KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
(KUST)

Reinforced Concrete Syllabus			
Course Title	**Reinforced Concrete I**		
Course Code	**CVE 3365**	**No. of Credits**	**3 CH**
Department	**Civil Engineering**	**Faculty**	**Engineering**
Pre-requisites Course Code	**Engineering Materials (CVE 3325C)**	**Co-requisites Course Code**	
Course Coordinator(s)	**Dr. Sabah Saadi Fayaed**		
Email	**sabah.saadi@komar.edu.iq**	**IP No.**	**116**
Other Course Teacher(s)/Tutor(s)	**Non**		
Learning Hours	**Section 1: Sunday and Tuesday (2:00pm - 3:30pm)** **Section 2: Monday and Wednesday (2:00pm- 3:30pm)**		
Contact Hours	**Wednesday and Thursday (8:00am- 10:00am)**		
Course Type	**Departmental Requirement**		
Offer in Academic Year	**Fall 2015**		

COURSE DESCRIPTION

This course provides an introduction to the reinforced concrete design procedures that will be the foundation for other concrete design course. Various topics were described like Flexural Analysis of Beams, Strength Analysis of Beams, Design of Rectangular Beams and One-Way Slabs, Analysis and Design of T Beams and Doubly Reinforced Beams, Serviceability, Bond Development Lengths, and Splices, Shear and Diagonal Tension. The style of this syllabus is adopted from Iowa University.

COURSE OBJECTIVES

In this course the students will learn the fundamentals of design of reinforced concrete structures, by the end of the course they will be able to analyze frame structures and design basic components: beams, one-way slabs and columns. This course will provide background in the use of current ACI building codes (318-11), specifications, and recommendations.

KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
(KUST)

COURSE LEARNING OUTCOME

After participating in the course, students would be able to:

1. Understand the principles of reinforced concrete structures **(ABET Outcome A)**
2. Choose proper dead, live and other structural loads **(ABET Outcome E)**
3. Calculate short-term and long-term deflections for reinforced concrete beams. **(ABET Outcome E)**
4. Design and analyze reinforced concrete beams, slabs and columns for flexure, shear and axial loads using ACI standard (ACI 318-11) **(ABET Outcome E&C)**
5. Apply the serviceability requirements to control deflections and cracking. **(ABET Outcome E)**
6. Determine shear reinforcement for concrete beams. **(ABET Outcome E)**

Grading Scale:

Points	Percentage Scores
A	**95-100**
A-	**90-94**
B+	**87-89**
B	**83-86**
B-	**80-82**
C+	**75-79**
C	**70-74**
C-	**65-69**
D+	**60-64**
D	**55-59**
D-	**50-54**
F	**0-49**
W	**Withdrawal**
I	**Incomplete**

Note: The minimum passing grade to pass this course is C-which is equivalent to 65%.

COURSE CONTENT

Course Topics Include:

Chapter 1: Introduction
Chapter 2: Flexural Analysis of Beams
Chapter 3: Strength Analysis of Beams According to ACI Code
Chapter 4: Design of Rectangular Beams and One-Way Slabs
Chapter 5: Analysis and Design of T Beams and Doubly Reinforced Beams
Chapter 6: Serviceability
Chapter 7: Bond, Development Lengths, and Splices
Chapter 8: Shear and Diagonal Tension

COURSE TEACHING AND LEARNING ACTIVITIES

Course Teaching and Learning Activities:

1. Interactive class discussion
2. Hands- on Exercises
3. Home work
4. Tests and Quizzes

COURSE ASSESSMENT Tools

Assessment Tool	Description	Weight
Quizzes (5)	Quizzes are scheduled as shown in the semester schedule.	**10 %**
Mid-term	The mid-term will be conducted after week 7 of the semester.	**25 %**
Homework (2)	The H.W will be conducted during the semester.	**5 %**
Contribution	Students will be evaluated by the instructor based on their participation in the class, commitment, pop quizzes and other activities.	**5 %**
Test	The test will be conducted after week 12 of the semester.	**15 %**
Project	The project will be conducted in week 13 of the semester	**10 %**
Final Exam	The final exam will be conducted in week 16 of the semester	**30 %**

ESSENTIAL READINGS: (Journals, textbooks, website addresses etc.)

Textbooks:

Designed of Reinforced Concrete, 9 th edition, (2014), Jack C. McCormac and Russell H. Brown. Wiley, ISBN: 978-1-118-12984-5.

References:

1- Reinforced Concrete: Mechanics and Design", 6th Edition, (2011), Wight and MacGregor.

2- Reinforced Concrete Design, 7th Edition, (2007), C-K. Wang, C.G. Salmon, J.A. Pincheira ,Wiley Publishers, ISBN: 0-471-26286-2

COURSE POLICY *(including plagiarism, academic honesty, attendance etc)*

Attendance Policy:

Students are expected to attend each class for the entire semester. Students are responsible for material present in lectures. Only students with official KUST absence, family crises, and illness are excused from class. Three occasions of lateness count as one absence. The student who misses 10 percent of the classes will be placed on probation.

Make up Policy:

Since all examination are announced in advance, zero grade will be given to any missed examination unless a student's has an acceptable reason, such as illness, for not being able to take the examination during all those days when the examination was announced.

Academic Dishonesty:

Any type of dishonesty (Plagiarism, Copying another's test or home-work, etc) will Not be tolerated. Students found guilty of any type of academic dishonesty are subject to failure in this course, plus further punishment by the University Consul.

KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
(KUST)

Course calendar: Please check the academic calendar for fall 2015

Week	Beg/End Dates	Topics (Chapters)	Course Assignments per chapter
1	**(28-9 to 1-10) / 2015**	**Chapter 1: Introduction** • Concrete and Reinforced Concrete • Advantages of Reinforced Concrete as a Structural Material • Disadvantages of Reinforced Concrete as a Structural Material • Compatibility of Concrete and Steel	
2	**(4-10 to 8-10) / 2015**	**Chapter 2: Flexural Analysis of Beams** • Cracking Moment • Elastic Stresses-Concrete Cracked • Ultimate or Nominal Flexural Moments	
3	**(11-10 to 15-10) / 2015**	**Chapter 3: Strength Analysis of Beams According to ACI Code** • Design Methods • Advantages of Strength Design • Structural Safety • Derivation of Beam Expressions	**Quiz 1** (Ch.1 and Ch.2)
4	**(18-10 to 22-10) / 2015**	**Chapter 3: Continued** • Strains in Flexural Members • Balanced Sections, Tension-Controlled Sections, and Compression-Controlled • Minimum Percentage of Steel	
5	**(25-10 to 29-10) / 2015**	**Chapter 4: Design of Rectangular Beams and One-Way Slabs** • Load Factors • Design of Rectangular Beams • Determining Steel Area When Beam Dimensions Are Predetermined	**Quiz 2** (Ch.3)
6	**(1-11 to 5-11) / 2015**	**Chapter 4: Continued** • One-Way Slabs • Cantilever Beams and Continuous Beams	**Submitting "H.W1"**

7	**(8-11 to 12-11) / 2015**	**Chapter 5: Analysis and Design of T Beams and Doubly Reinforced Beams** • T Beams • Analysis of T Beams • Another Method for Analyzing T Beams • Design of T Beams	**Quiz 3** (Ch.4)
	15-11 to 19-11	**Mid-term**	(Ch.1, Ch.2, Ch.3, Ch.4 and Ch.5)
8	**(22-11 to 26-11) / 2015**	**Chapter 5: Continued** • Design of T Beams for Negative Moments • L-Shaped Beams • Design of Doubly Reinforced Beams	
9	**(29-11 to 3-12) / 2015**	**Chapter 6: Serviceability** • Importance of Deflections • Control of Deflections • Calculation of Deflections	
10	**(6-12 to 10-12) / 2015**	**Chapter 6: Continued** • Effective Moments of Inertia • Long-Term Deflections • Simple-Beam Deflections • Continuous-Beam Deflections	
11	**(13-12 to 17-12) / 2015**	**Chapter 7: Bond, Development Lengths, and Splices** • Cutting Off or Bending Bars • Bond Stresses • Development Lengths for Tension Reinforcing • Development Lengths for Bundled Bars	**Quiz 4** (Ch.5 and Ch.6) **Submitting "H.W2"**
12	**(20-12 to 24-12) / 2015**	**Chapter 7: Continued** • Development Lengths for Welded Wire Fabric in Tension • Development Lengths for Compression Bars • Critical Sections for Development Length	
	(27-12 to 31-12) / 2015	**New Year Holiday**	
13	**(3-1 to 7-1) / 2016**	**Chapter 8: Shear and Diagonal Tension** • Shear Stresses in Concrete Beams	**TEST (Ch. 6 and Ch.7)**

		• Lightweight Concrete • Shear Strength of Concrete	
14	**(10-1 to 14-1) / 2016**	**Chapter 8: Continued** • Shear Cracking of Reinforced Concrete Beams • Web Reinforcement • Behavior of Beams with Web Reinforcement • Design for Shear	**Quiz 5** (Ch.8)
15	**(17-1 to 21-1) / 2016**	**Review Week for Academic Courses**	
16	**(24-1 to 28-1) / 2016**	**Final Examination for Academic Courses**	**All the Chapters**