

Academic Year: 2023-2024	Semester: Fall	Starting Date: 15-10-2023
Course Name	Advanced Reinforced Concrete Design	
Module Language	English	
Instructor	Prof. Dr. Omar Qarani	
Teaching Assistance(s)	None	
College/University	College of Engineering – Salahaddin University-Erbil	
Department	Civil	
Semester Duration	15 weeks	
Course Overview	<p>The design of a structure may be regarded as the process of selecting the proper materials and proportioning the different elements of the structure according to state-of-the-art engineering science and technology. In order to fulfill its purpose, the structure must meet the conditions of safety, serviceability, economy, and functionality. This can be achieved using design approach-based strain limits in concrete and steel reinforcement.</p> <p>Emphasis is placed on understanding structural behavior and the background to the design methods in ACI and Euro code. By the end of this module students will have a good understanding of the design and behavior of reinforced concrete building members (beams, columns and slabs) according to ACI and Euro code, Strut and tie model for design of deep beams and corbels, design of shell structures with design of reinforced concrete walls also to be covered.</p>	
Course Objectives	<ol style="list-style-type: none"> 1. Review the design of beams, columns and slabs by ACI code. 2. Design of beams, columns and slabs by Euro code and compare with ACI results. 3. Design of reinforced concrete frames. 4. Design of Deep beams 5. Design of Concrete corbels 6. Strut-and-Tie model 7. Design of reinforced concrete walls 8. Design of concrete shell structures 	
Course Contents	<p>Week Lecture</p> <p>1st Introduction</p> <p>2nd Design of R.C. beams by ACI and Euro code</p> <p>3rd Design of R.C. beams by ACI and Euro code</p> <p>4th Design of R.C. columns by ACI and Euro code</p> <p>5th Design of R.C. columns by ACI and Euro code</p> <p>6th Design of R.C. slabs by ACI and Euro code</p>	

	<p>7th Design of R.C. Frames</p> <p>8th Design of R.C. Deep beams</p> <p>9th Design of R.C. Corbels</p> <p>10th Strut-and-Tie model</p> <p>11th Design of R.C. walls</p> <p>12th Design of R.C. shell structures</p> <p>13th Design of R.C. shell structures</p> <p>14th Seminar or article review Presentation</p> <p>15th Final Exam</p>
Textbooks and References	<ol style="list-style-type: none"> 1. Building code requirements for structural concrete-ACI 318M-19 and Commentary', by American Concrete Institute ACI 318, 2019. 2. Design of concrete structures by Nilson, Darwin, and Dolan, 14th edition, 2010, McGraw-Hill Companies. 3. Reinforced concrete: A Fundamental approach', by Nawy, 6th edition, 2009, Pearson-Prentice Hall. 4. Reinforced Concrete: Mechanics and Design', James G. MacGregor, James K. Wight, 4th edition Prentice Hall, 2005. 5. Structural Concrete Theory and Design by M. Nadim Hassoun and Akthem Al-Manaseer, 7th edition, 2020, Wiley. 6. Euro code 2 — Design of concrete structures — Part 2: Concrete bridges — Design and Detailing rules 7. ASCE 7-22 8. IBC 2021 9. Others
Teaching Style	3 hrs. in Class
Requirements for credit points	<p>For the award of credit points, it is necessary to pass the module exam. It contains:</p> <p>An examination during the academic semester, Quizzes, Assignments, and Final examination.</p> <p>Student's attendance is required in all classes.</p>
Credit ECTS	6
Grade Distribution	<p>The following grade system is used for the evaluation of the module exam:</p> <p>The module exam is based on the summation of two categories of evaluations:</p> <p>First: (50%) of the mark is based on the academic semester effort which includes</p> <ul style="list-style-type: none"> - Midterm Exam = 20%. - Quizzes = 5% - Seminar = 10% - Article review = 15%

Second: (50%) of the mark is based on the final examination that is comprehensive for the whole of the study materials reviewed during the academic semester.

Workload

Workload 10hrs/w (150hrs/s): Contact face-to-face 3hrs/w (45hrs/s) and Non-Contact Self learning 7hrs/w (105hrs/s)