MINISTRY OF EDUCATION & TRAINING

**HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY & EDUCATION**

**UNDERGRADUATE PROGRAM**

***Major of***

**CONSTRUCTION ENGINEERING TECHNOLOGY**

**NOVEMBER 2016**

 Ministry of Education and Training **SOCIALIST REPUBLIC OF VIETNAM**

 HCMC University of Technology and Education **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: Are proficient in the general knowledge of engineering science, the fundamental and specialized knowledge of construction engineering.

PO2: Grow professionally in their careers through continued development of technical and management skills, roles of responsibility in professional activities, and life-long learning ability.

PO3: Adapt effectively in the professional environment, leadership and teamwork in the context of construction engineering.

PO4: Are able to apply these knowledge and skills to design, develop and select sound solutions to construction engineering projects.

**Program Outcomes**

1. **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.
1. **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.
1. **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.
1. **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:** 130 credits

 (without Physical Education, Military Education, and Supplementary Courses)

**6. Allocation of credits**

|  |  |
| --- | --- |
| **Groups of Courses** | **Credits** |
| **Total** | **Required** | **Elective** |
| Foundation science courses | **41** | **37** | **4** |
| Political theory | 10 | 10 | 0 |
| General law | 2 | 2 | 0 |
| Social sciences and humanities  | 4 | 0 | 4 |
| Mathematics | 16 | 16 | 0 |
| Physics  | 3 | 3 | 0 |
| Chemistry  | 3 | 3 | 0 |
| Introduction to Construction Engineering Technology  | 3 (2+1) | 3 (2+1) | 0 |
| **Construction Engineering Courses** | **89** | **85** | **4** |
| Fundamental Construction Engineering courses  | 44 | 44 | 0 |
| Advanced Construction Engineering courses  | 22 | 18 | 4 |
| Practices and laboratory | 11 | 11 | 0 |
| Industry Internship | 2 | 2 | 0 |
| Capstone project | 10 | 10 | 0 |

**7. Content of program**

***7.1. Foundation science courses***

**A – Required courses**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Note** |
| 1 | LLCT150105E | Principles of Marxism-Leninism | 5 |  |
| 2 | LLCT230214E | Vietnamese Communist Party Policy of Revolution | 3 |  |
| 3 | LLCT120314E | Ho Chi Minh’s Ideology | 2 |  |
| 4 | GELA220405E | General Law | 2 |  |
| 5 | ICET130117E | Introduction to Construction Engineering Technology | 3(2+1) |  |
| 6 | MATH141601E | Calculus I | 4 |  |
| 7 | MATH141701E | Calculus II | 4 |  |
| 8 | MATH141801E | Calculus III | 4 |  |
| 9 | MATH122101E | Probability with Applications | 2 |  |
| 10 | NMCE120421E | Numerical Methods for Civil Engineers | 2 |  |
| 11 | PHYS130402E | Principles of Physics 1 | 3 |  |
| 12 | GCHE130603E | General Chemistry for Engineers | 3 |  |
| 13 | PHED110513E | Physical Education 1 | 1 |  |
| 14 | PHED110613E | Physical Education 2 | 1 |  |
| 15 | PHED130715E | Physical Education 3 | 3 |  |
| 16 | GDQP008031E | Military Education | 165 hours |  |
| 17 | - | Supplementary Courses | 26 |  |
| **Total** | **37** |  |

**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 | DGED122417E | 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 | 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 | PRAD232517E | 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 | DYST323317E | Dynamics of Structures | 2 |  |
| **Total** | **18** |  |

**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 |  |
| 3 | SMLA221318E | Soil Mechanics Lab | 2 |  |
| 4 | MELA211321E | Mechanics Lab | 1 |  |
| 6 | SSBD413417E | Structural Software for Building Analysis and Design | 1 |  |
| 7 | BIMP421619E | Building Information Modeling Practice | 2 |  |
| 8 | STLA323517E | Structures Lab | 2 |  |
| 9 | COPR320519E | Construction Practice | 2 |  |
| **Total** | **11** |  |

**7.2.3. Internship and Capstone project**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Note** |
| 1 | INTE424417E | Internship | 2 |  |
| 2 | CAPR402117E | Capstone Project | 10 |  |
| **Total** | **12** |  |

**8. Plan of courses**

**First semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Prerequisite** **(if any)** |
| 1 | MATH141601E | Calculus I | 4 | - |
| 2 | GCHE130603E | General Chemistry for Engineers | 3 | - |
| 3 | LLCT150105E | Principles of Marxism-Leninism | 5 | - |
| 4 | ICET130117E | Introduction to Construction Engineering Technology | 2+1 | - |
| 5 | PHED110513E | *Physical Education 1* | *1* | - |
| *6* | *EHQT 130137E* | *Academic English 1* | *3* |  |
| *7* | *EHQT 230237E* | *Academic English 2* | *3* |  |
| **Total**  | **15** |  |

**Second semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Prerequisite** **(if any)** |
| 1 | MATH141701E | Calculus II | 4 | - |
| 2 | MATH122101E | Probability with Applications | 2 | - |
| 3 | PHYS130402E | Principles of Physics 1 | 3 | - |
| 4 | GELA220405E | General law | 2 | - |
| 5 | DGED12­1023E | Descriptive Geometry and Engineering Drawing | 2 | - |
| 6 | ENME141121E | Engineering Mechanics | 4 | - |
| 7 | LLCT120314E | Ho Chi Minh’s Ideology | 2 | - |
| 8 | PHED110613E | *Physical Education 2* | *1* | - |
| *9* | *EHQT 230337E* | *Academic English 3* | *3* |  |
| *10* | *TEEN124017E* | *Technical English 1* | *2* |  |
| **Total** | **19** |  |

**Third semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Prerequisite** **(if any)** |
| 1 | LLCT230214E | Vietnamese Communist Party Policy of Revolution | 3 | - |
| 2 | MATH141801E | Calculus III | 4 | - |
| 3 | NUME120421E | Numerical Methods for Engineers | 2 | - |
| 4 | PRAD232517E | Principles of Architectural Design | 3 | - |
| 5 | ENDP110417E | Engineering Drawings Practice | 1 | - |
| 6 | MEMA241221E | Mechanics of Materials | 4 | - |
| 7 | PHED130715E | *Physical education 3 (elective)* | *3* | - |
| *8* | *TEEN234117E* | *Technical English 2* | *3* |  |
| **Total** | **17** |  |

**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 | COMA232817E | Construction Materials | 2+1 | - |
| *7* | *EHQT 230437E* | *Academic English 4* | *3* |  |
| **Total** | **18** |  |

**Fifth semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Prerequisite** **(if any)** |
| 1 | DYST323317E | Dynamics of Structures | 2 | - |
| 2 | DSST243017E | Design of Steel Structures I | 4 | MEMA241221 |
| 3 | FOAD331418E | Foundation Analysis and Design | 3 | SOME241118 |
| 4 | DRCS342917E | Design of RC Structures II | 4 | MEMA241221 |
| 5 | SSBD413417E | Structural Software for Building Analysis and Design | 1 | - |
| 6 | WSSE233217E | Water Supply & Sewerage Engineering | 3 | - |
| 7 | PCSD213117E | Project of RC Structure Design | 1 |  |
| *8* | *TEEN234217E* | *Technical English 3* | *3* |  |
| **Total** | **18** |  |

**Sixth semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Prerequisite** **(if any)** |
| 1 | SURV231419E | Surveying | 2+1 | - |
| 2 | DESS333617E | Design of Steel Structures II | 3 | MEMA241221 |
| 3 | COME340319E | Construction Methods | 4 | - |
| 4 | COPR320519E | Construction Practice | 2 | - |
| 5 | STLA323517E | Structures Lab | 2 |  |
| 6 | PFDE311518E | Project of Foundation Design | 1 | - |
| 7 | PSSD313717E | Project of Steel Structure Design | 1 |  |
| 8 | X | Social sciences and humanities 1  | 2 | - |
| *9* | *EHQT 330537E* | *Academic English 5* | *3* |  |
| **Total** | **18** |  |

**Seventh semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Prerequisite** **(if any)** |
| 1 | X | Social sciences and humanities 2 | 2 | - |
| 2 | CMMP310619E | Construction Methods and Management Project | 1 | - |
| 3 | COPM441519E | Construction Project Management | 4 | - |
| 4 | BIMP421619E | Building Information Modeling Practice | 2 | - |
| 5 | INTE424417E | Internship | 2 |  |
| *6* | *TEEN334317E* | *Technical English 4* | *3* |  |
|  | **Choose 2 courses** |
| 7 | COSU420919E | Construction Supervision | 2 | - |
| 8 | MRRB421319E | Maintenance, Repair and Rehabilitation of Buildings | 2 | - |
| 9 | GRIM421718E | Ground Improvement | 2 | - |
| 10 | FSHS421618E | Foundation Systems for High-Rise Structures | 2 |  |
| 11 | DPCS423717E | Design of Pre-stressed Concrete Structures | 2 | - |
| 12 | ENEN423817E | Environmental Engineering | 2 | - |
| 13 | TRIN323422E | Transportation Infrastructures | 2 |  |
| 14 | SUCO423917E | Sustainable Construction | 2 |  |
| 15 | DSCS424417E | Design of Steel-Concrete Composite Structures | 2 |  |
| **Total** | **15** |  |

**Eighth semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits** | **Prerequisite** **(if any)** |
| 1 | THES402117E | Capstone project |  | - |
| **Total** | **10** |  |

**9. Lecturers**

**First semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | ICET130117E | Introduction to Construction Engineering Technology | 3 | A/Prof. Dr. Nguyễn Trung Kiên |

**Second semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | ENME141121E | Engineering Mechanics | 4 | Dr. Lâm Xuân Bình |
| *2* | *TEEN124017E* | *Technical English 1* | *2* | *MSc. Bùi Xuân Bách* |

**Third semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | NMCE120421E | Numerical Methods for Civil Engineers | 2 | MSc. Lâm Phát Thuận |
| 2 | PRAD232517E | Principles of Architectural Design | 3 | MSc. Bùi Ngọc Hiển |
| 3 | ENDP110417E | Engineering Drawings Practice | 1 | MSc. Bùi Ngọc Hiển |
| 4 | MEMA241221E | Mechanics of Materials | 4 | Dr. Phan Đức Huynh |
| *5* | *TEEN234117E* | *Technical English 2* | *3* | *MSc. Bùi Xuân Bách* |

**Fourth semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | SOME241218E | Soil Mechanics | 4 | Dr. Nguyễn Minh Đức |
| 2 | SMLA221318E | Soil Mechanics Test | 2 | Dr. Nguyễn Minh Đức |
| 3 | STAN242617E | Structural Analysis | 4 | Dr. Trần Tuấn Kiệt |
| 4 | MELA211321E | Mechanics Lab | 1 | Dr. Phan Đức Huynh |
| 5 | DRCS242717E | Design of Reinforced Concrete Structures I  | 4 | Dr. Phạm Đức Thiện |
| 6 | COMA232817E | Construction Materials | 2 + 1 | A/Prof. Dr. Phan Đức Hùng |

**Fifth semester: /**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | DYST323317E | Dynamics of Structures | 2 | Dr. Châu Đình Thành |
| 2 | DRCS342917E | Design of Reinforced Concrete Structures II | 4 | Dr. Lê Anh Thắng |
| 3 | DSST243017E | Design of Steel Structures I | 4 | Dr. Lê Trung Kiên |
| 4 | FOAD331418E | Foundation Analysis and Design | 3 | Dr. Trần Văn Tiếng |
| 5 | SSBD413417E | Structural Software for Building Analysis and Design | 1 | MSc. Lê Phương |
| 6 | WSSE233217E | Water Supply & Sewerage Engineering | 3 | Dr. Trần Tuấn Kiệt |
| 7 | *TEEN234217E* | *Technical English 3* | *3* | *MSc. Bùi Xuân Bách* |

**Sixth semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | SURV231419E | Surveying | 2+1 | Msc.Nguyễn Thị Ánh Tuyết |
| 2 | DESS333617E | Design of Steel Structures II | 3 | A/Prof. Dr. Nguyễn Trung Kiên |
| 3 | COME340319E | Construction Methods | 4 | Dr. Hà Duy Khánh |
| 4 | PFDE311518E | Project of Foundation Design | 1 | MSc. Nguyễn Tổng |
| 5 | STLA323517E | Structures Lab | 2 | Dr. Châu Đình Thành |
| 6 | COPR320519E | Construction Practice | 2 | Dr. Hà Duy Khánh |
| 7 | PCSD213117E | Project of Reinforce Concrete Structure Design | 1 | Dr. Lê Anh Thắng |
| 8 | PSSD313717E | Project of Steel Structure Design |  | MSc. Nguyễn Ngọc Dương |

**Seventh semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits**  | **Lecturers** |
| 1 | COMA441519E | Construction Project Management | 4 | Msc. Nguyễn Văn Khoa |
| 2 | BIMP421619E | Building Information Modeling Practice | 2 | Dr. Nguyễn Thế Anh |
| 3 | CMMP310619E | Construction Methods and Management Project | 1 | Dr. Nguyễn Thế Anh |
| 4 | INTE424417E | Internship | 2 | Dr. Lê Trung Kiên |
| *5* | *TEEN334317E* | *Technical English 4* | *3* | *MSc. Bùi Xuân Bách* |
|  | **Choose 2 courses** |
| 6 | COSU420919E | Construction Supervision | 2 | MSc. Bùi Phạm Đức Tường |
| 7 | MRRB421319E | Maintenance, Repair and Rehabilitation of Buildings | 2 | MSc. Bùi Phạm Đức Tường |
| 8 | GRIM421718E | Ground Improvement | 2 | Dr. Nguyễn Minh Đức |
| 9 | FSHS421618E | Foundation Systems for High-Rise Structures | 2 | Dr. Trần Văn Tiếng |
| 10 | DPCS423717E | Design of Pre-stressed Concrete Structures | 2 | Dr. Trần Tuấn Kiệt |
| 11 | ENEN423817E | Environmental Engineering | 2 | Dr. Nguyễn Mỹ Linh (K. Hóa&CNTP) |
| 12 | TRIN323422E | Transportation Infrastructures | 2 | Dr. Trần Vũ Tự |
| 13 | SUCO423917E | Sustainable Construction | 2 | MSc. Bùi Xuân Bách |
| 14 | DSCS424417E | Design of Steel-Concrete Composite Structures | 2 | A/Prof. Dr. Phan Đức Hùng |

**Eighth semester:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Course code** | **Course**  | **Credits** | **Lecturers** |
| 1 | CAPR402117E | Capstone Project | 10 | Dr. Châu Đình Thành |

**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.

1. **Calculus I** (MATH141601E) (4 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.

1. **Calculus II** (MATH141701E) (4 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.

1. **Calculus III** (MATH141801) (MATH130301) (4 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.

1. **Probability with applications** (MATH122101) (2 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.

1. **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.

1. **Principle of 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.

1. **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.

1. **The Basic Principles of Marxism Leninism** (LLCT150105E) (5 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.

1. **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.

1. **Vietnamese Communist Party’s Revolutionary Policies** (LLCT230214E) (3 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.

1. **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.

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

These are three 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 economy (GEEC220105E) (2 credits)
* Introduction to quality management (IQMA220205E) (2 credits)
* Introduction to management (INMA220305E) (2 credits)
* Introduction to logic (INLO220405E) (2 credits)
* System thinking (SYTH220505E) (2 credits)
* Plan skill (PLSK320605E) (2 credits)
* Presentation skill (PRSK320705E) (2 credits)
* Technical and scientific document presentation skill (TDTS320805E) (2 credits)
* Introduction to Vietnam culture (IVNC320905E) (2 credits)
* Introduction to sociology (INSO321005E) (2 credits)
* University learning technique (ULTE121105E) (2 credits)

**B. Fundamental construction engineering courses**

1. **Descriptive Geometry and Engineering Drawing** (DGED121023E) (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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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 requirement](https://www.google.com.vn/search?biw=1150&bih=657&q=achieve+economic+technical+requirement&sa=X&ved=0ahUKEwixv_T5uaLPAhULjZQKHeckDh4QgwMIGQ)s. 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.

1. **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.

1. **Project of Reinforced Concrete Structure Design** (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.

1. **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.

1. **Water Supply and Sewerage Engineering** (WSSE233217E) (2 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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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**

1. **Principles of Architectural Design** (PRAD232517E) (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.

1. **Dynamics of Structures** (DYST323317E) (2 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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **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.

1. **Transportation Infrastructures** (TRIN323422) (2 credits)

Fundamentals of planningdesign and operation of highwaytransportation facilities. Topics covered 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.

1. **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

1. **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

1. **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.

1. **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.

1. **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

1. **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.

1. **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.

1. **Internship** (INTE424417E) (2 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

**D. Capstone Project**

1. **Capstone Project** (CAPR402117E) (10 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

**CAMPUS INFRASTRUCTURE**

Follow the Ministry of education and training’s regulations

1. **Workshops and Laboratories:**
* Mechanics Laboratory
* Mechanics Engineering Workshop
* Structural Laboratory
* Geotechnical Laboratory
* Construction Material Laboratory
* Construction Practice Workshop
1. **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**