Course Number and Name	CE317-3 Reinforced Concrete Design 1
Credits hours	3 Credits hours
Contact hours	4 Contact hours; 2 for lecture, 2 for tutorial and -0 for practical
Instructor/s name/s	Dr. Hesham Sakr Sherbeni Abou El-Mal
Textbook	*Hasson, M. N., "Structural Concrete- Theory and Design", 3rd Edition, ADDISON Wesley*
Other supplemental materials	*1- Saudi Building Code, Concrete Structures Requirements, SBC 304* *2- Saudi Building Code (Concrete Structures commentary, SBC 304C* *3- Saudi Building Code, Loads and Forces Requirements, SBC 301.* 4-Digital library of jazan university http://deanships.jazanu.edu.sa/lib/Pages/Default.aspx

Specific course information

a. Catalog description	**Assessment and Structural Design of Reinforced Concrete Elements** *Evaluate the behavior of reinforced concrete elements through Identifying the fundamentals of Ultimate limit state method and applying to design of beams ,solid slabs subjected to bending moments , and design of short columns subjected to pure compressive force*
b. Prerequisite	CE-215-3 Structural Analysis (1) CE-214-3 Materials for Construction
c. Required / Elective	Required

Specific goals for the course

Course Learning Outcomes (CLOs)	**Upon successful completion of the course a student should have the ability to:** **CLO#1- Evaluate** *the behavior of reinforced concrete and its mechanical properties as compressive strength, tensile strength, shear force and bending moment capacities, and bond between concrete and steel* **CLO#2- Identify** *the fundamentals of Ultimate limit state method and approach the design of beams and solid slabs subjected to bending moments in addition to design of short columns subjected to pure compressive force.* **CLO#3- Differentiate** *between different types of concrete elements based on shape,*

	alignment, and internal applied force or moment. **CLO#4- *Design*** *of solid slabs, Beams, and short columns.* **CLO#5**- *Prepare detailed design and workshop drawings **Individually and in work groups.*** **CLO#6- *Create*** *small programs or spread sheets for analysis and design of concrete sections and elements Individually and in work groups.*
Student outcomes that addressed by the course	The following student outcomes are addressed by the course: **SO#1** An ability to identify, formulate, and <u>**solve**</u> complex engineering problems by applying principles of engineering, science, and mathematics. **SO#2** An ability to apply engineering <u>**design**</u> to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. **SO#3**An ability to <u>**communicate**</u> effectively with a range of audiences. **SO#4**An ability to recognize <u>**ethical**</u> and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. **SO#5**An ability to function effectively on a <u>**team**</u> whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Topics to be covered	
Topic	**Number of weeks**
Introduction, advantages, and disadvantages of reinforced concrete as a construction material	1
Actual and adopted stress strain curves of concrete and reinforcing steel, Uncracked, working, and ultimate stages of loading, and Definition of different types of loading and their combination	1
Main assumptions for flexural design using strength design method, Strength	1

reduction factors for flexure, shear and torsion, and axial loads	
Analysis of singly reinforced, doubly reinforced, and flanged sections subjected to flexure using first principals. Analysis of singly reinforced, doubly reinforced, and flanged sections subjected to flexure using first principals	2
Design of singly reinforced, doubly reinforced, and flanged sections subjected to flexure using first principals and design aids. Design of singly reinforced, doubly reinforced, and flanged sections subjected to flexure using first principals and design aids	2
Critical sections for shear, code requirements for shear, and design for reinforced concrete sections subjected to shear	1
Bond between concrete and steel, development length, anchorage length, and splices of steel reinforcement, and detailing of simple, continuous and cantilever beams	2
Loads on beams from its own weight, walls, and slabs. Loads on beams from its own weight, walls, and slabs	2
Complete design of floor contains one-way and two-way solid slabs	1
Calculation of loads on columns, Design of tied and spiral short columns	1

Schedule of Assessment Tasks for Students During the Semester

Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week due	Proportion of Total Assessment
Homework	weekly	10
Quizzes	Bi-weekly	10
Midterm-exam I	7	15
Midterm-exam II	13	15
Term Project	-	20
Final Exam	16	30

CLO-SO Map							
	S01	**S02**	**S03**	**S04**	**S05**	**S06**	**S07**
CLO 1	√						
CLO 2	√	√					
CLO 3	√	√					
CLO 4		√		√	√		
CLO 5		√	√	√	√		
CLO 6							
CLO 7							
CLO 8							
CLO 9							