Course Syllabus

1. **Course Title:** Construction Technique
2. **Course Code:** COTE340319
3. **Credit Units:** 4 (4/0/8) (4 units of theory/ 0 unit of practice/ 8 units of self-study)
   Duration: 15 weeks (3 hours of theory+0*2 hours of practice, and 6 hours of self-study per week)
4. **Course Instructors**
   1/ Dr. Hà Duy Khánh
   2/ MSc. Nguyễn Văn Khoa
   3/ MSc. Nguyễn Thanh Tú
   4/ MSc. Bùi Phạm Đức Tường
5. **Course Requirements**
   Prerequisite courses: None
   Previous courses: Strength of Materials (STMA240121)
   Parallel courses: None
6. **Course Description**
   This course introduces the programme 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.
7. **Course Goals**

Goals	Goal Description	Programme ELOs
G1	Specialized knowledge in the field of construction engineering and technology such as construction method design for underground works, above-ground works, finishing works and assembly works for a civil project,	1.2, 1.3
G2	Examination of practical problems in the field of construction engineering and management	2.3, 2.4
G3	Development of soft skills necessary to needs of study and profession	3.1, 3.2, 3.3
G4	Ability of understanding design documents to give approximate construction solutions	4.4, 4.5

8. **Course Learning Outcomes (CLOs)**

CLOs		CLO Description	Programme ELOs
G1	**G1.1**	State and discuss basic activities in construction projects for structural works and finishing works.	1.2

	G1.2	Perceive the features and uses of some types of machinery and equipment commonly used in construction.	1.3
G2	**G2.1**	Assess the feasibility of construction method applied in the case of specific projects.	2.3, 2.4
	G2.2	Analyze the reasonable construction solutions for common projects.	2.3
G3	**G3.1**	Develop report-writing and presentational skills	3.1, 3.2
	G3.2	Engage in reading and communicating in English	3.3
G4	**G4.1**	Apply Vietnamese construction standards in designing construction methods	4.4, 4.5

9. Learning Resources

- Textbooks:

1. Đỗ Đình Đức, Lê Kiều, Construction Technique, Part 1 & 2, Ha Noi Construction Publisher, 2nd edition, 2004.
2. Nguyễn Văn Hùng, Construction Machines, Ha Noi Science and Technology Publisher, 2nd edition, 2002.

- References:

1. Lê Văn Kiểm, Assembly Construction Techniques, Ha Noi Construction Publisher, 2003.
2. Ngô Quang Tường, Q&A for Problems of Construction Techniques, VNU-Ho Chi Minh City Publisher, 2003.
3. Nguyễn Đình Hiện, Construction Techniques, Ha Noi University of Architecture, 2003.
4. Nunnally, S.W., Construction Methods and Management, Pearson, 7th edition, NJ., 2007.
5. Gransberg, D. D., Popescu, C. M., and Ryan, R., Construction Equipment Management for Engineers, Estimators, and Owners, CRC Press, 2006.

10. Student Assessment

- Grading scale: **10**
- Assessment plan:

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Assigments					**15**
BT#1	Calculate soil quantity for partial and longitudinal works	Week 2	15 minute-exam	G1.2, G2.2, G4.2	5
BT#2	Check and select machine to drive pile into soil	Week 5	15 minute-exam	G1.2, G2.2, G4.2	5
BT#3	Design formwork system for concrete elements	Week 8	15 minute-exam	G1.2, G2.2, G4.2	5
Presentation					35
BT#4	Presentation on some construction methods	Week	Group	G1.1,	35

	and technologies currently used	14-15	presentation	G1.2, G2.2, G3.1, G3.2	
Final exam					**50**
BT#5	Design, calculate and analyze construction methods for all basic activities of construction project	After week 15	Individual test	G1.1, G1.2, G2.1, G2.2, G3.2	50
Total					**100**

11. Course Content

Week	Content	CLOs
1	***Chapter 1:*** **Overview on Construction** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** Introduce the course's goals, CLOs, content, pedagogical and assessment methods 1.1 Importance of construction 1.2 Concepts on construction 1.3 Introduction on some machines which are commonly used in construction projects such as excavator, vibrator, compactor, concrete casting machine, rebar fabrication/ installation machine, pile driving/ pressing machine, tower crane, etc. **Pedagogical methods**: + Presentation of lecture	G1.2, G2.2
	B/ Self-study content: *(8h)* + Find some catalogues of construction machines and understand how these machines can work.	G1.2, G2.2
2	***Chapter 2:*** **Types of Earth Work and How to Calculate its Quantity** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 2.1 Introduction to earth works 2.2 Types of earth works 2.3 Soil classification 2.4 Main characteristics of soil 2.5 Calculation of soil quantity 2.5.1 Soil quantity for foundation 2.5.2 Soil quantity for longitudinal works • Soil quantity for leveling with a given level; • Soil quantity for leveling with the condition of excavation-embankment balance	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2

	2.5.3 Soil quantity distribution, determination of direction and distance of transport **Pedagogical methods**: + Presentation of lecture + Exercise in class	
	B/ Self-study content: *(8h)* + Study formulas for cross-section area of longitudinal works; + How to calculate soil quantity for longitudinal works; + Do some exercises about soil quantity	G2.1, G2.2
3	***Chapter 3:*** **Preparatory and temporary works on construction site** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 3.1 Preparatory works: site access, and site clearance. 3.2 Drainage of ground and underground water 3.3 Methods for supporting deep hole wall **Pedagogical methods**: + Presentation of lecture + Discussion on some practical issues	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* + Study more on components and operating principles of machines used to dewatering activity.	G1.2
4	***Chapter 4:*** **Construction Methods for Earth Works** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 4.1 Excavation works: • Manual methods: tools and construction organization for excavation works, construction method for excavation pit wall; • Mechanical methods: Introduction to excavation machines in construction, excavation design by hydraulic backhoe, and excavation design by hydraulic shovel. 4.2 Backfilling and compaction works: • Machines for backfilling and compaction: tamping foot roller, grid or mesh roller, self-propelled vibrating roller, smooth steel drum roller, pneumatic roller, and segmented pad roller • Construction methods for manual and mechanical backfill and compaction works. **Pedagogical methods**: + Presentation of lecture + Discussion on charts of soil excavation	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* + Study more on dragline excavator, and clamshell.	G1.2

5	***Chapter 5:*** **Construction Methods for Piling Works** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 5.1 Pile classification 5.2 Pile driving machines and equipment 5.3 Pile driving techniques 5.4 Obstacles during pile construction 5.5 Pile pressing techniques 5.6 Construction of screw pile 5.7 Construction of bored pile 5.8 Safety in pile construction **Pedagogical methods**: + Presentation of lecture + Discussion on new technologies in pile construction	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* + Study more on components and operating principles of pile driving machine, pile pressing machine, bored pile machine and Barrett pile machine.	G1.2
6	***Chapter 6:*** **Construction Methods for Formwork Activity** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 6.1 General definition • Characteristics of reinforcement concrete; • Types of concreting works 6.2 Formwork activity • Requirements of formwork activity; • Formwork classification; • Movable formwork for building structure; • Formwork for diaphragm walls and mass concrete • Scaffoldings and platform; • Steel formwork and scaffolding; • Climbing formwork, sliding formwork and jacking formwork **Pedagogical methods**: + Presentation of lecture + Discussion on problems of accidents related to formwork system	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* + Study more on machines used for formwork activity, types of scaffolding, PAL studs, and standardized formwork in practice. + Perceive components and operating principles of sliding formwork system + Perceive construction procedure of climbing formwork system	G1.2
7	***Chapter 6:*** **Construction Methods for Formwork Activity (cont.)** *(4h,0,8h)*	

	A/ Content and pedagogical methods in class*: (4h)* **Content:** 6.3 Formwork design for horizontal and vertical structural elements 6.4 Formwork inspection **Pedagogical methods**: + Presentation of lecture + Discussion on calculation and erection of scaffolding system covering the project.	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* + Find solutions for the structure of formwork of slab, beam, column and walls.	G1.2
8	***Chapter 7:*** **Construction Methods for Rebar Activity** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 7.1 Reinforcement classification 7.2 Reinforcement fabrication 7.3 Reinforcement installation 7.4 How to cut rebar with optimal solution? 7.5 Rebar inspection 7.6 Some pictures on rebar fabrication/ installation on construction site **Pedagogical methods**: + Presentation of lecture + Discussion on cost of rebar fabrication/ installation	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* + Installation order of rebar and formwork for structural elements: foundation, column, beam and slab.	G1.2
9	***Chapter 8:*** **Construction Methods for Concrete Casting Activity** *(4h,0,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **In-class practice:** 8.1. Requirements of concrete casting 8.2. Design of concrete mixing factory 8.3. Concrete transportation methods 8.4. Concrete casting approaches 8.5. Concrete vibration principles 8.6. Concrete joints 8.7. Equipment for concrete casting 8.8. Concrete maintenance and remove 8.9. Machines for aggregate of concrete 8.10. Concrete mixing machines: small and big factory 8.11. Trucks for transporting concrete mix 8.12. Concrete vibrators **Pedagogical methods**: + Presentation of lecture + Discussion	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2

	B/ Self-study content: *(4h)* 8.13. Machines for finishing concrete surface 8.14. Concrete puff under water 8.15. Pouring concrete under water 8.16. Repair for concrete defects	G1.2
10	***Chapter 9:*** **Construction methods for assembly activity** *(4h,0h,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 9.1. Equipment and cranes for assembly • Equipment for hanging and tighting: cable, puli, truckle... • Choice a crane in assembly • Assembly for walls • Assembly for beam, slab, staircase, and balcony. **Pedagogical methods**: + Presentation of lecture	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* 9.2 Construction procedure of tower crane and other cranes	G1.2
11	***Chapter 9:*** **Construction methods for assembly activity (cont.)** *(4h,0h,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 9.3. Assembly for structural elements: • Foundation • Column • Beam • Roof **Pedagogical methods**: + Presentation of lecture	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(6h)* 9.4 Assembly for steel structure	G1.2
12	***Chapter 10:*** **Finishing works** *(4h,0h,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** 10.1. Tools and principles for finishing works 10.2. Finishing plan 10.3. Brick and mortar for mason works 10.4. Finishing works by hollow concrete bricks **Pedagogical methods**: + Presentation of lecture	G1.1, G1.2, G2.1, G2.2, G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* 10.5 Machines and equipment for finishing works	G1.2
13	***Chapter 10:*** **Finishing works (cont.)** *(4h,0h,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:**	G1.1, G1.2, G2.1, G2.2,

	10.6. Mason work for wall, ceil, and columns 10.7. Mason work for slab leveling. 10.8. Construction methods for waterproofing and moisture **Pedagogical methods**: + Presentation of lecture	G3.2, G4.1, G4.2
	B/ Self-study content: *(8h)* 10.9 Hoist and machines for outdoor activities	G1.2
14	**Student presentation** *(4h,0h,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** - Lecturer will listen student presentation with selected topics; - Topics are practical problems related to construction technologies and methods. **Pedagogical methods**: + Presentation + Group discussion	G1.1, G1.2, G2.2, G3.1, G3.2
	B/ Self-study content: *(8h)* + Study knowledge related to the topic and make presentation contents	G1.1, G1.2, G2.2, G3.1, G3.2
15	**Student presentation** *(4h,0h,8h)*	
	A/ Content and pedagogical methods in class*: (4h)* **Content:** - Lecturer will listen student presentation with selected topics; - Topics are practical problems related to construction technologies and methods. **Pedagogical methods**: + Presentation + Group discussion	G1.1, G1.2, G2.2, G3.1, G3.2
	B/ Self-study content: *(8h)* + Study knowledge related to the topic and make presentation contents	G1.1, G1.2, G2.2, G3.1, G3.2

12. Learning Ethics

Students must do homework by themselves. If plagiarism is found, students will get zero point.

13. Date of first approval: August 1st, 2012

14. Approved by

Dean	Head of Department	Instructor
A/Prof. Dr. Nguyễn Trung Kiên	**MSc. Nguyễn Văn Khoa**	**Dr. Hà Duy Khánh**

15. Date and Up-to-date content

1st time: Date:	Instructor: Head of Department: