MINISTRY OF EDUCATION & TRAINING

HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY & EDUCATION

UNDERGRADUATE PROGRAM

Major of

CONSTRUCTION ENGINEERING TECHNOLOGY

Ho Chi Minh City, 2022

Ministry of Education and Training
HCMC University of Technology and Education

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness
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TRAINING PROGRAM

Training program: CIVIL & INDUSTRIAL CONSTRUCTIONS
Level: Undergraduate
Major: CONSTRUCTION ENGINEERING TECHNOLOGY
Major's ID: 52510102
Type of Program: Fulltime
(Issued by decision No. ……dated….of Rector of……)

1. Duration of study: 4 years

2. Student Enrollment: High school graduates

3. Grading system, Training procedure, Graduation conditions
Grading system: 10
Training procedure: According to regulations issued by decision No. 43/2008/BGDĐT
Graduation conditions:
*General conditions***:** According to regulations issued by decision No. 43/2008/BGDĐT
*Major conditions***:** Not applied

4. Program Objectives and Program Outcomes

Program Goals

With objectives of all-sided developments in knowledge, skills, attitudes, practical competence and having consciousness of responsibility for society, students specializing in Construction Engineering Technology are trained for needs of recruitment, wholly developments of "hard skills" and "soft skills" to be able to rapidly adapt to continuous changes in working environment.

Program Objectives

PO1: Proficient in the fundamental knowledge of science, engineering, and specialized and advanced knowledge in civil engineering.
PO2: Advance their professional career growth through continued development in technical and management skills, take roles of leadership in professional activities, and life-long learning ability.
PO3: Adapt effectively in professional environments, leadership, and teamwork in modern construction industry.
PO4: Are able to apply these knowledge and skills to design, develop and select sound solutions to construction engineering projects.

Program Outcomes

A. General knowledge, fundamental and specialized knowledge of construction engineering

- ELO1: Apply knowledge of mathematics and science.
- ELO2: Analyze core fundamental knowledge of construction engineering.
- ELO3: Analyze advanced fundamental knowledge of construction engineering necessary for construction engineering practice.

B. Specialized and professional skills in construction engineering major:

- ELO4: Analyze and solve construction engineering problems.
- ELO5: Measure and interpret experimental data related to construction materials and structures.
- ELO6: Select possible solutions of construction engineering within the context of society, enterprise and technique.
- ELO7: Adapt for life-long learning.
- ELO8: Perceive professional practice skills in construction engineering including professional and ethical responsibility.

C. Communication skills and ability to work in multidiscipline areas:

- ELO9: Evaluate the goals and characteristics of individuals to engage technical collaboration with team members towards the sound solution of multi-disciplinary projects.
- ELO10: Choose various communication skills such as technical writing, sketching and drawing, persuasive arguments, and presentation to support the need needs and character of the audience.
- ELO11: Demonstrate the ability to use English in construction engineering, emphasizing on reading and writing skills.

D. Skills to take shape of ideas, design, deploying and operate in construction industry

- ELO12: Judge the impact of construction engineering solution in global, economic, environmental, and societal context, and vice versa.
- ELO13: Adapt different enterprise cultures and develop professional behaviors to work successfully in organizations.
- ELO14: Select appropriate models of construction engineering performance to meet desired needs within realistic constraints such as economic, environmental, social, and sustainability.
- ELO15: Design a part or complete construction project by means of design experiences integrated throughout the professional component of the curriculum.
- ELO16: Develop appropriate processes of construction engineering practice.
- ELO17: Select suitable procedure to operate a construction project including inspection, maintenance, repair and upgrade.

5. Total program credits: 151 credits
(without Physical Education, Military Education, and Supplementary Courses)

6. Allocation of credits

Groups of Courses	Credits		
	Total	**Required**	**Elective**
Foundation science courses	**56**	**53**	**4**
Political theory	11	11	0
General law	2	2	0
Social sciences and humanities	4	0	4

Mathematics	14	14	0
Physics	3	3	0
Chemistry	3	3	0
Introduction to Construction Engineering Technology	3 (2+1)	3 (2+1)	0
English	17	17	0
Construction Engineering Courses	**94**	**90**	**4**
Fundamental Construction Engineering courses	44	44	0
Advanced Construction Engineering courses	28	24	4
Practices and laboratory	11	11	0
Internship	4	4	0
Capstone project	7	7	0

7. Content of program

7.1. Foundation science courses

A – Required courses

No.	Course code	Course	Credits	Note
1	LLCT130105E	Philosophy of Marxism and Leninism	3	
2	LLCT120205E	Political Economics of Marxism and Leninism	2	
3	LLCT120405E	Scientific Socialism	2	
4	LLCT120314E	Ho Chi Minh's Ideology	2	
5	LLCT220514E	History of Vietnamese Communist Party	2	
6	GELA220405E	General Law	2	
7	ICET130117E	Introduction to Construction Engineering Technology	3(2+1)	
8	MATH132401E	Calculus I	3	
9	MATH132501E	Calculus II	3	
10	MATH132601E	Calculus III	3	
11	MATH132901E	Mathematical Statistics for Engineer	3	
12	NMCE120421E	Numerical Methods for Civil Engineers	2	
13	PHYS130902E	Physics 1	3	
14	GCHE130603E	General Chemistry for Engineers	3	
15	PHED110513E	Physical Education 1	0(1)	
16	PHED110613E	Physical Education 2	0(1)	
17	PHED130715E	Physical Education 3	0(3)	
18	GDQP008031E	Military Education	165 hours	
19	-	English	17	
Total			**53**	

B – Selective courses (choose 2 courses)

No.	Course code	Course	Credits	Note
1	GEEC220105E	General Economics	2	
2	INMA220305E	Introduction to Management	2	
3	INLO220405E	Introduction to Logic	2	
4	INSO321005E	Introduction to Sociology	2	
Total (choose 2 courses)			**4**	

7.2. Construction Engineering Courses

7.2.1. Fundamental Construction engineering courses

No	Course code	Course	Credits	Note
1	DGED125716E	Descriptive Geometry and Engineering Drawing	2	
2	ENME141121E	Engineering Mechanics	4	
3	MEMA241221E	Mechanics of Materials	4	
4	SURV231419E	Surveying	2+1	
5	SOME241218E	Soil Mechanics	4	
6	STAN242617E	Structural Analysis	4	
7	DRCS242717E	Design of Reinforced Concrete Structures I	4	
8	PCSD213117E	Project of Reinforced Concrete Structure Design I	1	
9	COMA232817E	Construction Materials	2+1	
10	DSST243017E	Design of Steel Structures I	4	
11	COME340319E	Construction Methods	4	
12	FOAD331418E	Foundation Analysis and Design	3	
13	PFDE311518E	Project of Foundation Design	1	
14	WSSE233217E	Water Supply & Sewerage Engineering	3	
Total			**44**	

7.2.2. Major courses

A – Required courses

No.	Course code	Course	Credits	Note
1	ARCH230216E	Principles of Architectural Design	3	
2	DRCS342917E	Design of Reinforced Concrete Structures II	4	
3	COPM441519E	Construction Project Management	4	
4	CMMP310619E	Construction Methods and Management Project	1	
5	DESS333617E	Design of Steel Structures II	3	
6	PSSD313717E	Project of Steel Structure Design	1	
7	DYST333317E	Dynamics of Structures	3	
8	REPR325517E	Research Project	2	
9	PCSD311817E	Project of Reinforced Concrete Structure Design II	1	
10	SCIC424517E	Enterprise-Specialized Seminar (*CET*)	2	

11	BLIE324019E	Business and Leadership in Engineering (CET)	0(2)	
Total			**24**	

B – Selective courses

No.	Course code	Course	Credits	Note
1	COSU420919E	Construction Supervision	2	
2	MRRB421319E	Maintenance, Repair and Rehabilitation of Buildings	2	
3	GRIM421718E	Ground Improvement	2	
	FSHS421618E	Foundation Systems for High-Rise Structures	2	
4	DPCS423717E	Design of Pre-stressed Concrete structures	2	
5	ENEN423817E	Environmental Engineering	2	
6	TRIN323422E	Transportation Infrastructures	2	
7	SUCO423917E	Sustainable Construction	2	
8	DSCS424417E	Design of Steel-Concrete Composite Structures	2	
Total (choose 2 courses)			**4**	

7.2.3. Practices

No.	Course code	Course	Credits	Note
1	ENDP110417E	Engineering Drawings Practice	1	
2	SMLA221318E	Soil Mechanics Lab	2	
3	MELA211321E	Mechanics Lab	1	
4	SSBD413417E	Structural Software for Building Analysis and Design	1	
5	BIMP421619E	Building Information Modeling Practice	2	
6	STLA323517E	Structures Lab	2	
7	COPR320519E	Construction Practice	2	
Total			**11**	

7.2.3. Internship and Capstone project

No.	Course code	Course	Credits	Note
1	INTE444417E	Internship	4	
2	CAPR472117E	Capstone Project	7	
Total			**11**	

8. Plan of courses

First semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	MATH132401E	Calculus I	3	-
2	GCHE130603E	General Chemistry for Engineers	3	-
3	ICET130117E	Introduction to Construction	2+1	-

		Engineering Technology		
4	PHED110513E	Physical Education 1	0(1)	-
5	ACEN340535E	Academic English 1	4	
6	ACEN340635E	Academic English 2	4	
7	LLCT130105E	Philosophy of Marxism and Leninism	3	-
9	PHYS130902E	Physics 1	3	
Total			**23**	

Second semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	MATH132501E	Calculus II	3	-
2	MATH132901E	Mathematical Statistics for Engineer	3	-
3	DGED125716E	Descriptive Geometry and Engineering Drawing	2	-
4	ENME141121E	Engineering Mechanics	4	-
5	PHED110613E	Physical Education 2	0(1)	-
6	ACEN440735E	Academic English 3	4	
7	ACEN440835E	Academic English 4	4	
8	LLCT120405E	Scientific Socialism	2	
9	LLCT120205E	Political Economics of Marxism and Leninism	2	
Total			**24**	

Third semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	MATH132601E	Calculus III	3	-
2	NMCE120421E	Numerical Methods for Civil Engineers	2	-
3	ARCH230216E	Principles of Architectural Design	3	-
4	ENDP110417E	Engineering Drawings Practice	1	-
5	MEMA241221E	Mechanics of Materials	4	-
6	PHED130715E	Physical education 3 (elective)	0(3)	-
7	IEPR550935E	IELTS Preparation	0(5)	
8	GELA220405E	General law	2	-
9	LLCT120314E	Ho Chi Minh's Ideology	2	
10	COMA232817E	Construction Materials	2+1	-
11		Social Sciences and Humanities 1	2	
Total			**22**	

Fourth semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	SOME241218E	Soil Mechanics	4	-
2	SMLA221318E	Soil Mechanics Lab	2	-
3	STAN242617E	Structural Analysis	4	MEMA241221

4	MELA211321E	Mechanics Lab	1	-
5	DRCS242717E	Design of RC Structures I	4	MEMA241221
6	DSST243017E	Design of Steel Structures I	4	MEMA241221
7	WSSE233217E	Water Supply & Sewerage Engineering	3	-
Total			**22**	

Fifth semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	DYST333317E	Dynamics of Structures	3	-
2	FOAD331418E	Foundation Analysis and Design	3	SOME241118
3	DRCS342917E	Design of RC Structures II	4	MEMA241221
4	SSBD413417E	Structural Software for Building Analysis and Design	1	-
5	PCSD213117E	Project of RC Structure Design I	1	DRCS242717E
6	STLA323517E	Structures Lab	2	
7	SURV231419E	Surveying	2+1	
8	DESS333617E	Design of Steel Structures II	3	MEMA241221
9	PFDE311518E	Project of Foundation Design	1	
	LLCT220514E	History of Vietnamese Communist Party	2	
Total			**23**	

Sixth semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	PCSD311817E	Project of Reinforced Concrete Structure Design II	1	DRCS242717E
2	COME340319E	Construction Methods	4	-
3	COPR320519E	Construction Practice	2	-
4	-	Social Sciences and Humanities 2	2	-
5	REPR325517E	Research Project	2	*(in 2 semesters)*
6	BLIE324019E	Business and Leadership in Engineering (CET)	0 (2)	
7	BIMP421619E	Building Information Modeling Practice	2	-
8	COPM441519E	Construction Project Management	4	-
9	PSSD313717E	Project of Steel Structure Design	1	
	Choose 2 courses			
10	COSU420919E	Construction Supervision	2	-
11	MRRB421319E	Maintenance, Repair and Rehabilitation of Buildings	2	-
12	GRIM421718E	Ground Improvement	2	-
13	FSHS421618E	Foundation Systems for High-Rise	2	

		Structures		
14	DPCS423717E	Design of Pre-stressed Concrete Structures	2	-
15	ENEN423817E	Environmental Engineering	2	-
16	TRIN323422E	Transportation Infrastructures	2	
17	SUCO423917E	Sustainable Construction	2	
18	DSCS424417E	Design of Steel-Concrete Composite Structures	2	
Total			**22**	

Seventh semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	CMMP310619E	Construction Methods and Management Project	1	-
2	INTE444417E	Internship	4	
3	SCIC424517E	Enterprise-Specialized Seminar (*CET*)	2	
4	ENTW611038E	English for Thesis Writing	1	
Total			**8**	

Eighth semester:

No.	Course code	Course	Credits	Prerequisite (if any)
1	CAPR472117E	Capstone Project	7	-
Total			**7**	

BRIEF OUTLINE OF ALL COURSES IN THE CET PROGRAM

A. Foundation science courses

1. Introduction to Construction Engineering Technology (ICET130117E) (3 credits)

This course introduces the program of construction engineering technology (CET), including ELOs, specification, structure, and content. The course also provides an exciting introduction of the civil engineering profession, including professional and ethical responsibilities, and equips soft skills necessary for undergraduate study and professional practice.

Textbook: Philip Kosky, Robert Balmer, William Keat, George Wise: *Exploring Engineering – An Introduction to Engineering and Design, 2nd Edition*, 2010.

2. Calculus I (MATH132401E) (3 credits)

This course covers most of the elementary topics in the theory of functions of a single variable: limits, continuity, derivatives, integration, series, and their applications. The emphasis of this course is placed on concepts and computations not mathematical proofs. The goal is to provide students with mathematical skills that are necessary for their studies in the areas of science and engineering.

Textbook: K. Smith, M. Strauss and M. Toda –Calculus - 6th National Edition–Kendall Hunt, 2013.

3. Calculus II (MATH132501E) (3 credits)

This course covers matrix theory and linear algebra, emphasizing on topics useful in other disciplines. Linear algebra is a branch of mathematics that studies systems of linear equations and the properties of matrices. This course also provides the theory of vector calculus, particularly geometry of Euclidean spaces, gradients and directional derivatives and higher-order derivatives.

Textbook: K. Smith, M. Strauss and M. Toda. *Calculus - 6th National Edition*, Kendall Hunt, 2013.

4. Calculus III (MATH132601) (3 credits)

This course provides knowledge of integration of multi-variable functions, including 2-, 3-variable, line, surface integrations, and topics of ordinary and partial differential equations. These are important tools in modern science and engineering. Through the course, students are equipped with skills to compute multi-variable integrations, and solve first and second order linear PDEs with constant coefficients.

Textbook: K. Smith, M. Strauss and M. Toda. *Calculus - 6th National Edition*, Kendall Hunt, 2013.

5. Mathematical Statistics for Engineer (MATH132901E) (3 credits)

This course will expose students to the basic concepts of probability and applied statistics. This course will relate this material to real-world examples from current events and other fields may be brought in as well. Upon successfully completing the course students will be familiar with the fundamentals of probability and statistics, including unpredictable events, probability and its formula, random variables, discrete and continuous distributions, sample theory, hypothesis testing, recurrence, and linear correlation.

Textbook: Robert P. Dobrow. *Probability: With Applications and R*, Willey, 2013.

6. Numerical Methods for Civil Engineers (NMCE120421E) (2 credits)

The course provides computational methods, especially numerical methods, to solve mathematical problems necessary for civil engineering such as integration, ODEs, PDEs, linear algebra equations, and analysis of experimental data. The course also aims at introducing students to programming and numerical methods within a technical computing environment. MATLAB will be used as the framework for presentation, explanation, discussion and application of numerical methods.

Textbook: Steven C. Chapra. *Applied Numerical Methods with MATLAB for engineers and scientists*, Mc Graw Hill, 2008.

7. Physics 1 (PHYS130402E) (3 credits)

This course provides students with physical knowledge necessary for engineering, including topics related mechanics, thermodynamics and electrics-magnetics. Mechanics covers fundamentals of classical mechanics (Newtonian mechanics) and the basis of relative mechanics: Newton's law, gravity law, conservation law of motion of points and point system and solids,

Einstein's theory and relative dynamics. Thermodynamics exposes students to fundamentals of the molecular thermal motion and basic principles of thermodynamics. And, electrics-magnetics provides students with electrostatic and magnetic interactions, and relationship between electronic and magnetic fields.

Textbook: R.A. Serway & J.W. Jewett; *Physics for Scientists and Engineers with Modern Physics*, 8th Edition; Brooks Cole, 2009.

8. General Chemistry for Engineers (GCHE130603E) (3 credits)

This course provides general chemistry necessary for engineering and science. This course covers fundamentals of electronic structures of atoms, relationship of electron and atomic properties, geometric configuration of the molecule, the polarity of the molecules, link of the physical molecules, a preliminary study on the physical and chemical properties of inorganic substances and their structures.

Textbook: Lawrence S. Brown. *Chemistry for Engineering Students*, 2nd Edition, Brooks Cole, 2011.

9. Philosophy of Marxism and Leninism (3 credits)

This course introduces fundamentals of Marxism and Leninism, particularly concentrating on basic concepts of worldview and philosophical methodology, economic theory of capitalism's production methods, and socialism in current and future.

Textbook: MOET. *Fundamental Principles of Marxism-Leninism*, National Political Publishing, 2012.

10. Ho Chi Minh's Ideology (LLCT120314E) (2 credits)

This course presents establishment and development of Ho Chi Minh's ideology. Students are provides with important contents of the Ho Chi Minh's ideology related to the Marxism and Leninism, Vietnam and the world's revolutionary policies, and citizen's ethics and responsibility.

Textbook: MOET. *Ho Chi Minh's Ideology*, National Political Publishing, 2012.

11. History of Vietnamese Communist Party (2 credits)

This course provides students with systematic knowledge of Vietnamese Communist Party's policies, especially in innovation stage.

Textbook: MOET. *Vietnamese Communist Party Policy of Revolution*, National Political Publishing, 2013.

12. General Law (GELA220405E) (2 credits)

This course provide students with general theories of the state and law including nature of the state and law, organizing apparatus of the state, Vietnam law system and criminal and civil laws. This knowledge helps student to correctly understand and apply the laws in practice.

Textbook: Le Minh Toan. *General Law*, National Political Publishing, 2010.

13. Social Sciences and Humanities 1, 2, 3 (2 credits)

These are two selective courses, 2 credits for each one, which relate to social sciences and humanities. These courses provide students with social knowledge, attitude, soft skills, and entrepreneurship. Students can choose three of the following courses

- General economics (GEEC220105E) (2 credits)
- Introduction to management (INMA220305E) (2 credits)
- Introduction to logic (INLO220405E) (2 credits)
- Introduction to sociology (INSO321005E) (2 credits)

B. Fundamental construction engineering courses

14. Descriptive Geometry and Engineering Drawing (DGED125716E) (2 credits)

The course introduces fundamental knowledge of engineering drawing such as projections, drawing presentations, and regulations of engineering drawings. The course also provides students with skills of reading and drawing basic drawings.

Textbook: Doan Nhu Kim. *Engineering Drawing*, Vietnam Education Publishing, 2003.

15. Engineering Drawing Practice (ENDP110417E) (1 credits)

This course helps students to develop skills of drawing architectural and structural shop-drawings by using computer-aided design (CAD) software, including procedures to draw such basic structural components as foundations, columns, beams, slabs, staircases, water tanks, trusses, bracing systems, or connections made of reinforced concrete or steel. The course also introduces basic terminologies in the construction (names of structural components, parts of building, types of construction drawings, etc.).

Textbook: Doan Nhu Kim. *Engineering Drawing*, Vietnam Education Publishing, 2003.

16. Engineering Mechanics (ENME141121E) (4 credits)

The course covers two basic topics, including statics and dynamics, which must be understood by students concerned with structures and materials. Statics deals with the equilibrium of rigid bodies are either at rest or move with a constant velocity; whereas dynamics is concerned with the accelerated motion of bodies.

Textbook: Hibbeler. *Engineering Mechanics*, 13th Edition, Prentice Hall, 2012.

17. Mechanics of Materials (MEMA241221E) (4 credits)

The course studies the internal effects of stress and strain in a solid body that is subjected to an external loading. Essential topics presented include elastic behavior of structural components under tension/compression, torsion, bending, and buckling. The course also introduces statically indeterminate and simply redundant structures; work and strain energy concepts.

Textbook: Hibbeler. *Mechanics of Materials*, 9th Edition, Prentice Hall, 2013.

18. Mechanics Lab (MELA211321E) (1 credit)

This course reinforces knowledge of material and structural behaviors students have been studied in mechanical courses. Mechanical experiments introduce knowledge and skills to conduct and measure material properties.

Textbook: Hibbeler. *Mechanics of Materials*, 9th Edition, Prentice Hall, 2013.

19. Structural Analysis (STAN242617E) (4 credits)

This is a fundamental course among a group of basic engineering ones which provides knowledge and skills for calculating internal forces and displacements of statically determinate and indeterminate structures. Additionally, the course also introduces the fundamental knowledge of matrix method to enhance the ability of using structural analysis software (ETABS, SAP 2000, SAFE, etc.).

Textbook: Hibbeler. *Structural Analysis*, 8th Edition, Prentice Hall, 2012.

20. Construction Materials (COMA232817E) (3 credits)

The course gives students knowledge about mechanic and physical properties of construction materials and provides students with skills of how to choose and use suitable materials for different construction purposes to achieve economic and technical requirements. Also, the course equips knowledge and skills to conduct experiments related to physical and mechanical properties of basic construction materials such as burnt-clay bricks, sand, stones, cements, and concrete.

Texbook: M. Ashby and K. John Son. *Materials and design*, 3rd Edition, Elsevier, 2014.

21. Design of Reinforced Concrete Structures I (DRCS242717E) (4 credits)

The course introduces concepts of reinforced concrete materials and methods for designing such reinforced concrete structural components subjected bending, shearing and tension/compression as girders or columns. In addition, the course also provides fundamental concepts of pre-stressed concrete structures.

Textbook: Wight J. *Reinforced concrete: Mechanics and design, 6th Edition*. Prentice Hall, 2011.

22. Project of Reinforced Concrete Structure Design I (PCSD213117E) (1 credits)

This is one of applied courses belonging to the reinforced concrete structures' course. The project aims to help students to be familiar with designing real structural components made of reinforced concrete. The project also reviews professional knowledge and skills related to designing reinforced concrete structures, writing report and drawing. Besides, the project helps students to improve skills in analyzing and choosing appropriate solution for structural design.

Textbook: Nguyen Dinh Cong *et al*. *Reinforced Concrete Structures (building and special members)*. Science and Technics Publishing, 2012.

23. Design of Steel Structures I (DSST243017E) (4 credits)

The course provides basic knowledge and skills in the field of steel structure design including detailed design of steel, steel-concrete composite members (trusses, beams, columns, and slabs), and steel connections (welded, bolted, and riveted ones). The course also helps students to strengthen their ability and self-confidence to analyze steel and composite structures.

Textbook: William T. Segui. *Steel Design, 5th Edition*. Cengage, 2012.

24. Water Supply and Sewerage Engineering (WSSE233217E) (3 credits)

The course aims to introduce students with basic knowledge of fluid mechanics such as flow, pressure, and flow velocities. Besides, the course also provide principles and solving methods to determine location, size and relationship between the parts of water supply and sewerage system

in buildings as well as inside and outside urban. The course helps the students to have abilities to design basically water supply and sewerage system inside and outside buildings.

Textbook: Nguyen Thong. *Water Supply and Sewerage Engineering*. Construction Publishing, 2007.

25. Soil Mechanics (SOME241118E) (4 credits)

The objectives of this course are to introduce the basic physical and engineering properties of soil to students so that they can effectively work in geotechnical engineering. In this course, students will learn what soils are, how they are derived, and how they are identified and classified for engineering purpose. Student will also learn the principles that govern flow of water in soils, deformation and shear strength of soils.

Textbook: Muni Budhu. *Soil Mechanics and Foundations, 3rd Edition*, Wiley, 2011.

26. Soil Mechanics Lab (SMLA221318E) (2 credit)

This course provides the contents relating to laboratory tests to determine soil properties. It also teaches students how to gather and evaluate testing results to report engineering geological survey for foundation design.

Textbook: Muni Budhu. *Soil Mechanics and Foundations, 3rd Edition*, Wiley, 2011.

27. Foundation Analysis and Design (FOAD331418E) (3 credit)

The course teaches students to deal with methods of design and experiment for different types of bases and foundations. The course emphasizes on proposing and selecting the appropriate foundation, depending on geological conditions, action loads and construction technology. The content of the course is also closely associated with the standards on foundation design, testing and construction.

Textbook: Coduto. *Foundation Design Principles and Practices, 2nd Edition*, Prentice Hall, 2000.

28. Project of Foundation Design (PFDE311518E) (1 credit)

This project helps students to systematize the knowledge of the previous geotechnical courses such as Engineering Geology, Soil Mechanics, and Foundation Engineering and helps them to apply this knowledge to designing the actual foundations. This project designs two main types of foundations: shallow foundations and pile foundations. The design specifications follow the national regulations in the field of soil mechanics and foundation engineering.

Textbook: Chau Ngoc An. *Foundation Engineering*. HCMC National University Publishing, 2011.

29. Surveying (SURV221419E) (2+1credits)

This course provides the following concepts to students: reference surfaces of Geoids and Ellipsoid of the earth; way of ground manifestation by the map; geodesic errors in measurement; basic knowledge and tools in geodesic measurements (angle measurement, length measurement, and height measurement); control grid of coordinates and altitude; method of measuring and drawing the detailed maps and its cross-sections, ways of using maps in construction design; and surveying and mapping work in the plans.

Textbook: Pham Van Chuyen. *General Surveying*. Construction Publishing, 2010.

30. Construction Methods (COME340319E) (4 credits)

This course equips students with basic knowledge of construction techniques for a construction project, including underground works, above-ground works, finishing works and erection techniques. The course also introduces to students all kinds of machinery and equipment used for construction, as well as their operation principles.

Textbook: S.W. Nunnally. *Construction Methods and Management, 7th Ed., Pearson*, NJ, 2007.

C. Advanced construction engineering courses

31. Principles of Architectural Design (ARCH230216E) (3 credits)

This course introduces fundamental concepts of architecture to civil engineers. The content of the course emphasizes on principles of architecture and gives architectural solutions under many different constrains. The architectural components of a building from the foundation to the roof are presented. The course also provides regulations and requirements for architectural drawings.

Textbook: Ta Xuan Truong. *Principles of Architectural Design*. Construction Publishing, 1999.

32. Dynamics of Structures (DYST333317E) (3 credits)

Students are introduced to concepts of structural dynamics and analysis methods for the linear response of civil engineering structures subjected to time-varying dynamic loads. In details, students will learn how to analyze and formulate the equation of motion of Single Degree-of-Freedom (SDOF) and Multi Degree-of-Freedom System (MDOF) then calculate the dynamic characteristics, displacements, internal forces of these systems. Besides, this course helps students to understand the evaluating of the behaviors of building structures under earthquake ground motions following Vietnam Construction Code.

Textbook: Anil K. Chopra. *Dynamics of structures: Theory and applications to earthquake engineering, 3rd Edition*, Pearson Prentice Hall, 2007.

33. Design of Reinforced Concrete Structures II (DRCS342917E) (4 credits)

This course provides students with professional knowledge of building engineering related to modeling and computing building components made of reinforced concrete. The course also supplies students with analytical skills in optimal design of concrete building structures.

Textbook: Wight J. *Reinforced concrete: Mechanics and design*, 6th Edition. Prentice Hall, 2011.

34. Project of Reinforced Concrete Structures Design II (PCSD311817E) (1 credits)

This is one of applied courses belonging to the reinforced concrete structures' course. The project aims to help students to be familiar with designing reinforced concrete structures. The project also reviews professional knowledge and skills related to designing reinforced concrete structures, writing report and drawing. Besides, the project helps students to improve skills in analyzing and choosing appropriate solution for structural design.

35. Design of Steel Structures II (DESS333617E) (3 credits)

This course aims to explore steel structures knowledge as a natural progression of the steel structures module from which the students will develop their knowledge on the design of simple steel building structures such as single-span steel portal frames, wide-span steel buildings and multi-story steel buildings. Moreover, the students will show familiarity with the calculation of load and action from the current Vietnamese Standard. This course also helps students to have basic knowledge and skills for carrying out the steel structures project.

Textbook: William T. Segui. *Steel Design*, 5th Edition, Cengage, 2012.

36. Project of Steel Structure Design (PSSD313717E) (1 credit)

This course helps students to apply theoretical knowledge learned in both courses of the Steel Structures and the Steel Building Structures to analysis and designing the industrial steel buildings having cranes.

Textbook: William T. Segui. *Steel Design*, 5th Edition, Cengage, 2012.

37. Structural Software for Building Analysis and Design (SSBD413417E) (1 credits)

This course provides knowledge and basic skills in using specialized design software such as ETABS, SAFE for students to model, analyze and design civil and industrial buildings.

Textbook: Ngo Minh Duc. *An Introduction to Etabs*. Construction Publishing, 2012.

38. Structures Lab (STLA323517E) (2 credits)

This course provides students with knowledge and skills to conduct experiments related structural engineering. Through this course, students know how to prepare specimens and use equipment to set up suitable model for investigation and verification of structural engineering. The course also makes students to strictly follow safety regulations.

Textbook: Vo Van Thao. *Structural Test Methods*. Science and Technics Publishing, 2001.

39. Design of Prestressed Concrete Structures (DPCS423717E) (2 credits)

The course introduces knowledge of prestressed concrete materials, calculation and design of basically prestressed concrete structural components subjected bending, shearing and tension/compression. In addition, the course also provides fundamental concepts of construction technology for pre-stressed concrete structures.

Textbook: N. Krishna Raju. *Pre-stressed concrete*. McGraw-Hill Education, 2006.

40. Ground improvement (GRIM421718E) (2 credits)

The course provides essential knowledge of weak soils, especially their different types and quality; the principal characteristics of deformation and bearing capacity of soft soils under loadings; the basic soil stabilization methods for improving strength of the soft soil foundations, particularly in construction process in reality.

Textbook: Nguyen Uyen. *Foundation of Buildings on Weak Soils*. Construction Publishing, 2010.

41. Foundation System for High-Rise Structures (FSHS421618E) (2 credits)

The course provides essential knowledge of weak soils, especially their different types and quality; the principal characteristics of deformation and bearing capacity of soft soils under

loadings; the basic soil stabilization methods for improving strength of the soft soil foundations, particularly in construction process in reality.

Textbook: Nguyen Uyen. *Foundation of Buildings on Weak Soils*. Construction Publishing, 2010.

Textbook: Braja M. Das. *Principles of foundation Engineering***,** Cengage Learning, 2010.

42. Design of Steel-Concrete Composite Structures (DSCS424417E) (2 credits)

The course sets out the basic principles of composite construction with reference to beams, slabs, columns and frames, and their applications to building structures. It deals with the problems likely to arise in the design of composite members in buildings, and relates basic theory to the design approach of Eurocodes 2, 3 and 4.

Textbook: R.P.Jonhson. *Composite Structures of Steel and Concrete*. Wiley- Blackwell, 2004.

43. Environmental Engineering (ENEN423817E) (2 credits)

An introduction to mass balance modeling of contaminant fate;
transport and removal in the environment, commonly used reactor
configurations for water and air quality control; partitioning of
contaminant types and sources; regional and global contemporary environmental issues.

Textbook: Ruth F. Weiner and Robin A. Matthews. *Environmental Engineering*, 4th Edition, Elsevier Science, 2003.

44. Transportation Infrastructures (TRIN323422) (2 credits)

Fundamentals of planningdesign and operation of highwaytransportation facilities. Topics covere d include driver and vehicle performance characteristics, highway geometric design principles, basics of traffic analysis and transportation planning.

Textbook: John Wright. *Transportation Engineering*, ICE Publishing, 2015.

45. Construction Methods and Management Project (CMMP310619E) (1 credit)

The course provides students with the knowledge and professional skills of construction, organization of construction, and construction machines and equipment in civil and industrial projects. The course offers work requirements that a civil engineer must do in specific situations.

Textbook: S.W. Nunnally. *Construction Methods and Management, 7th Ed., Pearson*, NJ, 2007

46. Construction Practice (COPR320519E) (2 credits)

This is the course that aims to provide students with practical skills in the construction field. This course helps students to apply construction techniques to conduct works such as construction, plastering, painting, formwork, bar steel, etc. of all structural beams, floors, columns, and walls. Students are also guided to operate machines often used in construction such as drilling machines, iron cutter, carve machines, tile cutting machine.

Textbook: S.W. Nunnally. *Construction Methods and Management, 7th Ed., Pearson*, NJ, 2007

47. Building Information Modeling Practice (BIMP411619E) (2 credit)

This course provides practical topics related to knowledge on economics and construction management. Students practice on schedule and management of construction projects by using MS Project software.

Textbook: Luong Duc Long. *Using MS Project 2007 for construction Management*, Construction Publishing, 2011.

48. Construction Project Management (COPM421519E) (4 credits)

The course provides knowledge about economics and management in construction. This course equips students with a basic knowledge of project management including planning, implementation and control of construction projects from the stage of project formulation to project completion. Students learn tools to make decisions and carry out work in the constraints of time, cost and manpower, the organizational forms of project management, planning methods, progress, project control, and distribution of resources, etc.

Textbook: E.I.A. Lester. *Project Management, Planning and Control, 6th Edition*, Elsevier, 2014.

49. Construction Supervision (COSU420919E) (2 credits)

This course introduces the new requirements for construction's quality and supervision works by ISO 9000 standard for construction firms in Vietnam. The ways of checking/ inspecting the quality of works from start to completion are also presented.

Textbook: MOC. *Quality Control and Supervision for buildings*, Construction Publishing, 2002

50. Maintenance, Repair and Rehabilitation of Buildings (CMRB421319E) (2 credits)

The course aims to systematize construction knowledge and skills. The course equips students with the ability to assess the defects and errors in structures, analyze their causes, and recommend solutions to repair or strength. This course also helps students to evaluate load capacity of structures before and after being strengthened.

Textbook: Nguyen Van Kiem. *Building prohibition*, HCMC National University Publishing, 2008.

51. Sustainable Construction (SUCO423917E) (2 credits)

Introduction to sustainable engineering systems. Topics covered include: environmental laws, regulations, and sustainability issues; financial calculations in sustainable engineering; life cycle assessment; hazard and risk assessment of pollutants.

Textbook: Nazaroff. *Introduction to Engineering and the Environment*. McGraw-Hill, 2001.

52. Internship (INTE444417E) (4 credits)

The 4-week internship offers students the invaluable chance to work in construction sites or companies. Students will incorporate the knowledge learned in the classroom into a real-world experience set in a professional practice-oriented environment. Students have the opportunity to demonstrate and develop their professional skills such as teamwork, effective communication, social interaction and professional networking, an understanding of business procedures, leadership, and critical thinking.

Textbook: No textbook

53. Research project (REPR325517E) (2 credits)

In this course, a group of students have to do a research project. Through doing the research project, the students will study up-to-date knowledge to solve applied researches in the civil engineering field. Besides, the course also helps students to develop skills related to self-study, self-research and team-working.

Textbook: No textbook

D. Capstone Project

54. Capstone Project (CAPR402117E) (7 credits)

This course gives students an opportunity to participate in a major design experience in construction engineering. Using knowledge and skills acquired in earlier courses of the CET program, the students are required to design a real-world construction project under the constraints and considerations of constructability, economics and sustainability. The results of analysis and design are presented in a thesis and shop-drawings.

Textbook: No textbook

E. Academic English Courses

F. General Knowledge Electives Courses

1. Engineering Psychology

Credits: 2(2/0/4)

Prerequisites: None

Course Description:

In order to create the interaction between technology and people, students of technology majors need to understand the basic psychological characteristics of humans. This course will provide students with knowledge of human psychology and the application of this knowledge into the design of engineering systems that are suitable for humans.

Textbook:

2. System Thinking

Credits: 2(2/0/4)

Prerequisites: None

Course Description:

This course provides students with basic knowledge about systems, systematic methodologies, and creative thinking methods while forming in students the ability to reason and solve problems systematically, logically, and creatively.

Textbook:

3. Planning Skills

Credits: 2(2/0/4)

Prerequisites: None

Course Description:

This course provides learners with basic knowledge about planning methods and develops students' thinking skills and the ability to find solutions suitable to particular conditions and circumstances. This enables learners to develop their study skills, short-term and long-term personal and professional plans and teaches them how to be effective. In addition, students will learn time management skills and effective work arrangements.

Textbook:

4. Workplace Skills

Credits: 2(2/0/4)

Prerequisites: None

Course Description:

This course aims to provide students with basic working skills in a technical environment, especially those needed for working in a multicultural, modern environment with rapid technological change.

Textbook:

***5.* Research Methods**

Credits: 2(2/0/4)

Prerequisites: None

Course Description:

This course covers the content of concepts, processes, and structures regarding research methods. The students will go through the selection of research topics, prepare an outline and apply it, collect and process information while conducting scientific research. By the end of the course, students will be able to sign up for research projects at the university level, as well as to conduct graduate thesis or graduation project scientifically and successfully.

CAMPUS INFRASTRUCTURE

Follow the Ministry of education and training's regulations

A. Workshops and Laboratories:

- Mechanics Laboratory
- Mechanics Engineering Workshop
- Structural Laboratory
- Geotechnical Laboratory
- Construction Material Laboratory
- Construction Practice Workshop

B. Library, Website

- University's Library
- Faculty's Library
- Faculty's Website

PROGRAM GUIDE

- Credit hour is calculated as:

1 credit = 15 lecture hours
= 30 laboratory hours
= 45 hours practice
= 45 hours self -study
= 90 workshop hours.
= 45 hours for project, thesis.

- Graduation thesis: conduct a research project to solve specific problems related to the major.

RECTOR **DEAN OF FACULTY**