design of Hydraulic and Pneumatic Control systems	3	5	125	2	1	2	5	MEP213
MCT334	Design of Mechatronic Systems (2)	3	5	125	2	0	3	5	MCT333
MCT342	Industrial Robotics	3	5	125	2	2	1	5	MDP214
CSE323	Advanced Embedded Systems Design	3	5	125	2	0	2	4	CSE322
-	ASU Elective (2)	2	3	75	2	0	0	2	
-	MCTA Elective (1)	3	5	125	2	2	1	5	
MCT392	MCTA Graduation Project (1)	1	2	50	0	2	0	2	
Total		18	30	750	12	7	9	28	
Semester (7)									
MCT414	Modern Control	2	3	75	2	1	0	2	MCT211
MCT441	Design of Autonomous Systems	3	5	125	2	2	1	5	MCT342
CSE243	Data Structures and Problem Solving	3	5	125	2	1	2	5	CSE141
CSE482	Computer Vision	3	5	125	2	2	0	4	PHM113 AND CSE141
CSE382	Introduction to Machine learning	3	5	125	2	2	0	4	PHM113 AND CSE141
-	MCTA Elective (2)	3	4	100	2	2	0	4	
MCT492	MCTA Graduation Project (2)	2	3	75	1	2	0	3	MCT392
Total		19	30	750	13	12	3	27	
Semester (8)									
MCT431	Industrial Communications and Networks Systems	3	5	125	2	1	2	5	
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	ASU Elective (3)	2	3	75	2	0	0	2	
-	MCTA Elective (3)	3	5	125	2	2	1	5	
-	MCTA Elective (4)	2	4	100	2	1	0	2	
-	MCTA Elective (5)	3	4	100	2	2	0	4	
MCT494	MCTA Graduation Project (3)	3	6	150	0	6	0	6	MCT492

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Total		18	30	750	12	12	3	26	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Mechatronics Engineering and Automation' Program

Program 15: Landscape Architecture Program "LAAR"

Program Description

Landscape Architecture Engineering solves real-life problems. This discipline finds the best solutions through the application of knowledge, experience and skills. Engineers help to define and refine the way of life by providing innovative, high-performance, safer, cleaner or more comfortable daily-used facilities for human beings. They seek improvements through the processes of invention, design, manufacturing and construction.

The products of Landscape Architecture engineering activities are intended to be sustainable. However, the drawbacks are associated with such activities; for example, the water, air, the environment and acoustic pollutions have been aggravated by many engineering marvels created throughout the past decades.

The engineer's problem-solving complexity grows as the world's social and technological problems become more closely related. For example, the problem of air pollution cannot be solved physically without considering the social, legal, political, and ethical conflicts. Moreover, the impact of the available engineering solutions on the interests of the individuals and groups should be considered. Engineering studies provide students with the advanced, effective, technology-based education that should meet the expected needs of future science and technology. They should also promote the technical understanding and problem-solving skills required to face the engineering challenges of tomorrow.

Moreover, it motivates students, faculty and staff to learn, grow, achieve and serve the needs of society nationally, regionally and internationally. It also prepares students for a productive and rewarding career in engineering based on strong moral and ethical foundation.

Career Prospects

Landscape architecture' is a professional title. It is recognized by the International Labour Organization and it is used throughout the world Landscape architects typically work across five main areas: landscape design; landscape management; landscape planning; landscape science and urban design. Alternative careers for landscape architects include: Conceptual Landscape Developer. Landscape Planner. Greenway Initiator. Landscape Assessor. Landscape-Architect. Garden Designer. Landscape Contractor. Designer-Builder. Product Design/Manufacture. Public services and Tourism Planner.

Typical employers of landscape architects include: Architecture and urban planning consultancy, the construction industry; real-estate developers, local authorities; private practices; public bodies; water networks companies, Roads companies

In the private sector, landscape architects are largely employed by architect and landscape architect companies, or by companies specializing in landscape engineering.

In the public sector, landscape architects tend to work for environmental agencies, local authorities and government agencies. There are also opportunities with voluntary organizations.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation

☐ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☐ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☒ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

There are no specified concentrations in this Program.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

The program is also in partnership with Mediterranea University of Reggio Calabria (UNIRC), Italy for a Master Degree of Architecture. Students joining this agreement will pay an additional fee, to substitute expenses for the study, advising and coordination that will take place in Italy during the last semester(s) in Italy in addition to other semester(s) in Egypt. The Graduates should receive one B.Sc. certificate from ASU, and M.Sc. from Mediterranea University of Reggio Calabria.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Landscape Architecture Program graduate must be able to:

14. Create architectural, urban and landscape designs that satisfy both aesthetic and technical requirements, using adequate knowledge of: history and theory, related fine arts, local culture and heritage, technologies and human sciences.
15. Integrate relationship of structure, energy systems, landscape materials, and construction elements into design process in different scales.
16. Discuss, search and formulate informed opinions appropriate at specific context and circumstances affecting landscape architecture profession and practice.
17. Judge landscape architecture decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
18. Propose creative and innovative solution for problems facing landscape architecture projects.
19. Professionally merge the engineering knowledge and landscape architecture, understanding, and feedback to improve design, products and/or services.
20. Deal with sensitive spaces and locations using the required understanding for human needs and socio-economic dynamics.
21. Use and apply information technology and contemporary computer applications while dealing with landscape architecture issues

22. Prepare design project briefs and documents; and understand the context of the landscape architect in the construction industry, including the architect's role in the processes of bidding, procurement of architectural services and building production.
23. Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of: structural design, construction, technology and engineering problems associated with architectural landscape designs.

Graduate Attributes

The graduates from Landscape Architecture Program:

- Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- Behave professionally and adhere to engineering ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the landscape architecture field and contribute to the development of the profession and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.U
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business administration and entrepreneurial skills.
- Create architectural, urban landscaping and planning designs that satisfy both aesthetic and technical requirements, using adequate knowledge of history and theory, related fine arts, local culture and heritage, technologies and human sciences.
- Produce designs that meet building users' requirements through understanding the relationship between people' needs and the built environment, and between the built environment and nature.
- Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of structural design, construction, technology and engineering problems associated with building designs.
- Transform design concepts into indoor and outdoor spaces and integrate plans into overall planning within the constraints of project financing, project management, cost control and methods of project delivery; while having adequate knowledge of industries, organizations, regulations and procedures involved.
- Prepare design project briefs and documents and understand the context of the architect in the construction industry, including the architect's role in the processes of bidding, procurement of architectural services and building production.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Landscape Architecture Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	11	4	1	16
	Faculty of Engineering Requirements	34	68	1700	21	35	16	72
UPL211	Principles of Urban Design and Landscape	3	4	100	1	4	0	5
UPL213	Mixed-Use Design Studio	3	5	125	1	4	0	5
UPL311	Context and Place Design Studio	3	5	125	1	4	0	5
UPL312	Urban and Landscape Design Studio	3	5	125	1	4	0	5
UPL413	Mega Projects Urban Design Studio	3	6	150	0	6	0	6
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4
UPL241	Horticulture and Garden Design*	2	3	75	2	1	0	2
UPL341	Arid Landscape Architecture Design Studio	3	6	150	1	4	0	5
UPL342	Landscape Working Design (1): Landscape Detailed Working Documents	3	5	125	1	4	0	5
UPL442	Landscape Working Design (2): Landscape Execution Documents Complexity	3	5	125	1	4	0	5
UPL351	Housing Studies	3	5	125	1	4	0	5
UPL462	Contemporary Environmental Issues	2	4	100	2	0	0	2
UPL481	Urban Informatics	2	4	100	1	0	3	4
ARC132	History and Theory of Landscape	3	5	125	2	2	0	4
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4
ARC253	Landscape Construction	3	4	100	2	2	0	4
ARC261	Control of Thermal Environment	2	3	75	2	0	0	2
ARC262	Principles of Sustainable Architecture	3	4	100	3	0	0	3
ARC322	Interior Design and Landscaping	3	4	100	2	2	0	3
ARC353	Working Design (1): Execution Drawings Coordination, Annotation and Coding	3	5	125	1	4	0	5
ARC354	Working Design (2): Blow-Ups Detailing, Items Specifications and BOQs	3	5	125	1	4	0	5
ARC363	Outdoor Lighting and Effects	3	4	100	1	4	0	5
ARC464	Soundscape and Aural Architecture	2	3	75	2	0	0	2
ARC371	Architectural Projects Management and Economics*	2	3	75	2	1	0	2
ARC372	Architecture Profession and Legislations	2	4	100	1	2	0	3
CES315	Concrete and Steel Structures	3	5	125	2	2	0	4
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4
CEI314	Infrastructure Planning and Landscape Irrigation	2	4	100	1	2	0	3
-	LAAR Elective (1)	2	3	75	1	2	0	3
-	LAAR Elective (2)	3	5	125	2	2	0	4
-	LAAR Elective (3)	3	4	100	2	2	0	4
-	LAAR Elective (4)	3	5	125	2	2	0	4
-	LAAR Elective (5)	3	4	100	1	4	0	5
-	LAAR Elective (6)	2	3	75	1	2	0	3
UPL493	LAAR Graduation Project (2)	3	5	125	1	4	0	5
UPL497	LAAR Graduation Project (3)	6	12	300	0	12	0	12
Total		144	250	6250	81	140	21	239
Pool of LAAR Elective (1) & (6) Courses								
UPL212	Placemaking and Place Identity*	2	3	75	2	1	0	2
UPL271	Human Behavior and the Built Environment*	2	3	75	2	1	0	2
ARC341	Photography and Architecture	2	3	75	1	2	0	3
ARC362	Selected Topics in Architecture Issues	2	3	75	1	2	0	3
Pool of LAAR Elective (2) & (4) Courses								
UPL331	CityLab	3	5	125	1	4	0	5
ARC424	Architectural Criticism and Project Evaluation	3	5	125	2	2	0	4
ARC426	Built Environment Accessibility	3	5	125	2	2	0	4
ARC442	Building Information Modeling (BIM)	3	5	125	1	4	0	5
Pool of LAAR Elective (3) & (5) Courses								
UPL425	Selected Topics in Urbanization Issues	3	4	100	2	2	0	4
UPL432	Urban and Architectural Heritage	3	4	100	2	2	0	4
UPL362	Urban Ecology and Environmental Studies	3	4	100	2	2	0	4
UPL461	Environmental Impact Assessment	3	4	100	2	2	0	4

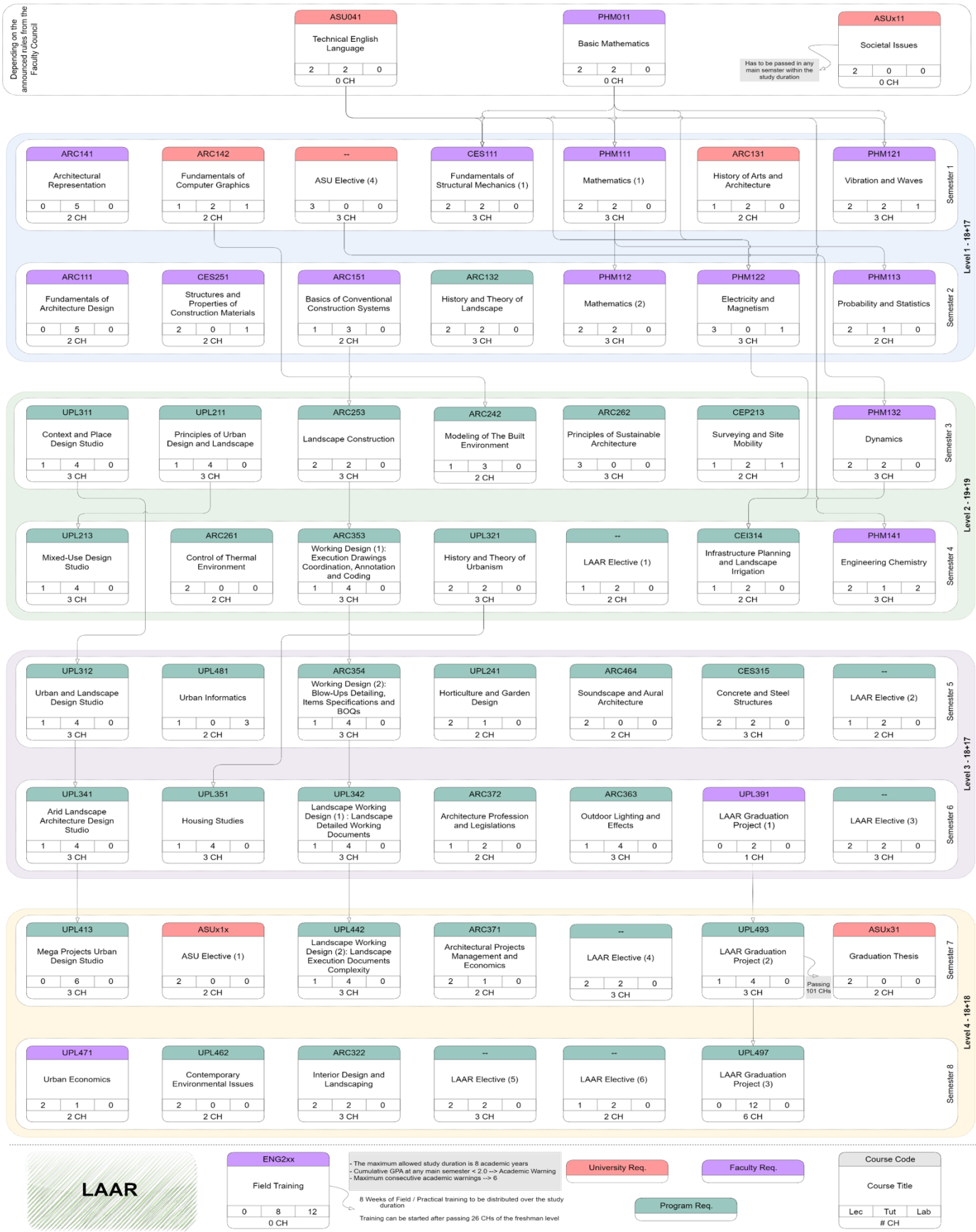
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
ARC131	History of Arts and Architecture	2	3	75	1	2	0	3	
ARC141	Architectural Representation	2	5	125	0	5	0	5	
ARC142	Fundamentals of Computer Graphics	2	3	75	1	2	1	4	
CES111	Fundamentals of Structural Mechanics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
-	ASU Elective (4)	3	4	100	3	0	0	3	
Total		18	30	750	11	15	2	28	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
ARC111	Fundamentals of Architecture Design	2	5	125	0	5	0	5	
ARC132	History and Theory of Landscape	3	5	125	2	2	0	4	
ARC151	Basics of Conventional Construction Systems	2	4	100	1	3	0	4	
CES251	Structures and Properties of Construction Materials	2	3	75	2	1	0	3	
Total		17	30	750	11	16	1	27	
Semester (3)									
PHM132	Dynamics	3	5	125	2	2	0	4	CES111
UPL211	Principles of Urban Design and Landscape	3	4	100	1	4	0	5	
UPL311	Context and Place Design Studio	3	5	125	1	4	0	5	
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4	ARC142
ARC253	Landscape Construction	3	4	100	2	2	0	4	ARC151
ARC262	Principles of Sustainable Architecture	3	4	100	3	0	0	3	
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4	
Total		19	30	750	11	17	1	29	
Semester (4)									
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
UPL213	Mixed-Use Design Studio	3	5	125	1	4	0	5	UPL211
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4	
ARC353	Working Design (1): Execution Drawings Coordination, Annotation and Coding	3	5	125	1	4	0	5	ARC253
ARC261	Control of Thermal Environment	2	3	75	2	0	0	2	
CEI314	Infrastructure Planning and Landscape Irrigation	2	4	100	1	2	0	3	PHM122 AND PHM132
-	LAAR Elective (1)	2	3	75	1	2	0	3	
Total		18	30	750	10	15	2	27	
Semester (5)									
UPL312	Urban and Landscape Design Studio	3	5	125	1	4	0	5	ARC311
UPL241	Horticulture and Garden Design	2	3	75	2	1	0	3	
UPL481	Urban Informatics	2	4	100	1	0	3	4	
ARC354	Working Design (2): Blow-Ups Detailing, Items Specifications and BOQs	3	5	125	1	4	0	5	ARC353
ARC464	Soundscape and Aural Architecture	2	3	75	2	0	0	2	
CES315	Concrete and Steel Structures	3	5	125	2	2	0	4	CES315
-	LAAR Elective (2)	3	5	125	2	2	0	4	
Total		18	30	750	11	13	3	27	
Semester (6)									
UPL341	Arid Landscape Architecture Design Studio	3	6	150	1	4	0	5	UPL312
UPL342	Landscape Working Design (1): Landscape Detailed Working Documents	3	5	125	1	4	0	5	ARC354
UPL351	Housing Studies	3	5	125	1	4	0	5	UPL321
ARC363	Outdoor Lighting and Effects	3	4	100	1	4	0	5	
ARC372	Architecture Profession and Legislations	2	4	100	1	2	0	3	
-	LAAR Elective (3)	3	4	100	2	2	0	4	
UPL391	LAAR Graduation Project (1)	1	2	50	1	0	0	1	
Total		18	30	750	8	20	0	28	
Semester (7)									

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
UPL413	Mega Projects Urban Design Studio	3	6	150	0	6	0	6	UPL341
UPL442	Landscape Working Design (2): Landscape Execution Documents Complexity	3	5	125	1	4	0	5	UPL342
ARC371	Architectural Projects Management and Economics	2	3	75	2	1	0	3	
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	ASU Elective (1)	2	3	75	2	0	0	2	
-	LAAR Elective (4)	3	5	125	2	2	0	4	
UPL493	LAAR Graduation Project (2)	3	5	125	1	4	0	5	UPL391
Total		18	30	750	10	17	0	27	
Semester (8)									
UPL462	Contemporary Environmental Issues	2	4	100	2	0	0	2	
UPL471	Urban Economics	2	3	75	1	2	0	3	
ARC322	Interior Design and Landscaping	3	4	100	2	2	0	3	
-	LAAR Elective (5)	3	4	100	1	4	0	5	
-	LAAR Elective (6)	2	3	75	1	2	0	3	
UPL497	LAAR Graduation Project (3)	6	12	300	0	12	0	12	UPL493
Total		18	30	750	7	22	0	28	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Landscape Architecture' Program

Program 16: Environmental Architecture and Urbanism Program "ENVR"

Program Description

Driven by the current urgency of building more environmentally friendly buildings and cities, the environmental Architecture and Urbanism Program (ENVR) aims at preparing architects and urban designers specialized in environmental design. Graduates are capable of understanding the relationship between humans and buildings and between buildings and their environment. They can integrate all the aspects dealing with the built environment and how it is planned, designed, used, furnished, landscaped, managed, and valued by the society in their creative thinking while dealing with complex architectural and urban environment problems. The program introduces students to building science and enables them to conceive the basic concepts of sustainable architecture and urbanism. They are trained to balance functional and ecological demands when developing policies or designs for new construction. Graduate will be able to deal with modern techniques and tools for learning and linking theory and practice. All efforts are directed towards achieving environmental architecture and urbanism.

Career Prospects

The acquired skills through the program qualifies the graduates to occupy a wide range of jobs, fulfilling the market's diversity of needs. They can work as architects or urban designers whether in multi-national and local companies or in architectural, urban design firms and environmental design consultancies. Moreover, graduates will be equipped to work in fields of interior design, visualization using computer graphics, 3D Modeling, and model making. Specializations extend as well to dimensions of project/construction management, site supervision, and quantity surveying. The ENVR graduates can deal with environmental building assessment techniques and be aware of issues related to building energy efficiency, net zero systems and net plus systems. The current market in Egypt is thriving for such kind of interdisciplinary-skilled graduates who have strong background in environmental design that is highly needed nowadays.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☒ GOAL 8: Decent Work & Economic Growth	☐ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☒ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

There are no specified concentrations in this Program.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

The program is also in partnership with Mediterranea University of Reggio Calabria (UNIRC), Italy for a Master Degree of Architecture. Students joining this agreement will pay an additional fee, to substitute expenses for the study, advising and coordination that will take place in Italy during the last semester(s) in Italy in addition to other semester(s) in Egypt. The Graduates should receive one B.Sc. certificate from ASU, and M.Sc. from Mediterranea University of Reggio Calabria.

Furthermore, the program under the ASU umbrella is part of the CNRD – Centres for Natural Resources and Development- project, which is one of 5 centres of Excellence in Germany under the Exceed program. The CNRD is coordinated by Cologne University of Applied Sciences (CUAS – Germany) and includes 13 universities partners from Indonesia, Chile, Mexico, Nepal, Egypt, Jordan, Kenya, Ethiopia, Sudan, Bangladesh, Vietnam, and Brazil. The CNRD is supported by the Federal Ministry for Economic Cooperation and Development, Exceed and DAAD.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Environmental Architecture and Urbanism Program graduate must be able to:

14. Create aesthetically pleasing and technically sound architectural and urban designs by using the architectural and urban planning principles, history and theories, technologies, economics, human sciences and local culture and heritage.
15. Produce designs that meet building users' requirements through studying the relationship between people and buildings, and between buildings and their environment.
16. Prepare design project briefs and documents and analyse the context of the architecture in the construction industry, including the architect's role in the processes of bidding, procurement of architectural services, and building production.
17. Solve problems and creatively design sustainable building schemes or urban contexts that demonstrate awareness and integration of information and processes in project work by using building environmental systems and management together with the underlying concepts and theories.
18. Realize the process of sustainable building and urban design and their various components through the integration of structural design, construction, technology and engineering problems associated with building designs.
19. Coordinate and monitor the production of information and data from a variety of sources, including drawings, specifications, codes of practice, related to principals of environmental architecture and urbanism.
20. Apply appropriate mathematical and computer-based methods for Modeling and analysing environmental design problems.
21. Judge engineering decisions considering balanced costs, benefits, risks, safety, quality, reliability, and environmental impact, while having adequate knowledge of industries, organizations, regulations and procedures involved.

22. Produce professional technical and workshop drawings to transform the concepts into buildings using traditional drawing tools and computer-aided drawings' techniques, as well as building information Modeling techniques.
23. Exchange knowledge and skills with engineering sectors and industrial sectors working in the field of environmental control.

Graduate Attributes

The graduates from Environmental Architecture and Urbanism Program:

- Master a wide spectrum of architectural engineering knowledge and specialized skills, specifically in the realm of environmental aspects and sustainability and can apply acquired knowledge using theories and abstract thinking in real life situations;
- Apply analytic critical and systemic thinking to identify, diagnose and solve architectural engineering problems with a wide range of complexity and variation;
- Behave professionally and adhere to architectural engineering and sustainability ethics and standards;
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance;
- Recognize his/her role in promoting the environmental architectural engineering field and sustainability, and contribute in the development of the architecture profession and the community;
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles;
- Use techniques, skills and modern engineering tools necessary for environmental and eco-friendly architectural engineering practice. In addition to applying his/her own knowledge and practical skills to create and develop sustainable architectural designs starting from the briefing phase till beyond the construction and operating phase.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies;
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner;
- Demonstrate leadership qualities, business and project administration and entrepreneurial skills.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Environmental Architecture and Urbanism Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	11	4	1	16
	Faculty of Engineering Requirements	34	68	1700	22	33	16	71
ARC214	Vernacular Architecture Design Studio	3	6	150	1	4	0	5
ARC215	Environmental Architecture Design Studio	3	6	150	1	4	0	5
ARC313	Sustainable Architecture Design Studio (1)	3	6	150	1	5	0	6
ARC314	Sustainable Architecture Design Studio (2)	3	6	150	1	4	0	5
ARC323	Interior Design	3	4	100	1	4	0	5
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4
ARC443	Building Performance Simulation	3	5	125	2	2	0	4
ARC254	Sustainable Construction	3	5	125	2	3	0	5
ARC353	Working Design (1): Execution Drawings Coordination, Annotation and Coding	3	5	125	1	4	0	5

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ARC354	Working Design (2): Blow-Ups Detailing, Items Specifications and BOQs	3	5	125	1	4	0	5
ARC455	Working Design (3): Execution Documents Complexity	3	5	125	1	4	0	5
ARC261	Control of Thermal Environment	2	3	75	2	0	0	2
ARC262	Principles of Sustainable Architecture	3	4	100	3	0	0	3
ARC263	Lighting in Architecture	2	3	75	1	2	0	3
ARC461	Acoustics in Architecture*	2	3	75	2	1	0	2
UPL211	Principles of Urban Design and Landscape	3	4	100	1	4	0	5
UPL313	Eco Urban Design	3	5	125	1	4	0	5
UPL414	Sustainable Contextual Architecture Design Studio	3	6	150	1	4	0	5
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4
UPL332	Sustainable Urban Development	3	5	125	1	4	0	5
UPL242	Ecological Landscape	3	5	125	1	4	0	5
UPL351	Housing Studies	3	5	125	1	4	0	5
UPL461	Environmental Impact Assessment	3	4	100	2	2	0	4
CES223	Concrete Structures for Architectural Engineering	2	3	75	1	2	0	3
CES345	Steel Structures for Architectural Engineering	2	3	75	1	2	0	3
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4
CEP252	Green Building Systems and Infrastructure	2	3	75	2	0	0	2
-	ENVR Elective (1)	2	3	75	2	0	0	2
-	ENVR Elective (2)	3	5	125	2	2	0	4
-	ENVR Elective (3)	3	4	100	2	2	0	4
-	ENVR Elective (4)	3	4	100	2	2	0	4
-	ENVR Elective (5)	3	5	125	2	2	0	4
-	ENVR Elective (6)	3	5	125	2	2	0	4
ARC493	ENVR Graduation Project (2)	3	4	100	1	4	0	5
ARC494	ENVR Graduation Project (3)	6	12	300	0	12	0	12
Total		144	250	6250	82	141	18	240
Pool of ENVR Elective (1) Courses								
ARC341	Photography and Architecture	2	3	75	1	2	0	3
ARC345	Model Making and Digital Fabrication	2	3	75	1	2	0	3
ARC464	Soundscape and Aural Architecture	2	3	75	2	0	0	2
Pool of ENVR Elective (2) Courses								
ARC424	Architectural Criticism and Project Evaluation	3	5	125	2	2	0	4
ARC426	Built Environment Accessibility	3	5	125	2	2	0	4
ARC442	Building Information Modeling (BIM)	3	5	125	1	4	0	5
ARC444	Principles of Parametric Design	3	5	125	2	2	0	4
ARC472	Building Life Cycle Assessment	3	5	125	2	2	0	4
Pool of ENVR Elective (3) & (4) Courses								
ARC462	Sustainable Building Rating Systems	3	4	100	2	2	0	4
UPL437	Smart CityLab	3	5	125	2	2	0	4
UPL432	Urban and Architectural Heritage	3	4	100	2	2	0	4
UPL435	Urban Renewal	3	5	125	2	2	0	4
Pool of ENVR Elective (5) & (6) Courses								
ARC465	Renewable Energy Systems and Economics	3	5	125	2	2	0	4
UPL463	Cities and Climate Change	3	5	125	2	2	0	4
UPL464	Disasters and Environmental Risk Reduction	3	5	125	2	2	0	4
UPL465	Selected Topics in Architecture and Urbanism	3	5	125	1	4	0	5

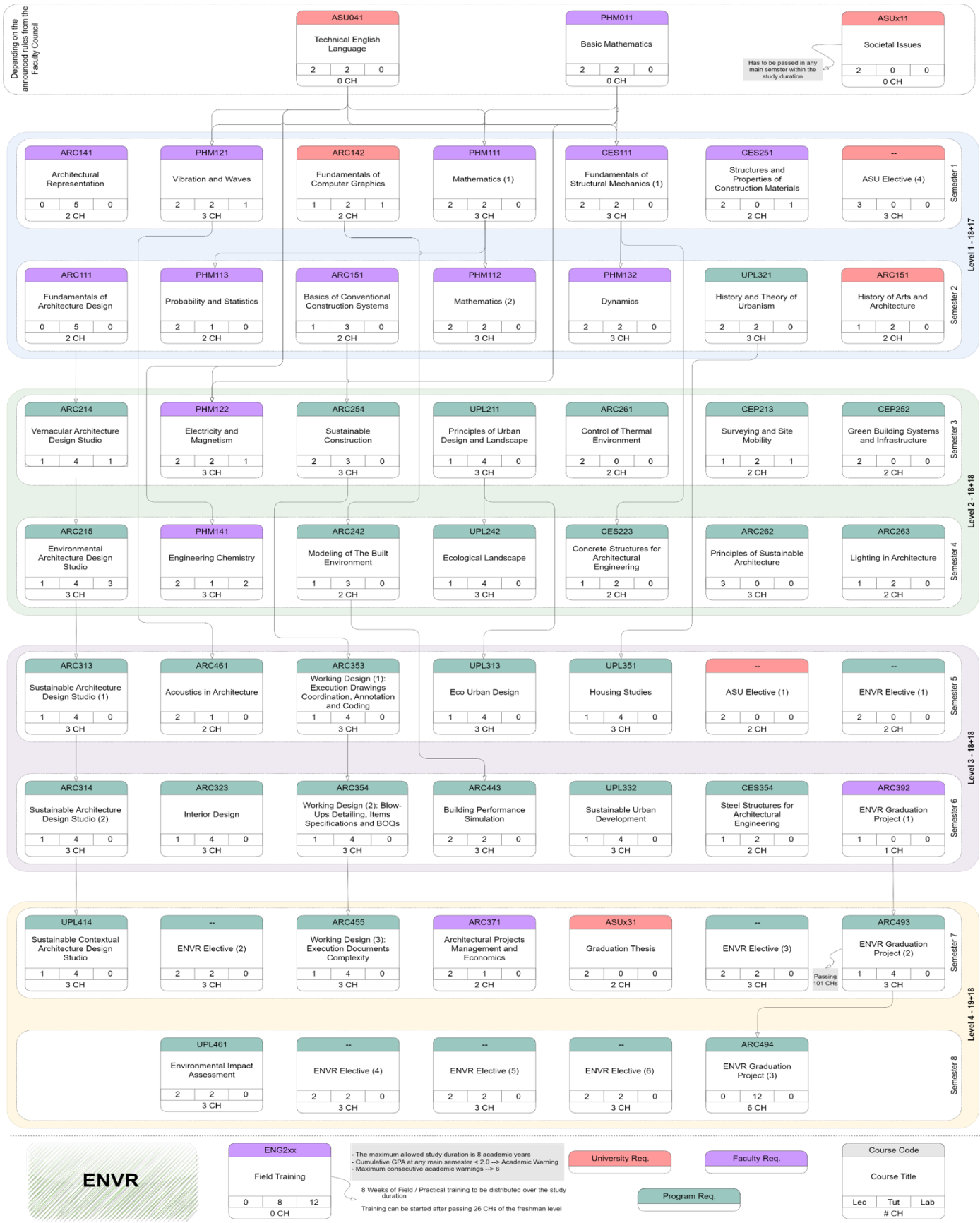
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
ARC141	Architectural Representation	2	5	125	0	5	0	5	
ARC142	Fundamentals of Computer Graphics	2	3	75	1	2	1	4	
CES111	Fundamentals of Structural Mechanics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
CES251	Structures and Properties of Construction Materials	2	3	75	2	1	0	2	
-	ASU Elective (4)	3	4	100	3	0	0	3	
Total		18	30	750	12	14	2	27	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM132	Dynamics	3	5	125	2	2	0	4	CES111
ARC111	Fundamentals of Architecture Design	2	5	125	0	5	0	5	
ARC151	Basics of Conventional Construction Systems	2	4	100	1	3	0	4	
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4	
ARC131	History of Arts and Architecture	2	3	75	1	2	0	3	
Total		17	30	750	10	17	0	26	
Semester (3)									
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
ARC214	Vernacular Architecture Design Studio	3	6	150	1	4	0	5	ARC111
ARC254	Sustainable Construction	3	5	125	2	3	0	5	ARC151
ARC261	Control of Thermal Environment	2	3	75	2	0	0	2	
UPL211	Principles of Urban Design and Landscape	3	4	100	1	4	0	5	
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4	
CEP252	Green Building Systems and Infrastructure	2	3	75	2	0	0	2	
Total		18	30	750	11	15	2	28	
Semester (4)									
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
ARC215	Environmental Architecture Design Studio	3	6	150	1	4	0	5	ARC214
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4	ARC142
ARC262	Principles of Sustainable Architecture	3	4	100	3	0	0	3	
ARC263	Lighting in Architecture	2	3	75	1	2	0	3	
CES223	Concrete Structures for Architectural Engineering	2	3	75	1	2	0	3	CES111
UPL242	Ecological Landscape	3	5	125	1	4	0	5	UPL211
Total		18	30	750	10	16	2	28	
Semester (5)									
ARC313	Sustainable Architecture Design Studio (1)	3	6	150	1	5	0	6	ARC215
ARC353	Working Design (1): Execution Drawings Coordination, Annotation and Coding	3	5	125	1	4	0	5	ARC254
ARC461	Acoustics in Architecture	2	3	75	2	1	0	2	PHM121
UPL313	Eco Urban Design	3	5	125	1	4	0	5	UPL211
UPL351	Housing Studies	3	5	125	1	4	0	5	UPL321
-	ASU Elective (1)	2	3	75	2	0	0	2	
-	ENVR Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	10	18	0	27	
Semester (6)									
ARC314	Sustainable Architecture Design Studio (2)	3	6	150	1	4	0	5	ARC313
ARC323	Interior Design	3	4	100	1	4	0	5	
ARC443	Building Performance Simulation	3	5	125	2	2	0	4	ARC242
ARC354	Working Design (2): Blow-Ups Detailing, Items Specifications and BOQs	3	5	125	1	4	0	5	ARC353
UPL332	Sustainable Urban Development	3	5	125	1	4	0	5	
CES345	Steel Structures for Architectural Engineering	2	3	75	1	2	0	3	
ARC392	ENVR Graduation Project (1)	1	2	50	1	0	0	1	
Total		18	30	750	8	20	0	28	
Semester (7)									
UPL414	Sustainable Contextual Architecture Design Studio	3	6	150	1	4	0	5	ARC314

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
ARC455	Working Design (3): Execution Documents Complexity	3	5	125	1	4	0	5	ARC354
ARC371	Architectural Projects Management and Economics	2	3	75	2	1	0	2	
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	ENVR Elective (2)	3	5	125	2	2	0	4	
-	ENVR Elective (3)	3	4	100	2	2	0	4	
ARC493	ENVR Graduation Project (2)	3	4	100	1	4	0	5	ARC392
Total		19	30	750	11	17	0	27	
Semester (8)									
UPL461	Environmental Impact Assessment	3	4	100	2	2	0	4	
-	ENVR Elective (4)	3	4	100	2	2	0	4	
-	ENVR Elective (5)	3	5	125	2	2	0	4	
-	ENVR Elective (6)	3	5	125	2	2	0	4	
ARC494	ENVR Graduation Project (3)	6	12	300	0	12	0	12	ARC493
Total		18	30	750	8	20	0	28	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Environmental Architecture and Urbanism' Program

Program 17: Housing Architecture and Urban Development Program "HAUD"

Program Description

Globally, over 50% of the population lives in urban areas; and moving towards urbanization is accelerating. As urban populations grow, the housing gap will widen, exacerbating inequality and threatening the traditional view of cities as reliable drivers of economic growth. Though providing affordable, adequate and secure housing is a basic human need, housing provision persists a key urban challenge worldwide. The Housing Architecture and Urban Development (HAUD) program aims at preparing architects and urban planners specialized in housing and the built environment design for sustainable urban development. Graduates go on to obtain professional degrees in architectural engineering with specialization in housing and urban development…

The program is focusing on the technical, aesthetic and cultural components of design for housing and public buildings. Moreover, it qualifies graduates with all necessary competences to design and to understand the housing market and real estate development as well as to use digital technologies and tools to generate and analyse spatial data. Graduates will gain knowledge in housing typology, provision, policies, finance, legislation, and management and will be able to produce integrated architecture documents, and land mapping. The HAUD emphasizes the integration of social, economic, environmental, along with physical aspects to create safe, inclusive, healthy, and sustainable cities. It introduces graduates to contemporary trends and practices in housing industry and urban development schemes such as smart housing/cities as well as principles of Sustainable Development Goals. The program will prepare graduates to take leading roles in the professional practice in the field of architecture, housing and urban development on local and international level.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☐ GOAL 9: Industry, Innovation & Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☒ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Career Prospects

HAUD program graduates possess the versatility to excel in various roles within the realm of housing design and urban development. Their expertise spans across multiple tiers, encompassing architectural intricacies, urban planning, and even delving into real estate and land management nuances. These capable individuals are primed to assume positions as architects and urban planners across diverse entities, including governmental bodies like the Ministry of Housing Utilities and Urban Development, global organizations like UN-Habitat, as well as local enterprises and advisory firms. Given the ongoing surge in construction activities and the prospective emergence of novel urban communities and ambitious national projects in Egypt, there is a pressing demand for adept graduates who are not only well-versed in

the Sustainable Development Goals (SDGs) principles but also harbor an all-encompassing perspective to grapple with the multifaceted challenges in the realm of housing architecture and urban development.

Program Concentrations

There are no specified concentrations in this Program.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

The program is also in partnership with Mediterranea University of Reggio Calabria (UNIRC), Italy for a Master Degree of Architecture. Students joining this agreement will pay an additional fee, to substitute expenses for the study, advising and coordination that will take place in Italy during the last semester(s) in Italy in addition to other semester(s) in Egypt. The Graduates should receive one B.Sc. certificate from ASU, and M.Sc. from Mediterranea University of Reggio Calabria.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Housing Architecture and Urban Development Program graduate must be able to:

14. Create aesthetically pleasing and technically sound architectural designs ranging across different scale based on the most contemporary trends and smart systems and theories of architecture, urban and planning.
15. Produce designs that meet building users' requirements through understanding the relationship between people and buildings; and the need to relate indoor and outdoor to human needs, scale and environment.
16. Prepare design project briefs and documents and analyse the context of the architecture in the construction industry, Infrastructure including the architect's role in the processes of bidding, procurement of architectural services, and building production.
17. Solve problems and creatively design housing schemes or urban contexts that demonstrate awareness and integration of information and processes in project work by considering their contexts (social, economic, political, institutional, / environmental and physical) technical installations, infrastructure and engineering problems associated with building designs with the underlying concepts and theories.
18. Coordinate and monitor the production of information and data from a variety of sources, including drawings, specifications, codes of practice, related to principles of Architecture, Housing and urban development.
19. Apply appropriate mathematical and computer-based methods for modelling and analyse spatial and non-spatial data to produce integrated architecture documents and Land Mapping
20. Judge engineering decisions considering balanced costs, benefits, risks, safety, quality, reliability, and housing market, while having adequate knowledge of industries, organizations, regulations, and procedures involved.
21. Produce professional technical and workshop drawings to transform the concepts into buildings using traditional drawing tools and computer-aided drawings' techniques, as well as building information modelling techniques, urban informatics.
22. Exchange knowledge and skills with engineering sectors and industrial sectors working in the field of Housing production.

23. Evaluate and formulate Strategies and models of policy for develop or regenerate resources towards sustainable housing provision, informal upgrading and urban development.

Graduate Attributes

The graduates from Housing Architecture and Urban Development Program:

- Master a wide spectrum of architectural engineering knowledge and specialized skills, specifically in the realm of environmental aspects and sustainability and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systemic thinking to identify, diagnose and solve architectural engineering and urbanization problems with a wide range of complexity and variation.
- Behave professionally and adhere to architectural engineering and sustainability ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the environmental architectural engineering field and sustainability, and contribute to the development of the architecture profession, housing industry and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- Acclimate resiliently with the socio-economic fluctuations in real-estate business environments, and take advantages of the successive developments in technology, big data and artificial intelligence.
- Use techniques, skills and modern engineering tools necessary for environmental and echo friendly architectural engineering and housing industry practice. In addition to applying his/her own knowledge and practical skills to create and develop sustainable architectural designs starting from the briefing phase till beyond the construction and operating phase.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business and project administration and entrepreneurial skills.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Housing Architecture and Urban Development Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	11	4	1	16
	Faculty of Engineering Requirements	34	68	1700	21	34	16	71
ARC216	Multi Story Accommodation Building Design Studio	3	5	125	0	6	0	6
ARC414	Smart Housing Design Studio	3	6	150	0	6	0	6
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4
ARC346	Programming for Architects	2	3	75	1	2	1	4
ARC442	Building Information Modeling (BIM)	3	5	125	1	4	0	5
ARC255	Mass Housing Production Techniques	3	5	125	1	4	1	6
ARC353	Working Design (1): Execution Drawings Coordination, Annotation and Coding	3	5	125	1	4	0	5
ARC354	Working Design (2): Blow-Ups Detailing, Items Specifications and BOQs	3	5	125	1	4	0	5
ARC456	Working Design (3): Residential Towers Execution Documents	3	5	125	1	4	0	5
ARC371	Architectural Projects Management and Economics*	2	3	75	2	1	0	2
ARC372	Architecture Profession and Legislations	2	4	100	1	2	0	3
UPL111	Community-Centered Design Methods	4	5	125	3	2	0	5
UPL314	Urban Regeneration Design Studio	3	6	150	1	4	0	5
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4
UPL331	CityLab	3	5	125	1	4	0	5
UPL433	Urban Systems	3	5	125	2	2	0	4
UPL436	Land Management and Land Subdivision	3	5	125	1	4	0	5
UPL437	Smart CityLab	3	5	125	2	2	0	4
UPL243	Principles of Residential Urban Spaces and Landscape	3	4	100	3	0	0	3
UPL251	Residential Complex Design Studio	3	6	150	0	6	0	6
UPL352	Neighbourhood Planning and Design Studio	3	5	125	0	6	0	6
UPL361	City Development Strategies	3	5	125	2	2	0	4
UPL381	Geoinformatics	3	5	125	1	4	0	5
CES315	Concrete and Steel Structures	3	5	125	2	2	0	4
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4
MEP341	Technical Installations*	2	3	75	2	1	0	2
-	HAUD Elective (1)	2	3	75	2	0	0	2
	HAUD Elective (2)	2	3	75	2	0	0	2
-	HAUD Elective (3)	3	4	100	2	2	0	4
-	HAUD Elective (4)	2	3	75	2	0	0	2
-	HAUD Elective (5)	2	3	75	2	0	0	2
	HAUD Elective (6)	3	4	100	2	2	0	4
	HAUD Elective (7)	3	4	100	3	0	0	3
UPL494	HAUD Graduation Project (2)	3	5	125	0	6	0	6
UPL498	HAUD Graduation Project (3)	6	12	300	0	12	0	12
Total		144	250	6250	80	143	20	241
Pool of HAUD Elective (1) & (2) Courses								
ARC355	Housing Maintenance, Post-occupancy Evaluation, and Value Engineering	2	3	75	1	2	0	3
UPL212	Placemaking and Place Identity*	2	3	75	2	1	0	3
UPL271	Human Behavior and the Built Environment*	2	3	75	2	1	0	3
UPL281	Introduction to Geographic Information Systems	2	3	75	1	0	3	4
Pool of HAUD Elective (3) Courses								
ARC323	Interior Design	3	4	100	1	4	0	5
ARC356	Selected Topics in Housing Architecture	3	4	100	3	0	0	3
Pool of HAUD Elective (4) & (5) Courses								
UPL424	Selected Topics in Urban Planning and Development	2	3	75	2	0	0	2
UPL333	Sustainable Urban Mobility**	2	3	75	1	2	0	3
UPL473	Equity and Urban Justice	2	3	75	2	0	0	2
UPL483	Urban AI	2	3	75	1	0	3	4
Pool of HAUD Elective (6) & (7) Courses								
ARC462	Sustainable Building Rating Systems	3	4	100	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
UPL422	City Governance and Land Management	3	4	100	2	2	0	4
UPL425	Selected Topics in Urbanization Issues	3	4	100	2	2	0	4
UPL452	Housing Studies and Real Estate Development	3	4	100	2	2	0	4
UPL461	Environmental Impact Assessment	3	4	100	2	2	0	4
UPL463	Cities and Climate Change	3	5	125	2	2	0	4
UPL482	Introduction to Geo Design	3	4	100	1	4	0	5
CEP425	Urban Transportation Planning**	3	4	100	2	2	0	4

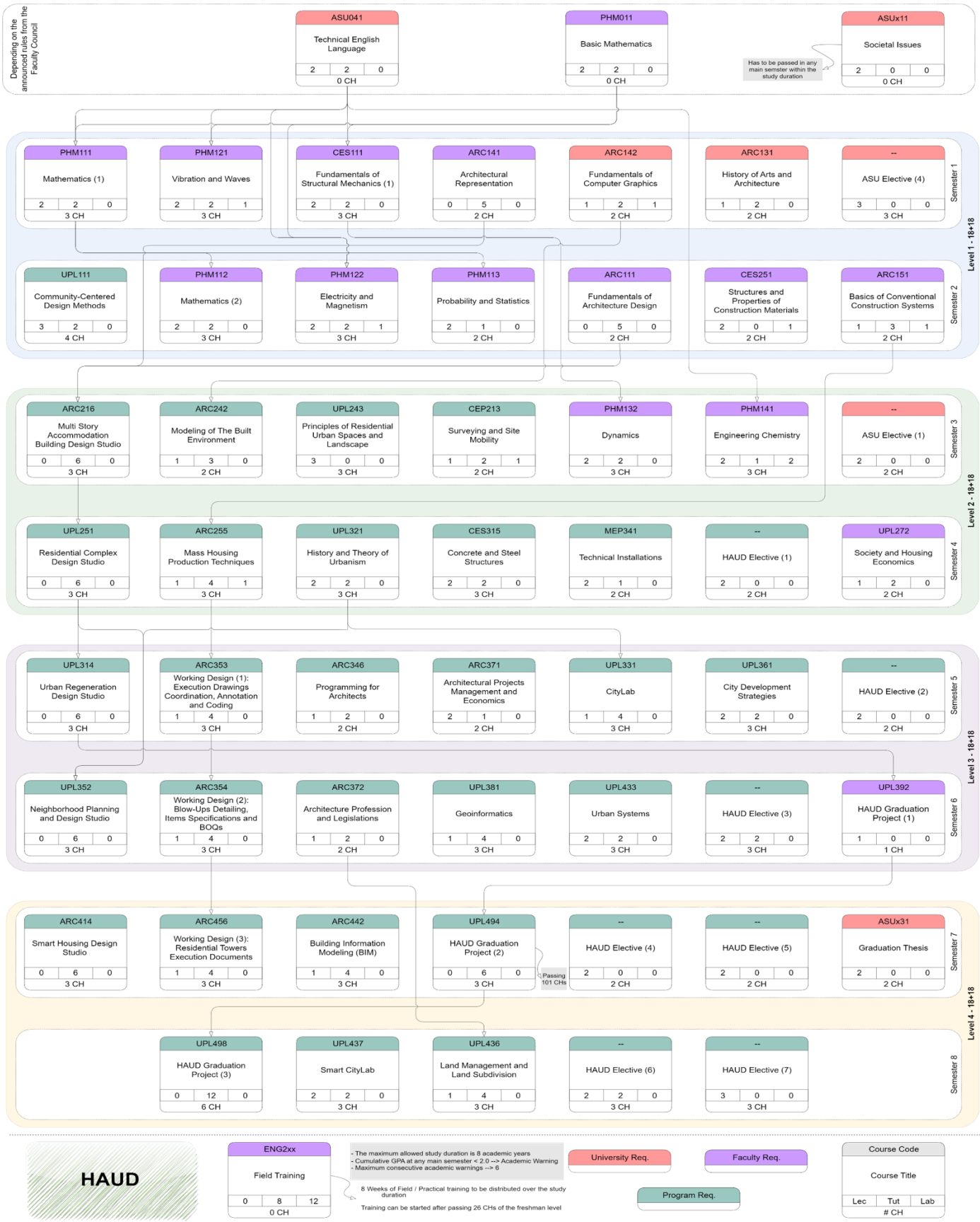
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.
** Only one of them can be selected.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
ARC131	History of Arts and Architecture	2	3	75	1	2	0	3	
ARC141	Architectural Representation	2	5	125	0	5	0	5	
ARC142	Fundamentals of Computer Graphics	2	3	75	1	2	1	4	
CES111	Fundamentals of Structural Mechanics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
-	ASU Elective (4)	3	4	100	3	0	0	3	
Total		18	30	750	11	15	2	28	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
ARC111	Fundamentals of Architecture Design	2	5	125	0	5	0	5	
ARC151	Basics of Conventional Construction Systems	2	4	100	1	3	0	4	
UPL111	Community-Centered Design Methods	4	5	125	3	2	0	5	
CES251	Structures and Properties of Construction Materials	2	3	75	2	1	0	2	
Total		18	30	750	12	16	1	27	
Semester (3)									
PHM132	Dynamics	3	5	125	2	2	0	4	CES111
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
ARC216	Multi Story Accommodation Building Design Studio	3	5	125	0	6	0	6	ARC111 AND ARC141
ARC242	Modeling of The Built Environment	2	4	100	1	3	0	4	ARC142
UPL243	Principles of Residential Urban Spaces and Landscape	3	4	100	3	0	0	3	
CEP213	Surveying and Site Mobility	2	4	100	1	2	1	4	
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	11	14	3	28	
Semester (4)									
ARC255	Mass Housing Production Techniques	3	5	125	1	4	1	6	ARC151
UPL321	History and Theory of Urbanism	3	5	125	2	2	0	4	
UPL251	Residential Complex Design Studio	3	6	150	0	6	0	6	ARC216
UPL272	Society and Housing Economics	2	3	75	1	2	0	3	
CES315	Concrete and Steel Structures	3	5	125	2	2	0	4	
MEP341	Technical Installations	2	3	75	2	1	0	2	
-	HAUD Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	10	17	1	27	
Semester (5)									
ARC346	Programming for Architects	2	3	75	1	2	1	4	
ARC353	Working Design (1): Execution Drawings Coordination, Annotation and Coding	3	5	125	1	4	0	5	ARC255
ARC371	Architectural Projects Management and Economics	2	3	75	2	1	0	2	
UPL314	Urban Regeneration Design Studio	3	6	150	1	4	0	5	UPL251
UPL331	CityLab	3	5	125	1	4	0	5	UPL321
UPL361	City Development Strategies	3	5	125	2	2	0	4	
-	HAUD Elective (2)	2	3	75	2	0	0	2	
Total		18	30	750	10	17	1	27	

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (6)									
ARC354	Working Design (2): Blow-Ups Detailing, Items Specifications and BOQs	3	5	125	1	4	0	5	ARC353
ARC372	Architecture Profession and Legislations	2	4	100	1	2	0	3	
UPL433	Urban Systems	3	5	125	2	2	0	4	
UPL352	Neighbourhood Planning and Design Studio	3	5	125	0	6	0	6	UPL251 AND UPL321
UPL381	Geoinformatics	3	5	125	1	4	0	5	
-	HAUD Elective (3)	3	4	100	2	2	0	4	
UPL392	HAUD Graduation Project (1)	1	2	50	1	0	0	1	UPL314
Total		18	30	750	8	20	0	28	
Semester (7)									
ARC414	Smart Housing Design Studio	3	6	150	0	6	0	6	
ARC442	Building Information Modeling (BIM)	3	5	125	1	4	0	5	
ARC456	Working Design (3): Residential Towers Execution Documents	3	5	125	1	4	0	5	ARC354
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	HAUD Elective (4)	2	3	75	2	0	0	2	
-	HAUD Elective (5)	2	3	75	2	0	0	2	
UPL494	HAUD Graduation Project (2)	3	5	125	0	6	0	6	UPL392
Total		18	30	750	8	20	0	28	
Semester (8)									
UPL436	Land Management and Land Subdivision	3	5	125	1	4	0	5	ARC372
UPL437	Smart CityLab	3	5	125	2	2	0	4	
-	HAUD Elective (6)	3	4	100	2	2	0	4	
-	HAUD Elective (7)	3	4	100	3	0	0	3	
UPL498	HAUD Graduation Project (3)	6	12	300	0	12	0	12	UPL494
Total		18	30	750	8	20	0	28	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Housing Architecture and Urban Development' Program

Program 18: Communication Systems Engineering Program "COMM"

Program Description

The Communication Systems Engineering program seeks to introduce the new in the science and technology of communication systems at the educational, practical, and scientific research levels through the application of quality systems and cooperation with specialized bodies locally and internationally. This program graduates' engineers with the ability to deal with the latest development in the fields of communication, optical, and electronic systems to meet the requirements of the market at the moral and professional levels by creating the appropriate conditions for the development of different skills of students and cooperate with specialized industrial and research bodies locally and internationally.

Career Prospects

The program aims at generating a graduate who is well trained in modern telecommunication industry as well as having a background in communication systems that enables him to fit easily within a modern telecommunication work environment and be able to identify market needs in this fast-moving segment of business. The graduate is exposed to a wide variety of courses to build an open scope to telecommunication engineering which is interdisciplinary in nature. The graduate acquires his degree by taking a balanced curriculum that is pre- dominantly concerned with communication systems on different levels and does not neglect required basic sciences needed for this field.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☐ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

The program qualifies graduates to work as Electronics and telecommunication engineers. The graduate can be specialized in one of the following three concentrations (fields):

1. Circuits and Systems.
2. Physical and Wave Electronics.
3. Signals and Communication Systems.

The student has to select six elective courses for a total of (18) Credit Hours with at least four of these courses from one of the mentioned fields.

1. Circuits and Systems: This is the concentration for the graduate engineer to work in national and international companies concern with electronic design.

2. Physical and Wave Electronics: This is the concentration for the graduate engineer to work in telecommunication companies for transmission field, or in research field related to microwave and optical communications.

3. Signals and Communication Systems: This is the concentration for the graduate engineer to work in telecommunication companies in core network or in research field related to signal processing.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Communication Systems Engineering Program graduate must be able to:

14. Estimate and measure the performance of communication and electronic systems under specific input excitation and evaluate its suitability for a specific application.
15. Identify needs, plan and manage resources, and gather information for solving a specific communication problem and efficiently document this solution.
16. Have the technological abilities to design and implement elements, modules, sub-systems or systems.
17. Be familiar with and utilize professional tools for communication system engineering.
18. Design, model and analyse electronic, microwave, optical, and communication systems or components for a specific application and identify the tools required to optimize this design.
19. Classify and evaluate the applications and market segments to create a specific product including the estimation of the required resources.
20. Demonstrate additional abilities related to the field of the concentration within Communication Systems Engineering as listed below.

Concentration	Competence
Circuits and Systems	20a. Demonstrate additional abilities to design analog and/or digital circuits of any electronic system.

Physical and Wave Electronics	20b. Demonstrate additional abilities to analyse, design any microwave or optical communication system.
Signals and Communication Systems	20c. Demonstrate additional abilities to work on state-of-the-art research problems in signal processing, image and multimedia processing. 20d. Demonstrate additional abilities to manage and design any communication system.

Graduate Attributes

The graduates from Communication Systems Engineering Program:

- Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- Behave professionally and adhere to engineering ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business administration and entrepreneurial skills.
- Select, model and analyze a communication system that satisfies a given specification.
- Design, model and analyze electronic / communication system or component for a specific application; and identify the tools required to optimize this design.
- Design and implement elements, modules, sub-systems or systems in communication systems engineering using technological and professional tools.
- Estimate and measure the performance of electronic / communication system or circuit under specific input excitation, and evaluate its suitability for a specific application.
- Use fundamental knowledge to investigate new and emerging technologies and synthesize solutions to communication systems engineering problems.
- Demonstrate additional abilities to design analog and/or digital circuits of any electronic system.
- Demonstrate additional abilities to analyze, design any microwave or optical communication system.
- Demonstrate additional abilities to work on state-of-the-art research problems in signal processing, image and multimedia processing.
- Demonstrate additional abilities to manage and design any communication system.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Communication Systems Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	12	1	2	15
	Faculty of Engineering Requirements	34	67	1675	26	27	17	70
PHM211	Differential and Partial Differential Equations	3	5	125	2	2	0	4
PHM214	Complex Variables, Special Functions and Numerical Analysis	3	4	100	2	2	0	4
PHM222	Modern Physics and Quantum Mechanics	3	5	125	2	2	1	5
PHM223	Thermal and Statistical Physics	3	6	150	2	2	0	4
ECE221	Electronic Materials	3	5	125	2	2	0	4
ECE222	Solid State Electronic Devices	3	6	150	2	2	0	4
ECE321	Electronic Circuits (1)	3	5	125	2	2	1	5
ECE322	Digital Circuit Design	3	5	125	2	2	0	4
ECE323	Electronic Circuits (2)	3	5	125	2	2	0	4
ECE241	Electrostatics and Magnetostatics	3	5	125	2	2	0	4
ECE242	Electromagnetic Waves	3	5	125	2	2	1	5
ECE341	Microwave Engineering	3	5	125	2	2	1	5
ECE442	Optical Fiber Communications	4	5	125	3	2	1	6
ECE261	Signals and Systems	3	5	125	2	2	1	5
ECE361	Analog Communications	3	5	125	2	2	1	5
ECE362	Digital Signal Processing	3	5	125	2	2	1	5
ECE363	Digital Communications	3	5	125	2	2	1	5
ECE364	Communication Networks (1)	3	5	125	2	2	0	4
ECE461	Communication Networks (2)	3	5	125	2	2	0	4
ECE462	Information Theory and Coding	3	5	125	2	1	2	5
CSE222	Digital Logic Design	3	5	125	2	2	0	4
CSE321	Computer Organization and Architecture	3	5	125	2	2	0	4
CSE481	Control Systems	3	5	125	2	2	0	4
EPM111	Engineering Economy and Investments*	2	3	75	2	1	0	2
EPM217	Fundamentals of Electrical Circuits	3	6	150	2	2	1	5
-	COMM Elective (1)	3	5	125	2	2	0	4
-	COMM Elective (2)	3	5	125	2	2	0	4
-	COMM Elective (3)	3	5	125	2	2	0	4
-	COMM Elective (4)	3	5	125	2	2	0	4
	COMM Elective (5)	3	5	125	2	2	0	4
	COMM Elective (6)	3	5	125	2	2	0	4
ECE492	COMM Graduation Project (2)	2	3	75	1	2	0	3
ECE494	COMM Graduation Project (3)	4	7	175	0	8	0	8
Total		144	250	6250	102	98	31	230
Pool of COMM Electives (1) to (6) for Circuits and Systems Concentrations								
ECE421	Analog Integrated Circuits Design	3	5	125	2	2	0	4
ECE422	ASIC Design and Automation	3	5	125	2	1	2	5
ECE423	RF Circuit Design	3	5	125	2	2	0	4
ECE424	VLSI Technology	3	5	125	2	2	0	4
ECE425	Selected Topics in Electronic Circuits	3	5	125	2	2	0	4
ECE426	Selected Topics in Electronic Systems	3	5	125	2	1	2	5
CSE322	Introduction to Embedded Systems	3	5	125	2	0	2	4
Pool of COMM Electives (1) to (6) Physical and Wave Electronics Concentrations								
ECE443	Microwave Circuits and systems	3	5	125	2	2	0	4
ECE444	Optoelectronics Devices	3	5	125	2	2	0	4
ECE445	Photonics Micro-Systems	3	5	125	2	2	0	4
ECE446	Microwave Measurements	3	5	125	2	1	2	4
ECE447	Optical Sensing and Instrumentation	3	5	125	2	2	1	5
ECE448	Selected Topics in Wave Electronics	3	5	125	2	2	0	4
ECE449	Selected Topics in Optics	3	5	125	2	2	0	4
Pool of COMM Electives (1) to (6) for Signals and Communication Systems Concentrations								
ECE463	Wireless Communications	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ECE464	Mobile Communications	3	5	125	2	2	0	4
ECE465	Signal Processing for Multimedia	3	5	125	2	2	1	5
ECE466	Satellite Communications	3	5	125	2	2	0	4
ECE467	Machine Learning for Multimedia	3	5	125	2	2	1	5
ECE468	Selected Topics in Signals	3	5	125	2	2	1	5
ECE469	Selected Topics in Communications	3	5	125	2	2	0	4

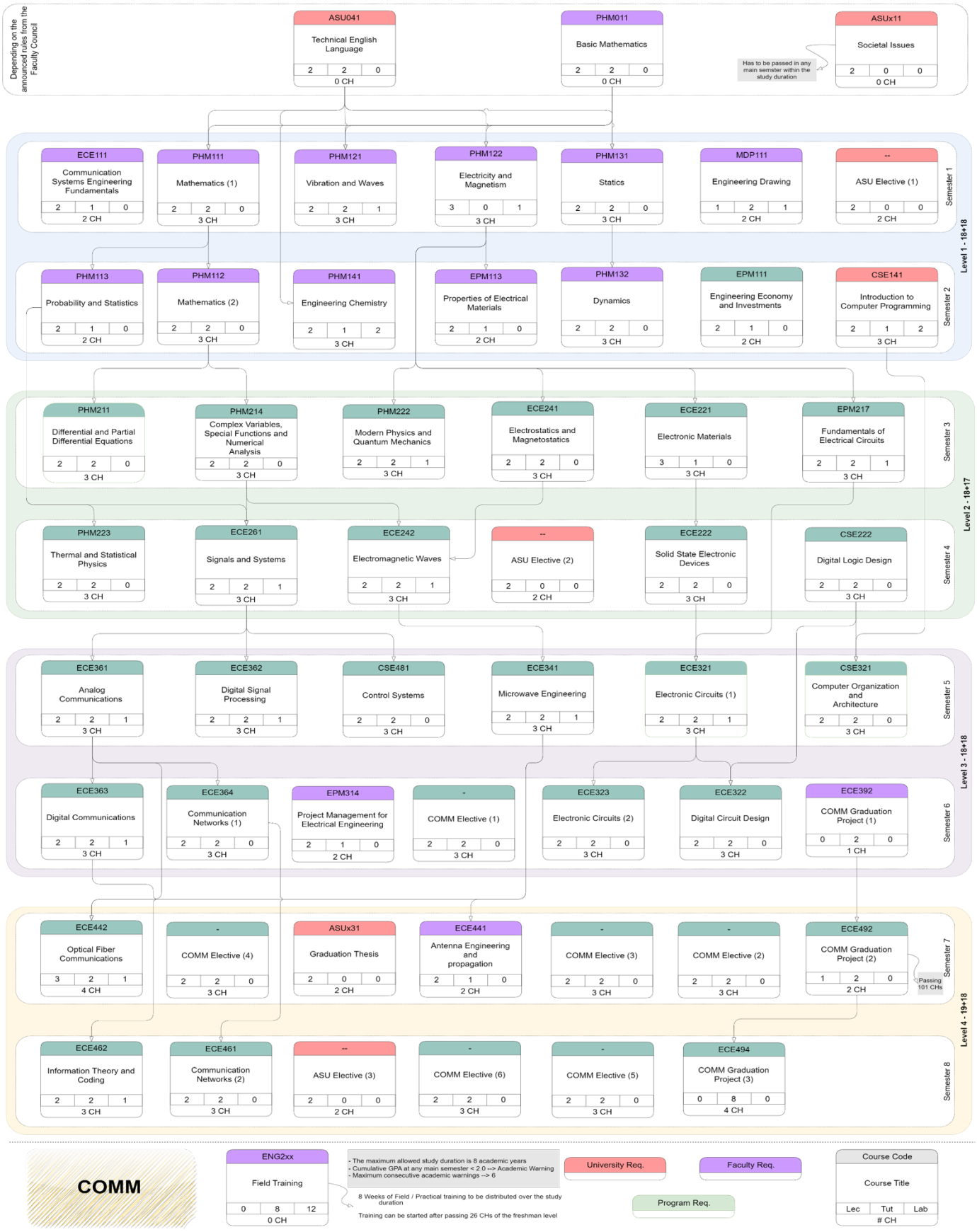
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM131	Statics	3	5	125	2	2	0	4	ASU041* AND PHM011*
ECE121	Communication Systems Engineering Fundamentals	2	3	75	2	1	0	2	
MDP111	Engineering Drawing	2	4	100	1	2	1	4	
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	13	11	3	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM132	Dynamics	3	5	125	2	2	0	4	PHM131
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
EPM113	Properties of Electrical Materials	2	5	125	2	1	0	2	PHM122
EPM111	Engineering Economy and Investments	2	3	75	2	1	0	2	
CSE141	Introduction to Computer Programming	3	4	100	2	1	2	5	
Total		18	30	750	14	9	4	24	
Semester (3)									
PHM211	Differential and Partial Differential Equations	3	5	125	2	2	0	4	PHM112
PHM214	Complex Variables, Special Functions and Numerical Analysis	3	4	100	2	2	0	4	PHM112
PHM222	Modern Physics and Quantum Mechanics	3	5	125	2	2	1	5	PHM122
ECE221	Electronic Materials	3	5	125	2	2	0	4	PHM122
ECE241	Electrostatics and Magnetostatics	3	5	125	2	2	0	4	PHM122
EPM217	Fundamentals of Electrical Circuits	3	6	150	2	2	1	5	PHM122
Total		18	30	750	12	12	2	26	
Semester (4)									
PHM223	Thermal and Statistical Physics	3	6	150	3	1	0	4	PHM113
ECE222	Solid State Electronic Devices	3	6	150	2	2	0	4	ECE221
ECE242	Electromagnetic Waves	3	5	125	2	2	1	5	PHM214 AND ECE241
ECE261	Signals and Systems	3	5	125	2	2	1	5	PHM113 AND PHM214
CSE222	Digital Logic Design	3	5	125	2	2	0	4	
-	ASU Elective (2)	2	3	75	2	0	0	2	
Total		17	30	750	13	9	2	24	
Semester (5)									
ECE321	Electronic Circuits (1)	3	5	125	2	2	1	5	ECE222 AND EPM217
ECE341	Microwave Engineering	3	5	125	2	2	1	5	ECE242
ECE361	Analog Communications	3	5	125	2	2	1	5	ECE261
ECE362	Digital Signal Processing	3	5	125	2	2	1	5	ECE261
CSE321	Computer Organization and Architecture	3	5	125	2	2	0	4	CSE141 AND CSE222
CSE481	Control Systems	3	5	125	3	1	0	4	ECE261
Total		18	30	750	13	11	4	28	
Semester (6)									
ECE322	Digital Circuit Design	3	5	125	2	2	0	4	ECE321 AND CSE222
ECE323	Electronic Circuits (2)	3	5	125	2	2	0	4	ECE321
ECE363	Digital Communications	3	5	125	2	2	1	5	ECE361
ECE364	Communication Networks (1)	3	5	125	2	2	0	4	ECE361
EPM314	Project Management for Electrical Engineering	2	3	75	2	1	0	2	
-	COMM Elective (1)	3	5	125	2	2	0	4	

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
ECE392	COMM Graduation Project (1)	1	2	50	0	2	0	2	
Total		18	30	750	12	13	1	25	
Semester (7)									
ECE441	Antenna Engineering and propagation	2	4	100	2	1	0	2	ECE341
ECE442	Optical Fiber Communications	4	5	125	3	2	1	6	ECE341 AND ECE361
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	COMM Elective (2)	3	5	125	2	2	0	4	
-	COMM Elective (3)	3	5	125	2	2	0	4	
-	COMM Elective (4)	3	5	125	2	2	0	4	
ECE492	COMM Graduation Project (2)	2	3	75	1	2	0	3	ECE392
Total		19	30	750	14	11	1	25	
Semester (8)									
ECE461	Communication Networks (2)	3	5	125	2	2	0	4	ECE364
ECE462	Information Theory and Coding	3	5	125	2	1	2	5	ECE363
-	ASU Elective (3)	2	3	75	2	0	0	2	
-	COMM Elective (5)	3	5	125	2	2	0	4	
-	COMM Elective (6)	3	5	125	2	2	0	4	
ECE494	COMM Graduation Project (3)	4	7	175	0	8	0	8	ECE492
Total		18	30	750	10	15	2	27	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Communication Systems Engineering' Program

Program 19: Energy and Renewable Energy Engineering Program "ERGY"

Program Description

The program is an interdisciplinary program that covers the energy studies from electrical and mechanical points of view. It aims to study both conventional energy and renewable sources energy. Energy's flows, constraints, generation, transmission, distribution, consumption, and management knowledge are acquired through the period of study. Students are provided with a deep knowledge of conventional and renewable energy technologies generation and applications. Thermal power plants, machine construction, design, and stability are topics covered. Hydro, tidal, wave, wind, solar photovoltaic, solar thermal, concentrated solar power, biomass, geothermal and others are studied. Renewable energy applications are illustrated and evaluated both theoretically and economically. Power system networks (transmission and distribution) control and Modeling are explained. Energy management is discussed in detail using demand side management, energy efficiency, and energy consumption and audit are explained in detail. Finally, the program encourages problem identification and solving as well as critical thinking skills. All topics under study prepare the program graduates for the national, regional and international energy job market.

Career Prospects

This program qualifies its graduates to work in electrical power engineering, mechanical power engineering, energy and renewable energy engineering fields. Graduates can join electrical sector entities such as generation (conventional and renewable), transmission, and distribution companies either public or private. Power plants, control centres, petroleum industry, factories, maintenance applications, and energy management sectors can be a target for the program's graduates. Distribution installations, refrigeration and Air Conditioning, water desalination and distillation applications, and solar pumping fields are candidate jobs for the energy graduates.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water & Sanitation
☒ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☒ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

There are no specified concentrations in this Program.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from

the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Energy and Renewable Energy Engineering Program graduate must be able to:

14. Model and analyse electrical power systems and electrical machines by applying energy systems concepts of: generation, transmission, distribution and protection of electrical power systems;
15. Select, analyse and control appropriate driving systems for different energy applications;
16. Model, analyse and design energy systems by applying energy concepts of: Thermal-fluid Mechanics, solid Mechanics, Material Properties and processing, Measurements, Control Systems, Dynamics and Vibrations;
17. Design of mechanical energy systems using appropriate materials via both traditional and computer-aided tools;
18. Select proper mechanical equipment according to the required specification;
19. Adopt suitable standards and codes to: design, build, operate, inspect and maintain mechanical energy systems;
20. Identify, analysis and evaluate the energy's conversion processes and management techniques;
21. Indicate and relate smart applications for energy systems; and
22. Test and evaluate the performance and suitability of energy systems.

Graduate Attributes

The graduates from Energy and Renewable Energy Engineering Program:

- Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- Behave professionally and adhere to engineering ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the renewable energy field and contribute to the envelopment of the profession and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business administration and entrepreneurial skills.
- Select, analyze and control appropriate driving systems for different energy application.
- Design of mechanical energy systems using appropriate materials via both traditional and computer-aided tools.
- Identify, analysis and evaluate the energy's conversion processes and management techniques.

- Test and evaluate the performance and suitability of energy systems.
- Distinguish the layout for Power generation stations and their related distribution network.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Energy and Renewable Energy Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	11	4	1	16
	Faculty of Engineering Requirements	34	67	1675	25	26	18	69
PHM211	Differential and Partial Differential Equations	3	5	125	2	2	0	4
EPM112	Renewable Energy Resources	2	3	75	2	0	0	2
EPM212	Electromagnetic Fields	3	5	125	2	2	0	4
EPM215	Electrical Circuits	3	5	125	2	2	1	5
EPM216	Electrical and Digital Measurement*	2	3	75	2	0	1	2
EPM313	Fundamentals of PV	3	5	125	2	2	1	5
EPM323	Direct Current Machines and Transformers	3	5	125	2	2	1	5
EPM324	Alternating Current Machines	3	5	125	2	2	1	5
EPM231	Electrical Power Engineering*	2	3	75	2	1	0	2
EPM334	Power System analysis	3	5	125	2	2	0	4
EPM335	Electrical Distribution System Installations	3	5	125	2	2	1	5
EPM353	Power Electronics for Energy Applications (1)	3	5	125	2	2	1	5
EPM354	Power Electronics for Energy Applications (2)	3	6	150	2	2	1	5
EPM251	Industrial Electronics*	2	3	75	2	1	0	2
EPM457	Electric Drives	3	5	125	2	2	1	5
EPM462	Protection Engineering in Power Systems	3	6	150	2	2	1	5
EPM372	Automatic Control Systems	3	5	125	2	2	0	4
EPM437	Economics of Generation*	2	4	100	2	1	0	2
MEP215	Basics of Thermal Physics*	2	4	100	2	1	0	2
MEP216	Thermodynamics*	2	4	100	2	1	0	2
MEP217	Fundamentals of Fluid Mechanics	3	5	125	2	2	1	5
MEP218	Fundamentals of Heat Transfer	3	5	125	2	2	0	4
MEP314	Solar Energy	3	4	100	2	2	0	4
MEP419	Wind Energy	3	5	125	2	2	0	4
MEP321	Incompressible Flow Machines	3	6	150	2	2	1	5
MEP432	Compressible Flow Machines	3	6	150	2	2	1	5
MEP438	Refrigeration and Air Conditioning	3	5	125	2	2	1	5
MDP211	Machine Construction	3	5	125	2	2	1	5
-	ERGY Elective (1)	3	4	100	2	2	0	4
-	ERGY Elective (2)	3	4	100	2	2	0	4
-	ERGY Elective (3)	3	4	100	2	2	0	4
-	ERGY Elective (4)	3	4	100	2	2	0	4
-	ERGY Elective (5)	2	3	75	2	0	0	2
-	ERGY Elective (6)	2	3	75	2	0	0	2
EPM493	ERGY Graduation Project (2)	3	5	125	1	4	0	5
EPM494	ERGY Graduation Project (3)	3	6	150	0	6	0	6
Total		144	250	6250	105	95	34	228
Pool of ERGY Elective (1) & (2) & (3) & (4) Courses								
EPM312	Microcontroller Applications	3	4	100	2	2	1	5
EPM412	Energy Management Essentials	3	4	100	2	2	0	4
EPM436	Advanced Control on Power Systems	3	4	100	2	2	0	4
EPM455	Electrical Power Quality	3	4	100	2	2	0	4
EPM373	Smart Grid	3	4	100	2	2	0	4
EPM484	Selected Topics in Energy Generation Engineering	3	4	100	2	2	0	4
EPM485	Selected Topics in Energy Management Engineering	3	4	100	2	2	0	4
MEP312	Combustion	3	5	125	2	2	1	5
MEP412	Internal Combustion Engines	3	4	100	2	2	1	5
MEP411	Thermal Power Plants	3	5	125	2	2	1	5

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
MEP418	Biomass and waste Conversion Technology	3	4	100	2	2	0	4
MEP425	Hydro-Tidal and Wave Energy	3	4	100	2	2	0	4
MEP426	Water Treatment	3	4	100	2	2	0	4
MDP471	Quality Control	3	5	125	2	2	0	4
Pool of ERGY Elective (5) & (6) Courses								
EPM411	Energy Project Management*	2	3	75	2	1	0	3
EPM435	Computer Applications in Power Engineering*	2	4	100	2	0	1	3
EPM481	Climate and Energy*	2	3	75	2	1	0	3
EPM482	Energy policy and Leadership*	2	3	75	2	1	0	3
EPM483	Community Based Energy Innovation*	2	3	75	2	1	0	3
EPM486	Energy Markets and Economics*	2	3	75	2	1	0	3

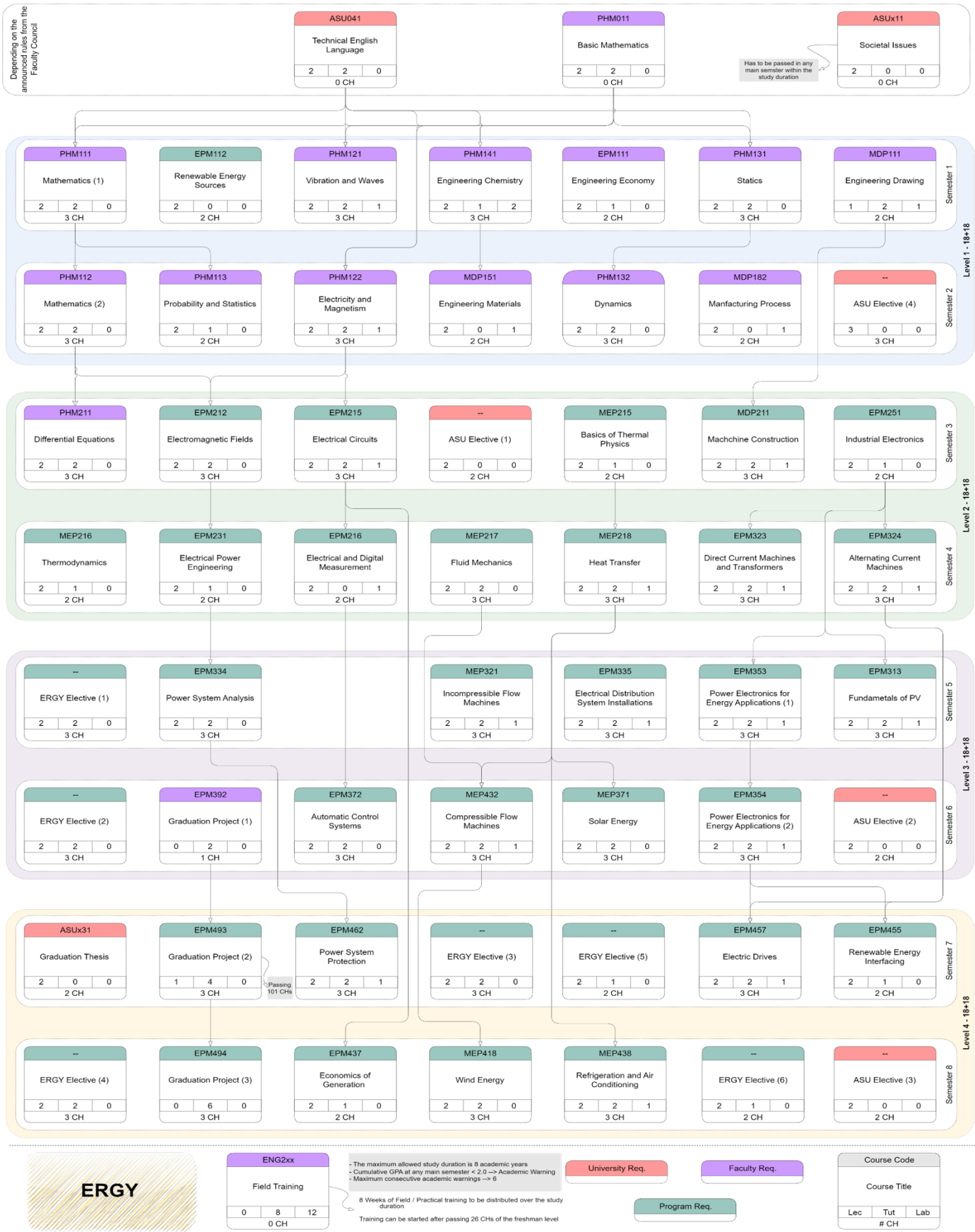
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM131	Statics	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
EPM111	Engineering Economy and Investments	2	3	75	2	1	0	2	
EPM112	Renewable Energy Resources	2	3	75	2	0	0	2	
MDP111	Engineering Drawing	2	4	100	1	2	1	4	
Total		18	30	750	13	10	4	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM132	Dynamics	3	5	125	2	2	0	4	PHM131
MDP151	Engineering Materials	2	4	100	2	0	1	2	
MDP182	Manufacturing Processes	2	4	100	2	0	1	2	
-	ASU Elective (4)	3	4	100	3	0	0	3	
Total		18	30	750	15	7	3	22	
Semester (3)									
PHM211	Differential and Partial Differential Equations	3	5	125	2	2	0	4	PHM112
EPM212	Electromagnetic Fields	3	5	125	3	1	0	4	PHM112 AND PHM122
EPM215	Electrical Circuits	3	5	125	2	2	1	5	PHM122
EPM251	Industrial Electronics	2	3	75	2	1	0	2	
MEP215	Basics of Thermal Physics	2	4	100	2	1	0	2	
MDP211	Machine Construction	3	5	125	2	2	1	5	MDP111
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	15	9	2	24	
Semester (4)									
EPM216	Electrical and Digital Measurement	2	3	75	2	0	1	2	
EPM323	Direct Current Machines and Transformers	3	5	125	2	2	1	5	EPM215
EPM324	Alternating Current Machines	3	5	125	2	2	1	5	EPM215
EPM231	Electrical Power Engineering	2	3	75	2	1	0	2	EPM212
MEP216	Thermodynamics	2	4	100	2	1	0	2	MEP215
MEP217	Fundamentals of Fluid Mechanics	3	5	125	2	2	0	4	
MEP218	Fundamentals of Heat Transfer	3	5	125	2	2	1	5	MEP215
Total		18	30	750	14	10	4	25	
Semester (5)									
EPM313	Fundamentals of PV	3	5	125	2	2	1	5	EPM251
EPM334	Power System analysis	3	5	125	2	2	0	4	EPM231
EPM335	Electrical Distribution System Installations	3	5	125	2	2	1	5	
EPM353	Power Electronics for Energy Applications (1)	3	5	125	2	2	1	5	EPM251
MEP321	Incompressible Flow Machines	3	6	150	2	2	1	5	MEP217
-	ERGY Elective (1)	3	4	100	2	2	0	4	
Total		18	30	750	12	12	4	28	
Semester (6)									

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
EPM354	Power Electronics for Energy Applications (2)	3	6	150	2	2	1	5	EPM353
EPM372	Automatic Control Systems	3	5	125	2	2	0	4	EPM216
MEP314	Solar Energy	3	4	100	2	2	0	4	MEP218
MEP432	Compressible Flow Machines	3	6	150	2	2	1	5	MEP217 AND MEP218
-	ASU Elective (2)	2	3	75	2	0	0	2	
-	ERGY Elective (2)	3	4	100	2	2	0	4	
EPM392	ERGY Graduation Project (1)	1	2	50	0	2	0	2	
Total		18	30	750	12	12	2	26	
Semester (7)									
EPM456	Renewable Resources Interfacing	2	4	100	2	1	0	3	EPM324 AND EPM354
EPM457	Electric Drives	3	5	125	2	2	1	5	EPM324 AND EPM354
EPM462	Protection Engineering in Power Systems	3	6	150	2	2	1	5	EPM334
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	ERGY Elective (3)	3	4	100	2	2	0	4	
-	ERGY Elective (5)	2	3	75	2	0	0	2	
EPM493	ERGY Graduation Project (2)	3	5	125	1	4	0	5	EPM392
Total		18	30	750	13	11	2	26	
Semester (8)									
EPM437	Economics of Generation	2	4	100	2	1	0	2	EPM215
MEP419	Wind Energy	3	5	125	2	2	0	4	MEP432
MEP438	Refrigeration and Air Conditioning	3	5	125	2	2	1	5	MEP217 AND MEP218
-	ASU Elective (3)	2	3	75	2	0	0	2	
-	ERGY Elective (4)	3	4	100	2	2	0	4	
-	ERGY Elective (6)	2	3	75	2	0	0	2	
EPM494	ERGY Graduation Project (3)	3	6	150	0	6	0	6	EPM493
Total		18	30	750	12	13	1	25	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Energy and Renewable Energy Engineering' Program

Program 20: Computer and Artificial Intelligence Engineering Program "CAIE"

Program Description

The systematic development of high-quality computer, intelligent, and software systems that are concerned with quality, cost, time, and several other requirements, demands well-qualified engineers in this field. Computer engineering, artificial intelligence, and software engineering are ones of the most promising fields in engineering and are considered important milestones in the ever-growing information technology sector. Targeted computer and artificial intelligence engineers develop algorithms and train neural networks to build intelligent tools and real-world smart applications. The main objective of this program is to graduate highly qualified engineers who are specifically experts in software development, data science, and programming. Therefore, graduates of this program are trained to apply engineering principles in each phase of software development life-cycle; requirements analysis, design, validation, implementation, testing, documentation, and management. This program focuses on modern methodologies in computer, intelligent, and software industry that represents, without a doubt, an important sector of the national economy.

Career Prospects

Graduates of this program will establish technical leadership proficiencies in the discipline of computer and artificial intelligence engineering. In addition, they will contribute as skilful engineers who are capable of participating and cooperating productively in their respective fields. The CAIE program opens the door to a world of high-level career opportunities to its graduates in computer engineering, artificial intelligence, software engineering, distributed and mobile computing, embedded systems, computer security, multimedia systems, data science, and others. Therefore, this program will meet the increasing demand for this specialization to address the market needs at the national, regional, and international levels.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☒ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water & Sanitation
☒ GOAL 7: Affordable & Clean Energy	☒ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☒ GOAL 12: Responsible Consumption & Production
☒ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

Elective courses are distributed in the following four concentrations. The student has to select seven technical elective courses for a total of (18) credit hours with at least five of these courses from one of the mentioned fields.

1. Multimedia and Computer Graphics: This concentration prepares the graduate to work in the field of graphics software development, including image processing, computer vision, computer animation, and games development.

2. Distributed and Mobile Computing: This concentration prepares the graduate to work in the field of distributed systems and networking, including cloud computing, wireless and mobile networks, digital forensics, IOT, and parallel computing.

3. Software Product Lines: This concentration prepares the graduate to work as a full-fledged software engineer who deeply understands all software development processes and aspects, including financial, managerial, and design, security, and performance aspects.

4. Data Science: This concentration prepares the graduate to work as a data scientist by covering a wide range of topics, including big-data, machine learning, deep learning, and various applications such as bioinformatics and business intelligence.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee to substitute expenses for the external Quality Audits/Moderation Boards. Graduates should receive two B.Sc. certificates, one from Ain Shams University, and another from the University of East London. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Computer and Artificial Intelligence Engineering Program graduate must be able to:

14. Design and implement elements, modules, sub-systems or systems using technological and professional tools.
15. Select and analyse appropriate design techniques for computer and artificial intelligence engineering.
16. Estimate and measure the performance of a digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
17. Identify needs, plan and manage resources, and gather information for solving a specific digital problem and document and communicate this solution efficiently.
18. Carry out design, development, testing, debugging, operation and maintenance of digital systems/services such as computer systems, circuit boards, software systems, and mixed (embedded) systems.
19. Establish an environment to build, test and release digital systems in a more rapid, frequent and reliable manner by emphasizing the collaboration and communication of developers and operations team members.
20. Select the most suitable technologies to deploy solutions to various kinds of problems and develop solutions using them
21. Abide to software engineering standards and best practices
22. Demonstrate additional abilities related to the field of the concentration within computer and artificial intelligence engineering as listed below:

Concentration	Competence
Multimedia and Computer Graphics	22a. Demonstrate additional abilities to model, analyse, and design multimedia and computer graphics systems potentially including pattern recognition, computer vision, computer animation, gaming, visualization, and/or human-computer interaction
Distributed and Mobile Computing	22b. Demonstrate additional abilities to model, analyse, manage, and design secure distributed and mobile computing systems potentially including cloud computing systems, distributed embedded systems, and/or various forms of parallelism

Concentration	Competence
Software Product Lines	22c. Demonstrate additional abilities to analyse, evaluate, design, and integrate secure, reliable, and high-quality software solutions including managing the necessary software engineering processes and the corresponding business model
Data Science	22d. Demonstrate additional abilities to model, design, and implement intelligent data science applications potentially requiring data mining, machine learning, deep learning, analytics, and text understanding

Graduate Attributes

The graduates from Computer and Artificial Intelligence Engineering Program:

- Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- Behave professionally and adhere to engineering ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business administration and entrepreneurial skills.
- Design and implement elements, modules, sub-systems, or systems using technological and professional tools.
- Select and analyse appropriate design techniques for computer engineering and software systems.
- Estimate and measure the performance of a digital system and circuit under specific input excitation and evaluate its suitability for a specific application.
- Identify needs, plan and manage resources, and gather information for solving a specific digital problem and document and communicate this solution efficiently.
- Carry out design, development, testing, debugging, operation, and maintenance of digital systems/services such as computer systems, circuit boards, software systems, and mixed (embedded) systems.
- Establish an environment to build, test and release digital systems in a more rapid, frequent, and reliable manner by emphasizing the collaboration and communication of developers and operations team members.
- Select the most suitable technologies to deploy solutions to various kinds of problems and develop solutions using them.
- Abide to software engineering standards and best practices.
- Demonstrate additional abilities related to the field of the concentration within computer and artificial intelligence engineering.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Computer and Artificial Intelligence Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	12	1	2	15
	Faculty of Engineering Requirements	34	68	1700	27	25	16	68
PHM114	Introduction to Discrete Mathematics*	2	3	75	2	1	0	2
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
CSE221	Logic Design and Computer Organization	4	7	175	3	2	1	6
CSE322	Introduction to Embedded Systems	3	5	125	2	0	2	4
CSE323	Advanced Embedded Systems Design	3	5	125	2	0	2	4
CSE421	High-Performance Computing	3	5	125	2	2	0	4
CSE241	Object-Oriented Computer Programming	3	5	125	2	1	2	5
CSE242	Advanced Software Engineering	3	5	125	2	2	0	4
CSE243	Data Structures and Problem solving	3	5	125	2	1	2	5
CSE244	Database Systems Design	3	5	125	2	2	1	5
CSE245	Advanced Algorithms and Complexity	3	5	125	2	2	1	5
CSE246	Design of Operating Systems	3	5	125	2	2	0	4
CSE247	Design of Compilers	3	5	125	2	2	0	4
CSE341	Software Testing, Validation, and Verification*	2	4	100	2	0	1	2
CSE342	Agile Software Development*	2	3	75	2	0	1	2
CSE343	Web Development	3	5	125	2	0	3	5
CSE441	Design Patterns*	2	3	75	2	1	0	3
CSE442	Mobile Applications Development*	2	4	100	2	0	1	2
CSE361	Computer Networking	3	5	125	2	2	1	5
CSE362	Distributed Computing	3	4	100	2	2	1	5
CSE461	Cryptography and Security	3	4	100	2	2	0	4
CSE281	Introduction to Artificial Intelligence	3	5	125	2	2	0	4
CSE382	Introduction to Machine learning	3	5	125	2	2	0	4
CSE481	Control Systems	3	5	125	3	1	0	4
ECE261	Signals and Systems	3	5	125	2	2	1	5
EPM111	Engineering Economy and Investments*	2	3	75	2	1	0	3
-	CAIE Elective (1)	3	5	125	2	2	0	4
-	CAIE Elective (2)	3	5	125	2	2	0	4
-	CAIE Elective (3)	3	5	125	2	2	0	4
-	CAIE Elective (4)	3	5	125	2	2	0	4
	CAIE Elective (5)	3	5	125	2	2	0	4
	CAIE Elective (6)	3	5	125	2	2	0	4
	CAIE Elective (7)	3	5	125	2	2	0	4
CSE493	CAIE Graduation Project (2)	2	4	100	1	2	1	4
CSE494	CAIE Graduation Project (3)	3	5	125	0	6	0	6
Total		144	250	6250	108	82	39	225
Pool of CAIE Elective Courses for 'Multimedia and Computer Graphics' Concentration								
CSE383	Computer Graphics	3	5	125	2	2	0	4
CSE384	Game Design and Development	3	5	125	2	2	0	4
CSE385	Human-Computer Interaction	3	5	125	2	2	0	4
CSE386	Visualization	3	5	125	2	2	0	4
CSE482	Computer Vision	3	5	125	2	2	0	4
CSE483	Computer Animation	3	5	125	2	2	0	4
CSE484	Digital Video Engineering	3	5	125	2	2	0	4
CSE485	Selected Topics in Multimedia and Computer Graphics	3	5	125	2	2	0	4
Pool of CAIE Elective Courses for 'Distributed and Mobile Computing' Concentration								
CSE423	Quantum Computing	3	5	125	2	2	0	4
CSE444	Parallel and Distributed Algorithms	3	4	100	2	2	0	4
CSE363	Introduction to Network Operations and Management	3	5	125	2	2	0	4
CSE364	Mobile and Wireless Networks	3	5	125	2	2	0	4
CSE365	Internet of Things	3	5	125	2	2	0	4
CSE462	Virtualization and Cloud Computing	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
CSE463	Computer and Network Forensics	3	5	125	2	2	0	4
CSE464	Selected Topics in Distributed and Mobile Computing	3	5	125	2	2	0	4
Pool of CAIE Elective Courses for 'Software Product Lines' Concentration								
CSE345	Business Process Modeling	3	5	125	2	2	0	4
CSE346	Program Analysis	3	5	125	2	2	0	4
CSE347	Software Engineering Process Management	3	5	125	2	2	0	4
CSE348	Software Formal Specifications	3	5	125	2	2	0	4
CSE445	Software Quality Assurance	3	5	125	2	2	0	4
CSE446	Software Performance Evaluation	3	5	125	2	2	0	4
CSE447	Aspect- and Service-Oriented Software Systems	3	5	125	2	2	0	4
CSE448	Secure Code Development	3	5	125	2	2	0	4
CSE449	Selected Topics in Software Product Lines	3	5	125	2	2	0	4
Pool of CAIE Elective Courses for 'Data Science' Concentration								
CSE324	Algorithms for Electronic Design Automation	3	5	125	2	2	0	4
CSE422	Embedded Operating Systems	3	5	125	2	2	0	4
CSE349	Advanced Database Systems Design	3	4	100	2	2	0	4
CSE387	Data Mining and Business Intelligence	3	5	125	2	2	0	4
CSE388	Computational Intelligence	3	5	125	2	2	0	4
CSE389	Natural Language Processing	3	5	125	2	2	0	4
CSE486	Big-Data Analytics	3	5	125	2	2	0	4
CSE487	Bioinformatics	3	5	125	2	2	0	4
CSE488	Deep Learning	3	5	125	2	2	0	4
CSE489	Selected Topics in Data Science	3	5	125	2	2	0	4

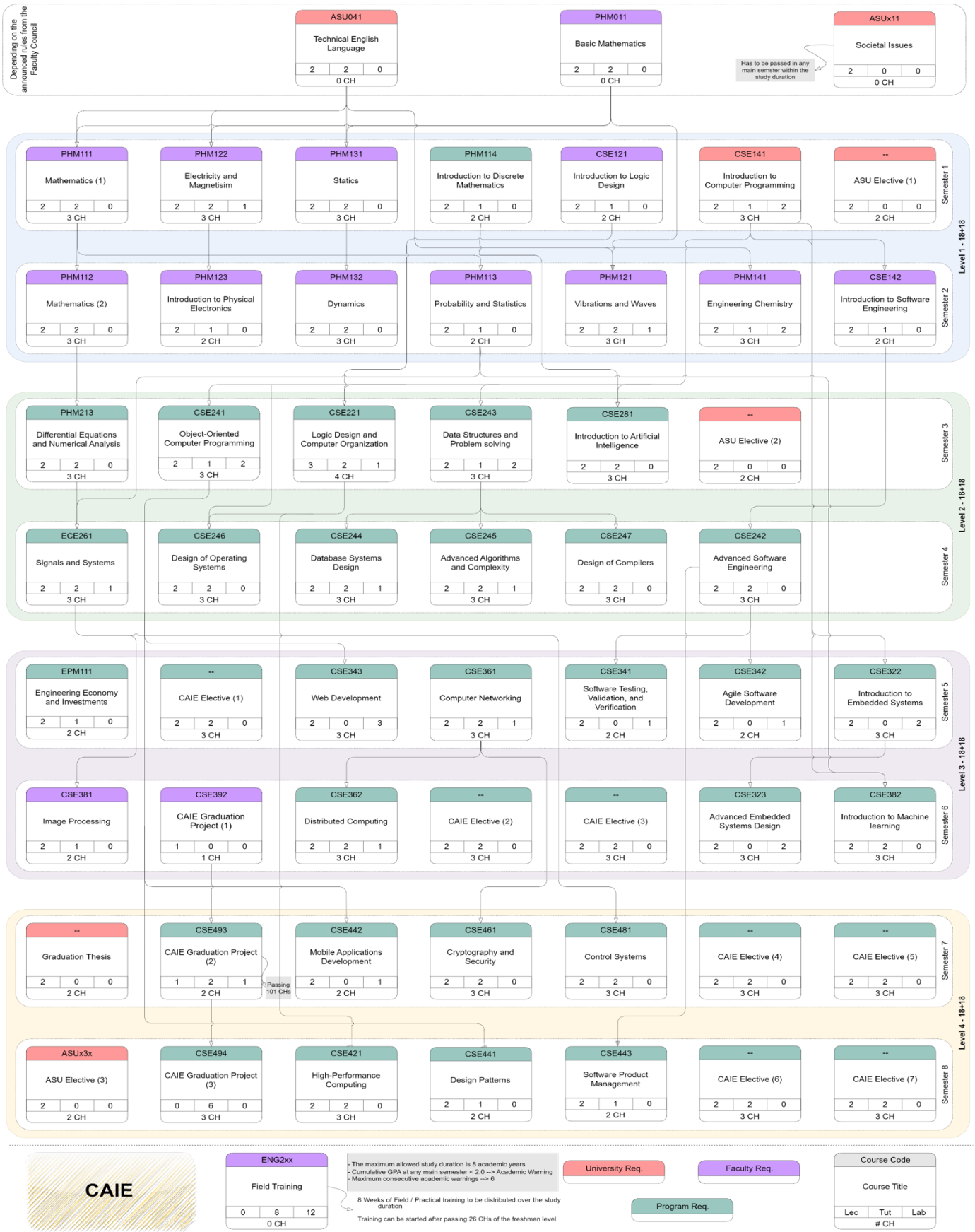
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM131	Statics	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM114	Introduction to Discrete Mathematics	2	3	75	2	1	0	2	
CSE121	Introduction to Logic Design	2	5	125	2	1	0	2	
CSE141	Introduction to Computer Programming	3	4	100	2	1	2	5	
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	14	9	3	24	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	3	PHM111
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM123	Introduction to Physical Electronics	2	3	75	2	1	0	3	PHM122
PHM132	Dynamics	3	5	125	2	2	0	4	PHM131
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
CSE142	Introduction to Software Engineering	2	4	100	2	1	0	2	CSE141
Total		18	30	750	14	10	3	26	
Semester (3)									
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4	PHM112
CSE221	Logic Design and Computer Organization	4	7	175	3	2	1	6	CSE141 AND CSE121
CSE241	Object-Oriented Computer Programming	3	5	125	2	1	2	5	CSE141
CSE243	Data Structures and Problem solving	3	5	125	2	1	2	5	CSE141
CSE281	Introduction to Artificial Intelligence	3	5	125	3	1	0	4	PHM114 AND CSE141
-	ASU Elective (2)	2	3	75	2	0	0	2	
Total		18	30	750	14	7	5	26	
Semester (4)									
CSE242	Advanced Software Engineering	3	5	125	2	2	0	4	CSE142
CSE244	Database Systems Design	3	5	125	2	2	1	5	CSE243
CSE245	Advanced Algorithms and Complexity	3	5	125	2	2	1	5	CSE243
CSE246	Design of Operating Systems	3	5	125	2	2	0	4	CSE141 AND CSE221
CSE247	Design of Compilers	3	5	125	2	2	0	4	CSE243
ECE261	Signals and Systems Fundamentals	3	5	125	2	2	1	5	PHM113 AND PHM213

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Total		18	30	750	12	12	3	27	
Semester (5)									
CSE322	Introduction to Embedded Systems	3	5	125	2	0	2	4	CSE141
CSE341	Software Testing, Validation, and Verification	2	4	100	2	0	1	2	CSE242
CSE342	Agile Software Development	2	3	75	2	0	1	2	CSE242
CSE343	Web Development	3	5	125	2	0	3	5	CSE241
CSE361	Computer Networking	3	5	125	2	2	1	5	
EPM111	Engineering Economy and Investments	2	3	75	2	1	0	3	
-	CAIE Elective (1)	3	5	125	2	2	0	4	
Total		18	30	750	14	5	8	25	
Semester (6)									
CSE323	Advanced Embedded Systems Design	3	5	125	2	0	2	4	CSE322
CSE362	Distributed Computing	3	4	125	2	2	1	5	CSE241 AND CSE361
CSE381	Image Processing	2	4	100	2	1	0	2	ECE261
CSE382	Introduction to Machine learning	3	5	125	2	2	0	4	PHM113 AND CSE141
-	CAIE Elective (2)	3	5	125	2	2	0	4	
-	CAIE Elective (3)	3	5	125	2	2	0	4	
CSE392	CAIE Graduation Project (1)	1	2	50	1	0	0	1	
Total		18	30	775	13	9	3	24	
Semester (7)									
CSE442	Mobile Applications Development	2	4	100	2	0	1	2	CSE241
CSE461	Cryptography and Security	3	4	100	2	2	0	4	CSE361
CSE481	Control Systems	3	5	125	2	2	0	4	ECE261
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	CAIE Elective (4)	3	5	125	2	2	0	4	
-	CAIE Elective (5)	3	5	125	2	2	0	4	
CSE493	CAIE Graduation Project (2)	2	4	100	1	2	1	4	CSE392
Total		18	30	750	13	10	2	24	
Semester (8)									
CSE421	High-Performance Computing	3	5	125	2	2	0	4	CSE221
CSE441	Design Patterns	2	3	75	2	1	0	2	CSE241
CSE443	Software Product Management	2	4	100	2	1	0	2	CSE142
-	ASU Elective (3)	2	3	75	2	0	0	2	
-	CAIE Elective (6)	3	5	125	2	2	0	4	
-	CAIE Elective (7)	3	5	125	2	2	0	4	
CSE494	CAIE Graduation Project (3)	3	5	125	0	6	0	6	CSE493
Total		18	30	750	12	14	0	24	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Computer and Artificial Intelligence Engineering Program

Program 21: Building Engineering Program "BLDG"

Program Description

The purpose of this program is to provide students with the necessary skills and knowledge for a successful career in building engineering. The program is designed with a holistic approach that focuses on the development of both industry-relevant skills and academic competencies. The program offers an excellent opportunity for collaboration between different disciplines (Structural, Construction Management, Architectural and Electromechanical Engineering) and promotes an integrated approach to the teaching and learning of building engineering.

The program offers a diverse and rigorous curriculum that includes the fundamentals of structural analysis and design of reinforced concrete and steel buildings, as well as numerous topics in the construction management of building projects. The program also covers basic topics from different disciplines such as architectural design, energy-efficient building design as well as HVAC systems and technical installations in buildings to give students a comprehensive overview of the building industry. The program also integrates new technologies such as Building information modeling (BIM) that enables architects, engineers, designers, and contractors to model and share information about building construction projects in digital form.

Career Prospects

Graduates of this department has a variety of opportunities to work, of the building engineering program, you will be qualified for positions at companies specializing in the design, analysis, operation, construction, and management of a wide range of residential, commercial, and industrial building projects. Our graduates can be found at different companies and organizations, for example:

- Government authorities,
- Consulting firms in civil engineering and construction,
- Civil engineering contractors and project managers,
- Environmental engineering organizations,

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

The program provides the undergraduate student with a thorough foundation and technologies in the basic tenets of Structural and Construction Project Management. The program provides two different fields in which the students in this program can specialize. These two fields are:

1. Structural Engineering
2. Construction Engineering Management

1. Structural Engineering is concerned with the structural design and structural analysis of buildings, bridges, towers and other structures. This involves identifying the loads which act upon a structure and the forces and stresses which arise within that structure due to those loads, and then designing the structure to successfully support and resist those loads. The loads can be self-weight of the structures, other dead load, live loads, moving (wheel) load, wind load, earthquake load, load from temperature change etc. The structural engineer must design structures to be safe for their users and to successfully fulfil the function they are designed for (to be serviceable). Due to the nature of some loading conditions, sub-disciplines within structural engineering have emerged, including wind engineering and earthquake engineering.

2. Construction Engineering Management gives students a specialized focus on planning, scheduling, Resources Management, quantity take off, computer applications, cost estimating, Risk and Safety Management, contracts, problem solving, people and networking, management and leadership skills.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Building Engineering Program graduate must be able to:

14. Select appropriate and sustainable technologies for construction of buildings; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics and Fluid Mechanics.
15. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and Transportation and Traffic.
16. Plan and manage construction processes; address construction defects, instability and quality issues; and maintain safety measures in construction and materials.
17. Deal with biddings, contracts and financial issues including project insurance and guarantees; and assess environmental impacts of civil engineering projects.
18. Produce designs that meet building users' requirements through understanding the relationship between people and buildings, and between buildings and their environment; and the need to relate buildings and the spaces between them to human needs and scale.

19. Generate ecologically responsible, environmental conservation and rehabilitation designs; through understanding of: structural design, construction, technology and engineering problems associated with building designs.
20. Apply computer applications to design and manage building construction projects.

Graduate Attributes

The graduates from Building Engineering Program:

- Master a wide spectrum of engineering knowledge and specialized skills, specifically in the realm of environmental aspects and sustainability and can apply acquired knowledge using theories and abstract thinking in real life situations.
- Apply analytic critical and systems thinking to identify, diagnose and solve architectural engineering problems with a wide range of complexity and variation.
- Behave professionally and adhere to architectural engineering and sustainability ethics and standards.
- Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- Recognize his/her role in promoting the architectural engineering field and contribute to the development of the architecture profession and the community.
- Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- Use techniques, skills, and modern engineering tools necessary for architectural engineering practice. In addition to applying his/her own knowledge and practical skills to create and develop architectural designs starting from the briefing phase till beyond the construction and operating phase.
- Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business and project administration and entrepreneurial skills.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Building Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	13	0	0	13
	Faculty of Engineering Requirements	34	66	1650	25	29	16	70
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
CES214	Structural Analysis	3	5	125	2	2	0	4
CES313	Dynamic Analysis of Structure	3	5	125	2	2	0	4
CES222	Concrete Structures Design (1)	3	6	150	2	3	0	5
CES324	Concrete Structures Design (2)	3	5	125	2	3	0	5
CES325	Construction Engineering	3	6	150	2	2	0	4
CES425	Concrete Structures Design (3)	3	5	125	2	3	0	5
CES241	Steel Structures Design (1)	3	6	150	2	3	0	5
CES344	Steel Structure Design (2)	3	5	125	2	3	0	5
CES351	Concrete Technology	3	5	125	2	2	1	5
CES454	Modern Building Materials	3	5	125	2	2	0	4
CES161	Geology	3	4	100	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
CES265	Soil Mechanics (1)	3	4	100	2	2	1	5
CES366	Soil Mechanics (2)	3	6	150	2	3	0	5
CES368	Foundation Design (1)	3	5	125	2	3	0	5
CES171	Engineering Economics and Finance	2	3	75	2	0	0	2
CES372	Construction Planning and Scheduling	3	5	125	2	2	0	4
CES476	Contracts and Legal Issues in Construction	3	5	125	2	2	0	4
CES481	Introduction to BIM	3	6	150	2	1	2	5
ARC161	Introduction to Lighting Systems*	2	4	100	2	1	0	2
ARC466	Building Envelope Design & Indoor Air Quality	3	4	100	2	2	0	4
CEP214	Surveying (1)	3	5	125	2	2	1	5
CEP222	Introduction to Transportation and Traffic Engineering*	2	4	100	2	1	0	2
CEI111	Fundamentals of Fluid Mechanics*	2	4	100	2	0	1	2
MEP241	Thermal Analysis and HVAC Systems for Buildings	3	4	100	2	2	0	4
MEP341	Technical Installations	2	3	75	2	1	0	3
-	BLDG Elective (1)	3	5	125	2	2	0	4
-	BLDG Elective (2)	3	5	125	2	2	0	4
-	BLDG Elective (3)	3	5	125	2	2	0	4
-	BLDG Elective (4)	3	5	125	2	2	0	4
	BLDG Elective (5)	3	5	125	2	2	0	4
	BLDG Elective (6)	3	5	125	2	2	0	4
CES493	BLDG Graduation Project (2)	4	6	150	3	2	0	5
CES494	BLDG Graduation Project (3)	4	6	150	1	6	0	7
Total		144	250	6250	106	100	22	225
Pool of BLDG Elective (1) Courses								
ARC264	Building Energy Conservation Technologies	3	5	125	2	2	0	4
ARC265	Introduction to Acoustics	3	5	125	2	2	0	4
CEP215	Surveying (2)	3	5	125	2	2	1	5
CEP231	Advanced Traffic Engineering	3	5	125	2	2	0	4
Pool of BLDG Elective (2) Courses								
CES314	Computer Applications in Structural Design	3	5	125	2	2	0	4
CES353	Recycling of Construction Materials	3	5	125	2	2	0	4
CES373	Quantity Surveying and Estimating	3	5	125	2	2	0	4
CES374	Construction Cost Management	3	5	125	2	2	0	4
Pool of BLDG Elective (3) & (4) Courses								
CES421	Design of Prestressed-Concrete and Concrete Bridges	3	4	100	2	2	0	4
CES447	Steel Structures Design (3)	3	5	125	2	2	0	4
CES464	Foundation Design (2)	3	5	125	2	2	0	4
CES482	Advanced BIM	3	5	125	2	2	0	4
CES483	Resources Management	3	5	125	2	2	0	4
CES485	Risk and Safety Management	3	5	125	2	2	0	4
Pool of BLDG Elective (5) & (6) Courses								
CES416	Structural Design with international Codes	3	5	125	2	2	0	4
CES426	Advanced Design of Reinforced Concrete Structures	3	5	125	2	2	0	4
CES428	Masonry for Building Construction	3	5	125	2	2	0	4
CES446	Advanced Design of Steel Structures	3	5	125	2	2	0	4
CES352	Strengthening and Repair of Structures	3	4	100	2	2	0	4
CEP455	Infrastructure and green building	3	5	125	2	2	0	4
CES475	Computer Applications in Construction Management	3	5	125	2	2	0	4
CES478	Selected Topics in Construction Management	3	5	125	2	2	0	4
CES479	Selected Topics in Structural Engineering	3	5	125	2	2	0	4
CES484	Environmental Risk Management	3	5	125	2	2	0	4

* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

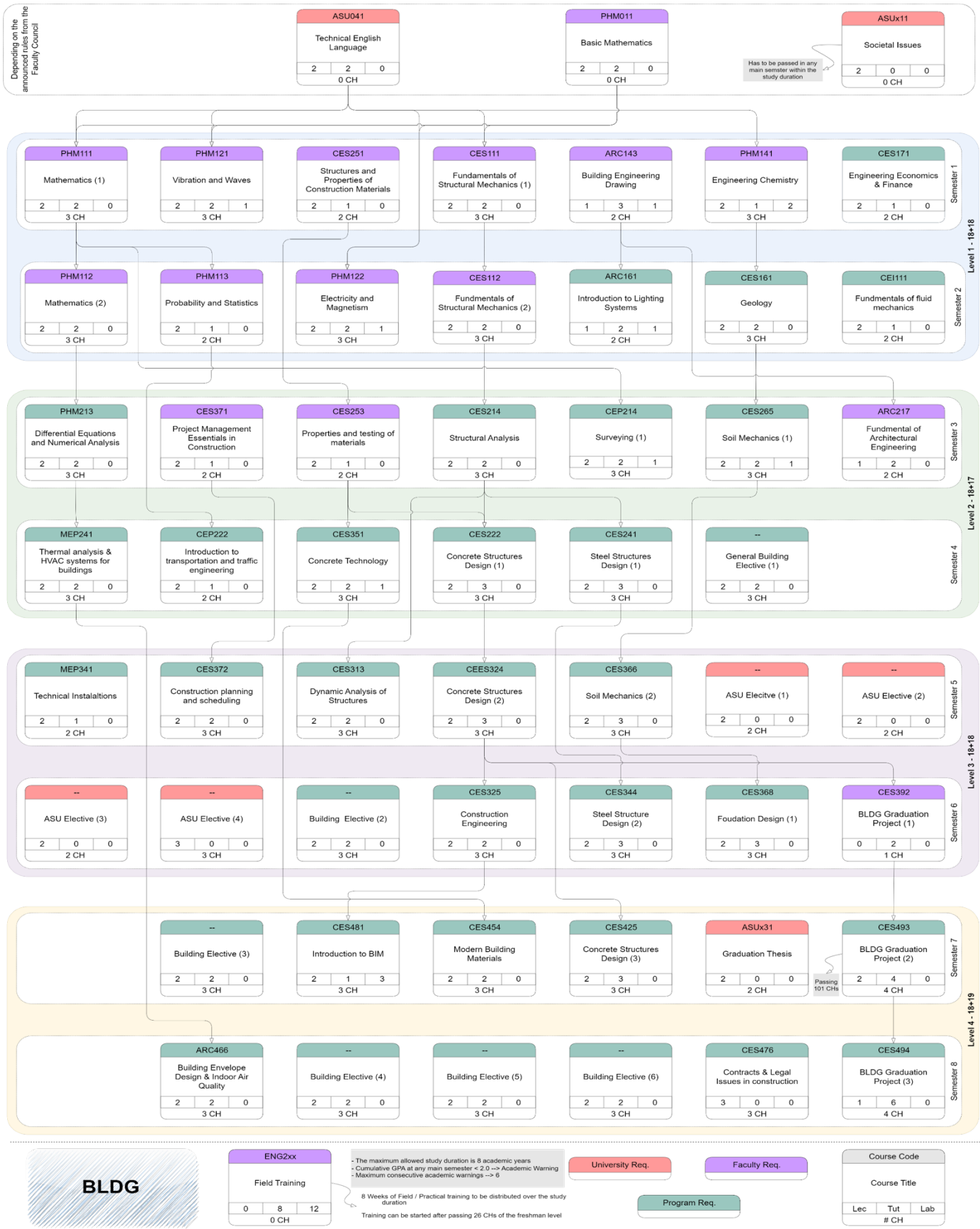
Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
CES111	Fundamentals of Structural Mechanics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
CES251	Structures and Properties of Construction Materials	2	3	75	2	1	0	2	
CES171	Engineering Economics and Finance	2	3	75	2	1	0	2	
ARC143	Building Engineering Drawing	2	4	100	1	3	0	4	
Total		18	30	750	13	12	3	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	5	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	4	ASU041* AND PHM011*
CES112	Fundamentals of Structural Mechanics (2)	3	5	125	2	2	0	4	CES111
CES161	Geology	3	4	100	2	2	0	4	PHM141
CEI111	Fundamentals of Fluid Mechanics	2	4	100	2	0	1	2	
ARC161	Introduction to Lighting Systems	2	4	100	1	2	1	4	ARC143
Total		18	30	750	13	11	3	25	
Semester (3)									
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4	PHM112
CES214	Structural Analysis	3	5	125	2	2	0	4	CES112
CES253	Properties and Testing of Materials	2	3	75	2	1	0	2	CES251
CES265	Soil Mechanics (1)	3	4	100	2	2	1	5	CES161
CES371	Project Management Essentials in Construction	2	3	75	2	1	0	2	
CEP214	Surveying (1)	3	5	125	2	2	1	5	PHM111
ARC217	Fundamentals of Architectural Engineering	2	5	125	1	2	0	3	ARC143
Total		18	30	750	13	12	2	25	
Semester (4)									
CES222	Concrete Structures Design (1)	3	6	150	2	3	0	5	CES112 AND CES251
CES241	Steel Structures Design (1)	3	6	150	2	3	0	5	CES214 and CES253
CES351	Concrete Technology	3	5	125	2	2	1	5	CES253
CEP222	Introduction to Transportation and Traffic Engineering	2	4	100	2	1	0	2	PHM113
MEP241	Thermal Analysis and HVAC Systems for Buildings	3	4	100	2	2	0	4	PHM213
-	BLDG Elective (1)	3	5	125	2	2	0	4	
Total		17	30	750	12	13	1	25	
Semester (5)									
CES313	Dynamic Analysis of Structure	3	5	125	2	2	0	4	CES214
CES324	Concrete Structures Design (2)	3	5	125	2	3	0	5	CES222
CES366	Soil Mechanics (2)	3	6	150	2	3	0	5	CES265
CES372	Construction Planning and Scheduling	3	5	125	2	2	0	4	CES371
MEP341	Technical Installations	2	3	75	2	1	0	2	
-	ASU Elective (1)	2	3	75	2	0	0	2	
-	ASU Elective (2)	2	3	75	2	0	0	2	
Total		18	30	750	14	11	0	24	
Semester (6)									
CES325	Construction Engineering	3	6	150	2	2	0	4	CES324
CES344	Steel Structure Design (2)	3	5	125	2	3	0	5	CES241
CES368	Foundation Design (1)	3	5	125	2	3	0	5	CES366
-	ASU Elective (3)	2	3	75	2	0	0	2	
-	ASU Elective (4)	3	4	100	3	0	0	3	
-	BLDG Elective (2)	3	5	125	2	2	0	4	
CES392	BLDG Graduation Project (1)	1	2	50	0	2	0	2	CES324
Total		18	30	750	13	12	0	25	
Semester (7)									
CES425	Concrete Structures Design (3)	3	5	125	2	3	0	5	CES324
CES454	Modern Building Materials	3	5	125	2	2	0	4	CES351
CES481	Introduction to BIM	3	6	150	2	1	2	5	CES325
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	BLDG Elective (3)	3	5	125	2	2	0	4	
CES493	BLDG Graduation Project (2)	4	6	150	2	4	0	6	CES392
Total		18	30	750	12	12	2	26	
Semester (8)									
ARC466	Building Envelope Design & Indoor Air Quality	3	4	100	2	2	0	4	MEP241
CES476	Contracts and Legal Issues in Construction	3	5	125	2	2	0	4	
-	BLDG Elective (4)	3	5	125	2	2	0	4	
-	BLDG Elective (5)	3	5	125	2	2	0	4	
-	BLDG Elective (6)	3	5	125	2	2	0	4	

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
CES494	BLDG Graduation Project (3)	4	6	150	1	6	0	7	CES493
Total		19	30	750	11	16	0	27	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Building Engineering' Program

Program 22: Civil Infrastructure Engineering Program "CISE"

Program Description

Civil engineering today is concerned with the deterioration of the nation's roads, bridges, water and power distribution systems, storm and sanitary sewers and other public infrastructure. The aim of the Civil Infrastructure Engineering Program is to graduate civil engineers responsible for the life-cycle of the system he creates and must be capable of optimizing the total system performance of large-scale public works projects, including their social and environmental impacts, in a way that addresses critical issues of infrastructure behaviour, deterioration science, and structural rehabilitation. On top of these fields comes surveying engineering, sanitary environment, transportation engineering, water-related engineering projects who can enrich the water resources and public works field.

Career Prospects

Graduates of this department has a variety of opportunities to work, for example:

- Government authorities.
- Consulting firms in civil engineering and construction.
- Civil engineering contractors and project managers.
- Water and sanitation utility companies.
- Environmental engineering organizations.
- Coastal engineers developing coastal environment systems.
- Water resources management authority.

Relation to Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health & Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water & Sanitation
☐ GOAL 7: Affordable & Clean Energy	☐ GOAL 8: Decent Work & Economic Growth	☒ GOAL 9: Industry, Innovation & Infrastructure	☐ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities & Communities	☐ GOAL 12: Responsible Consumption & Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☐ GOAL 16: Peace & Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Program Concentrations

The program provides the undergraduate student with a thorough foundation and technologies in the basic tenets of civil engineering and technologies. The program provides three different fields in which the students in this program can specialize. These three fields are:

1. Transportation Engineering
2. Geomatics and Environmental Engineering
3. Water Engineering

1. Transportation Engineering is concerned with moving people and goods efficiently, safely, and in a manner conducive to a vibrant community. This involves specifying, designing, constructing, and maintaining transportation

infrastructure which includes streets, canals, highways, rail systems, airports, ports, and mass transit. It includes areas such as transportation design, transportation planning, traffic engineering, some aspects of urban engineering, queueing theory, pavement engineering, Intelligent Transportation System (ITS), and infrastructure management.

2. Geomatics and Environmental Engineering is the process by which a surveyor measures certain dimensions that occur on or near the surface of the Earth. Surveying equipment, such as levels and theodolites, are used for accurate measurement of angular deviation, horizontal, vertical and slope distances. With computerization, electronic distance measurement (EDM), total stations, GPS surveying and laser scanning have to a large extent supplanted traditional instrument. Data collected by survey measurement is converted into a graphical representation of the Earth's surface in the form of a map. This information is then used by civil engineers, contractors and realtors to design from, build on, and trade, respectively. Elements of a structure must be sized and positioned in relation to each other and to site boundaries and adjacent structures. Although surveying is a distinct profession with separate qualifications and licensing arrangements, civil engineers are trained in the basics of surveying and mapping, as well as geographic information systems. Surveyors also lay out the routes of railways, tramway tracks, highways, roads, pipelines and streets as well as position other infrastructure, such as harbours, before construction. Environmental engineering, emphasis is based both on the design of systems for water supply, water treatment, soil treatment, wastewater treatment, and waste management, as well as on the design of physical, chemical and biological unit operations and processes encountered in these systems.

3. Water Engineering is concerned with the collection and management of water (as a natural resource). As a discipline it therefore combines elements of hydrology, environmental science, meteorology, conservation, and resource management. This area of civil engineering relates to the prediction and management of both the quality and the quantity of water in both underground (aquifers) and above ground (lakes, rivers, and streams) resources. Water resource engineers analyse and model very small to very large areas of the earth to predict the amount and content of water as it flows into, through, or out of a facility. Although the actual design of the facility may be left to other engineers. Also concerned with design of pipelines, water supply network, drainage facilities (including bridges, dams, channels, culverts, levees, storm sewers), and canals. Hydraulic engineers design these facilities using the concepts of fluid pressure, fluid statics, fluid dynamics, and hydraulics, among others.

Agreements with another University

The program is in partnership with the University of East London (UEL), United Kingdom for a Bachelor Dual Degree. Students joining this agreement will pay an additional fee, to substitute expenses for the external Quality Audits/Moderation Boards that will take place in Egypt. The Graduates should receive two B.Sc. certificates, one from the University of East London, and one from Ain Shams University. Students are allowed to study a full year or more in London with a 10% reduction in the UK tuition fees.

Program Competences

In addition to the competences for Graduates from Ain Shams University and all Engineering Programs, the Civil Infrastructure Engineering Program graduate must be able to:

14. Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics and Fluid Mechanics.

15. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures, Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbours; or any other emerging field relevant to the discipline.
16. Plan and manage construction processes; address construction defects, instability and quality issues; and maintain safety measures in construction and materials.
17. Deal with biddings, contracts and financial issues including project insurance and guarantees; and assess environmental impacts of civil engineering projects.
18. Use the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems. They work to improve recycling, waste disposal, public health, and water and air pollution control. They also address global issues, such as unsafe drinking water, climate change, and environmental sustainability.

Graduate Attributes

The graduates from Civil Infrastructure Engineering Program:

- Master a wide spectrum of civil engineering knowledge and specialized skills.
- Apply acquired knowledge using theories and abstract thinking in real life situations.
- generate effective solutions by using engineering approaches in the field of Civil Infrastructure Engineering.
- Are well versed in technology, social, and environmental issues.
- Are responsible for the life-cycle of the systems they create.
- Are capable of optimizing the total system performance of large-scale civil infrastructure projects, including their social and environmental impacts.
- Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- Demonstrate leadership qualities, business administration and entrepreneurial skills.

Required Courses

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Civil Infrastructure Engineering Program Requirements courses.

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	11	18	450	13	0	0	13
	Faculty of Engineering Requirements	34	65	1625	25	29	18	72
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4
CEP214	Surveying (1)	3	5	125	2	2	1	5
CEP215	Surveying (2)	3	5	125	2	2	1	5
CEP313	Surveying (3)*	2	4	100	2	0	1	3
CEP314	Infrastructure Network Planning*	2	5	125	2	1	0	2
CEP222	Introduction to Transportation and Traffic Engineering*	2	4	100	2	1	0	2
CEP342	Railway Engineering Principles	3	5	125	2	3	0	5
CEP333	Highway Geometric and Structural Design	3	4	100	2	2	0	4
CEP251	Introduction to Environmental Engineering and Sustainability	3	5	125	2	2	0	4
CEP352	Design of Water and Wastewater Networks	3	5	125	2	2	0	4
CEP481	Selected Topics in Civil Infrastructure Engineering*	2	4	100	2	1	0	2
CES214	Structural Analysis	3	5	125	2	2	0	4
CES222	Concrete Structures Design (1)	3	6	150	2	3	0	5
CES324	Concrete Structures Design (2)	3	5	125	2	3	0	5
CES425	Concrete Structures Design (3)	3	5	125	2	3	0	5
CES432	Advanced Construction Methods and Techniques	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
CES343	Basics of Steel Structures Design*	2	4	100	2	1	0	2
CES448	Steel Structures Design	3	6	150	2	3	0	5
CES351	Concrete Technology	3	5	125	2	2	1	5
CES161	Geology	3	4	100	2	2	0	4
CES264	Soil Mechanics	4	6	150	3	2	1	6
CES367	Foundation Design	3	5	125	2	2	0	4
CES477	Planning and Scheduling of Repetitive Projects*	2	4	100	2	1	0	2
CEI111	Fundamentals of Fluid Mechanics *	2	4	100	2	0	1	2
CEI212	Hydraulics	3	4	100	2	1	2	5
CEI313	Applied Hydrology	3	5	125	2	2	0	4
CEI321	Irrigation and Drainage Engineering	3	5	125	2	2	0	4
CEI436	Design of Irrigation Structures	3	5	125	2	2	0	4
CEI261	Principles of Water Resources Engineering*	2	4	100	2	1	0	2
CEI462	Port Engineering and Navigation	2	3	75	2	1	0	2
-	CISE Elective (1)	3	4	100	2	2	0	4
-	CISE Elective (2)	3	4	100	2	2	0	4
-	CISE Elective (3)	3	4	100	2	2	0	4
-	CISE Elective (4)	3	4	100	2	2	0	4
CEP493	CISE Graduation Project (2)	2	3	75	1	2	0	3
CEP494	CISE Graduation Project (3)	3	7	175	1	4	0	5
Total		144	250	6250	109	96	26	223
Pool of Transportation Engineering Concentration Courses								
Pool of CISE Elective (1) Courses								
CEP323	Principles of Traffic Engineering	3	4	100	2	2	0	4
CEP332	Highways Construction Material and Pavement Design	3	5	125	2	2	0	4
Pool of CISE Elective (2) Courses								
CEP424	Transportation Economics	3	4	100	2	2	0	4
CEP433	Pavement Maintenance and Rehabilitation	3	4	100	2	2	0	4
Pool of CISE Elective (3) Courses								
CEP425	Urban Transportation Planning	3	4	100	2	2	0	4
CEP431	Highway Construction Technology	3	5	125	2	2	0	4
Pool of CISE Elective (4) Courses								
CEP423	Intelligent Transportation Systems	3	4	100	2	2	0	4
CEP434	Airports Engineering	3	4	100	2	2	0	4
Pool of Geomatics and Environmental Engineering Courses								
Pool of CISE Elective (1) Courses								
CEP315	Photogrammetric Surveying	3	4	100	2	2	0	4
CEP353	Computer Applications in Sanitary Engineering	3	4	100	2	2	0	4
Pool of CISE Elective (2) Courses								
CEP415	Geodetic and GPS Surveying	3	4	100	2	2	0	4
CEP457	Principles of Water and Wastewater Treatment	3	4	100	2	2	0	4
Pool of CISE Elective (3) Courses								
CEP416	Hydrographic Surveying and Harbor Engineering	3	4	100	2	2	0	4
CEP456	Water and Wastewater Supply	3	4	100	2	2	0	4
Pool of CISE Elective (4) Courses								
CEP417	GIS Applications in Civil infrastructure Projects	3	4	100	2	2	0	4
CEI412	River Engineering	3	5	125	2	2	0	4
Pool of Water Engineering Concentration Courses								
Pool of CISE Elective (1) Courses								
CEI323	Modern Irrigation Systems	3	4	100	2	2	0	4
CEI431	Dams Engineering	3	5	125	2	2	0	4
CEI441	Groundwater Hydrology	3	4	100	2	2	0	4
Pool of CISE Elective (2) Courses								
CEI312	Environmental Hydraulics	3	5	125	2	2	0	4
CEI463	Coastal Environment Engineering	3	5	125	2	2	0	4
Pool of CISE Elective (3) Courses								
CEI311	Pump Stations Hydraulics	3	5	125	2	2	0	4
CEI413	Hydraulic Modeling	3	4	100	2	2	0	4
CEI351	Geographical Information Systems in Water Engineering	3	5	125	2	2	0	4
CEI465	Inland Ports and Inland Navigation	3	4	100	2	2	0	4
Pool of CISE Elective (4) Courses								
CEI412	River Engineering	3	5	125	2	2	0	4

Code	Course Title	Weight			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
CEI414	Sustainable Urban Water Systems	3	4	100	2	2	0	4
CEI437	Topics in Hydraulic Structures	3	4	100	2	2	0	4
CEI466	Water Security and Governance	3	4	100	2	2	0	4

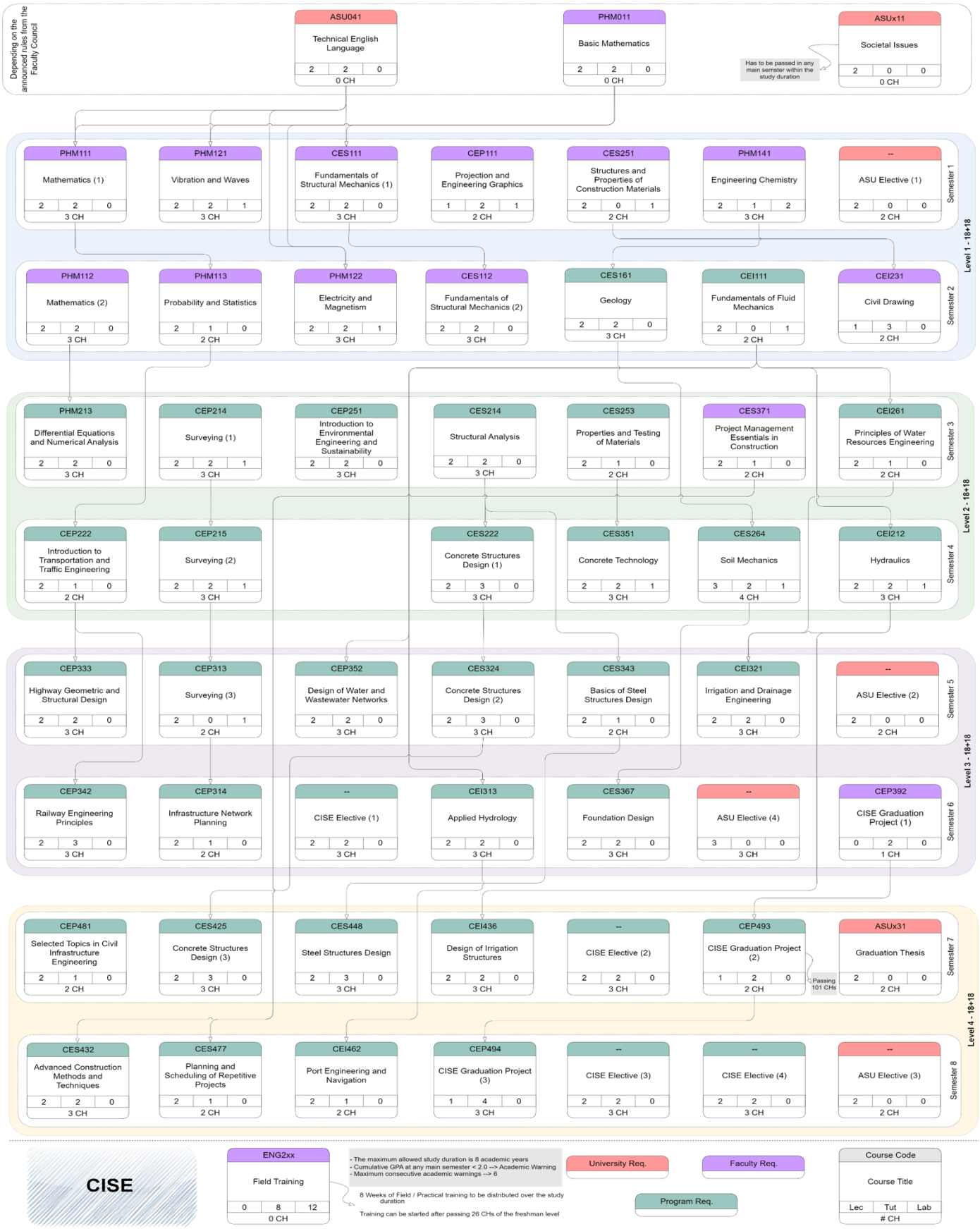
* Specific Courses that have office hours as clarified in Article (18) and Appendix 3.

Proposed Study Plan

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester (1)									
PHM111	Mathematics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
PHM121	Vibration and Waves	3	5	125	2	2	1	5	ASU041* AND PHM011*
PHM141	Engineering Chemistry	3	5	125	2	1	2	5	ASU041*
CEP111	Projection and Engineering Graphics	2	4	100	1	2	1	4	
CES111	Fundamentals of Structural Mechanics (1)	3	5	125	2	2	0	4	ASU041* AND PHM011*
CES251	Structures and Properties of Construction Materials	2	3	75	2	1	0	2	
-	ASU Elective (1)	2	3	75	2	0	0	2	
Total		18	30	750	13	10	4	26	
Semester (2)									
PHM112	Mathematics (2)	3	5	125	2	2	0	4	PHM111
PHM113	Probability and Statistics	2	3	75	2	1	0	2	PHM111
PHM122	Electricity and Magnetism	3	5	125	2	2	1	5	ASU041* AND PHM011*
CES112	Fundamentals of Structural Mechanics (2)	3	5	125	2	2	0	4	CES111
CES161	Geology	3	4	100	2	2	0	4	PHM141
CEI111	Fundamentals of Fluid Mechanics	2	4	100	2	0	1	2	
CEI231	Civil Drawing	2	4	100	1	3	0	4	CEP111
Total		18	30	750	13	12	2	25	
Semester (3)									
PHM213	Differential Equations and Numerical Analysis	3	5	125	2	2	0	4	PHM112
CEP214	Surveying (1)	3	5	125	2	2	1	5	PHM111
CEP251	Introduction to Environmental Engineering and Sustainability	3	5	125	2	2	0	4	PHM141
CES214	Structural Analysis	3	5	125	2	2	0	4	CES112 AND CES251
CES253	Properties and Testing of Materials	2	3	75	2	1	0	2	CES251
CES371	Project Management Essentials in Construction	2	3	75	2	1	0	2	
CEI261	Principles of Water Resources Engineering	2	4	100	2	1	0	2	CEI111
Total		18	30	750	14	11	1	23	
Semester (4)									
CEP215	Surveying (2)	3	5	125	2	2	1	5	CEP214
CEP222	Introduction to Transportation and Traffic Engineering	2	4	100	2	1	0	3	PHM113
CES222	Concrete Structures Design (1)	3	6	150	2	3	0	5	CES112 AND CES251
CES264	Soil Mechanics	4	6	150	3	2	1	6	CES161
CES351	Concrete Technology	3	5	125	2	2	1	5	CES253
CEI212	Hydraulics	3	4	100	2	1	2	5	CEI111
Total		18	30	750	13	11	5	29	
Semester (5)									
CEP313	Surveying (3)	2	4	100	2	0	1	2	CEP215
CEP333	Highway Geometric and Structural Design	3	4	100	2	2	0	4	CEP222
CEP352	Design of Water and Wastewater Networks	3	5	125	2	2	0	4	CEI111
CES324	Concrete Structures Design (2)	3	5	125	2	3	0	5	CES222
CES343	Basics of Steel Structures Design	2	4	100	2	1	0	2	CES214
CEI321	Irrigation and Drainage Engineering	3	5	125	2	2	0	4	CEI212 AND CEI261
-	ASU Elective (2)	2	3	75	2	0	0	2	
Total		18	30	750	14	10	1	23	
Semester (6)									
CEP314	Infrastructure Network Planning	2	5	125	2	1	0	2	CEP313
CEP342	Railway Engineering Principles	3	5	125	2	3	0	5	CEP222
CES367	Foundation Design	3	5	125	2	2	0	4	CES264
CEI313	Applied Hydrology	3	5	125	2	2	0	4	CEI111
-	ASU Elective (4)	3	4	100	3	0	0	3	
-	CISE Elective (1)	3	4	100	2	2	0	4	
CEP392	CISE Graduation Project (1)	1	2	50	0	2	0	2	

Code	Course Title	Weight			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Total		18	30	750	13	12	0	24	
Semester (7)									
CEP481	Selected Topics in Civil Infrastructure Engineering	2	4	100	2	1	0	2	
CES425	Concrete Structures Design (3)	3	5	125	2	3	0	5	CES324
CES448	Steel Structures Design	3	6	150	2	3	0	5	CES343
CEI436	Design of Irrigation Structures	3	5	125	2	2	0	4	CEI212
ASUx31	Graduation Thesis	2	3	75	2	0	0	2	
-	CISE Elective (2)	3	4	100	2	2	0	4	
CEP493	CISE Graduation Project (2)	2	3	75	1	2	0	3	CEP392
Total		18	30	750	13	13	0	25	
Semester (8)									
CES432	Advanced Construction Methods and Techniques	3	5	125	2	2	0	4	CES371
CES477	Planning and Scheduling of Repetitive Projects	2	4	100	2	1	0	2	CES371
CEI462	Port Engineering and Navigation	2	3	75	2	1	0	2	CEI313
-	ASU Elective (3)	2	3	75	2	0	0	2	
-	CISE Elective (3)	3	4	100	2	2	0	4	
-	CISE Elective (4)	3	4	100	2	2	0	4	
CEP494	CISE Graduation Project (3)	3	7	175	1	4	0	5	CEP493
Total		18	30	750	13	12	0	23	

* Only if applicable according to regulations announced by the Faculty council based on article (15).



Course Tree for 'Civil Infrastructure Engineering' Program

Bylaw 2023 QR code

https://eng.asu.edu.eg/education/undergraduates/bylaws