

VIETNAM NATIONAL UNIVERSITY, HCMC
INTERNATIONAL UNIVERSITY

Department of Civil Engineering



STUDENT HANDBOOK

CIVIL ENGINEERING

2023 - onwards

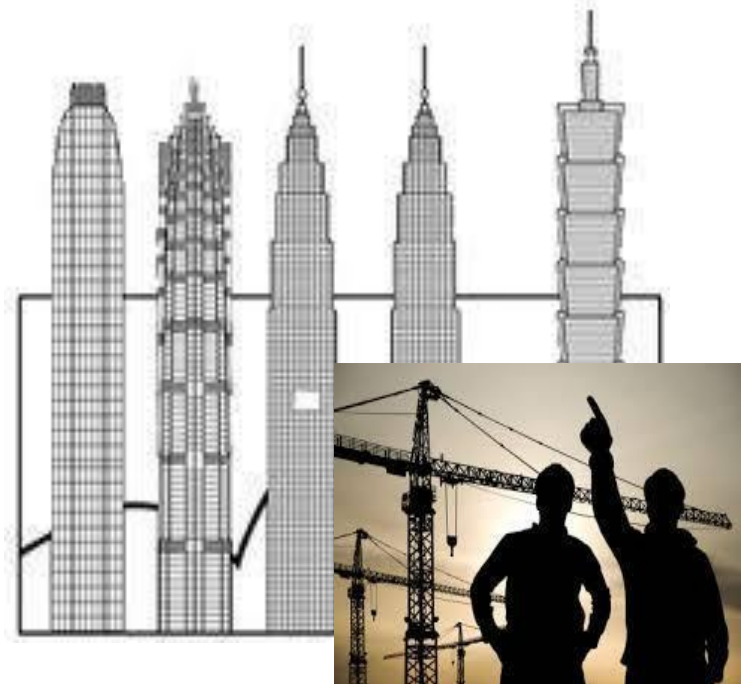


Table of Contents

A.	2	
1.	2	
2.	3	
B.	7	
1.	8	
2.	15	
3.	16	
C. ACADEMIC INFORMATION		21
1.	21	
2.	21	
3.	22	
4.	22	
5.	23	
6.	24	
7.	25	
8.	26	
9.	26	
10.	27	
11.	27	
D. FACULTY DIRECTOR		28
E. LECTURERS		30
F. COURSE DESCRIPTION		33
1.	34	
2.	43	
3.	48	

A. OVERVIEW

1. International University

International University (IU), one of six member universities of Vietnam National University HCMC, was established in December 2003. As an interdisciplinary university, it is the first public university in Vietnam that uses English as the primary language in teaching and researching.

IU and its partner universities currently offer undergraduate and graduate accredited programs. The focus has been on offering academic majors that are aligned with the growing demand for human resources in such fields as economics, management, science, and technology. IU's overall model adheres to the international standards in developing syllabi or curricula in collaboration with several top universities in the United States, Europe, and Asia.

● Vision

Within five years the International University will become a high quality, research-oriented university with:

- courses taught to international standards;
- a large, dedicated, highly competent faculty;
- modern facilities for instruction and research;
- a professional administrative staff;

- high quality students;
- an alumni of well-trained graduates, familiar with modern technology, conversant with current, best practices in industry, and able to work in international settings; and
- a reputation as a pioneer in higher education management.

- **Missions**

- 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;
- To provide state-of-the-art services to industry and society.

2. Civil Engineering Department

- **Missions**

The mission of the Department of Civil Engineering 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 for graduate students; and to provide service to the university, engineering profession, and the public.

Consistent with the mission of the university, the mission of Department of Civil Engineering is:

- 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;
- To provide state-of-the-art services to industry and society.

- **Educational Objective**

The objectives of Department of Civil Engineering were developed according to the regional, national and industrial demands and needs:

- Established a mastery of fundamental knowledge, problem solving skills, engineering experimental abilities, and design capabilities for a civil engineer.
- Established the knowledge and skills necessary for identifying and assessing design alternatives and the related social, economic, environmental, and public safety impacts.
- Demonstrated ability to deal effectively with ethical and professional issues.
- Contribute to the economic and social development of the region and country by maintaining mutually beneficial partnerships with the public and private sectors.

- **Job Opportunities**

Having a solid background in Civil Engineering as well as proficiency in English, students graduating from Department of Civil Engineering will have more opportunity to acquire employment different civil engineering fields, such as:

- Tall Building Structures Design
- Road and Bridge Structures Design
- Hydraulic Structures Design
- Steel Structures Design
- Construction Management

● **Academic Program**

Department of Civil Engineering offers two types of training programs:

● **The training program at International University (4.5 years)**

The 4.5-year undergraduate program in Civil Engineering is educated at International University. On completion of this course, students are awarded the degree of Bachelor of Civil Engineering by Vietnam National University, HCMC.

● **The twinning program between the International University and a foreign partner university (2+2 program)**

These programs allow students to spend the first two years studying at the International University and the other two years at the partner universities. After completing the second phase and meeting all requirements from the partner universities, students will be awarded

the Bachelor Degree by the partner universities. Currently, the Civil Engineering Department has a Deakin University twinning program.

- **Expected Learning Outcomes**

Graduates from school of Civil Engineering should have attained:

- (a) Understanding of the physical world and use knowledge of mathematics to represent it.
- (b) Understanding of fundamentals of the engineering field including mechanics of solids and structures, soil mechanics, fluid mechanics and computational techniques, measuring, surveying, analyze data for design, build and appraisal construction.
- (c) Ability to analyze and prepare investment projects and understand the economic, environmental, and social impact of engineering solutions.
- (d) Awareness of professional and ethical responsibilities of a civil engineer.
- (e) Ability to function as a member of a multidisciplinary team as well as having good knowledge of management and organization.
- (f) Recognition of the need for, and an ability to engage in life-long learning in order to work efficiently in situations in which new technologies emerge regularly.
- (g) Ability to communicate effectively including oral, written,

and others.

- (h) Broad education necessary to understand the impact of engineering solutions in a global and social context.
- (i) Broad understanding of national, regional and world contemporary issues of.
- (j) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- (k) Ability to use English in both technical and daily-life situations.

- **Contact us**

School of Civil Engineer and Construction Management

Civil Engineering Department

A1.506 – Block A1, International University Building

Quarter 6, LinhTrung Ward, Thu Duc District, Ho Chi Minh City, Viet Nam.

Phone: (84-8) 37244270 Ext. 3425

Fax: (84-8) 37244271

Website: <http://hcmiu.edu.vn/ce-en>

B. CIVIL ENGINEERING PROGRAM

1. Overview

The Bachelor of Civil Engineering requires at least **152 credits** for graduation including required and elective courses. In addition to these required credits, students need to complete (1) two courses of physical training and (2) the certificate of military training. The English outcome requirement for graduates is TOEFL (paper test) of 550; or TOEFL (iBT) of 79; or IELTS of 6.5; or equivalence (Decision No. 796/QĐ-ĐHQĐ-ĐT issued on the 3rd of December, 2010).

The curriculum specification as the following table:

No.	Subject's ID	Subject	Credits	ECTS
I	GENERAL KNOWLEDGE (61 credits/ 102.42 ECTS)			
I.1	Political theory (14 credits/ 21.64 ECTS)			
1	PE015IU	Philosophy of Marxism and Leninism	3	4.64
2	PE016IU	Political economics of Marxism and Leninism	2	3.09
3	PE017IU	Scientific socialism	2	3.09
4	PE018IU	History of Vietnamese Communist Party	2	3.09
5	PE019IU	Ho Chi Minh's Thoughts	2	3.09
6	PE021IU	General Law	3	4.64
I.2	Mathematics - Informatics - Natural Science (29 credits/46.63 ECTS)			

No.	Subject's ID	Subject	Credits	ECT S
7	MA001IU	Calculus 1	4	6.18
8	MA003IU	Calculus 2	4	6.18
9	MA024IU	Differential Equations	4	6.18
10	CE215IU	Applied Linear Algebra	2	3.09
11	CEI216U	Probability and Statistics	3	4.64
12	PH013IU	Physics 1	2	3.09
13	PH014IU	Physics 2	2	3.09
14	PH015IU	Physics 3	3	4.64
15	PH016IU	Physics 3 Laboratory	1	2.45
16	CH011IU	Chemistry for Engineer	3	4.64
17	CH012IU	Chemistry Laboratory	1	2.45
I.3	Social Sciences - Humanities – Arts (4 credits/ 7.09 ECTS)			
18	PE022IU	Engineering Ethics and Critical Thinking	3	4.64
19	CE100IU	Introduction to Civil Engineering	1	2.45
I.4	Intensive English and Academic English (8 credits/ 12.36)			
20	EN007IU	Writing AE1	2	3.09
21	EN008IU	Listening AE1	2	3.09
22	EN011IU	Writing AE2	2	3.09
23	EN012IU	Speaking AE2	2	3.09
I.5	Physical Training (6 credits/ 14.7 ECTS)			

No.	Subject's ID	Subject	Credits	ECT S
24	PT001IU	Physical Training 1	3	4.64
25	PT002IU	Physical Training 2	3	4.64
II	FUNDAMENTAL KNOWLEDGE (42 credits/69.46 ECTS)			
26	CE102IU	Introduction to Computing for Engineers	3	4.64
27	CE213IU	Computational Methods for Civil Engineering	3	4.64
28	CE101IU	Engineering Mechanics -Statics	3	4.64
29	CE217IU	Artificial Intelligence in Civil Engineering and Construction Management	3	4.64
30	CE103IU	Computer-Aided Design and Drafting	3	4.64
31	CE104IU	Computer-Aided Design and Drafting Practice	1	2.45
32	CE201IU	Mechanics of Materials 1	2	3.09
33	CE208IU	Mechanics of Materials 2	2	3.09
34	CE202IU	Mechanics of Materials Lab	1	2.45
35	CE205IU	Fluid Mechanics	2	3.09
36	CE206IU	Fluid Mechanics Lab	1	2.45

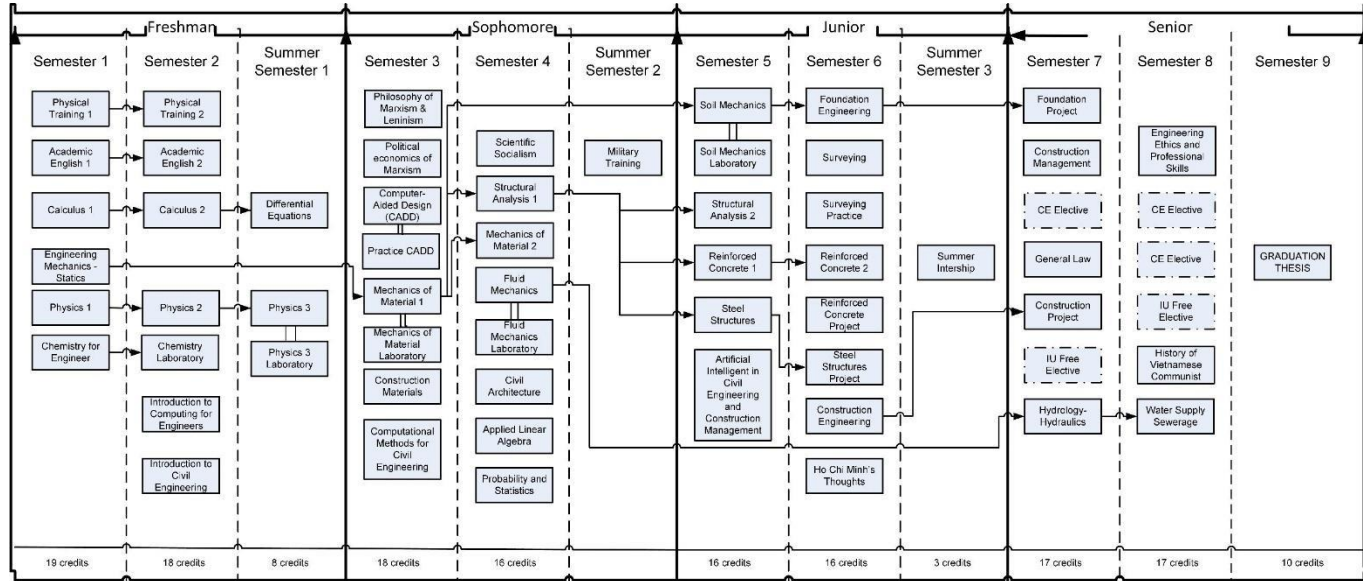
No.	Subject's ID	Subject	Credits	ECT S
37	CE211IU	Hydrology- Hydraulics	3	4.64
38	CE306IU	Water Supply and Sewerage	3	4.64
39	CE210IU	Construction Materials	3	4.64
40	CE214IU	Civil Architecture	2	3.09
41	CE307IU	Surveying	2	3.09
42	CE308IU	Surveying Practice	1	2.45
43	CE302IU	Soil Mechanics	3	4.64
44	CE303IU	Soil Mechanics Laboratory	1	2.45
III	COMPULSORY PROFESSIONAL KNOWLEDGE (27 credits/ 45.37 ECTS)			
45	CE309IU	Foundation Engineering	3	4.64
46	CE209IU	Structural Analysis 1	2	3.09
47	CE301IU	Structural Analysis 2	3	4.64
48	CE304IU	Reinforced concrete 1	3	4.64
49	CE310IU	Reinforced Concrete 2	3	4.64
50	CE305IU	Steel Structures	3	4.64
51	CE311IU	Construction Engineering	3	4.64
52	CE401IU	Construction Management	3	4.64
53	CE312IU	Steel Structure Project	1	2.45
54	CE313IU	Reinforced Concrete Project	1	2.45
55	CE402IU	Foundation Project	1	2.45

No.	Subject's ID	Subject	Credits	ECTS
56	CE403IU	Construction Project	1	2.45
IV	ELECTIVE PROFESSIONAL KNOWLEDGE (15 credits/ 23.2 ECTS)			
IV.1	Civil Engineering Elective (Select three of following courses)			
57	CE404IU	Dynamics of Structures	3	4.64
58	CE405IU	Hydraulics Structures	3	4.64
59	CE407IU	Tall Buildings	3	4.64
60	CE406IU	Bridge Engineering	3	4.64
61	CM310IU	Building Information Management	3	4.64
62	CE412IU	Advanced Artificial Intelligence in Civil Engineering and Construction Management	3	4.64
63	CE413IU	GIS Applications in Civil Engineering	3	4.64
64	CE414IU	Construction Project Management	3	4.64
IV.1	IU Elective Courses (Select two of the following courses)			
65	BA003IU	Principles of Marketing	3	4.64
66	BA006IU	Business Communication	3	4.64
67	BA020IU	Business Ethics	3	4.64
68	BA115IU	Introduction to Business Administration	3	4.64

No.	Subject's ID	Subject	Credits	ECT S
69	BA116IU	Introduction to Social Science	3	4.64
70	BA117IU	Introduction to Microeconomics	3	4.64
71	BA118IU	Introduction to Psychology	3	4.64
72	BA119IU	Introduction to Macroeconomics	3	4.64
73	BA120IU	Business Computing Skills	3	4.64
74	BA123IU	Principles of Management	3	4.64
75	BA130IU	Organizational Behavior	3	4.64
76	BA169IU	Management Information Systems	3	4.64
77	IS019IU	Production Management	3	4.64
78	IS026IU	Project Management	3	4.64
79	IT063IU	Theoretical Models in Computing	4	6.18
80	IT091IU	Computer Networks	4	6.18
81	IT094IU	Information System Management	4	6.18
82 (new)	IT116	C/C++ Programming	3	4.64
83 (new)	BA151IU	Entrepreneurship and Small Business Management	3	4.64
V	INTERNSHIP AND THESIS (13 credits/31.91 ECTS)			
84	CE314IU	Internship	3	7.36

No.	Subject's ID	Subject	Credits	ECT S
85	CE420IU	Graduation Thesis	10	24.6

2. Curriculum Map



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

Legend:

→ Prerequisite

— Co-requisite

3. Curriculum Distribution

Freshman Year					
<i>Semester 1</i>			<i>Semester 2</i>		
EN007IU	Writing AE1	2	EN011IU	Writing AE2	2
EN008IU	Listening AE1	2	EN012IU	Speaking AE2	2
MA001IU	Calculus 1	4	CE100IU	Introduction to Civil Engineering	1
PH013IU	Physics 1	2	MA003IU	Calculus 2	4
CH011IU	Chemistry for Engineer	3	PH014IU	Physics 2	2
CE101IU	Engineering Mechanics - Statics	3	CH012IU	Chemistry Laboratory	1
PT001IU	Physical Training 1	3	CE102IU	Introduction to Computing for Engineers	3
			PT002IU	Physical Training 2	3
<i>Total Credits</i>		19	<i>Total Credits</i>		18
<i>Summer Semester 1</i>					
Political Education:		8			

1. PH015IU Physics 3 (3)					
2. PH016IU Physics 3 Laboratory (1)					
3. MA024IU Differential Equations (4)					
Sophomore Year					
Semester 3			Semester 4		
PE015IU	Philosophy of Marxism and Leninism	3	PE017IU	Scientific socialism	2
PE016IU	Political economics of Marxism and Leninism	2	CE208IU	Mechanics of Materials 2	2
CE103IU	Computer-Aided Design and Drafting (CADD)	3	CE209IU	Structural Analysis 1	2
CE104IU	Practice CADD	2	CE205IU	Fluid Mechanics	2
CE201IU	Mechanics of Materials 1	2	CE206IU	Fluid Mechanics Laboratory	1
CE202IU	Mechanics of Materials Laboratory	1	CE214IU	Civil Architecture	2
CE210IU	Construction Materials	3	CE216IU	Probability and Statistics	3
CE213IU	Computational Methods for Civil Engineering	3	CE215IU	Applied Linear Algebra	2

Total Credits			18	Total Credits		16
Summer Semester 2						
MP001IU Military Training						
Junior Year						
Semester 5				Semester 6		
CE301IU	Structural Analysis 2	3	CE307IU	Surveying	2	
CE302IU	Soil Mechanics	3	CE308IU	Surveying Practice	1	
CE303IU	Soil Mechanics Laboratory	1	CE309IU	Foundation Engineering	3	
CE304IU	Reinforced concrete 1	3	CE310IU	Reinforced Concrete 2	3	
CE305IU	Steel Structures	3	CE313IU	Reinforced Concrete Project	1	
CE217IU	AI in Civil Engineering and Construction Management	3	CE312IU	Steel Structure Project	1	
			CE311IU	Construction Engineering	3	
			PE019IU	Ho Chi Minh's Thoughts	2	
	Total Credits	16		Total Credits	16	
Summer Semester 3						

CE314IU Summer Internship (3 crds)					
Senior Year					
<i>Semester 7</i>			<i>Semester 8</i>		
CE401IU	Construction Management	3	CE_ _ _	CE Free Elective	3
CE211IU	Hydrology- Hydraulics	3	PE018IU	History of Vietnamese Communist Party	2
CE402IU	Foundation Project	1	CE_ _ _	CE Free Elective	3
CE403IU	Construction Project	1	CE306IU	Water Supply and Sewerage	3
PE021IU	General Law	3	IU_ _ _	IU Elective	3
IU_ _ _	IU Elective	3	PE022IU	Engineering Ethics and Critical Thinking	3
CE_ _ _	CE Elective	3			
	<i>Total Credits</i>	17		<i>Total Credits</i>	17
<i>Semester 9</i>					
CE420IU	<i>GRADUATION THESIS</i>	10			
<i>Total Credits</i>		10			

Total credits: 156

IE – Intensive English Program

Students, who are not qualified with the entrance English requirement (TOEFL iBT 60; TOEFL PBT 500; or IELTS 6.0), have to study the Intensive English Program before starting the academic curriculum. The table of English proficiency equivalency is as

Level	TOEFL iBT	TOEFL PBT	IELTS
IE1	< 24	< 373	< 4.0
IE2	24 – 35	374 – 417	4.5
IE3	36 – 48	418 – 460	5.0
IE4	49 – 60	461 – 500	5.5
AE1, AE2	61 – 79	501 – 550	6.0

English Program Distribution

Level	SEMESTER 1		SEMESTER 2	
	IE1	IE2	IE3	IE4
Skill Taught	4 skills	4 skills	4 skills	4 skills
Credits	11	11	11	11
Periods	165	165	165	165
Weeks	7	7	7	7

Level	SEMESTER 3	SEMESTER 4
	AE1	AE2
Skill Taught	Listening & Notetaking Academic writing 1	Effective presentations Academic writing 2
Credits	4	4
Periods	60	60
Weeks	15	15

Academic English (Study Skills)

C. ACADEMIC INFORMATION

1. Specialization Selection

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

1	CE404IU	Dynamics of Structures
2	CE405IU	Hydraulics Structures
3	CE407IU	Tall Buildings
4	CE406IU	Bridge Engineering
5	CM310IU	Building Information Management
6	CE412IU	Advanced Artificial Intelligence in Civil Engineering and Construction Management
7	CE413IU	GIS Applications in Civil Engineering
8	CE414IU	Construction Project Management

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

2. Summer Internship Registration

Students are allowed to register for summer internship before the academic year when they aim to apply for a 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 a company before graduation.
- **Internship duration:** minimum 8 weeks (full-time working)

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

4. Graduation Criteria

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

- Successfully complete the academic curriculum (144 credits) with GPA ≥ 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

5. Scholarship Information

- **University Scholarship (Decision No 99 &100/ĐHQT-ĐT)**

Each semester, top 10% of students with highest GPA will receive scholarship from the IU. 4% of students will receive full scholarship (12.620.000 VND for Fall/Spring semester or 6.310.000 VND for Summer semester) and 6% of students will receive half scholarship (6.310.000 VND for Fall/Spring semester or 3.165.000 for Summer semester).

- **Minimum requirements:**

- Complete the Academic English 1 (AE1)
- Register at least 12 credits for Fall/Spring semester or 6 credits for Summer semester
- Semester GPA ≥ 70 (with no course fails in that semester)

- **Admission Scholarship 2016**

- **Full scholarship** (full tuition exemption for 4 years – equivalent to 168.000.000 VND): Students have entrance examination scores ≥ 24.5

- **Partial scholarship** (half tuition exemption for 4 years – equivalent to 84.000.000 VND): Student have entrance examination scores ≥ 23.5
- **Condition to maintain Scholarships:** Students must have GPA each semester ≥ 70 and the score of every subject ≥ 50 .

6. Course Registration

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

- Students should register a minimum of 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 cumulative GPA ≥ 65
- The subject registration form must be approved by the academic advisors.

- 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/> (username and password for student will be created by the university).
- The registration time will be informed at the Department of Civil Engineering.

- **Adjusting Student Timetable**

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

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

- **Adding and Dropping Courses**

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

7. Academic Probation

The University Academic Committee will consider to settle the academic matters after the first and summer semester annually. The

result of the summer semester will be added to that of the second semester of the corresponding year upon academic settling.

Student violating the below regulation will be admonished academically:

- Those who acquire insufficient credits as required by the specialization in one semester;
- Cumulative GPA < 3.5.
- Having two consecutive cumulative GPA < 3.0.

The duration for academic probation will last in the succeeding formal semester.

8. Academic suspension

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

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

9. Academic Information

- Students can see all studying results in each semester and training results at the School of Electrical Engineering.

- In the studying process, students can ask for a student's transcript at the Office of Academic Affairs.
- For students who are warned or suspended, the university will send the information to the student's family.

10. Grading Classification

GPA Classification	100 Point Grading Scale	Point Grading Scale in letters
PASSING		
Excellent	$90 \leq \text{GPA} \leq 100$	A+
Very good	$80 \leq \text{GPA} < 90$	A
Good	$70 \leq \text{GPA} < 80$	B+
Fair	$60 \leq \text{GPA} < 70$	B
Average	$50 \leq \text{GPA} < 60$	C
NO PASSING		
Weak	$40 \leq \text{GPA} < 50$	D+
Rather weak	$30 \leq \text{GPA} < 40$	D
Too weak	$\text{GPA} < 30$	F

11. List of Academic Advisors

Following is the list of Academic Advisors, please contact your advisors for academic advice.

- Year 2011** : Assoc. Prof. PhD. Lê Văn Cảnh
- Year 2012** : PhD. Nguyễn Đình Hùng
- Year 2013** : PhD. Trần Cao Thanh Ngọc
- Year 2014** : MSc. Phạm Nhân Hòa
- Year 2015** : PhD. Phạm Ngọc
- Year 2016** : Assoc. Prof. PhD. Lưu Trường Văn
- Year 2017** : Assoc. Prof. PhD. Lê Văn Cảnh
- Year 2022** : Dr. Phạm Nguyễn Linh Khanh
- Year 2023** : MSc. Phạm Nhân Hòa

D. FACULTY DIRECTOR

NGUYỄN HOÀI NGHĨA, Ph.D. – Lecturer Degree

(Dean of School of Civil Engineering and Management)

- Ph.D., Sirindhorn International Institute of Technology, Thammasat University, Thailand, 2018.
- M.E.M., Ho Chi Minh University of Technology, Viet Nam, 2008.
- B.Eng., Ho Chi Minh University of Technology, Viet Nam, 2002.

Teaching

- Construction management.
- Construction Engineering.
- Professional ethics and professional work skills.
- Construction Economics.
- Construction Cost Management.
- Construction Measurement and Cost Estimating
- Construction Planning and Scheduling
- Contract Management – FIDIC contracts.
- Project Feasibility Study and Appraisal

Research Interest

- Project cost/ finance management.
- Project schedule management.
- Quantitative analysis.
- Project procurement management.
- Project contract management.
- Real estate business strategies.
- Project legal disputes.

Email: nhnghia@hcmiu.edu.vn

Phạm Nguyễn Linh Khánh, PhD – Lecturer

Degree:

PhD in Geotechnical Engineering, Korea University - Korea, 2018

Teaching:

- Probability and Statistics,
- Foundation Engineering;
- Soil Mechanics

Research Interest:

- Unsaturated soil mechanics;
- Landslides;
- Constitutive models of porous media;
- THM coupling
- Machine learning in Geotechnical engineering.

Email: pnlkhanh@hcmiu.edu.vn

E. LECTURERS

LÊ VĂN CẢNH, Prof. PhD – Lecturer

Degree: PhD in Computational Mechanics, University of Sheffield - UK, 2010
MSc in Mechanics of Construction, University of Liege - HCMC University of Technology, 2004
BEng, Industrial and Civil Engineering, Hanoi Architectural University, 2001

Teaching
: Engineering Mechanics – Statics, Structural Analysis 1, Structural Analysis 2

Research Interest: Multi-scale modeling, macro-micro computational homogenization
Computational Mechanics, Computational Plasticity (Limit and Shakedown Analysis)
Numerical Methods: meshfree methods, finite elements, SFEM, XFEM
Error estimation and adaptivity
Optimization algorithms: linear, nonlinear and second-order cone programming
Structural optimization, Discontinuity Layout Optimization (DLO)

Email: lvcanh@hcmiu.edu.vn

TRẦN CAO THANH NGỌC, Assoc.Prof. PhD – Lecturer

Degree: PhD in Civil Engineering, Nanyang Technological University - Singapore, 2010
BEng, Nanyang Technological University - Singapore, 2006

Teaching
: Mechanics of Materials Lab, Reinforced Concrete 1, Reinforced Concrete 2, Reinforced Concrete Project, Building Structure

Research Interest: Earthquake and Blast Resistant Design
Structural Dynamics
Structural Vibration Control

Email: tctngoc@hcmiu.edu.vn

PHẠM NGỌC, Assoc.Prof. PhD – Lecturer

- Degree:** Post-Doctor, Civil and Environmental Engineering, National University of Singapore, Singapore, 2009-2011
PhD, Civil and Environmental Engineering, Tohoku University, Japan, 2005-2008
M.Eng, Civil Engineering, Asian Institute of Technology, Thailand, 2001-2003
B.Eng, Water Resources Engineering, Hanoi Water Resources University, Vietnam, 1992-1997
- Teaching:** Fluid Mechanics, Hydraulic Structures, Sustainable Building Systems
- Research Interest:** Eco-hydraulic/hydrology, probability design, , Climate Change
Integrated water resources management, Sustainable water infrastructures development, Sustainable river basin planning and management, Water related-disasters risk assessment and management.
- Email:** pngoc@hcmiu.edu.vn

PHẠM NHÂN HÒA, MSc – Lecturer

- Degree:** MSc Civil Engineering Department, HCMC University of Technology, 2007
MSc. in Mechanics of Construction, University of Liege - HCMC University of Technology, 2006
BEng. in Civil Engineering Department, HCMC University of Technology, 2003
- Teaching** : Introduction to Computing for Civil Engineers, Engineering Mechanics – Statics and Dynamics, Steel Structure, Steel Structure Project
- Research:** Structural Control
- Interest:** Dynamics of Structures
Earthquake Engineering
- Email:** pnhoa@hcmiu.edu.vn

ANGELI DOLIENTE CABALTICA, MSc – Lecturer

Degree: MSc Water Resources Engineering and Management, Stuttgart University - Germany, 2011
MSc Environmental Sanitation, Ghent University - Belgium, 2007
BSc Civil Engineering, University of The Philippines at Los Baños - Philippines, 1996

Teaching: Fluid Mechanics, Fluid Mechanics Lab, Hydrology – Hydraulics, Water Supply Sewerage

Research Interest: Flood studies (flood risks; flood forecasting; sustainable flood prevention/protection/mitigation strategy), River Assessment (habitat modeling; hydro peaking studies), Sanitation (solid waste management; wastewater treatment)

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Ms BUI THI HOP– Secretary

Degree: Secretary Degree: Bachelor of Literature Pedagogy, Saigon University, Ho Chi Minh City

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F. COURSE DESCRIPTION

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 - Prerequisite: MA001IU (Calculus 1)

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.

MA023IU

4 credits

Calculus 3 - Prerequisite: MA003IU (Calculus 2)

Complex numbers, complex series, complex functions, complex derivatives; Laplace transform; z- transform; Fourier series, Fourier transform, the inverse transform, transforms of derivatives and integrals; first-order differential equations, second-order differential equations, difference equations, applications to electrical circuits and signal processing.

MA024IU

4 credits

Differential Equations - Prerequisite: MA003IU (Calculus 2)

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.

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, motion of rigid bodies in a plane.

PH014IU

2 credits

Physic 2 (Thermodynamics)

This course provides students 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.

PH015IU

3 credits

Physics 3 (Electricity & Magnetism)

Co-requisite:PH016IU (Physics 3 Laboratory)

To provide a thorough introduction to the basic principles of physics to physics and engineering students in order to prepare them for further study in physics and to support their understanding and design of practical applications in their fields. Content: Electrostatics, particles in electric and magnetic fields, electromagnetism, circuits, Maxwell's equations, electromagnetic radiation.

PH016IU

1 credit

Physics 3 Laboratory - Co-requisite:PH015IU (Physics 3)

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

CH011IU

3 credits

Chemistry for Engineers

Co-requisite: CH012IU (Chemistry for Engineers Laboratory)

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, 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.

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

Prerequisite: EN007IU & EN008IU (Academic English 1)

This course concentrates on academic English speaking and writing skills.

Speaking subjects provide students with the skills to be able to 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.

PE022IU

3 credits

Engineering Ethics and Critical Thinking

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. Further, this course also provides the nature and techniques of thought as a basis for our claims, beliefs, and attitudes about the world. Specifically, the course includes the theory and practice of presenting arguments in oral and written forms, making deductive and inductive arguments, evaluating the validity or strength of arguments, detecting fallacies in arguments, and refuting fallacious arguments.

CE100IU

1 credits

Introduction to Civil Engineering

This course is an introduction to reading, team-working, and presentation skills including civil engineering problems such as findings of mega structures, green buildings, supply-sewage of a tall building, BIM technologies in civil-structural design and management, MEP design, or real-estate business.

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 stepwise 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 towards the solution of engineering problems.

CE213IU

3 credits

Computational Methods for Civil Engineering

Prerequisite: MA001IU & MA003IU (Calculus 1 & 2)

The goal in 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.

CE101IU

3 credits

Engineering Mechanics – Statics

Prerequisite: MA001IU (Calculus 1)

Co-requisite: MA003IU (Calculus 2)

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 truss 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 obtains knowledge of the laws of dry friction.

CE203IU

3 credits

Engineering Mechanics – Dynamics

Prerequisite: CE101IU (Engineering Mechanics - Statics)

This course provides students with a basic understanding of forces and motion, and thus gives 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.

CE201IU

2 credits

Mechanic of Material 1

Prerequisite: CE101IU (Engineering Mechanics - Statics)

Co-requisite: CE202IU (Mechanic of Material Lab)

This course is an introduction to the relationship between loads applied to a deformable body and the internal stress, strains and deformation. This course obtains 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.

CE208IU

2 credits

Mechanic of Material 2

Prerequisite: CE201IU (Mechanic of Material 1)

This course is to develop analytical and problem-solving skills. To show proficiency in 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 obtains knowledge of combined loadings, stress and strains transformation; stress-strain relationship; design of beams; buckling of columns and energy methods.

CE202IU

1 credit

Mechanic of Material Laboratory

Co-requisite: CE201IU (Mechanic of Material 1)

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

CE209IU

2 credits

Structure Analysis 1

Prerequisite: CE201IU (Mechanic of Material 1)

Co-requisite: CE208IU (Mechanic of Material 2)

This course is an introduction to basic structural engineering concepts. Determine magnitude of different types of loads in accordance to 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.

CE301IU

3 credits

Structure Analysis 2

Prerequisite: CE209IU (Structure Analysis 1)

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 are introduced.

CE206IU

2 credits

Fluid Mechanics

Co-requisite: CE207IU (Fluid Mechanics Laboratory)

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.

CE207IU

1 credit

Fluid Mechanics Laboratory

Co-requisite: CE206IU (Fluid Mechanics)

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.

CE217IU

3 credit

Artificial Intelligence in Civil Engineering and Construction Management

This course introduces how we apply artificial intelligence in civil engineering (CE) and construction management (CM). Several typical problems of applied artificial intelligence in CE and CM are introduced, such as regression, classification, segmentation, abnormality detection in experimental data, monitoring data, etc. The course introduces machine learning methods frequently utilized in CE and CM, including k-nearest neighbor, neural network, decision

tree, and random forest, and explains their concepts so that students can know how to formulate a problem-solving

CE302IU

2 credits

Soil Mechanics

Prerequisite: CE201IU (Mechanic of Material 1)

Co-requisite: CE303IU (Soil Mechanics Laboratory)

The course provides students with basic definitions, physical and mechanical 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 are 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 that are commonly used in civil engineering construction.

CE303IU

1 credit

Soil Mechanics Laboratory

Co-requisite: CE302IU (Soil Mechanics)

The course provides students with common methods to obtain necessary values of the properties of soil in laboratory 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.

CE307IU

2 credits

Surveying - *Co-requisite: CE308IU (Surveying Practice)*

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.

CE308IU

1 credit

Surveying Practice - *Co-requisite: CE307IU (Surveying)*

This course provides student skills that are applied in using all of the components and 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 and also methods of detail surveying and mapping.

CE204IU

3 credits

Computer-Aided Design and Drafting (CADD)

Co-requisite: CE205IU (Practice 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.

CE205IU

1 credit

Practice CADD - *Co-requisite: CE204IU (CADD)*

The principles in creating technical drawings with the help of AUTOCAD 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 particular useful for civil engineering students.

CE204IU

2 credits

Civil Architecture

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

2. Upper Division

CE210IU

3 credits

Construction Materials

Prerequisite: CE201IU (Mechanic of Material 1)

The course will introduce both conventional and modern construction materials that 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

Prerequisite: CE206IU (Fluid Mechanics)

This course provides students with 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.

CE306IU

3 credits

Water Supply and Sewerage

Prerequisite: CE211IU (Hydrology - Hydraulics)

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.

CE304IU

3 credits

Reinforced Concrete 1

Prerequisite: CE209IU (Structure Analysis 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.

CE310IU

3 credits

Reinforced Concrete 2

Prerequisite: CE304IU (Reinforced Concrete 1)

Co-requisite: CE313IU (Reinforced Concrete Project)

This course provides knowledge of the 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.

CE313IU

1 credit

Reinforced Concrete Project

Prerequisite: CE304IU (Reinforced Concrete 1)

Co-requisite: CE310IU (Reinforced Concrete 2)

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 consisting of calculating loads, determining internal forces with an analysis structure software, designing with a certain code, and ultimately describing them on a report.

CE305IU**3 credits****Steel Structures - Prerequisite: CE209IU (Structure Analysis I)**

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 EuroCode 3 – Design of steel structures.

CE312IU**1 credit****Steel Structures Project - Prerequisite: CE305IU (Steel Structure)**

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 consisting of calculating loads, determining internal forces with an analysis structure software, designing with a certain code, and ultimately describing them on a report.

CE309IU**3 credits****Foundation Engineering**

Prerequisite: CE302IU (Soil Mechanics)

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.

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

Prerequisite: CE309IU (Foundation Engineering)

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 with the knowledge necessary to apply geotechnical and foundation principles in analyzing and designing an economical substructure system.

CE311IU

3 credits

Construction Engineering

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

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.

CE401IU

3 credits

Construction Management

Prerequisite: CE311IU (Construction Engineering)

Co-requisite: CE403IU (Construction Project)

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.

CE403IU

1 credit

Construction Project

Co-requisite: CE401IU (Construction Management)

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 the construction schedule. This course will help students to master the knowledge learned in construction engineering and management.

CE420IU

10 credits

Graduation Thesis

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

3. Elective courses

CE411IU

3 credits

Bridges Engineering

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

The course will introduce a modern method to highway bridge analysis, design and evaluation based on 22TCV272-07 that is referred to by the 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.

CE412IU

3 credits

Dynamics of Structures - Prerequisite: CE203IU (Dynamics)

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

CE405IU

3 credits

Hydraulics Structures

Prerequisite: CE206IU (Fluid mechanics)

Co-requisite: CE211IU (Hydrology - Hydraulics)

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

CE414IU

3 credits

Tall Buildings

Philosophy and design criteria of tall buildings; structural systems for tall buildings: moment-resisting frames, shear walls, braced frames; P-Delta effects and instability; structural design process: functional requirements; design criteria and loading: dead, live, wind, and earthquake loads; preliminary and computer-aided proportioning; analysis of tall buildings; very tall buildings including framed tube, tube in tube, trussed tube and hat trusses, etc.

CE310IU

3 credits/4.64 ECTS

Building Information Management

Required and recommended prerequisites: N/A

The course will provide students with knowledge in terms of characteristics of Building Information Modeling and its application in the construction industry.

CE414IU

3 credits/4.64 ECTS

Construction Project Management

In this course, students will study roles, responsibilities, and authority of project participants. They also study how to manage project

participants, material, safety, waste, and environment. The jobsite layout design and control are also a part of the course.

CE412IU

3 credits/4.64 ECTS

Advanced Artificial Intelligence in Civil Engineering and Construction Management

Required and recommended prerequisites: Calculus 1, 2, Mechanics of Material 1, Artificial Intelligence In Civil Engineering And Construction Management

The objective of this course is to provide the students with advanced information of machine learning (ML) and analysis tools with their applications in civil engineering (CE) and construction management (CM). The course will emphasize on 1) traditional supervised algorithms such as support vector machines, 2) ensemble machine learning algorithms including bagging and boosting, 3) deep learning algorithms such as convolution neural networks, 4) fundamentals of tools used to handle large-scale data, and 5) tools used to handle ML algorithms. Fundamentals of these algorithms and tools and their applications in different problems related to CE and CM will be covered along with a course project.

CE413IU

3 credits/4.64 ECTS

GIS Applications in Civil Engineering

Required and recommended prerequisites: CE307IU Surveying

This course does not require prior knowledge of GIS. The first part of the course will include introductory concepts and will cover basic topics in GIS including data types and common GIS processing and analysis tools, thematic mapping, etc. In the second part of the course, GIS procedures and techniques that are relevant to Civil Engineering will be covered through a series of case studies and exercises.