

## Module (Course Syllabus) Catalogue 2023-2024

College/ Institute	Erbil Polytechnic University	
Department	CMTED	
Module Name	Structural Concrete Design – II	
Module Code	RCD501	
Degree	Technical Diploma <input type="checkbox"/>	Bachelor <input checked="" type="checkbox"/>
	High Diploma <input type="checkbox"/>	Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	6 <sup>th</sup>	
Qualification	M.Sc. Structural Engineering	
Scientific Title	Assistant Lecturer	
ECTS (Credits)	6	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours	4 hours	
Weekly hours (Theory)	(4) hr Class	(159) Total hrs Workload
Weekly hours (Practical)	(None)hr Class	(None)Total hrs Workload
Number of Weeks	15	
Lecturer (Theory)	Aysar Jafar Ismael	
E-Mail & Mobile NO.	<a href="mailto:aesar.ismael@epu.edu.iq">aesar.ismael@epu.edu.iq</a>	
Lecturer (Practical)	None	
E-Mail & Mobile NO.		
Websites		

## Course Book

<b>Course Description</b>	<p>Increase student knowledge and learn the principles and practices for the analyses, design, contracting, and construction of structural concrete elements.</p> <p>After attending this course, student shall have a firm grasp of the background and design specifics necessary to compete in this industry, including industry-leading information on the principles and practices of structural concrete members design for buildings, infrastructure, utilities, and industrial facilities. Understand practical emerging technologies including advanced design techniques for specific structural elements.</p>			
<b>Course objectives</b>	<ul style="list-style-type: none"> <li>• Understand the importance of basic principles of reinforced concrete design for certain structural elements.</li> <li>• Apply analytical skills to solving problems in reinforced concrete design.</li> <li>• Understand the basic requirements of international codes for reinforced concrete design.</li> <li>• Appreciate the interaction between the structural analysis, strength of material, mechanics of structural and the reinforced concrete design.</li> <li>• Identify the key mechanical and structural issues in reinforced concrete design.</li> <li>• Appreciate the range of structural elements types available and their application.</li> <li>• Select an appropriate reinforced concrete system for a structure</li> <li>• Appreciate the practical problems of design and detailing for reinforced concrete structures, buildings and facilities.</li> <li>• Introduce the student to certain case studies</li> </ul>			
<b>Student's obligation</b>	<ol style="list-style-type: none"> <li>a. To attend the classes regularly with minimum absence.</li> <li>b. To participate actively in the class discussion and Q&amp;A session.</li> <li>c. Study on daily basis to digest the class material</li> <li>d. To write note off-handouts</li> <li>e. Prepared for sudden Quizzes</li> <li>f. Vet through the references provided by the lecturer and to solve as much as possible of homework and exercises for the subjective materials.</li> <li>g. Prepare the assignment and the seminar as instructed by the lecture.</li> <li>h. Solve and submit the home works on time.</li> <li>i. Prepare and submit the requested scientific reports on time to the standards set by the lecturer.</li> <li>j. Prepare and present seminars in the number required for the titled assigned by the lecturer.</li> <li>k. Prepare for and attend the mid – terms exam</li> <li>l. Prepare for and attend the final – exam</li> </ol>			
<b>Required Learning Materials</b>	<p>Students at this stage with the workload assigned technical for the subject are not required to scatter their attention with bunch of sources. Students are encouraged to thoroughly study the reference given by the lecturer and to vet through available cyber data related to the subject and this shall include the concrete technology worked examples and all those are support with construction site visit for the students to appreciate and monitor closely the application of the theoretical concept in construction.</p>			
<b>Evaluation</b>	<b>Task</b>	<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>

	Paper Review		None for B.SC.			
	Assignments	Homework	10	Weekly	Application for subject by subject	
		Class Activity	2	Weekly	Participate in syllabus learning	
		Report	8	4 <sup>th</sup> & 8 <sup>th</sup>	Concentrate on certain subject of the module and cover its technical aspects	
		Seminar	8	6 <sup>th</sup> & 10 <sup>th</sup>	Individual or in group for subjects within the module but out of the syllabus	
		Essay				
		Project				
	Quiz	8				
	Lab.					
	Midterm Exam	24	7 <sup>th</sup>			
Final Exam	40	14 <sup>th</sup> & 15 <sup>th</sup>				
Total	<b>100</b>					
<b>Specific learning outcome:</b>	<p>1- The analysis and design of two – way slabs  2- The analysis and design of various R.C columns design  3- The analysis and design of stair case of various types  4- Get familiar with various types of retaining structures, their analysis and design  5- Attend construction sites for the elements above  6- Interaction between various RC elements through the courses of RC I, RC II and Prestress Concrete in Reinforced Concrete Bridge Design Module on 7<sup>th</sup> semester  7 – Vet through the available topics related to the course syllabus published up to date.  8 – As the module time line is relatively short, the student shall be able to study on his/her own further subjects in RC module  9 – introduce the recipient to available software to analysis and design the RC structural elements individually or in whole.</p>					
<b>Course References:</b>	<p>1 - 318-19: Building Code Requirements for Structural Concrete and Commentary.  2 - Reinforced Concrete: Mechanics and Design, by James K. Wight   Jun 22, 2021.  3 - Reinforced Concrete Buildings: Behaviour and Design by Ahmad A. Hamid   Jan 19, 2021.  4 - Design of Concrete Structures by David Darwin and Charles Dolan   Jul 6, 2020.  5 - Structural Concrete: Theory and Design by M. Nadim Hassoun and Akthem Al-Manaseer   Mar 10, 2020.  6 - Reinforced Concrete Design by Abi O. Aghayere and Jason Vigil   Mar 16, 2018.</p>					
<b>Course topics (Theory)</b>			<b>Weeks</b>			
<b>Introduction to Reinforced Concrete Structures</b>						
1. Structural Elements and Structural Forms						
2. Flooring and Roofing Systems						
3. Loads						

4. Design Codes and Specification		
5. Design Criteria		
6. Design Philosophy		
7. Strength Versus Working-Stress Design Methods		
8. Fundamental Assumptions For Reinforced Concrete Behavior		
9. Examples		
10. Additional Examples		
<b>Materials</b>		
1. Introduction		
2. Concrete, Chemical Aspects		
3. Concrete, Physical Aspects		
4. Reinforcing Steels For Concrete		
5. General Problems.		
<b>Design of Concrete Structures and Fundamental Assumptions</b>		
1. Introduction		
2. Members and Sections		
3. Theory, Codes, and Practice		
4. Fundamental Assumptions for Reinforced Concrete Behavior		
5. Behavior of Members Subject to Axial Loads		
6. Bending of Homogeneous Beams		
<b>Design and analysis of Reinforced Concrete short columns</b>		
1. Introduction.		
2. Behavior of Concrete columns		
3. Analysis and Design of Axially loaded		
4. Analysis and design of Axially loaded column with uniaxial bending moment		
5. Analysis and design of axially loaded column with bi-axial moment		
6. Slender column		
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**Analysis and design of One-way slab**

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**Analysis and design of Two-way slab**

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<b>Questions Example Design</b>		
First year teaching, no questions example yet		
<b>Extra notes:</b>		
None so far		
<b>External Evaluator</b>		