Course Syllabus

1. **Course Title:** Engineering Geology
2. **Course Code:** ENGE220118
3. **Credit Units:** 2 (2/0/4) (2 units of theory/ 4 unit of practice/ 4 units of self-study)
   Duration: 15 weeks (2 hours of theory + 0x2 hours of practice, and 4 hours of self-study per week)
4. **Course Instructors**
   1/ MSc. Lê Phương Bình
   2/ MSc. Nguyễn Tổng
5. **Course Requirements**
   Prerequisite courses: None
   Previous courses: None
   Parallel courses: None
6. **Course Description**
   This course provides the fundamental knowledge of mineral geology, structure geology, historical geology, water and water flow in soil. Develop understanding about dynamics geology to analyze the influences of geological activities on construction engineering.
7. **Course Goals**

Goals	Goal Description	Programme ELOs
G1	Applying fundamental knowledge of geology engineering such as mineral, geological structures, historical geology, dynamic geology, physical properties of soil, groundwater and movement of groundwater.	1.2
G2	Be able to describe the geological conditions of the area, analyze effects of groundwater and geological activities to design and construct water pump borehole.	2.1
G3	Be able to communicate and work in the group flexibly and efficiently.	3.1, 3.2

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

CLOs		CLO Description	Programme ELOs
G1	G1.1	Recognize the concepts as well as the fundamental elements of geology, mineral, geological structures, historical geology, dynamical geology and hydrogeology	1.2
	G1.2	Analyze and identify the soil properties	1.2
G2	G2.1	Describe the geological conditions of the area, analyze rule of	2.1

		movement of groundwater, influences of geological activities on construction engineering.	
	G2.2	Design water pump borehole to lowering the groundwater level in the construction scope.	2.1
G3	G3.1	Organize the work in groups: search for documents, discussions.	3.1
	G3.2	Choose appreciable communication skills such as speech, text, images, graphics ... when expressing personal views and writing essay.	3.2

9. Learning Resources

- Textbooks:
  1. Bùi Trường Sơn, "Engineering geology", Published by Ho Chi Minh City University of Technology. (In Vietnamese), 2013
- References:
  1. Đỗ Tạo, "Engineering geology", Published by Ho Chi Minh City University of Technology. (In Vietnamese), 2011.
  2. Nguyễn Uyên, Nguyễn Văn Phương, Nguyễn Định, Nguyễn Xuân Diên, "Engineering geology", Publisher Construction.
  3. Nguyễn Uyên, "Practice of Engineering geology ", Publisher Construction, 2011.
  4. Steven Hencher, Practical Engineering Geology, Spon press, 2012.

10. Student Assessment:

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

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Assignments					**25**
BT#1	**Geological structures:** Determine rock types, folds and faults. Analyze and identify its impacts to construction engineering.	Week 5-6	Individual assignment in class	G1.1 G2.1	8
BT#2	Analysis of water samples and identify corrosive water problem. Movement of groundwater and its laws. Lowering the groundwater level and its impact on adjacent buildings.	Week 7-10	Individual assignment in class & Homework	G1.1 G2.1 G2.2	12
BT#3	Determine soil properties.	Week 13-15	Individual assignment in class	G1.2	5
Projects					**25**
	Group working List of topics: **1.** Research about mineral and rock in Vietnam	Week 2-12	Group-working at home +	G1.1 G2.2 G3.1 G3.2	25

	2. The relationship of minerals to the soil properties. Focus on particular soils such as saline soil, organic mud, swelling soils ... **3.** Analyze the impact of geomorphology to construction engineering (Southern region) **4.** Flowing soil . Analyze influence of this phenomenon to the construction works. **5.** Quicksand . Analyze influence of this phenomenon on the construction works. **6.** Underground erosion: Analyze influence of this phenomenon on building construction. **7.** Landslides: Analyze influence of this phenomenon on the building construction. **8.** The casto phenomenon: Analyze influence of this phenomenon on the building construction.		Presentation		
Final exam					**50**
	Contents includes all CLOs Duration: 90 minutes		Paper assessment	G1.1 G1.2 G2.1 G2.2	

11. Course Content:

Week	Content	CLOs
1	**Chapter 1: Introduction** (1/0/2)	
	A/ Content and pedagogical methods in class: (1) **Content:** 1.1 Overview of concepts 1.2 Research contents and methods of Engineering geology 1.3 Role of course in CET programme. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples + Discussion.	G1.1
	B/ Self-study content: (2) 1.4 Research more about the geological concepts	G1.1
1	**Chapter 2: Minerals and historical geology** (7/0/14)	

	A/ Content and pedagogical methods in class: (1) **Content:** 2.1 Introduction to the Earth **Pedagogical methods:** + Presentation of lecture + Interactive lectures.	G1.1
	B/ Self-study content: (2) Reviews	G1.1
2	**Chapter 2: Minerals and historical geology** (7/0/14) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 2.2 Minerals and rocks. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.1
	B/ Self-study content: (4) Group assignment: Find out and make a list of minerals and their relationship with a rock in Vietnam.	G1.1 G3.1; G3.2
3	**Chapter 2: Minerals and historical geology** (7/0/14) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 2.3 Rocks **Pedagogical methods:** + Presentation of lecture + Interactive lectures.	G1.1; G1.2
	B/ Self-study content: (4) Reviews	G1.1; G1.2
4	**Chapter 2: Minerals and historical geology** (7/0/14) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 2.4 The research methods of the thickness and interruption of sedimentary 2.5 Methods to determine the absolute and relative age of rocks 2.6 Geological time scale. 2.7 Theory of plate tectonics. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.1; G1.2
	B/ Self-study content: (4) Reviews	G1.1; G1.2

5	**Chapter 3: Geological structures** (5/0/10)	
	A/ Content and pedagogical methods in class: (2) **Content:** 3.1 Introduction to the impact of tectonic 3.2 Stratification**.** **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.1 G2.1
	B/ Self-study content: (4) Reviews	G1.1 G2.1
6	**Chapter 3: Geological structures** (5/0/10) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 3.2 Stratification (cont.) 3.3 Folds and faults of the rock. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.1 G2.1
	B/ Self-study content: (4) Two homework assignment	G1.1 G2.1
7	**Chapter 3: Geological structures** (5/0/10) – (cont.)	
	A/ Content and pedagogical methods in class: (1) **Content:** 3.4 Influence of the geological phenomena to construction activity **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.1 G2.1
	B/ Self-study content: (2) Reviews	G1.1 G2.1
7	**Chapter 4: The soil properties** (5/0/10)	
	A/ Content and pedagogical methods in class: (1) **Content:** 4.1 The soil composition. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.2
	B/ Self-study content: (2) Reviews	G1.2 G3.1; G3.2
8	**Chapter 4: The soil properties** (5/0/10) – (cont.)	

	A/ Content and pedagogical methods in class: (2) **Content:** 4.2 The physical properties of soil 4.3 Index properties and classification tests **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples + Exercises in class	G1.2
	B/ Self-study content: (4) Two homework assignment	G1.2
9	**Chapter 4: The soil properties** (5/0/10) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 4.4 Soil classification 4.5 Parameters of soil shear strength **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.2
	B/ Self-study content: (4) Group assignment: Analyzing the results of geological reports of a given building.	G1.2 G3.1; G3.2
10	**Chapter 5: Groundwater and Movement of Groundwater** (8/0/16)	
	A/ Content and pedagogical methods in class: (2) **Content:** 5.1 General 5.2 Type of water in soil 5.3 Properties of groundwater **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples	G1.1 G2.2
	B/ Self-study content: (4) Reviews	G1.1 G2.2
11	**Chapter 5: Groundwater and Movement of Groundwater** (8/0/16) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 5.4 The physical and chemical properties of groundwater 5.5 Evaluation of groundwater quality for construction 5.6 Types of aquifer. **Pedagogical methods:** + Presentation of lecture	G1.1 G2.2

	+ Interactive lectures illustrated with many practical examples	
	B/ Self-study content: (4) Reviews	G1.1 G2.2
12	**Chapter 5: Groundwater and Movement of Groundwater** (8/0/16) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 5.7 Darcy law. 5.8 Movement of groundwater **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples + Exercises in class	G1.1 G2.2
	B/ Self-study content: (4) Reviews	G1.1 G2.2
13	**Chapter 5: Groundwater and Movement of Groundwater** (8/0/16) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 5.9 The law of groundwater movement to the water pump borehole 5.10 The methods of determining the coefficient of permeability of the soil. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples + Exercises in class	G1.1 G2.2
	B/ Self-study content: (4) Two homework assignment: Water sample analysis Two homework assignment: lowering the water level	G1.1 G2.2
14	**Chapter 6: Dynamic geology** (4/0/8)	
	A/ Content and pedagogical methods in class: (2) **Content:** 6.1 The phenomenon of quicksand and underground erosion. 6.2 The Casto phenomenon. **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples + Discussion	G2.1 G3.1; G3.2
	B/ Self-study content: (4) Group assignment: Research about quicksand and underground erosion. Analyzing the influence of this phenomenon on the building construction.	G2.1 G3.1; G3.2

15	**Chapter 6: Dynamic geology** (4/0/8) – (cont.)	
	A/ Content and pedagogical methods in class: (2) **Content:** 6.3 The phenomenon of landslides **Pedagogical methods:** + Presentation of lecture + Interactive lectures illustrated with many practical examples + Discussion	G2.1 G3.1; G3.2
	B/ Self-study content: (4) Reviews	G2.1

12. Learning Ethics:

Home assignments and projects must be done by the students themselves. Plagiarism found in the assessments 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	**Dr. Trần Văn Tiếng**	**MSc. Lê Phương Bình**

15. Date and Up-to-date content:

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