



**VIETNAM NATIONAL UNIVERSITY – HO CHI MINH CITY**

**INTERNATIONAL UNIVERSITY**

**School of Civil Engineering and Management**

# **PROGRAM SPECIFICATION**

## **PROGRAM LEVEL BACHELOR OF ENGINEERING IN CIVIL ENGINEERING**

**Oct. 2023**

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## **PREFACE**

The Bachelor of Engineering in Civil Engineering (CE) program was accredited in January 2011 and has been reviewed annually. Since 2011, the CE program has undergone minor modifications (such as changing the course code, introducing proper entrance-English levels, and offering elective courses) and moderate modifications in 2019 by introducing political and new courses. The program specification can be found on the school website and in the student handbook. Furthermore, to align the stakeholders' interests and comply with the recommended practice of AUN accreditation, this Program Specification was published in 2023 with comprehensive program information and is applicable for Batch 2023-onward.

# PROGRAM SPECIFICATION

## 1. INTRODUCTION

### a) *Vision*

- *To be a leading educational center in the field of civil engineering in Vietnam and Southeast Asia as well, with three levels of Engineer, Master of Engineering, and Doctor of Engineering;*
- *To be a prestigious research center in some orientations such as structural analysis, sustainable infrastructural development, green building, and so on; and expand applied research into actual problems of the city and region;*
- *To be the trusted partner of construction and industrial companies and overseas educational organizations.*

### b) *Mission*

*The mission of the School of Civil Engineering and Management is to provide quality education to prepare undergraduate students for a successful career in civil engineering; to provide advanced skills and knowledge in research and design of civil engineering problems for graduate students; and to provide service to the University, engineering profession, and the public.*

*Consistent with the mission of the University, the missions of the School of Civil Engineering and Management are:*

- *To deliver a high level of research for both academic and practical use;*
- *to educate a "new" generation of civil engineers who are able to tackle challenging problems in engineering practice and have comprehensive English communication skills to be used in both technical and daily-life situations; and*
- *to provide state-of-the-art services to industry and society.*

### c) *Objectives*

*The School of Civil Engineering and Management offers two programs: (1) Bachelor of Engineering in Civil Engineering and (2) Bachelor of Engineering in Construction Management.*

### d) *Program*

- *Language: All the teaching and research activities are conducted in English*

- *Types of Program: The Civil Engineering program requires students to spend four years of study at IU, and it offers students a degree awarded by IU-VNU once completing the program. (IU program))*

e) **Qualification**

- *The Bachelor Degrees are awarded by IU-VNU*

- Degree title: "Bachelor of Engineering in Civil Engineering"

## 2. PROGRAM LEARNING OUTCOMES

- Understanding the physical world and using knowledge of mathematics and natural sciences to represent it in pursuing and establishing research by the use of quantitative and quantitative methods.
- Understanding the fundamentals of the civil engineering field (e.g., construction geology, material science, construction physics, surveying, structural theory, technical design, construction informatics, soil mechanics, fluid mechanics, and computational techniques, analyzing data for design, build, and appraisal construction)
- Ability to analyze and prepare investment projects and understand their economic, environmental, and social impacts
- Awareness of professional and ethical responsibilities of a civil engineer
- Ability to function as a member of a multidisciplinary team (including multi-national and mixed-gender teams) as well as having good knowledge of management and organization to be able to take on leadership roles
- Recognition of the need for and ability to engage in life-long learning in order to work efficiently in situations in which new technologies emerge regularly, as well as take part in developing new technologies by engaging in research works having the ability to interpret and use empirical datasets, integrate technical literature and databases to solve specific civil engineering problems or fill knowledge gaps.
- Ability to communicate matters related to civil engineering to colleagues in the same profession or the general public, effectively using oral, written, and other forms of communication.
- A broad education necessary to understand the impacts of civil engineering solutions in a global and social context
- A broad understanding of contemporary issues in civil engineering in the national, regional, and global level
- Ability to use techniques, skills, and modern engineering tools necessary for engineering practice, including identifying tasks of civil engineering, analyzing, abstracting, and formulating, along with being able to develop concepts, plans, and methods for proof and forecast (e.g., documented evidence for stability, energy efficiency, noise protection, flood protection, water supply)
- Ability to use English in both technical and daily life situations



### 3. THE PROGRAM OBJECTIVES

During the preparation and development process of the undergraduate educational program, the Dean of the School and the faculty members had in-depth discussions about the CE program with not only many professors and experts but also construction governments, associations, and companies in civil engineering. Consequently, the Program Educational Objectives (PEO) were clearly formulated. As a result, graduates of the program will:

- be successful in **tackling** open-ended civil engineering problems in a quantitative and systematic approach;
- be motivated to continuously **expand their knowledge**, be creative and innovative in their contributions to the field of civil engineering; and
- possess the ability to **design and manage** civil engineering projects in an ethical and professional manner.

The Department of Civil Engineering, the precursor of School of Civil Engineering and Management, was established in 2011 with 03 key objectives

1. to deliver a high level of research for both academic and practical use;
2. to educate a "new" generation of civil engineers who are able to tackle challenging problems in engineering practice and have comprehensive English communication skills to be used in both technical and daily-life situations; and
3. to provide state-of-the-art services to industry and society.

Table 3.1 presents the consistency of the PEO with the Missions of IU and the School of Civil Engineering and Management. The School is committed to providing students the contemporary knowledge of Civil Engineering and English communication skills. The graduated students, hence, can quickly adapt to changes in construction technologies. Furthermore, the School also aims to be nationally and internationally recognized for its excellence in research and teaching and to be the primary provider of civil engineers with strong technical knowledge and English skills in Vietnam.

**Table 3.1: Consistency of the Program Educational Objectives with the Missions of the University and School of Civil Engineering and Management**

PEO	CE's mission	IU's mission
1. To be successful in tackling open-ended civil engineering problems in a quantitative and systematic approach	2. to educate a "new" generation of civil engineers who are able to tackle challenging problems in engineering practice and have comprehensive English communication skills to be	1. To offer high-quality graduate and undergraduate education in multidisciplinary. All educational programs are internationally accredited (AUN and ABET)





PEO	CE's mission	IU's mission
	used in both technical and daily-life situations	
2. To be motivated to continuously expand their knowledge, be creative and innovative in their contributions to the field of civil engineering	1. To deliver a high level of research for both academic and practical use	1. To offer high-quality graduate and undergraduate education in multidisciplinary. All educational programs are internationally accredited (AUN and ABET)
3. To possess the ability to design and manage civil engineering projects in an ethical and professional manner	3. To provide state-of-the-art services to industry and society	2. To conduct excellent research, including basic and applied research, to meet the needs of industry, local provinces, and society. 3. To take the pioneer role in Vietnam by practicing management excellence, inspiring and assisting other VNUHCM members in the advancement toward the development of VNUHCM as a whole.

#### 4. JOB OPPORTUNITIES

Graduates can work in design, construction, consultancy, and inspection of civil and industrial building projects as Structural Engineers, Quality and Quantity Supervisors, Consulting Construction Engineers, Contracting Construction Engineers, Site Engineers, etc.

#### 5. PROGRAM OFFERING

- a) *Awarding body/institution: International University HCMC*
- b) *Teaching institution: School of Civil Engineering and Management*
- c) *Accreditation:*
  - *Institutional level: MOET (2016), AUN (2018)*
  - *Program level: AUN, 2018*
- d) *Name of the final award: Bachelor of Engineering in Civil Engineering*
- e) *Program Title: Bachelor of Engineering in Civil Engineering*
- f) *Admission criteria of the program:*

- Admission via the National High School Achievement Exam
- Admission based on Academic Records of the Candidates in the 10th, 11th, and 12th Grades of Designated High Schools
- Admission for candidates with national and international awards
- Admission via Scholastic Aptitude Exam held by IU
- Admission via Scholastic Aptitude Exam held by VNU

## 6. TEACHING AND LEARNING APPROACH

### ***6.1 The educational philosophy is well articulated and communicated to all stakeholders***

CE's educational philosophy is 'student-centered'. Therefore, all teaching and learning activities aim to transfer specific and in-depth knowledge to students, encouraging them to discover the impact of the acquired knowledge in a more general setting in engineering practice and motivating them to self-awareness and self-development of their knowledge. The crucial points underlying this educational philosophy are that students must learn to identify the problems arising in real-world engineering practices and find out the optimal solutions to a given problem.

The educational philosophy has been well articulated to the stakeholders, particularly lectures and students. CE's and IU's lecturers have been trained in teaching methods to bring this educational philosophy into all their teaching activities. During the orientation week and at the beginning of the courses, students are introduced to learning approaches based on this educational philosophy. Before technical concepts, instructors present syllabi and discuss the course's contents, textbooks, learning outcomes, grading scheme, and links to previous courses to prepare students with starting knowledge. Their impacts in both academic and practical situations motivate students to study new courses.

Students are convinced to learn actively, think independently, and work collaboratively in a group. In and out of the classroom, questions and discussions are always encouraged. Apart from theoretical studying, all students must acquire hand-on experience in the laboratory and work site.

### ***6.2 Teaching and learning activities are constructively aligned to the achievement of the expected learning outcomes***

In order to ensure that students can entirely meet the program expected learning outcomes, each course is designed to meet specific learning outcomes.

The CE program is student-centered, offering students opportunities to study at their own pace and interest. Lectures continuously stimulate and nurture their students' active and reflective learning in many activities:

- Lecturers are intertwined by questions and answers to encourage class and group discussion.
- Course assignments, including homework, quizzes, midterm exams, final exams, written reports, and oral presentations, are required in many courses.
- Seminars are also organized by the School to help students update their professional knowledge. Seminars are delivered by speakers from industry or experts in the field of civil engineering.

- Several courses have term projects and are accompanied by laboratory work. The School of Civil Engineering and Management has four laboratories with sufficiently equipped instruments for both study and research. Students can spend as much time as needed in the laboratories for self-study.
- Professional practice, internship, capstone project, and graduation thesis are required for all students. The School arranges several field trips, ensuring students are familiar with the real-world construction process. With a good connection with the industry, the School brings all third-year students to a company for the summer internship. During the internship, students are well-trained by experienced engineers, so their work knowledge and practical skills are improved significantly.
- IU has the vision to become one of the leading research-oriented universities. To encourage students to do research, it offers students research grants for conducting their research projects under the supervision of a faculty in the School.
- Students learn from their lecturers and higher-class students via several voluntary tutorial sessions organized by the School and youth association.

These teaching and learning activities are implemented efficiently with the help of sufficient facilities provided by the University. The number of students in each class is medium, with about 40-50 students for the lower division and 20-30 students for the upper division. Each classroom is well-equipped with a computer, projector, and whiteboard. These facilities, together with the Blackboard system, support lecturers in providing course materials to students. Technical discussions between students and lecturers are not limited to class hours; students are encouraged to seek help from their instructors outside the classrooms during office hours, via emails, or by appointment.

### ***6.3 Teaching and learning activities enhance life-long learning***

Students are not encouraged to learn by remembering but by learning how to learn, learning to know, learning to do, learning to live, learning to be, and learning for personal and professional development. With this in mind, the School organizes peer-review teaching activities to provide teachers with opportunities to learn with and from each other by working on real-world problems and sharing industrial experiences. Teachers are also encouraged to arrange a time to work off-hour for a consultant company to enhance their real-site experiences and build relationships with the industry. In addition, the School coordinates with the University to continuously help instructors improve their teaching and learning strategy by facilitating interaction between instructors and students and giving them feedback from students. Formal and closed discussions occur after the IU's Center of Education Quality Management (CEQM) delivers the results of the Course Evaluation Sheet filled out by students.

In and out of class, students are always boosted to discover and discuss any topic related to the field. The courses focus on creativity, independence, teamwork, organization, and know-how. 'Action learning', one of the critical factors to enhance life-long learning, is also considered one of the centers of our teaching and learning activities. With an understanding of theory and design principles, students are required to implement a real model and perform the test in the laboratory. To provide the best optimal model, students must read several online and library documents and analyze them themselves. By applying project/problem-based teaching, students learn that there is not only a single solution for the problem, and they must direct to self-learning to find solutions with confidence, creativity, and enjoyment, which are crucial characteristics of life-long learning.

In short, the School is restricted to providing both teachers and students opportunities to engage in teaching and learning activities and to create the challenge to understand, explore, and support new essential dimensions of learning such as self-directed learning, learning on demand, informal learning, and collaborative and organizational learning. Teachers are supported to be learning teachers, continuously pushing themselves to learn new ways to facilitate teaching and learning and increase student engagement. The courses require students to apply knowledge and skills in authentic, self-directed problems. The courses are designed by integrating working and learning; students can learn within the context of their work on real-world problems with confidence, creativity, and enjoyment.

## **7. STUDENT ASSESSMENT**

### ***7.1 The student assessment is constructively aligned to the achievement of the expected learning outcomes***

- ✓ The course outcomes are built and improved by instructors to achieve the program outcomes, including the expected knowledge, skills, attitudes, competencies, and habits of mind. Furthermore, the assessment criteria are built based on the course content, ensuring that suitable course outcomes are achieved. The criteria are generally used to assess students' level through six major categories: remember, understand, apply, analyze, evaluate and create. Students' assessment is made through classroom communication, assignments, laboratory activities, exams, projects, and theses.
- ✓ Classroom communication, assignments, laboratory activities, and exams are designed to evaluate the simplest to the most complex levels of Bloom's taxonomy, which are remembering, understanding, and applying (using a concept in a new situation or unprompted use of an abstraction).
- ✓ Projects and thesis: are used to assess students' level of applying (what they learned in the classroom to real-world situations in engineering practices), analyzing, evaluating, and creating knowledge and skills.

- ✓ The curriculum of the CE undergraduate program was designed to give students a solid science and engineering foundation with an emphasis on scientific research, practical skills, and a multidisciplinary approach. The assessment methods covering those objectives include:
- ✓ Midterm exams, final exams, quizzes, and home assignments assess the basic science and engineering knowledge of students;
- ✓ Lab performance evaluation assesses the practical skills of students;
- ✓ Project results assess the knowledge of students with emphasis on research skills and capability of conducting independent work;
- ✓ Finally, internship, pre-thesis, and thesis evaluation cover all objectives' assessments.

***7.2 The student assessments, including timelines, methods, regulations, weight distribution, rubrics, and grading, are explicit and communicated to students***

Student assessment includes assessment of student entrance, progress, and graduation thesis.

**Admission**

- ***By special selection:*** Candidates who pass special national competitions or international Olympiads in Math, Chemistry, Biology, Physics, or Computing will be selected by Admission Panel
- ***Via the national university entrance exam:*** Every July, high-school students participate in the national entrance exam organized by MOET. Based on the test results, the student can choose a field and University to apply for admission. Some English courses are required for students who do not meet the required level of English.

In 2017, IU operated the SAT subjective test to collect 35% of the total students.

***International students:*** International students, who do not follow MOET's standardized curriculum, can apply for admission following the process announced to international applicants on the IU website.

***Transfer students:*** Students from abroad universities can be transferred to IU programs. The Admission Panel screens and admission interviews. Students from a department or School can be transferred to another IU program within IU.

**Student progress**

The assessment of each course is made by exams (midterm and final exams), lab performance, quizzes, homework, and project presentation. The criteria for assessing student performance are explicitly and clearly stated in each course syllabus. These assessment criteria are informed to students at the beginning of each course. Examination schedules are set and informed to both instructors and students via EduSoftweb Students' performance is recorded for each semester,





including courses, accumulated credits, and Grade Point Average (GPA), and they can assess via their personal EduSoft account.

Students' overall performance throughout the semester is formally monitored through course grades which are at least 50/100 in order to pass the course (student must obtain a minimum of C grade, see Table 7.1). As per the regulation of IU, the categories to calculate course grades are as follows:

- ✓ Midterm exam: 20% – 30%
- ✓ Final exam: 40% – 60%
- ✓ Others (quizzes, home assignments, projects, etc.): 20% – 30%

The final grade of a laboratory course includes the following:

- ✓ Laboratory assignment: 70% – 80%
- ✓ Laboratory final exam: 20% – 30%

**Table 7.1: Grading criteria**

Classification	GPA	100-Point Grading Scale	Point Grading Scale in letters
<b>PASSING</b>			
Excellent		$90 \leq \text{GPA} \leq 100$	A+
Very Good		$80 \leq \text{GPA} < 90$	A
Good		$70 \leq \text{GPA} < 80$	B+
Fairly good		$65 \leq \text{GPA} < 70$	B
Fair		$55 \leq \text{GPA} < 60$	C+
Average		$50 \leq \text{GPA} < 55$	C
<b>NO PASSING</b>			
Weak		$30 \leq \text{GPA} < 50$	D+
Rather weak		$10 \leq \text{GPA} < 30$	D

Too weak

GPA <10

F

## **Graduation assessment**

Students who have completed 127.8 credits/210.62ECTS credits out of 152 credits/257.66 ECTS for the whole program are permitted to carry out the graduation thesis. The graduation thesis requires the design of real-world engineering problems, including buildings, bridges, and hydraulic structures. The thesis report focused on the design calculation and drawings must be implemented within 15 weeks. During this period, students must arrange a weekly meeting with their supervisors to discuss and correct their design. When the thesis report is finished, it must be submitted to the School for reviewing and assessing by a reviewer assigned by the Head of the School. Students who passed the assessment by the reviewer will be qualified for thesis defense. In addition, a Graduation Thesis Defense Committee assigned by the Rector of IU is responsible for assessing the graduation thesis. Each student must present their design work and answer the questions from each committee member within 30 minutes of the defense date. Students who pass the graduation thesis defense will gain 10 credits for graduation approval.

### ***7.3 Methods including assessment rubrics and marking schemes are used to ensure validity, reliability, and fairness of student's assessment***

Instructors examine each assessment tool's validity, reliability, and fairness every time to obtain the results of student assessment or from student feedback. Necessary changes in student assessment are discussed and improved accordingly by instructors and the School.

## **Written Examination**

There is also a well-defined process for making and approving the exam texts. Lecturers must submit the exam question at least 03 days before the exam date. Each exam question set has to be approved by the Head of the School to ensure that the course's learning outcomes are met.

## **Laboratory Report**

The laboratory assessment requires students to perform performance testing and report experimental results. Laboratory report shows all results of laboratory experiments integrated with students' understanding of the laboratory assignment.

## **Assignment and Presentation**

At IU, most courses have quizzes and homework assignments. In addition, presentation is required for some courses and compulsory for capstone projects and thesis.

## **Internship assessment**

Each student is supervised by one advisor from a company and one from the CEM school. The students must report their work during the internship weekly to the assigned School advisor via email. At the end of the internship, they submit their reports and present practical knowledge, skills, and professional attitudes they learned from the company.

## **Pre-thesis and thesis assessment**

The pre-thesis is the primary course providing students with essential research skills and knowledge to complete the thesis. The thesis is performed within 1 semester.

## **Graduation approval**

For graduation, students at the School are required to complete a total of 152 credits (pass the graduation thesis defense), obtain TOEFL scores of 550 or equivalent, and accomplish the military training duty. Every semester, the OAA prepares a list of potential candidates for graduation, which is reviewed by the School. The university committee discusses and gives its approval.

### ***7.4 Feedback on student assessment is timely and helps to improve learning***

The School assigns an advisor for each class, responsible for systematically collecting, reviewing, and using evidence or information related to student learning. The advisor consults students on their course registration each semester. Based on the student's performance, the advisor helps them see what areas need to be re-addressed to increase their learning performance. Students meet their supervisors weekly to review their design work when performing projects or thesis. These regular meetings allow students to respond freely rather than trying to get the "right" answer or look good, and also allow supervisors opportunities to determine the fact that student learning related to considering the topic is somewhat lacking, to inform the students about confusion and make adjustments to address this confusion. By doing this, students are provided feedback about their learning and new learning opportunities/strategies to increase their learning. When getting results of their performance (Assignment, Quiz, Presentation, Midterm test, Final Test, Lab report), students can contact instructors to arrange a face-to-face meeting for a detailed discussion on the results and get advice for improvement.

### ***7.5 Students have ready access to the appeal procedure***

IU has a policy and procedure to ensure all enrolled students have ready access to a fair and inexpensive complaints and appeals process. Students are encouraged to resolve complaints informally in the first instance. Any staff member can attempt to assist the student in resolving informal complaints. Informally, if the matter is resolved, there is no need for other parties to be involved or for a record to be kept. However, the student should proceed to a formal resolution if the issue is not resolved. The formal appeal or complaint must be in writing and submitted to the School and OOA. All complaints are considered in the first instance by 1) reviewing relevant documentation, 2) considering any informal decision made to date, 3) discussing the matter with the student and any other relevant parties, 4) forming a recommendation, and 5) notifying the student in writing of the outcome.

An instructor has two weeks to mark the midterm or final exam and informs students of their grade 2 or 3 days before submitting the grade to OAA. If a student does not satisfy with the grade,

he/she can meet the instructor personally to review their marks. If a student does not satisfy with the grade after it has been submitted to OAA, he/she can ask for a re-assessment.

## 8. PROGRAM STRUCTURE

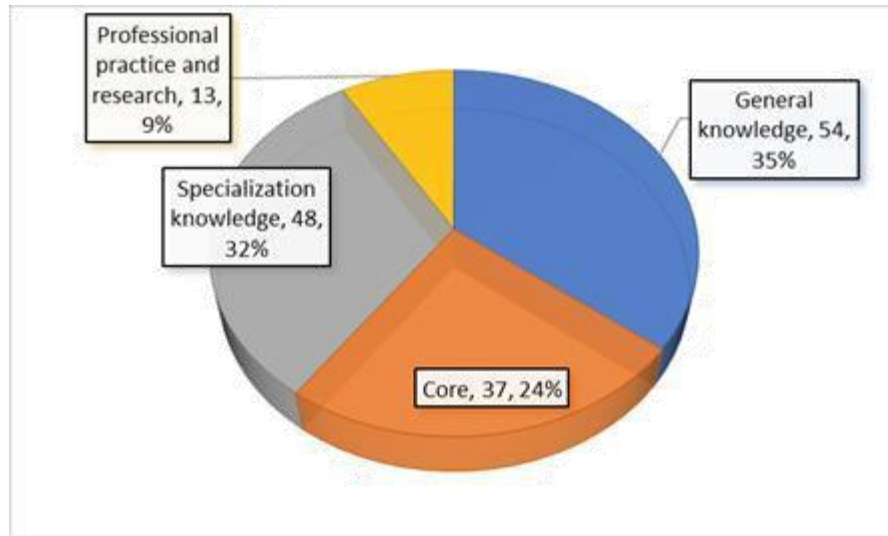
The curriculum is logically structured with general courses, fundamental courses, specialized courses, including elective courses, and a graduation thesis that balances specific and general courses, as shown in Figure 8.1. Additionally, Table 8.1 compares the CE curriculum with prestigious universities.

Table 8.1. Comparison of the percentage of each group between prestigious universities

Comparison among the Universities																
		IU			HCMC Uni. of Technology			Uni. of Texas, Austin			Rutgers Uni.			Uni. of Pittsburgh		
		Cr.	%	No. of Co.	Cr.	%	No. of Co.	Cr.	%	No. of Co.	Cr.	%	No. of Co.	Cr.	%	No. of Co.
1	General knowledge	54	33.5	21	53	35	20	62	49	19	67	52	23	60	47,0	18
2	Core Major Requirement	37	24.3	18	33	22	20	26	21	9	28	22	12	32	25,0	10
3	Specialization Requirement	33	21.7	15	37	25	20	28	22	9	23	18	9	12	9,4	4
4	Professional Practice And Research	13	8.5	3	18	12								3	2,3	1
5	CE Electives	9	5.9	3	10	7	5	9	7	3	10	8	3	21	16,3	7
6	IU Electives	6	3.9	2												
	<b>Total</b>	<b>152</b>	<b>100</b>	<b>62</b>	<b>151</b>	<b>100</b>	<b>52</b>	<b>125</b>	<b>100</b>	<b>40</b>	<b>128</b>	<b>100</b>	<b>47</b>	<b>128</b>	<b>100</b>	<b>40</b>

The courses in the curriculum are arranged in sequence of increasing difficulty from the first to seventh semesters, and the graduation thesis in the last semester. Advanced courses require prerequisite fundamental courses. Students can study an advanced course only when they pass its prerequisite courses.





**Figure 8.1. Percentage of each group**

Additionally, there are integrated courses in the curriculum. These courses are usually projected ones, which combine knowledge from several relevant courses. Soft skills are also required to complete these. The most important integrated course is the graduation thesis. The graduation thesis requires students to select appropriate solutions and design a specific project, such as a tall building, bridge, dam, or river embankment. For that, the students must use and integrate knowledge and skills accumulated from the courses and projects over the previous semesters. Elective courses and projects make the curriculum structure flexible enough to allow students to pursue an area of specialization and incorporate more recent changes and developments in civil engineering. Especially various topics of the graduation thesis are practical opportunities for students to study and apply state-of-the-art technology in design and construction to their projects. Therefore, the educational program has also been changed structurally to match the thesis content or contemporary construction technologies.

Annually, the CE curriculum is regularly reviewed to ensure that it is up-to-date just after CE receives stakeholders' feedback who need graduates with good soft skills such as self-studying, writing, drawing, presentation, and communication ability in English.

## 9. CURRICULUM

### 9.1 Standard curriculum for students of English LEVEL AE1 (IELTS ≥ 6.0/ TOEFL iBT ≥ 61)

- Total credits: 152/ 250.3
- Length of study: 4.5 years

Freshman Year							
Semester 1		Credits	ECTS	Semester 2		Credits	ECTS
EN007IU	Writing AE1	2	3.09	EN011IU	Writing AE2	2	3.09
EN008IU	Listening AE1	2	3.09	EN012IU	Speaking AE2	2	3.09
MA001IU	Calculus 1	4	6.18	CE100IU	Introduction to Civil Engineering	1	2.45
PH013IU	Physics 1	2	3.09	MA003IU	Calculus 2	4	6.18
CH011IU	Chemistry for Engineer	3	4.64	PH014IU	Physics 2	2	3.09
CE101IU	Engineering Mechanics -Statics	3	4.64	CH012IU	Chemistry Laboratory	1	2.45
PT001IU	Physical Training 1			CE102IU	Introduction to Computing for Engineers	3	4.64
				PT002IU	Physical Training 2		
<b>Total Credits</b>		<b>16</b>	<b>24.73</b>	<b>Total Credits</b>		<b>15</b>	<b>24.99</b>
Summer Semester 1							
Political Education: 1. PH015IU Physics 3 (3) 2. PH016IU Physics 3 Laboratory (1) 3. MA024IU Differential Equations (4)		<b>8</b>	<b>13.27</b>				
Sophomore Year							
Semester 3		Credits	ECTS	Semester 4		Credits	ECTS
PE015IU	Philosophy of Marxism and Leninism	3	4.64	PE017IU	Scientific socialism	2	3.09
PE016IU	Political economics of Marxism and Leninism	2	3.09	CE208IU	Mechanics of Materials 2	2	3.09
CE103IU	Computer-Aided Design and Drafting (CADD)	3	4.64	CE209IU	Structural Analysis 1	2	3.09
CE104IU	Practice CADD	1	2.45	CE205IU	Fluid Mechanics	2	3.09
CE201IU	Mechanics of Materials 1	2	3.09	CE206IU	Fluid Mechanics Laboratory	1	2.45
CE202IU	Mechanics of Materials Laboratory	1	2.45	CE214IU	Civil Architecture	2	3.09
CE210IU	Construction Materials	3	4.64	CE216IU	Probability and Statistics	3	4.64
CE213IU	Computational Methods for Civil Engineering	3	4.64	CE215IU	Applied Linear Algebra	2	3.09
<b>Total Credits</b>		<b>18</b>	<b>29.64</b>	<b>Total Credits</b>		<b>16</b>	<b>25.63</b>
Summer Semester 2							
MP001IU Military Training							
Junior Year							
Semester 5		Credits	ECTS	Semester 6		Credits	ECTS
CE301IU	Structural Analysis 2	3	4.64	CE307IU	Surveying	2	3.09
CE302IU	Soil Mechanics	3	4.64	CE308IU	Surveying Practice	1	2.45



CE303IU	Soil Mechanics Laboratory	1	2.45	CE309IU	Foundation Engineering	3	4.64
CE304IU	Reinforced concrete 1	3	4.64	CE310IU	Reinforced Concrete 2	3	4.64
CE305IU	Steel Structures	3	4.64	CE313IU	Reinforced Concrete Project	1	2.45
CE217IU	AI in Civil Engineering and Construction management	3	4.64	CE312IU	Steel Structure Project	1	2.45
				CE311IU	Construction Engineering	3	4.64
				PE019IU	Ho Chi Minh's Thoughts	2	3.09
<b>Total Credits</b>		<b>16</b>	<b>25.65</b>	<b>Total Credits</b>		<b>16</b>	<b>27.45</b>
<b>Summer Semester 3</b>							
CE314IU Summer Internship (3/4.64 crds)							
<b>Senior Year</b>							
<b>Semester 7</b>		<b>Credits</b>	<b>ECTS</b>	<b>Semester 8</b>		<b>Credits</b>	<b>ECTS</b>
CE401IU	Construction Management	3	4.64	CE_ _ _	CE Elective	3	4.64
CE211IU	Hydrology- Hydraulics	3	4.64	PE018IU	History of Vietnamese Communist Party	2	3.09
CE402IU	Foundation Project	1	2.45	CE_ _ _	CE Elective	3	4.64
CE403IU	Construction Project	1	2.45	CE306IU	Water Supply and Sewerage	3	4.64
PE021IU	General Law	3	4.64	_ _ _ IU	IU Free Elective	3	4.64
_ _ _ IU	IU Free Elective	3	4.64	PE020IU	Engineering Ethics and Professional Skills	3	4.64
CE_ _ _	CE Elective	3	4.64				
<b>Total Credits</b>		<b>17</b>	<b>28.1</b>	<b>Total Credits</b>		<b>17</b>	<b>26.29</b>
<b>Senior Year</b>							
<b>Semester 9</b>		<b>Credits</b>	<b>ECTS</b>				
CE420IU	GRADUATION THESIS	10	24.55				
<b>Total Credits</b>		<b>10</b>	<b>24.55</b>				

## 9.2 Curriculum for students of English level 2 LEVEL IE2 (IELTS $\geq$ 5.0/ TOEFL iBT $\geq$ 46-60)

- Total credits: 155/ 268.67
- Length of study: 4.5 years

Freshman Year							
Semester 1		Credits	ECTS	Semester 2		Credits	ECTS
ENTP02	IE2	13	20.09	EN007IU	Writing AE1	2	3.09
				EN008IU	Speaking AE1	2	3.09
MA001IU	Calculus 1	4	6.18	PH014IU	Physics 2	2	3.09
PH013IU	Physics 1	2	3.09	CH011IU	Chemistry for Engineer	3	4.64
PT001IU	Physical Training 1			CE101IU	Engineering Mechanics - Statics	3	4.64
				CE102IU	Introduction to Computing for Engineers	3	4.64
				MA003IU	Calculus 2	4	6.18
<b>Total Credits</b>		<b>19</b>	<b>29.36</b>	<b>Total Credits</b>		<b>19</b>	<b>29.37</b>
Summer Semester 1							
Political Education: 1. EN011IU Writing AE2 (2) 2. EN012IU Speaking AE2 (2) 3. PE015IU Philosophy of Marxism and Leninism (3) 4. PH015IU Physics 3 (3)		<b>10</b>	<b>24.55</b>				
Sophomore Year							
Semester 3		Credits	ECTS	Semester 4		Credits	ECTS
PH016IU	Physics 3 Laboratory	1	2.45	CE213IU	Computational Methods for Civil Engineering	3	4.64
MA024IU	Differential Equations	4	6.18	PE016IU	Political Economics of Marxism and Leninism	2	3.09
CH012IU	Chemistry Laboratory	1	2.45	CE208IU	Mechanics of Materials 2	2	3.09
CE103IU	Computer-Aided Design and Drafting	3	4.64	CE209IU	Structural Analysis 1	2	3.09
CE104IU	Computer-Aided Design and Drafting Practice	1	2.45	CE205IU	Fluid Mechanics	2	3.09
CE201IU	Mechanics of Materials 1	2	3.09	CE206IU	Fluid Mechanics Lab	1	2.45
CE202IU	Mechanics of Materials Lab	1	2.45	CE214IU	Civil Architecture	2	3.09
PT002IU	Physical Training 2	3	4.64	CE216IU	Probability and Statistics	3	4.64
CE100IU	Introduction to Civil Engineering	1	2.45	CE215IU	Applied Linear Algebra	2	3.09
<b>Total Credits</b>		<b>17</b>	<b>30.80</b>	<b>Total Credits</b>		<b>19</b>	<b>30.29</b>
Summer Semester 2							
MP001IU Military Training							
Junior Year							
Semester 5		Credits	ECTS	Semester 6		Credits	ECTS
CE301IU	Structural Analysis 2	3	4.64	PE017IU	Scientific Socialism	2	3.09
CE210IU	Construction Materials	3	4.64	CE307IU	Surveying	2	3.09
CE302IU	Soil Mechanics	3	4.64	CE308IU	Surveying Practice	1	2.45

CE303IU	Soil Mechanics Laboratory	1	2.45	CE309IU	Foundation Engineering	3	4.64
CE304IU	Reinforced concrete 1	3	4.64	CE310IU	Reinforced Concrete 2	3	4.64
CE305IU	Steel Structures	3	4.64	CE313IU	Reinforced Concrete Project	1	2.45
CE305IU	AI in Civil Engineering and Construction management	3	4.64	CE312IU	Steel Structure Project	1	2.45
				CE311IU	Construction Engineering	3	4.64
				PE019IU	Ho Chi Minh's Thoughts	2	3.09
<b>Total Credits</b>		<b>19</b>	<b>30.29</b>	<b>Total Credits</b>		<b>18</b>	<b>30.54</b>
<b>Summer Semester 3</b>							
CE314IU Summer Internship (3/4.64 crds)							
<b>Senior Year</b>							
<b>Semester 7</b>		<b>Credits</b>	<b>ECTS</b>	<b>Semester 8</b>		<b>Credits</b>	<b>ECTS</b>
CE401IU	Construction Management	3	4.64	CE_ _ _	CE Elective	3	4.64
CE211IU	Hydrology- Hydraulics	3	4.64	CE_ _ _	CE Elective	3	4.64
CE402IU	Foundation Project	1	2.45	CE306IU	Water Supply and Sewerage	3	4.64
CE403IU	Construction Project	1	2.45	_ _ _ IU	IU Free Elective	3	4.64
PE021IU	General Law	3	4.64	PE018IU	History of Vietnamese Communist Party	2	3.09
	IU Free Elective	3	4.64	PE022IU	Engineering Ethics and Critical Thinking	3	4.64
	CE Elective	3	4.64				
<b>Total Credits</b>		<b>17</b>	<b>28.1</b>	<b>Total Credits</b>		<b>17</b>	<b>26.29</b>
<b>Senior Year</b>							
<b>Semester 9</b>		<b>Credits</b>	<b>ECTS</b>				
CE420IU	GRADUATION THESIS	10	24.55				
<b>Total Credits</b>		<b>10</b>	<b>24.55</b>				

### 9.3 Curriculum for students of English level IE1 (IELTS $\geq 3.5$ / TOEFL iBT < 45)

- Total credits: 155/ 264.21
- Length of study: 4.5 years

<b>Freshman Year</b>							
<b>Semester 1</b>		<b>Credits</b>	<b>ECTS</b>	<b>Semester 2</b>		<b>Credits</b>	<b>ECTS</b>
ENTP01	IE1	17	26.26	EN007IU	Writing AE1	2	3.09
				EN008IU	Speaking AE1	2	3.09
ENTP02	IE2	13	20.09	MA001IU	Calculus 1	4	6.18
				PH013IU	Physics 1	2	3.09
				CE100IU	Introduction to Civil Engineering	1	2.45
				PT001IU	Physical Training 1	3	4.64
				CE101IU	Engineering Mechanics - Statics	3	4.64
				CE102IU	Introduction to Computing for Engineers	3	4.64
<b>Total Credits</b>		<b>30</b>	<b>46.35</b>	<b>Total Credits</b>		<b>20</b>	<b>31.82</b>

<i>Summer Semester 1</i>							
Political Education: 1. EN011IU Writing AE2 (2) 2. EN012IU Speaking AE2 (2) 3. PE015IU Philosophy of Marxism and Leninism (3) 4. MA003IU Calculus 2 (4)		<b>11</b>	<b>16.99</b>				
<i>Sophomore Year</i>							
<i>Semester 3</i>		<i>Credits</i>	<i>ECTS</i>	<i>Semester 4</i>		<i>Credits</i>	<i>ECTS</i>
MA024IU	Differential Equations	4	6.18	PH015IU	Physics 3	3	4.64
PH014IU	Physics 2	2	3.09	PH016IU	Physics 3 Laboratory	1	2.45
CH011IU	Chemistry for Engineer	3	4.64	CE208IU	Mechanics of Materials 2	2	3.09
CH012IU	Chemistry Laboratory	1	2.45	CE209IU	Structural Analysis 1	2	3.09
CE103IU	Computer-Aided Design and Drafting	3	4.64	CE205IU	Fluid Mechanics	2	3.09
CE104IU	Computer-Aided Design and Drafting Practice	1	2.45	CE206IU	Fluid Mechanics Lab	1	2.45
CE201IU	Mechanics of Materials 1	2	3.09	CE214IU	Civil Architecture	2	3.09
CE202IU	Mechanics of Materials Lab	1	2.45	CE213IU	Computational Methods for Civil Engineering	3	4.64
PT002IU	Physical Training 2	3	4.64	CE215IU	Applied Linear Algebra	2	3.09
<b>Total Credits</b>		<b>20</b>	<b>33.63</b>	<b>Total Credits</b>		<b>18</b>	<b>29.63</b>
<i>Summer Semester 2</i>							
MP001IU Military Training							
<i>Junior Year</i>							
<i>Semester 5</i>		<i>Credits</i>	<i>ECTS</i>	<i>Semester 6</i>		<i>Credits</i>	<i>ECTS</i>
CE301IU	Structural Analysis 2	3	4.64	PE017IU	Scientific Socialism	2	3.09
PE016IU	Political Economics of Marxism and Leninism	2	3.09	CE307IU	Surveying	2	3.09
CE210IU	Construction Materials	3	4.64	CE308IU	Surveying Practice	1	2.45
CE302IU	Soil Mechanics	3	4.64	CE309IU	Foundation Engineering	3	4.64
CE303IU	Soil Mechanics Laboratory	1	2.45	CE310IU	Reinforced Concrete 2	3	4.64
CE304IU	Reinforced concrete 1	3	4.64	CE313IU	Reinforced Concrete Project	1	2.45
CE305IU	Steel Structures	3	4.64	CE312IU	Steel Structure Project	1	2.45
CE216IU	Probability and Statistics	3	4.64	CE311IU	Construction Engineering	3	4.64
				CE217IU	AI	3	4.64
<b>Total Credits</b>		<b>21</b>	<b>33.38</b>	<b>Total Credits</b>		<b>19</b>	<b>32.09</b>
<i>Summer Semester 3</i>							
CE314IU Summer Internship (3/4.64 crds)							
<i>Senior Year</i>							
<i>Semester 7</i>		<i>Credits</i>	<i>ECTS</i>	<i>Semester 8</i>		<i>Credits</i>	<i>ECTS</i>
CE401IU	Construction Management	3	4.64	CE_ _ _	CE Elective	3	4.64
CE211IU	Hydrology- Hydraulics	3	4.64	CE_ _ _	CE Elective	3	4.64
CE402IU	Foundation Project	1	2.45	CE306IU	Water Supply and Sewerage	3	4.64
CE403IU	Construction Project	1	2.45	_ _ _IU	IU Free Elective	3	4.64
PE021IU	General Law	3	4.64	PE019IU	Ho Chi Minh's Thoughts	2	3.09
PE018IU	History of Vietnamese Communist Party	2	3.09	PE022IU	Engineering Ethics and Critical Thinking	3	4.64
	IU Free Elective	3	4.64				
	CE Elective	3	4.64				
<b>Total Credits</b>		<b>19</b>	<b>31.19</b>	<b>Total Credits</b>		<b>17</b>	<b>26.29</b>

Senior Year							
Semester 9		Credits	ECTS				
CE420IU	GRADUATION THESIS	10	24.55				
<b>Total Credits</b>		<b>10</b>	<b>24.55</b>				

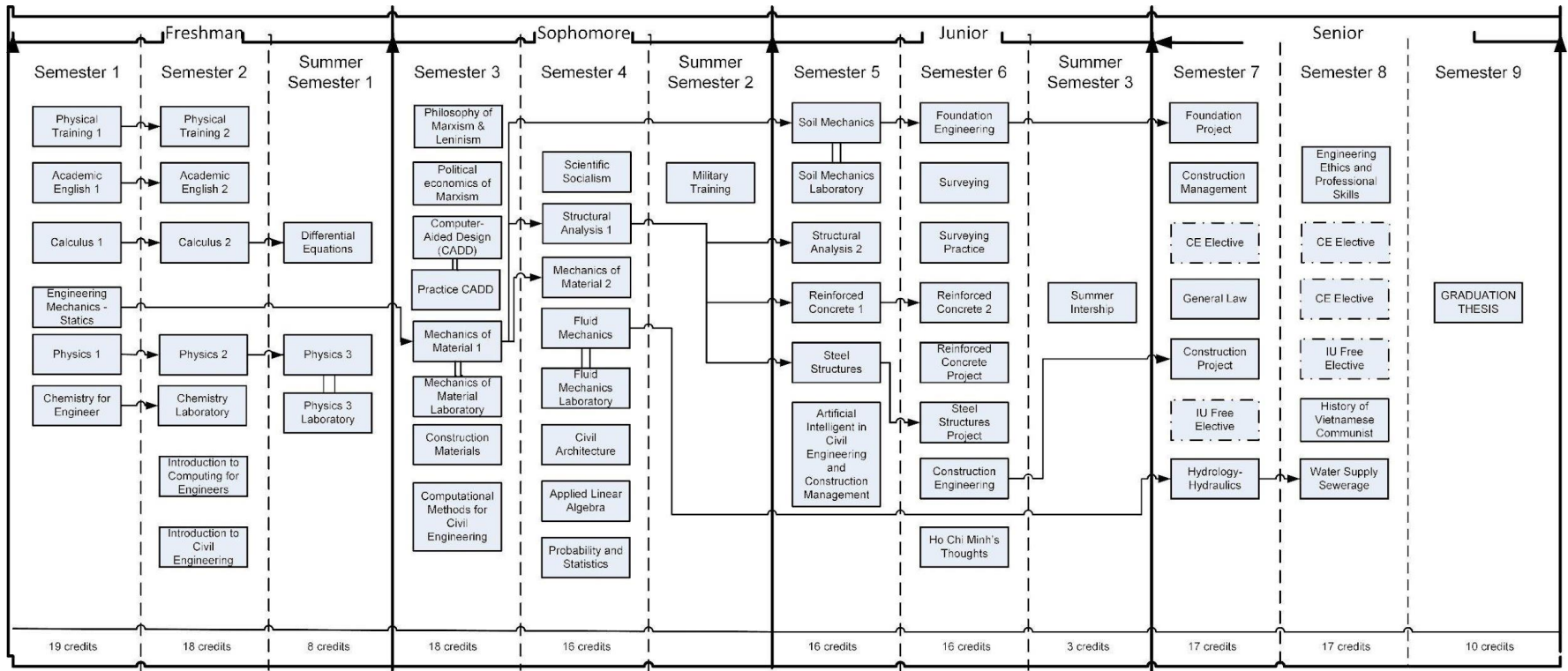
#### 9.4 Curriculum for students of English level IE0 (IELTS ≤3.5)

- Total credits: 165/ 275.03
- Length of study: 4.5 years

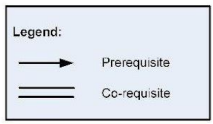
Freshman Year							
Semester 1		Credits	ECTS	Semester 2		Credits	ECTS
ENTP00	IE0	17	26.26	ENTP02	IE2	13	20.09
ENTP01	IE1	17	26.26	MA001IU	Calculus 1	4	6.18
				PH013IU	Physics 1	2	3.09
				PT001IU	Physical Training 1		
<b>Total Credits</b>		<b>34</b>	<b>52.52</b>	<b>Total Credits</b>		<b>19</b>	<b>29.36</b>
Summer Semester 1							
Political Education: 1. EN011IU Writing AE1 (2) 2. EN008IU Listening AE1 (2) 3. MA003IU Calculus 2 (4)		<b>8</b>	<b>12.36</b>				
Sophomore Year							
Semester 3		Credits	ECTS	Semester 4		Credits	ECTS
EN011IU	Writing AE2	2	3.09	PH015IU	Physics 3	3	4.64
EN012IU	Speaking AE2	2	3.09	PH016IU	Physics 3 Laboratory	1	2.45
CE100IU	Introduction to Civil Engineering	1	2.45	PE018IU	History of Vietnamese Communist Party	2	3.09
PE015IU	Philosophy of Marxism and Leninism	3	4.64	PE019IU	Ho Chi Minh's Thoughts	2	3.09
PE016IU	Political Economics of Marxism and Leninism	2	3.09	CE103IU	Computer-Aided Design and Drafting	3	4.64
PH014IU	Physics 2	2	3.09	CE104IU	Computer-Aided Design and Drafting Practice	1	2.45
CH011IU	Chemistry for Engineer	3	4.64	MA024IU	Differential Equations	4	6.18
CE101IU	Engineering Mechanics -Statics	3	4.64	CE201IU	Mechanics of Materials 1	2	3.09
PT002IU	Physical Training 2			CE202IU	Mechanics of Materials Lab	1	2.45
<b>Total Credits</b>		<b>18</b>	<b>28.73</b>	<b>Total Credits</b>		<b>19</b>	<b>32.08</b>
Summer Semester 2							
MP001IU Military Training							
Junior Year							
Semester 5		Credits	ECTS	Semester 6		Credits	ECTS
CE213IU	Computational Methods for Civil Engineering	3	4.64	CE215IU	Applied Linear Algebra	2	3.09
CE208IU	Mechanics of Materials 2	2	3.09	CE301IU	Structural Analysis 2	3	4.64
CE209IU	Structural Analysis 1	2	3.09	CE302IU	Soil Mechanics	3	4.64

CE205IU	Fluid Mechanics	2	3.09	CE303IU	Soil Mechanics Laboratory	1	2.45
CE206IU	Fluid Mechanics Lab	1	2.45	CE304IU	Reinforced concrete 1	3	4.64
CE102IU	Introduction to Computing for Engineers	3	4.64	CE305IU	Steel Structures	3	4.64
CE214IU	Civil Architecture	2	3.09	PE017IU	Scientific Socialism	2	3.09
CEI216U	Probability and Statistics	3	4.64				
CH012IU	Chemistry Laboratory	1	2.45				
<b>Total Credits</b>		<b>19</b>	<b>31.18</b>	<b>Total Credits</b>		<b>17</b>	<b>27.19</b>
<b>Summer Semester 3</b>							
CE314IU Summer Internship (3/4.64 crds)							
<b>Senior Year</b>							
<b>Semester 7</b>		<b>Credits</b>	<b>ECTS</b>	<b>Semester 8</b>		<b>Credits</b>	<b>ECTS</b>
CE210IU	Construction Materials	3	4.64	CE307IU	Surveying	2	3.09
CE211IU	Hydrology- Hydraulics	3	4.64	CE308IU	Surveying Practice	1	2.45
CE309IU	Foundation Engineering	3	4.64	CE217IU	Artificial Intelligence in Civil Engineering and Construction Management	3	4.64
CE310IU	Reinforced Concrete 2	3	4.64	CE311IU	Construction Engineering	3	4.64
CE312IU	Steel Structure Project	1	2.45	CE306IU	Water Supply and Sewerage	3	4.64
CE313IU	Reinforced Concrete Project	1	2.45	CE402IU	Foundation Project	1	2.45
PE021IU	General Law	3	4.64	CE403IU	Construction Project	1	2.45
					CE Elective	3	4.64
<b>Total Credits</b>		<b>17</b>	<b>28.1</b>	<b>Total Credits</b>		<b>17</b>	<b>29</b>
<b>Senior Year</b>							
<b>Semester 9</b>		<b>Credits</b>	<b>ECTS</b>	<b>Semester 10</b>		<b>Credits</b>	<b>ECTS</b>
CE401IU	Construction Management	3	4.64	GRADUATION THESIS	10	24.55	
	CE Elective	3	4.64				
	CE Elective	3	4.64				
	IU Elective	3	4.64				
	IU Elective	3	4.64				
PE022IU	Engineering Ethics and Critical Thinking	3	4.64				
<b>Total Credits</b>		<b>18</b>	<b>27.84</b>	<b>Total Credits</b>		<b>10</b>	<b>24.55</b>

# 10. CURRICULUM MAPPING



- CE Elective:**
1. Dynamics of Structures
  2. Hydraulics Structures
  3. Tall Buildings
  4. Bridge Engineering
  5. Building Information Management
  6. Advanced Artificial Intelligence in Civil Engineering and Construction Management
  7. GIS Application in Civil Engineering
  8. Construction Project Management



## 11. RELATION OF PROGRAM ELOS AND COURSES

While each course may relate to all the ELOs at different degrees, only the most significant correlation is shown in table 11.1. below

Table 11.1. Relation of Course learning outcome and Expected learning outcomes

Code	Courses	Expected Learning Outcomes										
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
<b>CORE MAJOR REQUIREMENT</b>												
CE204IU	Computer-Aided Design and Drafting (CADD)		H					H				M
CE202IU	Practice CADD				M						L	
CE102IU	Introduction to Computing for Civil Engineers	M	M								M	
CE101IU	Engineering Mechanics-Statics	M	M				M					
CE203IU	Engineering Mechanics-Dynamics	M	M				M				M	
CE201IU	Mechanics of Materials 1	M	M		M		M					
CE202IU	Mechanics of Materials Laboratory		H			H					H	H
CE208IU	Mechanics of Materials 2	M	M		M		M					
CE209IU	Structural Analysis 1	M	M								M	M
CE215IU	Applied Linear Algebra	M						M				M
CE216IU	Probability and Statistics	M	M					M				M
CE301IU	Structural Analysis 2	M	M								M	M
CE213IU	Computational Methods for Civil Engineering	H	H		H			M			H	
CE206IU	Fluid Mechanics	H	H			M						M
CE207IU	Fluid Mechanics Laboratory		H				L	H				M
CE211IU	Hydrology- Hydraulics	M	H			M					H	H
CE302IU	Soil Mechanics	M	M				M				H	
CE303IU	Soil Mechanics Laboratory		H			H					H	H
<b>SPECIALIZATION REQUIREMENT</b>												
CE210IU	Construction Materials		M		L				L			L
CE307IU	Surveying		H			M					H	H





Code	Courses	Expected Learning Outcomes										
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
CE304IU	Reinforced concrete 1	L	M								M	M
CE310IU	Reinforced concrete 2	L	H								M	M
CE313IU	Reinforced Concrete Project						L	L				
CE305IU	Steel Structures	M	M				M		M	M		
CE312IU	Steel Structure Project		M		M		M				M	
CE309IU	Foundation Engineering	M	M				M				H	
CE402IU	Foundation Project		M				M	M			H	
CE212IU	Civil Architecture	M	M	L		L		H	M		H	M
CE306IU	Water Supply and Sewerage					M	M				H	H
CE311IU	Construction Engineering	M	M								M	M
CE403IU	Construction Project	H						M			H	M
CE401IU	Construction Management			M		M		H	M			H
<b>CE ELECTIVES (take at least 03 courses)</b>												
CE413IU	Hydraulics Structures		H					M		L	M	H
CE411IU	Bridges Engineering								L	L	M	
CE412IU	Dynamics of Structures	M	M				M		M	M		
CE414IU	Tall Buildings	L	M								M	M
<b>PROFESSIONAL PRACTICE AND RESEARCH</b>												
CE314IU	Summer Internship		M		H	H		M			H	M
PE020IU	Engineering Ethics and Professional Skills				M	M						
CE420IU	Graduation Thesis	H	H	H	L	L	L	H	M	H	H	L

## 12. ACADEMIC REGULATION

### 12.1 Specialization Selection

After completing the first two years of the program, students are allowed to choose their specialization. Specialization is the research area that students are interested in and wish to continue with for their final thesis. School of Civil Engineering and Management currently offers three specializations:

- Tall Building Structures Design

- Roads and Bridges Structures Design

- Hydraulics Structures Design

Once specialization is chosen, students have to take the required courses for each specialization, relevant elective courses, and final thesis.

### **12.2 Summer Internship Registration**

Students are allowed to register for the summer internship before the academic year when they aim to apply for the thesis.

#### **Objectives:**

- To develop skills in the application of theory to practical work situations;
- To develop skills and techniques directly applicable to their careers;
- To provide students the opportunity to get involved with the company before graduating.

**Internship duration:** minimum 8 weeks (full-time working)

### **12.3 Thesis Registration**

#### **Criteria:**

- Successfully accumulate at least 90% of credit numbers of the academic curriculum and finish all projects.
- Do not under any academic admonishment.

**Duration:** minimum 12 weeks

### **12.4 Graduation Criteria**

Students have to complete all of the following requirements for graduation:

- Successfully complete the academic curriculum (152 credits) with GPA  $\geq 50$
- Meet the minimum English requirement of 550 TOEFL PBT or its equivalence: 79 TOEFL iBT, 6.5 IELTS
- Military Education Certification
- Meet other requirements in accordance with the regulations for graduation set by the IU

### **12.5 Scholarship Information**

**University Scholarship (Decision No 99 &100/ĐHQ-TĐT)**

Each semester, the top 10% of students with the highest GPA will receive a scholarship from IU. 4% of students will receive a full scholarship (12.000.000 VND for Fall/Spring semester or 6.000.000 VND for the Summer semester), and 6% of students will receive half scholarship (6.000.000 VND for Fall/Spring semester or 3.000.000 for Summer semester).

**Minimum requirements:**

- Complete the Academic English 1 (AE1)

- Register at least 12 credits for Fall/Spring semester or 6 credits for the Summer semester
- Semester GPA  $\geq 70$  (with no course fails in that semester)

### **Admission Scholarship 2012**

- **Full scholarship** (full tuition exemption for 4 years – equivalent to 120.000.000 VND):  
Students have entrance examination scores  $\geq 24$ .
- **Partial scholarship** (half tuition exemption for 4 years – equivalent to 60.000.000 VND):  
Student has entrance examination scores  $\geq 23$ .
- **Condition to maintain Scholarships:** Students must have GPA of each semester  $\geq 70$  and a score of every subject  $\geq 50$ .

### **12.6 Course Registration**

Course registration aims at helping students gain full success in building their training plan and selecting appropriate subjects for every semester in such a way that they can meet his or her capacity and conditions for the highest achievement.

- Students should register at least 12 credits, except for the last semester.
- Students should register a maximum of 24 credits in one semester, except for the last semester, for those who have a cumulative GPA  $\geq 65$
- The academic advisors must approve the subject registration form.
- For exceptional cases, students must file for the consideration of the Dean of Schools.
- Students do online course registration on the website: <https://hcmiu.edu.vn/edusoftweb/> (the University will create a username and password for the student).
- The School will inform the registration time of Civil Engineering and Management.

### **Adjusting Student Timetable**

When receiving the timetables, students must check the information, including the number of registered courses, tuition fees, etc. If there are any errors, students must report to the School within three days of the timetable announcement.

The School must check (through the academic advisors) and give their opinions on the students' file of the document, and then send them to the Office of Academic Affairs for settlement

### **Adding and Dropping Courses**

In the first week of teaching, students can file for adding and dropping courses based on their timetables, ability and learning conditions.

### **12.7 Academic Probation**

University Academic Committee will consider settling the academic matters annually after the first and summer semester. The result of the summer semester will be added to that of the second semester of the correspondent year upon academic settling.

Students violating the below regulation will be admonished academically:

- Those who acquire insufficient credits as required by the specialization in one semester;
- Cumulative GPA < 35.
- Having two consecutive cumulative GPA < 50.

The duration of academic probation will last in the subsequent formal semester.

### **Academic suspension**

Students violating one of the below regulations will be suspended academically:

- The ultimate time for studying has finished;
- To drop out of University for more than one semester without approval of IU;
- Students are warned more than 2 times;
- Do not register for courses for each semester;
- Do not finish tuition fees in the prescribed time.

### **12.8 Academic Information**

- Students can see all studying results in each semester and training results at the School of Civil Engineering and Management
- In the studying process, the student can ask for the transcript at the Office of Academic Affairs.
- The University will send the information to the student's family for the student who is warned or suspended.

### **12.9 Grading Criteria**

CLASSIFICATION	SCALE 0 OF 100	SCALE 0 OF 4	LETTER GRADE
<b>PASS</b>			
<b>Excellent</b>	85 ≤ GPA ≤ 100	4.0	A
<b>Very Good</b>	75 ≤ GPA < 85	3.75	A-
<b>Good</b>	65 ≤ GPA < 75	3.5	B+
<b>Fairly good</b>	60 ≤ GPA < 65	3.0	B



<b>Fair</b>	$55 \leq \text{GPA} < 60$	2.5	C+
<b>Average</b>	$50 \leq \text{GPA} < 55$	2.0	C
<b>FAIL</b>			
<b>Weak</b>	$30 \leq \text{GPA} < 50$	1.3	D+
<b>Rather weak</b>	$10 \leq \text{GPA} < 30$	1.0	D
<b>Too weak</b>	$\text{GPA} < 10$	0.0	F

## 13. COURSE DESCRIPTION

### 13.1 Lower Division

#### MA001IU

4 credits

#### Calculus 1

Functions; Limits; Continuity; Derivatives, Differentiation, Derivatives of basic elementary functions, differentiation rules; Application of Differentiation: L'Hopital's rule, Optimization, Newton's method; Anti-derivatives; Indefinite integrals, definite integrals; Fundamental theorem of calculus; Technique of integration; Improper integrals; Applications of integration.

#### MA003IU 4 credits Calculus 2

Sequence and series; Convergence tests; Power series; Taylor & Maclaurin series; Cartesian Coordinates; Lines, Planes and Surfaces; Derivatives and integrals of vector functions; Arc length and curvature; parametric surfaces; Functions of several variables; Limits, continuity, partial derivatives, tangent planes; Gradient vectors; Extrema; Lagrange multipliers; Multiple integrals: double integrals, triple integrals, techniques of integration; Vector fields, line integrals, surface integrals.

*Prerequisite: MA001IU (Calculus 1)*

#### MA024IU 4 credits Differential Equations

First-order differential equations; second-order linear differential equations, undetermined coefficients, variation of parameters, applications, higher-order linear differential equations, systems of first-order linear equations, elementary partial differential equations and the method of separation of variables. This course also provides the laboratory by using Maple and Matlab to solve many different types of differential equations.

*Prerequisite: MA003IU (Calculus 2)*

#### CE215IU 3 credits Applied Linear Algebra

The course will focus on matrix and vector methods for studying systems of linear equations, with an emphasis on concrete calculations and applications. Specific topics to be covered include matrices, Gaussian elimination, vector spaces, LU decomposition, orthogonality, the Gram–Schmidt process, determinants, inner products, eigenvalue problems, and applications to differential equations and Markov processes.



### **CE216IU 3 credits Probability and Statistics**

Probability problems in engineering, conditional probability, discrete and continuous distributions, sampling distribution, interval estimates, hypothesis testing, analysis of variance, regression models and non-parametric testing.

### **PH013IU 2 credits Physic 1 (Engineering Mechanics)**

An introduction to mechanics including planar forces, free body diagrams, planar equilibrium of rigid bodies, friction, distributed forces, internal forces, shear force and bending moment diagrams, simple stress and strain and associated material properties, kinematics and kinetic of particles, work, and energy, the motion of rigid bodies in a plane.

### **PH014IU 2 credits Physic 2 (Thermodynamics)**

This course provides students with basic knowledge about fluid mechanics, macroscopic description of gases; heat and the first law of thermodynamics; heat engines and the second law of thermodynamics; microscopic description of gases and the kinetic theory of gases.

### **PH016IU 1 credit Physics 3 Laboratory**

This laboratory includes the topics on vectors and uncertainties, electrostatic; Ohm's law; magnetic force; ampere law; faraday law, and RLC circuits.

*Co-requisite: PH015IU (Physics 3)*

### **CH011IU 3 credits Chemistry for Engineers**

This course is designed for non-chemistry majors, as it is intended for students pursuing a degree in information technology, electronic and telecommunication. The course is designed to provide a strong background in the fundamentals of chemistry, preparing students for further study in their major field. Topics include important principles, theories, concepts of chemistry, and chemical calculations necessary for a comprehension of the structure of matter, and the chemical actions of the common elements and compounds. The impact of chemistry on everyday life and on the environment is also introduced wherever possible.

*Co-requisite: CH012IU (Chemistry for Engineers Laboratory)*

**EN007IU & EN008IU**

**4 credits**

## **Academic English 1**

This course concentrates on academic English listening and writing skills.

Strategies for Academic Listening, Note-taking, and Discussion will help the student face the challenges of learning English in an Academic environment. The student will learn to do all the things that successful international college students do – listen actively to lectures, take effective notes, and participate confidently in discussions about the lecture with classmates and the lecturer. While learning these strategies, you will also learn and use common academic vocabulary as well as useful idioms.

Writing skills are developed for pre-advanced academic writers. It focuses on composition writing using Writing process, Building Framework, Description, Opinion, Process, Comparison-Contrast, Cause-Effect, Problem-Solution, and Argument. Students will have writing practice in "Real-World Writing" formats.

## **EN011IU & EN012IU 4 credits Academic English 2**

This course concentrates on academic English speaking and writing skills.

Speaking subject provides students with the skills to be able prepare and deliver effective formal, structured presentations that are appropriate to the specific environment and audience.

Writing subject provides an overview of the organizational format for a research paper and assists students in completing research projects in any content area course by providing assistance in writing effective research papers using a step-by-step process approach. Course content includes the components of a research paper, and techniques of selecting and narrowing topics; writing thesis statements; outlining; locating and documenting sources; taking notes; writing introductions, body paragraphs, and conclusions; and writing rough and final drafts. Students work with projects relating to their content area courses.

*Prerequisite: EN007IU & EN008IU (Academic English 1)*

## **PE008IU 3 credits Critical Thinking**

This course provides students the fundamental knowledge of critical thinking concept. This is a general thinking skill that is useful for all sorts of careers and professions. The course covers introduction to critical thinking; meaning analysis and argument analysis; basic logic, sentential logic (SL) and predicate logic; Venn diagrams; scientific reasoning; basic statistics; strategic thinking; values and morality; fallacies & biases; and introduction to creativity thinking.

**PE020IU**

**3 credits**

### **Engineering Ethics and Professional Skills**

This course is designed to introduce engineering students to the concepts, theory and practice of engineering ethics. It will allow students to explore the relationship between ethics and engineering, and apply classical moral theory and decision making for engineering issues encountered in academic and professional careers. This course also provides students with the professional skills: sharing ideas and concepts, team working, and presentation skills.

### **CE102IU 3 credits Introduction to Computing for Civil Engineers**

This course is an introduction to solving engineering problems through the use of the computer. It introduces general problem-solving techniques including the concepts of step-wise refinement applied to the development of algorithms. This course will cover elementary programming concepts using the programming language MATLAB accompanied with VBA in Excel and apply those concepts to the solution of engineering problems.

### **CE213IU 3 credits Computational Methods for Civil Engineering**

The goal of this course is to introduce numerical methods to students, emphasize the practical aspects of the use of these methods and establish the limitations, advantages, and disadvantages of these methods.

*Prerequisite: MA001IU & MA003IU (Calculus 1 & 2)*

### **CE101IU 3 credits Engineering Mechanics - Statics**

This course is an introduction to the principles of statics and the ability to construct free body diagrams. Students will understand properties of areas and be able to calculate centroids and moments of inertia for areas. Moreover, students understand how to solve equilibrium problems involving trusses frames and machines, be able to analyze distributed loads, understand the concept of internal forces in members, and be able to draw shear and bending-moment diagrams for beams. This course also obtain knowledge of the laws of dry friction.

*Prerequisite: MA001IU (Calculus 1)*

*Co-requisite: MA003IU (Calculus 2)*

### **CE203IU 3 credits Engineering Mechanics - Dynamics**

This course provide students with a basic understanding of forces and motion, and thus to give students a fundamental understanding and background in introductory (planar) dynamics at the



second year university level. To provide the requisite background for further study at the junior and senior level in the MAE curriculum, as well as to prepare students for further study in the subject area. To provide students in other engineering curricula with a background in this fundamental engineering science.

*Prerequisite: CE101IU (Engineering Mechanics - Statics)*

### **CE201IU 2 credits Mechanic of Material 1**

This course is an introduction to the relationship between loads applied to a deformable body and the internal stress, strains and deformation. This course obtain knowledge of internal loading, axial force, shear, moment, and torque in structural members; stress, strain, and stress-strain relations; mechanical properties of material; strain energy; torsion of circular shafts; bending of singly symmetric beams.

*Prerequisite: CE101IU (Engineering Mechanics - Statics)*

*Co-requisite: CE202IU (Mechanic of Material Lab)*

### **CE208IU 2 credits Mechanic of Material 2**

This course is to develop analytical and problem-solving skills. To show proficiency in the mathematics and basic sciences required to solve structural engineering and mechanics problems. To demonstrate the ability to organize, approach, and solve engineering problems that are multi-step problems in which the solutions are not visible at the beginning of the process. This course obtained knowledge of combined loadings, stress and strains transformation; stress-strain relationship; design of beams; buckling of columns and energy methods.

*Prerequisite: CE201IU (Mechanic of Material 1)*

### **CE202IU 1 credit Mechanic of Material Laboratory**

Students will apply the basic principles learned from the mechanics of materials course. They will do experiments to understand bending stress in beams; steel bars under pure tensile force, torsion of circular sections, buckling of struts; continuous and indeterminate beams. Through this course, students understand about testing equipment, general procedures related to each test, and parameters measured by the tests.

*Co-requisite: CE201IU (Mechanic of Material 1)*

**CE209IU 2 credits Structure Analysis 1**

This course is an introduction to basic structural engineering concepts. Determine the magnitude of different types of loads in accordance with the related codes. Idealization of structures and loads in relation to real structures. Determine the internal forces and draw diagrams for frames. Understand numerical methods for computing displacements and slopes for beams and frames using integration, virtual work methods, and graph multiplication method. Understand force and displacement methods to solve indeterminate beams, frames, and trusses.

*Prerequisite: CE201IU (Mechanic of Material 1)*

*Co-requisite: CE208IU (Mechanic of Material 2)*

### **CE301IU 3 credits Structure Analysis 2**

This course introduces computational analysis of structures and the practice of using programs to solve structural problems. Background in finite element analysis is developed. Plastic analysis of frames and slabs is introduced.

*Prerequisite: CE209IU (Structure Analysis 1)*

### **CE206IU 2 credits Fluid Mechanics**

Fluid Mechanics is the study of the mechanisms in which fluids, under all possible conditions (gases and liquids and a few other materials) respond to forces, exert forces, and move from one place to another in physical view. This course will provide fundamental knowledge on physical properties of fluid and characteristics of the fluid state as well. Moreover, students learn the laws and the governing equations representing different kinds of fluid at both static and motion state interacting to structures; and also know how to solve these equations or compute physical parameters in practical meaning. In addition, the practices to measure fluid properties are introduced in this course.

*Co-requisite: CE207IU (Fluid Mechanics Laboratory)*

### **CE207IU 1 credit Fluid Mechanics Laboratory**

Students will apply the basic principles learned from the basic fluid mechanics course. Some experiments such as discharge over notch; Reynolds number and transition flow; flow measurement apparatus; flow through orifice; fluid friction apparatus is included in this course. Through this course, students understand about testing equipment, general procedures related to each test, and parameters measured by the tests.

*Co-requisite: CE206IU (Fluid Mechanics)*

**CE215IU**

**2 credit**

### **Applied Linear Algebra**

The course will focus on matrix and vector methods for studying systems of linear equations, with an emphasis on concrete calculations and applications. Specific topics to be covered include matrices, Gaussian elimination, vector spaces, LU decomposition, orthogonality, the Gram–Schmidt process, determinants, inner products, eigenvalue problems, and applications to differential equations and Markov processes.

### **CE216IU 3 credit Probability and Statistics**

Probability problems in engineering, conditional probability, discrete and continuous distributions, sampling distribution, interval estimates, hypothesis testing, analysis of variance, regression models and non-parametric testing.

### **CE302IU 2 credits Soil Mechanics**

The course provides to students basic definitions, physical and mechanics properties of various soils in different states such as dry, wet and saturated states. The methods to determine the properties of soils and the effect of ground water on properties of soil are also guided in the course. The stresses acting on soil at any point beneath the ground caused by upper soil layers and structures constructed on the ground are mentioned. Therefore, it can be determined the safety of constructed structures based on ultimate shear strength of soils. Further, students are able to appreciate the effect of lateral earth pressure on wall structures those are commonly used in civil engineering construction.

*Prerequisite: CE201IU (Mechanic of Material 1)*

*Co-requisite: CE303IU (Soil Mechanics Laboratory)*

### **CE303IU 1 credit Soil Mechanics Laboratory**

The course provides to students the common methods to obtain necessary values of the properties of soil in laboratory for design such as: Water content and unit weight, particle size distribution, Atterberg limit, compaction test, direct shear test. The course includes understanding about testing equipment, general procedures related to each test, and parameters measured by the tests.

*Co-requisite: CE302IU (Soil Mechanics)*

### **CE307IU 2 credits Surveying**

This course covers the principles of measurements of distances, elevations, and angles. It also includes basic error theory in measurement and calculations, stakeout computations, and basic principles of surveying and map making.

*Co-requisite: CE308IU (Surveying Practice)*

### **CE308IU 1 credit Surveying Practice**

This course provide student skills that is applied in using all of components also functions of the instruments and the algorithms of measurements. It also includes practice control survey a closed-loop traverse, adjusts and calculates coordinates of control stations. Understand and use all instruments also method of detail surveying and mapping.

*Co-requisite: CE307IU (Surveying)*

### **CE204IU 3 credits Computer-Aided Design and Drafting (CADD)**

This course is an introduction to overview of CADD and describe its applications in different fields; common terms associated with CADD hardware and software; the basic principles associated with CADD and to demonstrate common drafting techniques and shortcuts used by professionals; the advanced capabilities of CADD and how they can be used to increase productivity; information about the CADD industry resources. They can apply this knowledge to any CADD program.

*Co-requisite: CE205IU (Practice CADD)*

### **CE205IU 1 credit Practice CADD**

The principles of creating technical drawings with the help of ACAD software are offered. Lessons represented in this course consist of basic drawing commands, modifying tools, hatching, layers, and the like. Displaying many figures having different scales are given through the layout approach, which is in particularly useful for civil engineering students.

*Co-requisite: CE204IU (CADD)*

### **CE212IU 3 credits Civil Architecture**

This course is an introduction to the basic principles and understanding of design, building construction and professional practice. This course also gives basic pieces of training in building design analysis, project presentation, and design projects.

**13.2 Upper Division**

**CE210IU**

**3 credits**

## **Construction Materials**

The course will introduce both conventional and modern construction materials those are commonly used in civil engineering construction. Those are as concrete, steel, asphalt concrete and other construction materials such as brick, mortar, grout, wood, fibers and so on.

## **CE211IU 3 credits Hydrology - Hydraulics**

This course provides students basic knowledge on hydrology and hydraulics, the fundamentals of water engineering, an important field in civil engineering. In the hydrology part of this course, the students will have a deeper understanding of the physical processes of the hydrological cycle. In the hydraulics part, the students will apply the basic principles learned from their basic fluid mechanics course in the analysis and design of open channels and other hydraulic structures. This course has practical applications in the fields of water supply, hydropower, flood mitigation, and other related fields.

*Prerequisite: CE206IU (Fluid Mechanics)*

## **CE306IU 3 credits Water Supply and Sewerage**

In this course, students will learn the different components of drinking water supply systems from the extraction of raw water from its sources to the distribution of treated water. They will also learn the sources and impacts of water pollution as well as wastewater collection systems and wastewater treatment technologies.

*Prerequisite: CE211IU (Hydrology - Hydraulics)*

## **CE304IU 3 credits Reinforced Concrete 1**

This course provides students basic design concepts: basic layout of concrete structures, loading; Basic material properties: concrete and reinforcing steel; Analysis of structures: limit state design, simplification of framed structures, moment redistribution; Analysis and design of flexural members; Shear; Bond and anchorage; Serviceability; One-way and two-way slabs; Compression members; Foundation: footings. Current building code and standards are referred to extensively in this course. The objective is to equip the students with basic understanding of the behavior of reinforced concrete structures and to develop the skill to analyze and design basic concrete members.

*Prerequisite: CE209IU (Structure Analysis 1)*

**CE310IU**

**3 credits**



## **Reinforced Concrete 2**

This course provides knowledge to analysis and design of prestressed concrete members; beam; slabs; Analysis and design of composite slabs. Current building code and standards are referred to extensively in this course. This course is to equip the students with advanced understanding of the behavior of concrete structures (prestressed concrete and composite) and to develop the skill to analyze and design advanced concrete members.

*Prerequisite: CE304IU (Reinforced Concrete 1)*

*Co-requisite: CE313IU (Reinforced Concrete Project)*

## **CE313IU 1 credit Reinforced Concrete Project**

A practice construction project is carried out, including reinforced concrete buildings, and water supply or transportation structures. Students are supposed to apply the knowledge in the reinforced concrete structure course to this project composing of calculating loads, determining internal forces with an analysis structure software, designing with a certain code, and ultimately describing them on a report.

*Prerequisite: CE304IU (Reinforced Concrete 1)*

*Co-requisite: CE310IU (Reinforced Concrete 2)*

## **CE305IU 3 credits Steel Structures**

This course is an introduction to develop an understanding of Limit State Design as applied to structural steel members and connections based on the latest Euro Code 3 – Design of steel structures

*Prerequisite: CE209IU (Structure Analysis 1)*

## **CE312IU 1 credit Steel Structures Project**

A practice construction project is carried out, including steel buildings, and water supply or transportation structures. Students are supposed to apply the knowledge in the steel structure course to this project composing of calculating loads, determining internal forces with an analysis structure software, designing with a certain code, and ultimately describing them on a report.

*Prerequisite: CE305IU (Steel Structure)*

## **CE309IU 3 credits Foundation Engineering**



This course covers the fundamental concepts of foundation analysis and design to civil engineering students. Topics discussed in the courses includes: bearing capacity, settlement and structural design of shallow foundations, lateral earth pressure, retaining and sheet pile walls, introduction to deep foundations, and other topics as time permits. The overall objective of this course is to make Civil Engineer major students acquainted with basic knowledge of foundations for different types of civil engineering structures.

*Prerequisite: CE302IU (Soil Mechanics)*

### **CE402IU 1 credit Foundation Project**

This course is to provide an organizational and procedural understanding in geotechnical and foundation engineering. Topics covered in this course include subsurface soil investigation and integrated design of building foundations. This class will equip students the knowledge necessary to apply geotechnical and foundation principles in analyzing and designing an economical substructure system.

*Prerequisite: CE309IU (Foundation Engineering)*

### **CE311IU 3 credits Construction Engineering**

This course is to guide students in planning, estimating, and directing construction operations safely and effectively. Topics covered in this course include overview of the construction industry, earthmoving materials and operations, excavation and lifting, loading & hauling, compacting & finishing, steel construction, concrete construction, concrete form design.

*Prerequisite: CE309IU (Foundation Engineering), CE305IU (Steel Structure), CE304IU (Reinforced Concrete 1), CE201IU (Construction Materials), CE307IU (Surveying)*

### **CE401IU 3 credits Construction Management**

This course covers a wide range of subjects, reflecting the breadth of knowledge needed to understand the dynamics of the construction industry. This course focuses on the processes and tasks required for management of construction projects. Students will work in project teams and perform various tasks associated with construction project administration including, developing construction budgets, record keeping and documentation, interpreting contracts and specifications, and other duties necessary for efficient project operation and successful completion.

*Prerequisite: CE311IU (Construction Engineering)*

*Co-requisite: CE403IU (Construction Project)*

### **CE403IU 1 credit Construction Project**

This course is to provide the comprehensive understanding in construction engineering and management. Topics covered in this course include design of construction engineering and operations, developing construction budgets, preparing construction schedule. This course will help students to master the knowledge learned in construction engineering and management.

*Co-requisite: CE401IU (Construction Management)*

### **CE420IU 10 credits Graduation Thesis**

Theses are structure design projects designed to ensure students have mastered their studies in the program. All projects are based on real projects provided by companies for students to work on developing skills and applying knowledge gained from all courses throughout the program. Students will work independently to develop requirements, design, and implementation and provide design documents and drawings for construction. Students must do the project by themselves, following all appropriate project techniques.

## **13.3 Elective courses**

### **CE411IU 3 credits Bridges Engineering**

The course will introduce a modern method to high way bridge analysis, design, and evaluation based on 22TCV272-07 which is referred by on American Association of State Highway and Transportation Officials LRFD Bridge Design Specification, 4th edition 2007. Course topics will include types of bridges, site design overview, Highway bridge loading, bridge analysis, bridge deck slab, prestressed concrete bridge design, substructure design.

*Prerequisite: CE309IU (Foundation Engineering), CE304IU (Reinforced Concrete 1), CE201IU (Construction Materials)*

### **CE412IU 3 credits Dynamics of Structures**

This course covers the fundamental concepts of structural dynamics. Formulations of the equation of motion. Free vibrations of linear, single and multiple degrees of freedom systems. Damping. Mode superposition. Analysis of dynamic response for structures subjected to time-varying including earthquake, wind, and blast loading.

*Prerequisite: CE203IU (Dynamics)*

### **CE413IU 3 credits Hydraulics Structures**



This course involves the application of flow theory to the design of hydraulic structures. Most existing types of water infrastructures are introduced in the course, including storage structures, control structures, energy dissipation structures, and so on. Besides conventional procedures, students also are provided a sustainable approach by practicing designing some typical hydraulic structures which strongly impact society and the natural environment, such as dam, hydropower plants, urban drainage systems, and so forth.

*Prerequisite: CE206IU (Fluid mechanic)*

*Co-requisite: CE211IU (Hydrology - Hydraulics)*

