

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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CE610 Advanced Concrete Design

College: Engineering

Department: Civil Engineering

First: Course Definition

1- Course Code: CE 610

2- Units: 3

3- Semester:

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives: The objectives of this course are for the student to become able to:

1. Recognize that design criteria in ACI Code concerning the behavior and design of reinforced concrete members and structures are simple applications of the fundamentals of statics and applied mechanics;
2. Document decisions made during the design process in coherent and legible design calculations;
3. Design structural concrete members and systems, be they reinforced, prestressed, or partially prestressed, that are safe, serviceable, and economical.

Third: Course Specifications

1- Topics to be covered		
Subject	No of Weeks	Units
Beam column joints	1	3
Modified compression field theory	2	6
Strut and tie modeling of systems and areas	1	3

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Design of shear walls	2	6
Design of two-way slabs	2	6
Seismic design	2	6
Design for lateral wind loads	1	3
Concrete folded plates	1	3
Concrete shells	2	6
Deep beams	1	3

2- Course components (Total hrs in the Semester): 42

Lecture	Exercise	Other
42	-	0

3- Intended Learning Outcomes of the Course (ILO's)

- Analysis and design of beam column joints
- Analysis and design of two-way slabs
- Analysis and design of shear walls
- **Analysis and design of deep beams**
- Seismic design of concrete structures

a. Knowledge

i) Description of the knowledge to be acquired- :

- Analysis and design of beam column joints
- Analysis and design of two-way slabs
- Analysis and design of shear walls
- **Analysis and design of deep beams**
- Seismic design of concrete structures

ii) Teaching strategies to be used to develop that knowledge

Class lectures
Term projects
Students' presentations
Group discussion
Seminars
Instructor-student face-to-face interaction

iii) Methods of assessment of knowledge acquired

Examinations
Quizzes

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Homework assignments
Term projects
Written reports
Oral Examinations and presentations

b- Cognitive (Intellectual) Skills

i) Cognitive skills to be developed
Advanced concepts of analysis and design of reinforced concrete design
Advanced concrete analysis problem modeling
Investigation of advanced concrete design alternatives

ii) Teaching strategies to be used to develop these cognitive skills
Class lectures
Term projects
Students' presentations
Group discussion
Seminars
Instructor-student face-to-face interaction

iii) Methods of assessment of students' cognitive skills
Examinations
Quizzes
Homework assignments
Term projects
Written reports
Oral Examinations and presentations

c. Interpersonal Skills and Responsibility

i) Description of the interpersonal skills and capacity to carry responsibility to be developed
Decision making based on engineering analysis and design
Communication skills
Team work

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<p>ii) Teaching strategies to be used to develop these skills Class lectures Term projects Case studies of analysis and design</p> <p>iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility Term project Written reports Students' seminars and presentations</p>

d. Communication, Information Technology and Numerical Skills

<p>i) Description of the skills to be developed in this domain Literature research Problems modeling Utilization of computer applications in the analysis and design of concrete structures</p>

<p>ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> - Class lectures - Case studies analysis - Computer lab sessions - Term projects <p>iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> - Term projects - Written reports - Students' seminars and presentations - -

e. Psychomotor (if applicable) & Other Non-cognitive Skills

<p>i) Description of the psychomotor or other skills to be developed and the level of performance required</p> <ul style="list-style-type: none"> - NA -

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ii) Teaching strategies to be used to develop these skills-

- NA

iii) Methods of assessment of student's psychomotor skills

- NA

4- Student Assessment Schedule

Serial	Assessment tool (test, group project, examination etc.)	Week due	Weight
1	Term Project – 1	3 rd	15 %
2	Mid Term Exam -1	7 th	15 %
3	Term Project – 2	10 th	15 %
4	Term Project – 3	13 th	15 %
5	Final Exam	16 th	40 %

5- Student Support

- Providing electronic library of textbooks and scientific periodicals
- Providing the necessary computer applications for the course

6- Learning Resources

i) Essential Books (References)

Reinforced Concrete: Mechanics and Design, 5/e, June 2008
By James K. Wight and James G. MacGregor
Publisher: Prentice Hall, USA
ISBN-10: 0132281414, ISBN-13: 978-0132281416

Design of Reinforced Concrete, 8/e, Dec. 2008
By Jack C. McCormac and Russell Brown
Publisher: Wiley, USA
ISBN-10: 0470279273, ISBN-13: 978-0470279274

Structural Concrete: Theory and Design, 4/e, Aug. 2008
By M. Nadim Hassoun and Akthem Al-Manaseer
Publisher: Wiley, USA
ISBN-10: 0470170948, ISBN-13: 978-0470170946

Design of Concrete Structures, 14/e, July 2009
By Arthur Nilson, David Darwin, and Charles Dolan
Publisher: McGraw-Hill Science/Engineering

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ISBN-10: 0073293490, ISBN-13: 978-0073293493

ii) Course Notes
NA

iii) Recommended Books

iv) Electronic Books & Web Sites:
Scientific journals and forums
Instructor's instructions

v) Periodicals
ASCE scientific journals
British **Structural Engineering** journal
Canadian journal of **Structural Engineering**

7- Course Evaluation and Improvement Processes

i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Students' questioners
Students' evaluation of course and instructor

ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department
Public faculty seminars
Assessment by external evaluators of student's achievements

iii) Processes for Improvement of Teaching
Assessment of students' work by external examiners
Analysis of students' evaluation of course and instructor
Seminars by industry professionals

iv) Processes for verifying standards of student achievement
Check marking by an independent faculty member of a sample of student work

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Periodic exchange and re-marking of a sample of assignments/exams with an external evaluator

v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.