Date:	Examination No.:	Version:1/2/2023	Start: 12/2/2023

Module Name - Code	Reinforced Concrete Elements
Module Language:	English
Responsible:	Assistant Prof.: Dr. Ahmed Heidayet Mohammad
Lecture (s):	Assistant Prof.: Dr. Ahmed Heidayet Mohammad And Dr. Zrar Sedeeq O.
College:	College of Engineering – Salahaddin University
Duration:	15 week – 1 semester
Course outcomes:	At the end of the semester, the students must be understanding the basic theory of structural mechanics of concrete. The analysis and design methods of reinforced concrete elements can be familiar for the structure subjected to gravity or lateral loads. In addition, they can grasp practical requirements of design code specification for each element separately. Also, the application necessary to prepare students for more advance study for engineering practice are emphasized throughout.

Course Content:

Lecture	Weeks	Topics
Introduction	1	Introduction on Concrete and Steel Materials,
Beam-Flexural	2	Flexural Analysis of Beams, Cracking and Cracking Section (Elastic Stress) Beam, Ultimate Flexural Moment (Without specifications)
	2 and 3	Design and analysis of rectangular Beam
	3	Analysis and Design of T-Beam, Double Reinforced Beam (Compression Steel)
Columns	4	Axial loaded Columns
	4 and 5	Design of Short Columns Subjected to Axial and Bending
	6	Design of Biaxial Loaded Columns.
Shear	7	Shear and Diagonal Tension
Serviceability	8	Calculate and Control of Deflection and Calculate and Control of Flexural Cracks
Development Length	9 and 10	Bond, Development Length and Splices
ACI Coefficient Method	11	Approximate Methods-ACI Coefficient Method
Torsion	12 and 13	Design of Torsion Reinforcement
Slab	14	One way slab, Stair and Two-way Slab
Final Exam	15	

Literature:	1. M. Nadim Hassoun and Akthem Al-Manaseer "Structural Concrete Theory and Design" 7 Edition, Wily, 2020. 2. ACI 318M-19 `` Building Code Requirements For Structural Concrete( ACI 318M-19) and Commentary (ACI 318 RM-19)``American Concrete Institute Farmington Hills. 2019. Recommended Text: 1. J.C. McCormac and R.H. Brown ``Design of Reinforced Concrete`` John Wiley and Sons, Inc. 9 edition, 2014. 2. A.H. Nilson, D. Darwin and C.W. Dolan`` Design of Concrete Structures`` McGraw Hill companies , 16th edition ,2020. 3. J.G. Macgregor and J.K. Wight`` Reinforced Concrete Mechanics and Design`` Pearson Prentice Hall, 4th Edition, 2005. 4. P.M. Ferguson and H.J. Cowan `` Reinforced Concrete Fundamental `` John Wiley and Sons ,1981.
Type of Teaching:	2hrs+2hrs, per week Different tools and techniques will be used to attain goals and objectives. The following forms are used: Power point for main parts (head titles, definitions, objectives, cases, design tables, charts and mathematical equations, also examples …..) each subject. White board will be used for presenting and solving some examples. Students will be called to submit assignments defined in advance. Students have to participate in classroom discussions. The attendance (as much as possible) will take in consideration for students. Visiting to the field site of projects will be done at least one per year which may be considered for student evaluations.
Pre-requisites:	Mechanics of Materials and Concrete Technology
Frequency:	Yearly in both semester
Requirements for credit points:	Student's obligation **Attendance**: Students are required to attended lectures. The course consists of primarily of theory lectures and applied lecture. Regular attendance is necessary to maintain pace with the lectures. If the student absence in a lecture, he/she can present in another lecture just twice for each course (just for the same subject). The **late attendance** to the class is allowed twice (not more than 15 min.) at the third time recorded absence and subsequent in this way. Maximum allowable late attendance not more than six times. **Maximum absence 10%** per course is allowed. **Mobile** is not allowed to be use, except for taken photo of board after permission of lecturer. If noticed, at firstly returned after lecture, secondly detained for one week, thirdly until end of course.

	Home Works: Homework will be assigned according to the instructions given. The H.W. Will be collected at time scheduled. Late H.W. will minimize the marks. **Final Exam**: Each student must take at least 20M from 40M (final efforts) to allow to do final exam (from 60). Short **Quizzes** may be given periodically. Bring your calculator to every class. Calculator may not be shed for quizzes or exams. -The quizzes done during the 15 to 20 minutes of the lecture period or at time fixed by instructors. Use pencil for quizzes and exams. Permission: one quizzes are permitted to be not done.
Credit point:	5
Grade Distribution:	The Grade is generated from the examination result(s) with the following 20% Activity (Quiz, assignment and site visit, …..) 20% mid-term exam 60% Final exam
Work load:	The workload is 150h. It is the result of 60h attendance and 90h self-studies.