Department of Architectural Engineering

College of Engineering

University of Cihan- Sulaimaniya

Subject: Concrete Design II

Course Book – Year 4

Lecturer's name: Diyari Burhan Hussein

Academic Year: 2023/2024

Course Book

1. Course name	**Concrete Design**
2. Lecturer in charge	**Diyari Burhan Hussein**
3. Department/ College	**Architecture/Engineering**
4. Time (in hours) per week	**Theory: 4** **Practical: 0**
5. Office hours	**Saturday (8:30 am – 12:30 pm)**
6. Course code	
7. Teacher's academic profile	**Earned the bachelors degree in civil engineering at university of Sulaimani, Sulaymaneyh/Iraq, and the master's degree in structural engineering at Budapest University of Technoly and Economicsthat, Budapest/Hungary, and individual thesis that was 'Comparative analysis of strengthening methods for RC monolithic columns'.**
8. Keywords	Reinforced Concrete, beam, column, slab, reinforcement, strength, design

9. Course overview:

Designers and engineers are required to have a full-depth understanding of the behavior of concrete as the most popular construction material.

In this course, architectural engineering students are motivated to be familiar with properties of concrete and characteristics of reinforced concrete members under the action of various kinds of loadings.

Any structural member, when loaded, internal forces such as axial forces, shear forces, flexural torsional moments will emerge, which lead to the arise of internal stresses.

It is expected from engineers to design the buildings and the structural components to withstand these stresses safely based on fundamental formulae and the design equations provided by the design codes. The course has been divided into many chapters focusing on the analysis and design of structural members including and not limited to: beams, slabs, and columns.

10. Course objective:

In this course, the student is learning how to analyze and design structural members including but not limited to slabs, beams and columns after they have studied how to draw the shear and bending moment diagrams in the previous years.

Structural members cannot be designed without knowing the internal forces, so it is expected from the students to have a strong background in the strength of materials and structural analysis.

They are learning how to imagine the load path in buildings, and how to identify the tension and compression zones in members. Knowing the tension zones are one of the important topics as these zones are required to be reinforced due to the weakness of concrete in resisting tensile stresses.

The major theme is the relationship between concrete design and architectural design.

11. Student's obligation

Students should be on the commitment with lectures, do their home works and prepare themselves for exams and quizzes.

12. Forms of teaching

- ✓ **Data show**
- ✓ **Whiteboard**

Students are provided with handouts for each chapter to be available with them during the lectures. The handout includes explanations, examples, problems, and homework.

Some examples have been left unsolved provided with blank spaces to be filled during lectures.

Using data show may be limited, however, it is still be used for explaining complex topics using graphs, animations, and video clips.

13. Assessment scheme

Midterm Examination	**30%**
Paper, Quiz, Project	**10%**
Final theory exam	**60%**

14. Student learning outcome:

After successful completion of the course, students are expected to have

- An ability to distribute dead and live loads from slabs to the supporting beams
- How to distribute loads and moments between beams and columns to maintain equilibrium
- an ability to design RC beams (singly, doubly reinforced and
- T-sections) for flexure, shear, and torsion.
- an ability to design RC columns (short and long)
- an ability to design slabs (one-way and two-way)

an ability to design development length, lap splices, and other detailing requirements

15. Course Reading List and References:

1. [1] J. K. Wight and J. G. MacGregore, Reinforced Concrete, Mechanics and Design, 6th ed. 2012.
2. [2] C. V. R. Murty, R. Goswami, A. R. Vijayanarayanan, and V. V. Mehta, Some Concepts in Earthquake Behavior of Buildings. .
3. [3] A. O. Aghayer and G. F. Limrunner, Reinforced Concrete Design, 8th ed., vol. 1. 2015.
4. [4] C. D. Buckner, Concrete Design, Second Edition. .
5. [5] D. N. Y. Abboushi, Reinforced Concrete, vol. 1–2. 2014.
6. [6] R. H. B. Jack C. McCormac, Design of Reinforced Concrete. 2014.
7. [7] A. H. Nilson, D. Darwin, and C. W. Dolan, Design of Concrete Structures, 14th ed. 2010.
8. [8] ACI Committee 318, Aci 318M-14. 2014.
9. [9] M. N. Hassoun and A. Al-Manaseer, Structural Concrete Theory and Design, 6th ed. .
10. [10] Subramanian, Design of Reinforced Concrete Structures. 2013.
11. [11] A. M. Ibrahim, M. S. Mahmood, and Q. W. Ahmed, Design of Reinforced Concrete Structures, First. Baghdad, 2011.

16. The Topics:

Lecture No	Topic
1	Introduction to Concrete Structures
2	Singly Reinforced Beams
3	Doubly Reinforced Beams
4	T-Beams and Flanges Sections
5	T-Beams and Flanges Sections
6	Design of Shear Reinforcement

7	Continuous Beams and One-way Sabs
8	Continuous Beams and One-way Sabs
9	Design of Two-way Slabs
10	Design of RC Short Columns Axially Loaded Columns
11	Design of RC Short Columns Uniaxially Loaded Columns
12	Design of RC Short Columns Biaxially Loaded Columns
13	Design of Long Columns
14	Design for Torsional Resistance
15	Development, anchorage and Splicing of Reinforcement
16	Serviceability and Design of Staircases
Final Examination	

17. Peer review

Main Lecturer incharged
Diyari Burhan Hussein

Head of The Department
Mrs. Tara Azad Rauof