Course Syllabus

1. **Course Title:** Reinforced Concrete Building Structures
2. **Course Code:** RCBS320817
3. **Credit Units:** 2 (2/0/4) (2 units of theory/ 0 unit of practice/ 4 units of self-study)
   Duration: 15 weeks (2 hours of theory+0 hour of practice and 4 hours of self-study per week)
4. **Course Instructors:**
   1/ Dr. Phạm Đức Thiện
   2/ MSc. Nguyễn Văn Hậu
   3/ Dr. Lê Anh Thắng
   4/ MSc. Đoàn Ngọc Tịnh Nghiêm
5. **Course Requirements**
   Prerequisite courses: None
   Previous courses: Structural Mechanics (STME240517), Reinforced Concrete Structures (RCST240617)
   Parallel courses: None
6. **Course Description**
   This is an extended and advanced module in the series of reinforced concrete structures courses, which 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.

7. **Course Goals**

Goals	Goal Description	Programme ELOs
G1	Professional knowledge related to design of reinforced concrete structural components, such as: floor, frame, staircase, watertank and retaining wall	1.3
G2	Ability to analyse, explain and solve technical problems in design of reinforced concrete structural components	2.1
G3	Team-working skills and reading documents in English	3.1, 3.3
G4	Ability to design reinforced concrete structures	4.4

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

CLOs		CLO Description	Programme ELOs
G1	**G1.1**	Demonstrate the principles of calculation and design of reinforced concrete structural components	1.3

G2	**G2.1**	Ability to establish the calculation schema, the computation models of reinforced concrete members	2.1
	G2.2	Ability to calculate and design the reinforced concrete structural components	2.1
G3	**G3.1**	Organize and engage technical collaboration with team members in solving technical issues related to reinforced concrete building structures	3.1
	G3.2	Be able to reading references in English	3.3
G4	**G4.1**	Ability to apply flexible calculation processes, and propose optimum design of reinforced concrete building structures	4.4
	G4.2	Illustrate all or part of the design for construction project	4.4

9. Learning Resources

- Textbooks:

1. Võ Bá Tầm, Reinforced concrete structures – Volume 2 and 3, Vietnam National University – HCMC Publishing House, 2012 (in Vietnamese)

- References:

1. Jack C. McCormac, Russell H. Brown, Design of Reinforced Concrete, 9th Edition, 2014
2. James K. Wight, James G. MacGregor, Reinforced Concrete - Mechanics and Design, 6th Edition, 2012
3. M. Nadim Hassoun, Akthem Al-Manaseer, Structural Concrete - Theory and Design, 5th Edition, 2012
4. Arthur Nilson, David Darwin, Charles Dolan, Design of Concrete Structures, 14th Edition, 2010
5. Edward G Nawy, Reinforced concrete - A fundamental approach, 6th Edition, 2009
6. V. Baikov, E. Sigalov, Reinforced concrete structures_Volume 2, 1981
7. Trịnh Kim Đạm, Lê Bá Huế, Reinforced Concrete Frames, Science and Technics Publishing House, 2012 (in Vietnamese)
8. Nguyễn Đình Cống, Reinforced concrete structures – Volume 2 and 3, Science and Technics Publishing House, 2012 (in Vietnamese)
9. Ministry of Construction, TCVN 5574-2012, Reinforced Concrete Structure – Design Code, Construction Publishing House, 2012 (in Vietnamese)
10. S.S. Ray, Reinforced concrete – analysis and design, Blackwell Science Ltd 1995.

10. Student Assessment

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

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Diligence					**10**
Exam					**20**

BT#1	Calculate and design: - RC floors - RC staircases	Week 7	+ Individual paper assessment + Paper document available + Duration: 50 minutes	G1.1, G2.1, G2.2, G4.1, G4.2	20
Exam or Presentation					**20**
BT#2	Calculate and design: - RC watertanks - RC retaining walls	Week 12	+ Individual paper assessment + Paper document available + Duration: 50 minutes	G1.1, G2.1, G2.2, G4.1, G4.2	20
TL#1	Available subjects: - Joist slabs - Two-ways slabs - Waffle slabs and Hollow tile slabs - Flat slabs and Precast-panel slabs - 2D frames - 3D frames - Half-turn stairs - Half-turn stairs with stringers - Rectangular water tanks - Cylindrical water tanks - Cantilever retaining walls - Counterfort retaining walls	Week 2-15	+ Team-working + Presentation	G1.1, G2.1, G2.2, G3.1, G3.2, G4.1, G4.2	20
Final exam					**50**
	- Calculate and design reinforced concrete building structural components		+ Individual paper assessment + Paper document available + Duration: 90 minutes	G1.1, G2.1, G2.2, G4.1, G4.2	

11. Course Content

Week	Content	CLOs
1	***Chapter 1: Slabs***	

	***A/ Content and pedagogical methods in class**: (2)* **Content:** 1.1 Introduction 1.2 Classification **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study construction codes	G1.1, G2.1, G2.2, G4.1, G4.2
2	***Chapter 1: Slabs** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 1.3 One-way slabs **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study the calculations according to foreign construction codes	G1.1, G2.1, G2.2, G4.1, G4.2
3	***Chapter 1: Slabs** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 1.4 Two-way slabs 1.5 Two-way slabs with floor beams **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study the calculations according to foreign construction codes	G1.1, G2.1, G2.2, G3.2, G4.1, G4.2
4	***Chapter 1: Slabs** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 1.6 Waffle slabs (Grid slabs) 1.7 Hollow tile slabs **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study the calculations according to foreign construction codes	G1.1, G2.1, G2.2, G3.2, G4.1, G4.2
5	***Chapter 1: Slabs** (cont.)*	

	***A/ Content and pedagogical methods in class**: (2)* **Content:** 1.8 Flat slabs 1.9 Precast-panel slabs **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G3.1, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study the calculations according to foreign construction codes	G1.1, G2.1, G2.2, G4.1, G4.2
6	***Chapter 2: Frames***	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 2.1 Introduction 2.2 Classification 2.3 Calculation schema **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study and select the calculation schema for some real building frames	G1.1, G2.1, G2.2, G4.1, G4.2
7	***Chapter 2: Frames** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 2.4 Internal efforts in frame 2.5 Reinforcing steel design 2.6 Expansion, settlement and seismic joints **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Model and compute some frames by existent simulation softwares	G1.1, G2.1, G2.2, G4.1, G4.2
8	***Chapter 3: Staircases***	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 3.1 Introduction 3.2 Classification 3.3 Load cases 3.4 Design of half-turn stairs **Pedagogical methods**: + Presentation of lecture	G1.1, G2.1, G2.2, G4.1, G4.2

	+ Group discussion or Group presentation	
	***B/* Self-study content**: *(4)* Study the calculation documents related to the design of staircases	G1.1, G2.1, G2.2, G4.1, G4.2
9	***Chapter 3: Staircases** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 4.5 Design of half-turn stairs with stringers 4.6 Design of cantilever stairs **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Calculate and design half-turn stairs	G1.1, G2.1, G2.2, G4.1, G4.2
10	***Chapter 3: Staircases** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 4.7 Spiral stairs 4.8 Circular stairs **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G3.1, G4.1, G4.2
	***B/* Self-study content**: *(4)* Calculate and design half-turn or spiral or circular stairs	G1.1, G2.1, G2.2, G4.1, G4.2
11	***Chapter 4: Water tanks***	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 5.1 Introduction 5.2 Classification 5.3 Load cases **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study the applications of water tanks and water tanks making materials	G1.1, G2.1, G2.2, G4.1, G4.2
12	***Chapter 4: Water tanks** (cont.)*	

	***A/ Content and pedagogical methods in class**: (2)* **Content:** 5.4 Rectangular water tanks **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(2)* Calculate and design rectangular water tanks	G1.1, G2.1, G2.2, G4.1, G4.2
13	***Chapter 4: Water tanks** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 5.5 Cylindrical water tanks **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G3.1, G4.1, G4.2
	***B/* Self-study content**: *(2)* Calculate and design cylindrical water tanks	G1.1, G2.1, G2.2, G4.1, G4.2
14	***Chapter 5: Retaining walls***	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 6.1 Introduction 6.2 Load cases 6.3 Soil pressure **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Study some real retaining walls	G1.1, G2.1, G2.2, G4.1, G4.2
15	***Chapter 5: Retaining walls** (cont.)*	
	***A/ Content and pedagogical methods in class**: (2)* **Content:** 6.4 Cantilever retaining walls 6.5 Counterfort retaining walls **Pedagogical methods**: + Presentation of lecture + Group discussion or Group presentation	G1.1, G2.1, G2.2, G4.1, G4.2
	***B/* Self-study content**: *(4)* Calculate and design cantilever or counterfort retaining walls	G1.1, G2.1, G2.2, G4.1, G4.2

12. Learning Ethics:

Home assignments and presentations 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
Assoc. Prof. Dr. Nguyễn Trung Kiên	**MSc. Nguyễn Văn Hậu**	**Dr. Phạm Đức Thiện**

15. Date and Up-to-date content

	Instructor: Head of Department: