



39 Course Specification of Reinforced concrete 2

I. Course Identification and General Information:					
1	Course Title:	Reinforced Concrete 2			
2	Course Code & Number:	CE209			
3	Credit hours:	C.H			Credit Hours
		Th.	Tu.	Pr.	Tr.
		2	2		
4	Study level/ semester at which this course is offered:	3 rd Level / 2 st semester			
5	Pre –requisite (if any):	Reinforced Concrete 1			
6	Co –requisite (if any):	None			
7	Program (s) in which the course is offered:	Civil Engineering			
8	Language of teaching the course:	English + Arabic			
9	Location of teaching the course:	Class room			
10	Prepared By:	Dr. Abdulwahab Mohammed Al-nono			
11	Date of Approval				

II. Course Description:
<p>This course provides students with an understanding of the structural design process, the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members considering the design principles and criteria such as strength, serviceability, and economy. The topics that are taught in this course are: Introduction of slabs, types of slabs: solid slabs, one- and two-way slabs. Joist floor system (Ribbed slabs) with filled material like bricks, or with voids between ribs, One-way solid slab, Two-way solid slab, One-way Hollow Block Slabs, Two-way Hollow Block slabs, Introduction of stairs, Design of stairs, and Types of Reinforced concrete columns, Design of Axially loaded columns.</p>

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III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a.1	Identify types and behavior of the reinforced concrete slabs, several types of stairs and columns.	A1
a.2	Recognize the reinforced concrete code of practice (ACI-Code), and relevant standards (ASTM).	A2
a.3	Define design procedures of the reinforced concrete elements based on the Strength Design Method (SDM) considering the basic design criteria such as safety, serviceability, and economy.	A3
b.1	Identify how to model difference structure elements (slabs, stairs and columns),	B1, B2
b.2	Construct good assumptions for calculation of imposed loads, analyze the structure, determination critical sections, and calculation of appropriate cross sections and reinforcements, to produce a safe and economic structures.	B1
b.3	Choose the appropriate methods for transmission of loads from slabs to beams.	B2
b.4	Choose the suitable design procedure for different structural elements, considering the safety and economic.	B2, B4
c.1	Conduct full design calculations for slabs and columns based on the ACI Code.	C2
d.1	Prepare clear design reports and draw to show the full design detailing for the reinforced concrete designs.	D1

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Identify types and behavior of the reinforced concrete slabs, several types of stairs and columns.	Lecture Reading Tutorial Exercises	Written exam Written Assignment

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(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a2- Recognize the reinforced concrete code of practice (ACI-Code), and relevant standards (ASTM).	Lecture Reading Tutorial Exercises	Written exam Written Assignment
a3- Define design procedures of the reinforced concrete elements based on the Strength Design Method (SDM) considering the basic design criteria such as safety, serviceability, and economy.	Lecture Reading Tutorial Exercises	Written exam Written Assignment

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Identifying how to model difference structure elements (slabs, stairs and columns),	Lecture Reading Tutorial	Written exam Written Assignment
b2- Construct good assumptions for calculation of imposed loads, analyze the structure, determination critical sections, and calculation of appropriate cross sections and reinforcements, to produce a safe and economic structures.	Lecture Reading Tutorial Exercises	Written exam Written Assignment
b3- Choose the appropriate methods for transmission of loads from slabs to beams.	Lecture Tutorial Exercises	Written exam Written Assignment
b4- Choose the suitable design procedure for different structural elements, considering the safety and economic.	Lecture Tutorial Exercises	Written exam Written Assignment

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C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1- Conduct full design calculations for slabs and columns based on the ACI Code.	Lecture Tutorial, Exercises	Written exam Written Assignment

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d.1- Prepare clear design reports and draw to show the full design detailing for the reinforced concrete designs.	Lecture, Tutorial, case study ...	Project

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Loads on beams:	a1, b3	Equivalent uniformly distributed loads on beams for: One way & Two-way slab.	1	2
2	Introduction of slabs	a1, b1	Types of slabs: Solid slabs: One-way slab & Two-way floor system. Joist floor system (Ribbed slabs): -Ribbed slabs with filled material like bricks (blocks), -Ribbed slabs with voids between ribs, like waffle slabs and grid slabs.	1	2
3	One-way solid slab	a1, a2, a3, b1, b2, b4, c1, d1	design of one-way solid slab, ACI code considering assumptions, Loading	1	2

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IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
			Analyzing designing drawing		
4	Two-way solid slabs Introduction:	a1, a2, a3, b1, b2, b4, c1, d1	Introduction: Types of two-way slabs: Design of two-way slabs: Loading Analyzing designing drawing	1	2
5	Hollow block slabs	a1, a2, a3, b1, b2, b4, c1, d1	One-way hollow block slabs Design of one-way hollow block slabs Design of the sections Arrangement of blocks and ribs Design of hidden beams Design of the interior beam as a hidden beam:	2	4
6	Hollow block slabs	a1, a2, a3, b1, b2, b4, c1, d1	Two-way hollow block slabs with hidden beams, and with projected beams. Loading Calculating moment Design of sections of ribs: Arrangement of blocks and ribs in short and long directions. Design of the interior hidden beam	1	2
7	Hollow block slabs	a1, a2, a3, b1, b2, b4, c1, d1	Two-way hollow block slabs with hidden beams, and with projected beams.	2	4

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IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
			Loading Calculating moment Design of sections of ribs Arrangement of blocks and ribs in short and long directions. Design of the interior hidden beam		
8	Design of stairs	a1, a2, a3, b1, b2, b4, c1, d1	A) Classification of stairs: B) Stairs Spanning Transversely C) Stairs spanning longitudinally Design of stairs	2	4
9	Reinforced concrete columns	a1, a2, a3, b1, b2, b4, c1, d1	Short column: -Analysis and design of Axially loaded columns: -Analysis and design of Columns with combined - Axial load and bending moments. -Design of Long columns Loading Analysis and design	3	6
Number of Weeks /and Units Per Semester				14	28

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B - Tutorial Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Loads on beams	1	2	a1, b3
2	One-way solid slab	1	2	b1, b2, b4, c1, d1
3	Two-way solid slabs	1	2	b1, b2, b4, c1, d1
4	One-way Hollow block slabs	2	4	b1, b2, b4, c1, d1
5	Two-way Hollow block slabs	3	6	b1, b2, b4, c1, d1
6	Design of stairs	1	2	b1, b2, b4, c1, d1
7	Reinforced concrete Axially loaded columns	1	2	b1, b2, b4, c1, d1
8	Columns with combined Axial load and bending moments. Long Column.	4	8	b1, b2, b4, c1, d1
Number of Weeks /and Units Per Semester		14	28	

V. Teaching strategies of the course:
Lecture Reading Tutorial Exercises Written exam Course design project Case study

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VI. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 1	a1, a2, a3 ,b1, b2, b4, c1, d1	4	1.5
2	Assignment 2	a1, a2, a3 ,b1, b2, b4, c1, d1	8	1.5
3	Assignment 3	a1, a2, a3 ,b1, b2, b4, c1, d1	10	1.5
4	Assignment 3	a1, a2, a3 ,b1, b2, b4, c1, d1	13	1.5

VII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Written assignments	4, 8, 10, 13	6	4 %	a1, a2, a3, b1, b2, b4, c1, d1
2	Quizzes.	2 times randomly	3	2 %	a1, a2, a3, b1, b2, b4
3	Mid-term exam.	8	30	20 %	a1, a2, a3, b1, b2, b4, c1, d1
4	Course Design Project	14	6	4%	a1, a2, a3, b1, b2, b4, c1, d1
5	Final-exam.	End of term	105	70 %	a1, a2, a3, b1, b2, b4, c1, d1
6	Sum		150	100 %	

VIII. Learning Resources:	
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
	1-Structural Concrete, Theory & Design, Fifth Edition (2012), by: M. Nadim Hassou Akthem Al-manaseer.
	2- Building code requirements for structural concrete and commentary (ACI-318-12)
2- Essential References.	

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3- Electronic Materials and Web Sites etc.

IX. Course Policies:

Unless otherwise stated, the normal course administration policies and rules of the Faculty of ----- apply. For the policy, see: -----

1	Class Attendance: The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2	Tardy: The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	Exam Attendance/Punctuality: The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4	Assignments & Projects: The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
5	Cheating: If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries .
6	Plagiarism: The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7	Other policies: -All the teaching materials should be kept out the examination hall. -The mobile phone is not allowed. -There should be a respect between the student and his teacher.

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	<u>Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa</u>

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	<u>Dr. Ahmed mujahed</u> <u>Dr. Munaser Alsubri</u>
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Template for Course Plan (Syllabus) of Reinforced concrete 2

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Abdulwahab Mohammed Al-nono	Office Hours					
Location& Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:					
1	Course Title:	Reinforced Concrete 2			
2	Course Code & Number:	CE209			
3	Credit hours:	C.H			
		Th.	Tu.	Pr.	Tr.
		2	2		
4	Study level/ semester at which this course is offered:	3 rd Level / 2 st semester			
5	Pre –requisite (if any):	Reinforced Concrete 1			
6	Co –requisite (if any):	None			
7	Program (s) in which the course is offered:	Civil Engineering			
8	Language of teaching the course:	English + Arabic			
9	Location of teaching the course:	Class room			
10	Prepared By:	Dr. Abdulwahab Mohammed Al-nono			
11	Date of Approval				

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III. Course Description:

This course provides students with an understanding of the structural design process, the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members considering the design principles and criteria such as strength, serviceability, and economy. The topics that are taught in this course are: Introduction of slabs, types of slabs: solid slabs, one-way slabs, Two-way slabs. Joist floor system (Ribbed slabs) with filled material like bricks, or with voids between ribs, One-way solid slab, Two-way solid slab, One-way Hollow Block Slabs, Two-way Hollow Block slabs, Introduction of stairs, Design of stairs, and Types of Reinforced concrete columns, Design of Axially loaded columns.

IV. Intended learning outcomes (ILOs) of the course:

Brief summary of the knowledge or skill the course is intended to develop:

- a.1** identify types and behavior of the reinforced concrete slabs, several types of stairs and columns. A1
- a.2** Recognize the reinforced concrete code of practice (ACI-Code), and relevant standards (ASTM). A2
- a.3** Define design procedures of the reinforced concrete elements based on the Strength Design Method (SDM) considering the basic design criteria such as safety, serviceability, and economy. A3
- b.1** Identify how to model different structure elements (slabs, stairs and columns), B1, B2
- b.2** Construct good assumptions for calculation of imposed loads, analyze the structure, determination critical sections, and calculation of appropriate cross sections and reinforcements, to produce a safe and economic structures. B1
- b.3** Choose the appropriate methods for transmission of loads from slabs to beams. B2
- b.4** Choose the suitable design procedure for different structural elements, considering the safety and economic. B2, B4
- c.1** Conduct full design calculations for slabs and columns based on the ACI Code. C2
- d.1** Prepare clear design reports and draw to show the full design detailing for the reinforced concrete designs. D1

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V. Course Content:				
<ul style="list-style-type: none"> Distribution of Semester Weekly Plan Of course Topics/Items and Activities. 				
A – Theoretical Aspect:				
Order	Topics List	Sub Topics List	Week Due	Contact Hours
1	Loads on beams:	Equivalent uniformly distributed loads on beams for: One way & Two-way slab.	1	2
2	Introduction of slabs	Types of slabs: Solid slabs: One-way slab & Two-way floor system. Joist floor system (Ribbed slabs): -Ribbed slabs with filled material like bricks (blocks), -Ribbed slabs with voids between ribs, like waffle slabs and grid slabs.	2	2
3	One-way solid slab	design of one-way solid slab, ACI code considering assumptions, Loading Analyzing designing drawing	3	2
4	Two-way solid slabs Introduction:	Introduction: Types of two-way slabs: Design of two-way slabs: Loading Analyzing designing drawing	4	2
5	Hollow block slabs	One-way hollow block slabs Design of one-way hollow block slabs Design of the sections Arrangement of blocks and ribs Design of hidden beams Design of the interior beam as a hidden beam:	5,6	4
6	Hollow block slabs	Two-way hollow block slabs with hidden beams, and with projected beams.	7	2

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V. Course Content:				
<ul style="list-style-type: none"> Distribution of Semester Weekly Plan Of course Topics/Items and Activities. 				
A – Theoretical Aspect:				
Order	Topics List	Sub Topics List	Week Due	Contact Hours
		Loading Calculating moment Design of sections of ribs: Arrangement of blocks and ribs in short and long directions. Design of the interior hidden beam		
7		Midterm Exam	8	2
8	Hollow block slabs	Two-way hollow block slabs with hidden beams, and with projected beams. Loading Calculating moment Design of sections of ribs Arrangement of blocks and ribs in short and long directions. Design of the interior hidden beam	9,10	4
9	Design of stairs	A) Classification of stairs: B) Stairs Spanning Transversely C) Stairs spanning longitudinally Design of stairs	11,12	4
10	Reinforced concrete columns	Short column: -Analysis and design of Axially loaded columns: -Analysis and design of Columns with combined - Axial load and bending moments. -Design of Long columns Loading Analysis and design	13,14,15	6
11		Final Exam	16	2
Number of Weeks /and Units Per Semester			16	32

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B - Tutorial Aspect:			
Order	Topics List	Week Due	Contact Hours
1	Loads on beams	1	2
2	One-way solid slab	2	2
3	Two-way solid slabs	3	2
4	One-way Hollow block slabs	4,5	4
5	Two-way Hollow block slabs	6,7,8	6
6	Design of stairs	9	2
7	Reinforced concrete Axially loaded columns	10	2
8	Columns with combined Axial load and bending moments. Long Column.	11,12,13 ,14	8
Number of Weeks /and Units Per Semester		14	28

VI. Teaching strategies of the course:
Lecture Reading Tutorial Exercises Written exam Course design project Case study

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VII. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 1	a1, a2, a3, b1, b2, b4, c1, d1	4	1.5
2	Assignment 2	a1, a2, a3, b1, b2, b4, c1, d1	8	1.5
3	Assignment 3	a1, a2, a3, b1, b2, b4, c1, d1	10	1.5
4	Assignment 3	a1, a2, a3, b1, b2, b4, c1, d1	13	1.5

VIII. Schedule of Assessment Tasks for Students During the Semester:						
Assessment			Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Written assignments	4, 8, 10, 13	6	4 %		
2	Quizzes.	2 times randomly	3	2 %		
3	Mid-term exam.	8	30	20 %		
4	Course Design Project	14	6	4%		
5	Final-exam.	End of term	105	70 %		
	Sum		150	100 %		

IX. Learning Resources:	
<ul style="list-style-type: none"> • Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
1-Structural Concrete, Theory & Design, Fifth Edition (2012), by: M. Nadim Hassoun Akthem Al-manaseer. 2- Building code requirements for structural concrete and commentary (ACI-318-12)	
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	Tardy:
2	The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
	Exam Attendance/Punctuality:
3	The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
	Assignments & Projects:
4	The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
	Cheating:
5	If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries .
	Plagiarism:
6	The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
	Other policies:
7	<ul style="list-style-type: none"> -All the teaching materials should be kept out the examination hall. -The mobile phone is not allowed. -There should be a respect between the student and his teacher.

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