College: Engineering Department: Civil Engineering
Course Title: Reinforced Concrete II

Course No: 0901503
Credit Hours: 3 C.H.

Semester: 2021/2020

About The Course

Course Title: Reinforced Concrete II Class:1
Course No: 0901503
Credit Hours: 3 C.H.

Lecture Room:502

Obligatory/ Optional: Obligatory
1. Text Book: Nilson, Arthur, H., Design of Reinforced Concrete, 14th edition, John Wiley & Sons (2010)
2. Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary, ACI Committee (318-14)

The Instructor

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Course Description

This course is intended to complete the fundamentals of reinforced concrete design. The course involves the study of design of continuous reinforced concrete beams , two-way solid slabs, one-way and two-way ribbed slabs, flat slabs. It also covers design for torsion and columns sections subjected to normal force and bending moments. The course involves also the design of braced or unbraced slender columns, and Design of reinforced concrete stairs.

Course Objectives

Students will build on their knowledge of basic reinforced concrete design and learn to:

• model and predict the response of reinforced concrete members under axial, flexure and shear loads, and

• design typical reinforced concrete components such as continuous beams, slabs, slender columns and reinforced concrete stairs.

Learning Outcome

Upon completion of the course, students will be able to:

1- Identify the fundamentals of design of torsion, punching shear, and sections subjected to bending moments and normal forces.

2- Classify between different types of concrete elements based on internal applied force or moment.

3- Design of stairs, flat slabs, hollow block slabs, and long columns.

4- Prepare detailed design and workshop drawings to be execute in the field.

Course Outline and Time schedule

Week	Course Outline
First week	Introduction: Text Book, References, and Outlines, Review of structures analysis and reinforced concrete 1
	Analysis and Design of continuous beam for flexure using ACI and moment coefficients method
2nd week	Analysis and design of reinforced concrete continuous solid one-way slabs.
	Design examples for continuous solid one-way slabs.
3rd week	Analysis and design of Reinforced Concrete solid two-way slabs.

	Design examples for solid two-way slabs.
4th week	Analysis and design of reinforced concrete one-way ribbed slabs
	Design examples for solid concrete one-way ribbed slabs.
5th week	Analysis and design of reinforced concrete two-way ribbed slabs
	Design examples for solid concrete two -way ribbed slabs.
6th week	First term exam
	Analysis and design of reinforced concrete Flat slabs.
7th week	Analysis and design for torsion moment and shear force
	Design of reinforced concrete columns at the ultimate limit state including determination strength under uniaxial bending.
8th week	Design examples for columns under uniaxial bending.
	Design of reinforced concrete columns at the ultimate limit state including determination strength under biaxial bending.
9th week	Design examples for columns under biaxial bending.
	Analysis and design of slab type stairs
10th week	Design examples for stairs.
	Analysis and design of unbraced slender columns.

11th week	Design examples for unbraced slender columns.
	Analysis and design of braced slender columns.
12th week	Second term exam
	Analysis and design for torsion moment and shear force
13th week	Serviceability requirements, cracking control.
	short and long term deflection analysis for simple and continuous beams
14th week	shrinkage and creep deflection
	Analysis and design for Torsion, Torsion Plus Shear
15thweek	Final exam

Presentation methods and techniques

Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

1- Lecturing with active participations.

Involve the civil engineering students in asking some questions related to the target topic of the course.

2- Problem solving.

Encourage the students to solve the given assignments and submit them at the definite time,

3- Cooperative learning.

By enhancing the students studying in groups .

4- Discussion.

To discuss the results and the answers of the target problems.

5- Learning by activities.

To encourage the students to some group activity.

6- Connecting students with different sources of information.

Sources of information and Instructional Aids

- Computer software … power point
- Using weight board.
- Library sources

Assessment Strategy and its tools

The assigned syllabus is assessed and evaluated
Through: feedback and the skills that are acquired by the students
The tools:

1- Formal (stage) evaluation
   a) Class Participation 10%
   b) Ist Exam 20%
   c) 2nd Exam 20%
   d) Group activity and Quizzes 10%

Tool & Evaluation

Tests and quizzes are permanent tools & assessment, in addition to the activity file which contains curricular and the co-curricular activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

Test	Date	Grade
First Exam		20
2nd Exam		20
Activities & Participation And Quizzes	Students should be notified about their marks	20
Final Exam		40

Activities and Instructional Assignment

1- Practical assignments to achieve the syllabus objectives.

2- Group Activity.

Regulations to maintain the teaching-Learning Process in the Lecture:

1- Regular attendance.

2- Respect of commencement and ending of the lecture time.

3- Positive relationship between student and teacher.

4- Commitment to present assignments on time.

5- High commitment during the lecture to avoid any kind of disturbance and distortion.

6- High seuse of trust and sincerity when referring to any piece of information and to mention the source.

7- The student who absents himself should submit an accepted excuse.

8- University relevant regulations should be applied in case the student's behavior is not accepted.

9- Allowed Absence percentages is (20%).

References :

1. Nawy, E.G., “Reinforced Concrete - A Fundamental Approach", 5th Edition, Prentice Hall.
2. Wang, Chu-Kia and Salmon C. G., “Reinforced Concrete Design”, 5th Edition, Harper Collins.
3. McCormac, J. C. “Design of Reinforced Concrete”, 4th Edition, Addison – Wesly.
4. Ferguson, P. M., "Reinforced Concrete Fundamentals," John Wiley & Sons..
5. Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary, ACI Committee (318-14), Farmington Hills, MI, 2014, 530 pp.
6. Teaching notes

Syllabus Classification

Objectives	***Learning outcome***	***Assessment tools***
Be able to perform analysis and design of reinforced concrete members	After successfully completing this course, the students should be able to: 1. Understand the internal forces and moment envelopes of continuous beams considering placement of loads using ACI moment coefficients, classical and computer methods. 2. Analyze and design all types of concrete slabs by the direct design method.. 3. Carry out the complete design of flexural members subjected to flexural moment, shear force, and torsion. 4. Design columns subjected to axial load and bending, braced and un-braced slender columns due to gravity and wind loads. 5. Design of reinforced concrete frames. 6. Investigate control of flexural cracks based on crack width, factor and bar spacing applying the requirements of ACI code. 7. Design all types of reinforced concrete stair..	1-Correct answers to 1 or 2of design problems corresponding to each outcome. 2- Correct answers to midterm and final examinations
Be able to identify and interpret the appropriate relevant industry design codes	1.Students will be able to identify and apply the applicable industry design codes relevant to the design of reinforced concrete members. 2. Student will be familiar with professional and ethical issues and the importance of lifelong learning in structural engineering.	1- Correct answers to 1 or 2of design problems corresponding to each outcome with emphasis placed on identification of applicable industry design code. 2- Correct answers to midterm and final examinations. Questions include

		design/analysis problems that require the selection of the appropriate industry design code.
To become familiar with professional and contemporary issues in the design and fabrication of reinforced concrete members	1. Students will become familiar with the reinforced concrete fabrication and construction process. 2. Students will be able to perform an industry relevant design project in a team setting	Students will be required to perform as a group, each with individual assignments, on an industry relevant design project