



Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	Erbil Polytechnic University	
Department	Highway Engineering Technique Department	
Module Name	Reinforced Concrete Design – II	
Module Code	RCD601	
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 th	
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	(108) Total hrs Workload
Weekly hours (Practical)	(None)hr Class	(None)Total hrs Workload
Number of Weeks	15	
Lecturer (Theory)	Ali J. Nouri Al – Barazanchi	
E-Mail & Mobile NO.	ali.nouri@epu.edu.iq – 07706416969	
Lecturer (Practical)	None	
E-Mail & Mobile NO.		
Websites		

Course Book

<p>Course Description</p>	<p>Increase student knowledge and learn the principles and practices for the analyses, design, contracting, and construction of structural concrete elements. 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>
<p>Course objectives</p>	<ul style="list-style-type: none"> • Understand the importance of basic principles of reinforced concrete design for certain structural elements. • Apply analytical skills to solving problems in reinforced concrete design. • Understand the basic requirements of international codes for reinforced concrete design. • Appreciate the interaction between the structural analysis, strength of material, mechanics of structural and the reinforced concrete design. • Identify the key mechanical and structural issues in reinforced concrete design. • Appreciate the range of structural elements types available and their application. • Select an appropriate reinforced concrete system for a structure • Appreciate the practical problems of design and detailing for reinforced concrete structures, buildings and facilities. • Introduce the student to certain case studies
<p>Student's obligation</p>	<ol style="list-style-type: none"> a. To attend the classes regularly with minimum absence. b. To participate actively in the class discussion and Q&A session. c. Study on daily basis to digest the class material d. To write note off-handouts e. Prepared for sudden Quizzes f. Vet through the references provided by the lecturer and to solve as much as possible of homework and exercises for the subjective materials. g. Prepare the assignment and the seminar as instructed by the lecture. h. Solve and submit the home works on time. i. Prepare and submit the requested scientific reports on time to the standards set by the lecturer. j. Prepare and present seminars in the number required for the titled assigned by the lecturer. k. Prepare for and attend the mid – terms exam l. Prepare for and attend the final – exam

Required Learning Materials	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 refence 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.				
Evaluation	Task	Weight (Marks)	Due Week	Relevant Learning Outcome	
	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 th & 8 th	Concentrate on certain subject of the module and cover its technical aspects
		Seminar	8	6 th & 10 th	Individual or in group for subjects within the module but out of the syllabus
		Essay			
		Project			
	Quiz	8			
	Lab.				
	Midterm Exam	24	7 th		
	Final Exam	40	14 th & 15 th		
Total	100				
Specific learning outcome:	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 th 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.				

Course References:

- 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.

Course topics (Theory)	Weeks	Learning Outcome
Design of Two-Way Slabs		
1. Introduction	1 st	Under this subject the student shall be introduced to the slabs as structural elements in various structures. The student shall learn the analysis and design of the RC slabs through various up to date methods and shall be attending various home works and solved examples enabling the student to design and detail such elements individually or in bunch.
2. Types of Two – Way Slabs	1 st	
3. Design Concepts	1 st	
4. Column & Middle Strips	1 st	
5. Minimum Slab Thickness to Control Deflection	2 nd	
6. Shear Strength of Slabs	2 nd	
7. <i>Analysis of Two – Way Slabs by the Direct Design Method</i>	2 nd	
8. Design Moments in Columns	2 nd	
9. Solved Examples	3 rd & 4 th	
10. Transfer of Unbalanced Moments to Columns	4 th	
11. <i>Equivalent Frame Method</i>	4 th	
Reinforced Concrete Columns		
1. <i>Introduction to Axially Loaded Columns</i>	5 th	Under this subject, the student shall be introduced to almost all types of columns including the short and long columns covering the slenderness art of it and those subjected to pure axial load or the eccentric loaded columns that subject them to uniaxial and/or biaxial moments. The students by end of the subject shall be able to design various types of square, rectangular and circular columns.
2. Types of Columns	5 th	
3. ACI Code Limitations	5 th	
4. Spiral Reinforcement	5 th	
5. Design Equations	6 th	
6. Solved Examples	6 th	
7. <i>Introduction to Columns in Compression & Bending</i>	8 th	
8. Design Assumptions	8 th	
9. Load – Moment Interaction Diagrams	8 th	
10. Analysis and Design of Columns using Charts	8 th	
11. Design of Columns under Eccentric Loading	9 th	
12. Square and Rectangular Columns under Biaxial Bending	9 th	
13. Solve Examples	9 th	

Retaining Walls		
1. Introduction & Types of Retaining Walls	10 th	Under this subject, students shall be introduced to the earth retaining structures which they are part of the highway and building constructions. They shall be able to recognize typical types of the retaining walls and the forced imposed to such structures and ultimately, to analysis, design and detailing of the cantilever retaining wall which is the common type in application.
2. Forces on Retaining Walls	10 th	
3. Active & Passive Soil Pressure	10 th	
4. Friction of the Retaining Walls Base	10 th	
5. Stability against Overturning	10 th	
6. Proportions of Retaining Walls	10 th	
7. Design Requirements & Equations	11 th	
8. Drainage	11 th	
9. Solved Examples for Cantilever Retaining Walls	11 th	
Staircases		
1. Introduction	12 th	Under this subject, the student shall be able to analyse and design simply supported RC Staircases
2. Types of Stairs, their Analyses & Design	12 th & 13 th	
3. Solved Examples	13 th	
Questions Example Design		
First year teaching, no questions example yet		
Extra notes:		
None so far		
External Evaluator		