

COURSE CONTENT

Academic Year	AY2023-24,	Semester	2
Course Coordinator			
Course Code	CV3016		
Course Title	Construction Technology and Processes		
Pre-requisites	Nil		
No of AUs	3		
Contact Hours	Total : 39 Hours (Lectures: 26 hrs and tutorials: 13 hrs)		
Proposal Date	12 September 2023		

Course Aims

This course is open to Year 4 students. By the end of the course, you shall be equipped with basic understanding of construction technology principles in the various construction methodologies, machineries and technologies for the implementation of construction project.

Intended Learning Outcomes (ILO)

By the end of this course, you (as a student) shall be able to:

1. Apply the professional and moral duties of an engineer to promote and maintain good safety practices.
2. Select of suitable types of machineries for different job operations onsite.
3. Apply the construction procedures for various civil engineering structures.
4. Describe the role of prefabrication in construction.
5. Apply the building appraisal and retrofitting.
6. Apply the automation and robotics in construction.

Course Contents

S/N	Topic	Lecture	Tutorial
1	Construction safety	2	1
2	Construction of High-rise buildings	2	1
3	Precast and Prefabrication in Construction, Buildable Design and Appraisal System (BDAS), Building retrofitting, Appraisal & Repair	6	3
4	Construction of Bridges	2	1
5	Construction Machinery	2	1
6	Automation and Robotic	2	1
7	Tunneling	4	2
8	Dredging and Land Reclamation	3	1.5
9	Basement Construction and Drilled Shaft	3	1.5
	Check for Hours	26	13

Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	* Related Programme LO or Graduate Attributes	Weightage	Team / Individual	Assessment Rubrics
1. Final exam	All (in above)	CVE SLO (2018): a, b, c, f	60%	Individual	-

	ILO section)				
2.Continuous Assessment: Two Quizzes	2,3,4,5,6 (in ILO section)	CVE SLO (2018) : a, b	40%	Individual	-
Total			100%		

***CVE SLO (2018)**

- a) **Engineering Knowledge:** Apply the knowledge of mathematics, natural science, engineering fundamentals, and civil engineering specialisation to the solution of complex civil engineering problems.
- b) **Problem Analysis:** Identify, formulate, research literature, and analyse complex civil engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- c) **Design/development of Solutions:** Design solutions for complex civil engineering problems and design system components or processes with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- d) **Investigation:** Conduct investigations of complex problems using research-based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- e) **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex civil engineering activities with an understanding of the limitations.
- f) **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- g) **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and the need for the sustainable development.
- h) **Ethics:** Apply ethical principles and commit to professional and moral responsibilities in the civil engineering practice.
- i) **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
- j) **Communication:** Communicate effectively on complex civil engineering activities with the engineering community and with society at large, be able to comprehend and write effective reports and design documentation, and make effective presentations.

k) **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to work, as a member and leader in a multidisciplinary team.

l) **Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological evolution.

Formative feedback

Instructors would take questions at end of lectures, and provide on-the-spot clarifications or at review in next lecture. You can also confer with instructors at tutorials, at appointed consultations or via email.

You are assessed on two Quizzes consisting of MCQ or Essay questions; feedbacks are given for the quiz in terms of summary quiz scores and instructors go through (in the lecture) common mistakes made by students.

Learning and Teaching approach

Approach	How does this approach support students in achieving the learning outcomes?
Lectures	Lecture sessions are conducted to a large group in lecture theatre, and all lectures are recorded. Instructors take questions at end of lectures. Instructors may provide on-the-spot clarifications, and during review of taught materials in class. You can confer with instructors via emails or appointed face-to-face consultations. All these enhance the achievement of targeted learning outcomes.
Tutorials	You are given problems related to prevailing lectures, and are to solve them in advance before the weekly face-to-face tutorial sessions conducted in small groups, in smart tutorial rooms. You are encouraged to pose queries to tutor who share solution pointers in an interactive manner. Tutors also translate applied problems to the wider context of industry developments. Such practices serve to enhance the students' learning experience.

Reading and References

References:

- 1 Peurifoy, R.L., Schexnayder, C.J., Shapira, A. and Schmitt, R. "*Construction Planning, Equipment, and Methods*", 8th edition, McGraw-Hill Science (New York), 2010.
 - 2 Nunnally, S.W., "*Construction Methods and Management*", 8th edition, Pearson Prentice Hall, 2010.
 - 3 Harris, F., "*Modern Construction & Ground Engineering Equipment & Methods*", 2nd edition, Longman (London) & Wiley (New York), 1994.
- Supplementary reading materials are provided by instructors.

Course Policies and Student Responsibilities

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct. The university also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of mental health and wellbeing.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognise your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. If you are uncertain of the definitions of any of these terms, you should go to the [Academic Integrity Handbook](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors AY2018/19

Instructors	Office Location	Phone	Email

Planned Weekly Schedule

Week	Contents	Course LO	Activities
Module 1: Construction safety			
1	Construction safety management system and the legislative framework of workplace safety & health.	1	Lecture & Tutorial
Module 2: Construction of High-rise building, Precast & Prefabrication			
2-3	Sub-systems of high-rise building, challenges & technology, construction of reinforced concrete high-rise building, typical construction cases & sequence, construction of high-rise building using steel structure	3	Lecture & Tutorial
	Introduction of Precast and Prefabrication, conventional vs precast construction, load transfer & structural consideration in precast construction, examples and details of connection in precast construction	3	Lecture & Tutorial

Module 3: Buildable design, Appraisal and Building Retrofitting & Repair				
4-5	Introduction of Code of Practice in Buildability & Constructibility, concepts and scoring system, concept of building retrofitting, common materials used in retrofitting	5	Lecture & Tutorial	
	concept of building inspection and appraisal under Singapore context, common methods of structural repair, examples and sequence of repair	5	Lecture & Tutorial	
Module 4: Construction of Bridges				
6	Concept of bridge construction, common types of bridges, structural consideration in bridge construction.	4	Lecture & Tutorial	
	Methods and sequence of bridge construction, examples and areas of application	4	Lecture & Tutorial	
Module 5: Construction Machineries, Automation & robotic				
7-8	Concept of earth work, types of earthwork machines and its applications used on construction site, earth work calculations; general concept of automation and robotic, comparing robotic used in manufacturing and construction, the challenge of using robotic in construction project. Examples of automation and robotic applied on construction site.	2, 6		
Module 6: Construction of Civil engineering structures				
9-10	Soft ground and rock tunnelling, tunnel linings and supports	3	Lecture & Tutorial	
11-12	Various dredgers' operation, selection of dredgers and land reclamation	3	Lecture & Tutorial	
12-13	Bottom-up and top-down basement construction, various retaining walls and support systems for basement excavation	3	Lecture & Tutorial	