Course Syllabus

1. **Course Title:** Foundation of High-Rise Buildings
2. **Course Code:** FHRB420718
3. **Credit Units:** 02 (2/0/4) (2 units of theory/ 0 units of practice/ 4 units of self-study)
   Duration: 10 weeks (3 hours of theory + 0*3 hours of practice and 6 hours of self-study per week).
4. **Course Instructors**
   1/ Dr. Trần Văn Tiếng
   2/ Dr. Nguyễn Sỹ Hùng
   3/ MSc. Lê Phương Bình
5. **Course requirements**
   Prerequisite courses: Foundation Engineering (FOEN330518)
   Previous courses: None
   Parallel courses: None
6. **Course Description**
   This course provides the advanced knowdlge about foundation for high-rise building. In this course, you will learn how to: (1) select, assess appropriate solutions for foundation of high-rise building; (2) analyze and compute the settlement, capacity and structures of high-rise building foundation; (3) to familiarize students with design and construction technology of foundation for high-rise building.
   This module is closely linked with Soil Mechanics, Foundations, Reinforced Concrete Structures and Reinforced Concrete Building Structures. The module content is also closely associated with the design, test and construction standards for foundation.
7. **Course Goals:**

Goals	Goal Description	Programme ELOs
G1	Ability to analyze geological conditions, construction features, construction conditions, from which evaluate and select suitable foundations	2.1, 2.3
G2	Teamwork and communication skills; ability to read and understand documents of high-rise building foundation in English.	3.1, 3.2, 3.3
G3	Ability to calculate, design and verify different types of foundations for high-rise building.	4.1, 4.3, 4.4

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

CLOs		CLO Description	Programme ELOs
G1	G1.1	Identify reasonable foundation alternatives for high-rise buildings on various types of geological	2.1
	G1.2	Develop appropriate models to analyse, design and verify the	2.3

		foundations of high-rise buildings.	
G2	G2.1	Develop experience of collaborative group-working, discuss and resolve the foundation problems for high-rise buildings.	3.1,3.2
	G2.2	Engage in reading and understanding the foundation's document in English.	3.3
G3	G3.1	Evaluate the impact of high-rise buildings' foundation on social life, economy and environment.	4.1
	G3.2	Chose the appropriate test methods to test the foundation after construction	4.3
	G3.3	Design foundations for high-rise buildings in accordance with the current standards of Vietnam and based on outside practical knowledge.	4.4

9. Learning Resources

- Textbooks

[1] Trần Quang Hộ, Giải pháp Nền Móng cho nhà cao tầng, NXB ĐHQG TP.HCM

- References:

[2] Châu Ngọc Ẩn, Nền Móng, Nhà xuất bản Đại học Quốc gia TP.HCM

[3] Trần Quang Hộ, Công trình trên đất yếu, NXB ĐHQG TP.HCM

[4] Nguyễn Văn Quảng, Nền móng và tầng hầm nhà cao tầng, NXB Xây dựng

[5] Bowels, Foundation analysis and design

[6] Braja M. Das, Principles of foundation Engineering**,** NXB Thomson

10. Student Assessment

- Grading scale: 10
- Assessment plan:

Type	**Content**	**Timeline**	**Assessment method**	**CLOs**	**Rate (%)**
Bài tập					**50**
BT#1	Design the foundation using pretensioned spun concrete piles	Week 2	Individual exercise	G1.1, G1.2, G3.3	10
BT#2	Quiz vocabulary English for high-rise buildings foundation	Week 4	Online quiz	G2.2	5
BT#3	Determine the influence of negative friction on bearing capacity of pile	Week 5	Homework	G1.2, G3.3	10
BT#4	Analyse, chose, the foundation alternatives and design the piles foundation according to geological and building scale	Week 7	Individual exercise	G1.1, G1.2, G3.3	10
BT#5	Analyse the impact of high-rise buildings' foundation project on social life, economy and environment.	Week 7	Individual exercise	G3.1	5
BT#6	- Classification, application scope, methods of construction of the retaining wall, basement diaphragm wall;	Week 9	Individual exercise	G1.2, G3.3	10

	- Analysis the advantages and disadvantages of calculation models for the diaphragm ; - Selection of calculation models for diaphragm wall.				
Báo cáo cuối kỳ					**50**
	Final Project: + Design one foundation project for high-rise building on a specific geological + Question and answer about the design project + Report + presentation	Week 10	Group-working Report + Presentation	All CLOs	

11. Course Content

Week	Content	CLOs
1	**Chapter 1: Shallow foundations** (3/0/12)	
	***A/* Content and pedagogical methods in class:** (3) **Content:** 1.1 Introduction about foundation for high-rise buildings 1.2 Raft foundation + Introduction + Bearing capacity of Raft foundation + Settlement of Raft foundation + Reinforcement design for raft foundation + Exercise **Pedagogical methods**: + Presentation of lecture + Discussion	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
	***B/* Self-study content**: (6) + Design the raft foundation using different calculation methods + Create model to calculate the raft foundation using Safe, Etabs software **References:** + [1]; [2]; [3]; [4]; [5]; [6]	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
2	**Chapter 2: Deep foundations** (18/0/36)	
	***A/* Content and pedagogical methods in class:** (3) **Content** 2.1 Pretensioned Spun Concrete Piles + Introduction + Material capacity + Pile fabrication technology + Construction technology	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3

	+ Breakdown or damage during construction and remedial measures + Exercise **Pedagogical methods**: + Presentation of lecture + Group Discussion	
	***B/* Self-study content**: (6) + Calculate the pile capacity (base on material soil parameters) + Create the numerical calculation models for foundation using pretensioned piles + Design foundation using pretensioned piles for high-rise building project **References:** + [1]; [2]; [3]; [4]; [5]; [6]	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
3	**Chapter 2: Deep foundations** (18/0/36) (Ctn)	
	***A/* Content and pedagogical methods in class:** (3) **Content** 2.2 Japan Pile + Introduction + Pile capacity base on material and soil parameters + Pile fabrication technology + Construction technology + Breakdown or damage during construction and remedial measures + Exercise **Pedagogical methods**: + Presentation of lecture + Group Discussion	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
	***B/* Self-study content**: (6) + Calculate the pile capacity (base on material soil parameters) + Create the numerical calculation models for foundation using Japan piles + Design foundation using Japan piles for high-rise building project **References:** + [1]; [2]; [3]; [4]; [5]; [6]	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
	Chapter 2: Deep foundations (18/0/36) (Ctn)	
	***A/* Content and pedagogical methods in class:** (3) **Content** 2.3 Influence of earthquake on pile capacity + Influence of earthquake on foundations of high-rise building + Pile capacity in case of earthquake 2.4 Bored piles + Introduction + Structure of pile cap + Structure of circular bored pile and Barrette	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3

4	+ Construction technology + Pile quality verification + Exercise **Pedagogical methods**: + Presentation of lecture + Group Discussion	
	***B/* Self-study content**: (6) + Calculate the capacity of circular bored pile and barette + Create the numerical calculation models for foundation using bored piles + Design foundation using bored piles for high-rise building project **References:** + [1]; [2]; [3]; [4]; [5]; [6]	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
5	**Chapter 2: Deep foundations** (18/0/36) (Ctn)	
	***A/* Content and pedagogical methods in class:** (3) **Content** 2.5 Negative friction phenomena + Introduction + Causes of negative friction + Influence of negative friction on pile capacity and foundation + Measures to reduce the effects of negative friction + Calculate the negative friction **Pedagogical methods**: + Presentation of lecture + Group Discussion	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
	***B/* Self-study content**: (6) + Research the damage of buildings caused by nagative friction. + Calculate the pile capacity including nagative friction + Evaluate the ability to occur the nagative friction on pile for a specific geological. **References:** + [1]; [2]; [3]; [4]; [5]; [6]	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
6	**Chapter 2: Deep foundations** (18/0/36) (Ctn)	
	***A/* Content and pedagogical methods in class: (3)** **Content** 2.6 Piled trip and raft foundations + Introduction + Design the piled trip foundations under wall and columns + Calculation methods for piled raft foundations + Capacity and settlement of piled raft foundations + Exercise **Pedagogical methods**:	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3

	+ Presentation of lecture + Group Discussion	
	***B/* Self-study content: (6)** + Avaluate, anlyse and chose the calculation models for piled trip and raft foundations + Use finite element method to modeling the piled trip and raft foundations **References:** + [1]; [2]; [3]; [4]; [5]; [6]	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
7	**Chapter 2: Deep foundations** (18/0/36) (Ctn)	
	***A/* Content and pedagogical methods in class: (3)** **Content** 2.7 Retaining walls and diaphragm walls + Introduction + Classification + Calculation and design methods + Contruction technology + Exercise **Pedagogical methods**: + Presentation of lecture + Group Discussion	G1.1, G1.2,G2.1,G2.2 G3.1, G3.3
	***B/* Self-study content: (6)** + Use finite element method to modeling the retaining wall and diaphragm wall + Design the diaphragm wall for a high-rise building project + Research the construction technology **References:** **+ [1]; [2]; [3]; [4]; [5]; [6]**	G1.1, G1.2,G2.1,G2.2 G3.1
8	**Chapter 3: Standard test method in situ for piles (6/0/12)**	
	***A/* Content and pedagogical methods in class: (3)** **Content** 3.1 Test method in situ for piles under axial compressive load + Introduction + Vietnamese standard + Process and method + Calculation the pile capacity from the test result + Evaluation the test result **Pedagogical methods**: + Presentation of lecture + Group Discussion	G1.1, G1.2,G2.1,G2.2 G3.2

	***B/* Self-study content: (6)** + Read and analyse the test brief + Calculate the pile capacity from the test result + Research on the different test methods **References:** **+ [1]; [2]; [3]; [4]; [5]; [6]**	G1.1, G1.2,G2.1,G2.2 G3.2
9	**Chapter 3: Standard test method in situ for piles (6/0/12) (ctn)**	
	***A/* Content and pedagogical methods in class: (3)** **Content** 3.2 Pile dynamic load test + Introduction + The principle of method + Calculation models used in the tets + Calculation of pile capacity from the test result + Evaluation the test result **Pedagogical methods**: + Presentation of lecture + Group Discussion	G1.1, G1.2,G2.1,G2.2 G3.2
	***B/* Self-study content: (6)** + Read and analyse the test brief + Calculate the pile capacity from the test result + Research on the different test methods + Compare the result of axial compressive load test with the one of dynamic load test **References:** **+ [1]; [2]; [3]; [4]; [5]; [6]**	G1.1, G1.2,G2.1,G2.2 G3.2
10	**Chapter 4: Group activies (3/0/6)**	
	***A/* Content and pedagogical methods in class: (3)** **Content** + Groups present their final projects; **Pedagogical methods**: + Groups present design ideas + Evaluate and award	G1.1, G1.2,G2.1,G2.2 G3.1, G3.2
	***B/* Self-study content: (6)** + Review the course **References:** **+ [1]; [2]; [3]; [4]; [5]; [6]**	G1.1, G1.2,G2.1,G2.2 G3.1, G3.2

12. Learning Ethics:

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

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

14. Approval by:

Dean	Head of Department	Instructor
A/Prof. Dr. Nguyễn Trung Kiên	**Dr. Trần Văn Tiếng**	**Dr. Trần Văn Tiếng**

15. Date and Up-to-date content

1st time: Date:	Instructor Head of department