

<p>Kingdom of Saudi Arabia Ministry of Higher Education <b>Qassim University</b> College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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## CE 600 Concrete Technology

**College:** Engineering

**Department:** Civil

### First: Course Definition

**1- Course Code:** CE 600

**2- Units:** 3

**3- Semester:**

**4- Prerequisite:**

**5- Co-requisite:**

**6- Location** (if not on main Campus):

### Second: Course Objectives

- 1- To characterize engineering properties of the cement based materials.
- 2- To *Develop an advanced knowledge of the mechanical performance of cement based materials.*

### Third: Course Specifications

Manufacturing of cement, Flash and false setting of cement, Cement and secondary raw materials like silica fume, fly ash, metakaolin and slag, testing of rheological properties of cement, effect of SRM on setting time of cement, fineness of cement, soundness of cement, Rheological properties of the concrete, mix design of the concrete for normal and high strengths, strength development of concrete, plastic and drying shrinkage of concrete, compressive, tensile and shear strength of concrete, Mineral admixtures for concrete, plasticizers, elastic and plastic behaviour of hardened concrete, fracture mechanics of concrete, concrete under fire, freezing of concrete, hot weather concrete.

### 1- Topics to be covered

Subject	No of Weeks	Units
Manufacturing of cement, Flash and false setting of cement	1	3
secondary raw materials like silica fume, fly ash, metakaolin and	1	3

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slag		
Testing of rheological properties of cement	1	3
Setting time of cement, fineness of cement, soundness of cement	1	3
Rheological properties of the concrete	1	3
Mix design of the concrete for normal and high strengths	1	3
Strength development of concrete	1	3
Plastic and drying shrinkage of concrete	1	3
Compressive, tensile and shear strength of concrete	1	3
Mineral admixtures for concrete, plasticizers	1	3
Elastic and plastic behaviour of hardened concrete	1	3
Fracture mechanics of concrete	1	3
Concrete under fire and Freezing of Concrete	1	3
Hot weather concrete	1	3

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

Lecture	Excercise	Other
42	-	0

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

### **a. Knowledge**

#### *i) Description of the knowledge to be acquired:*

- Cement and secondary raw materials, their rheological properties
- Testing of cement and SRM
- Mineral admixtures and plasticizers and their properties
- Mix design for normal and high strength concrete
- Strength development of concrete and its mechanism
- Concrete and fire
- Fracture behaviour of concrete
- Hot and cold weather concrete

#### *ii) Teaching strategies to be used to develop that knowledge*

- Class lectures.
- Term projects.
- Students' presentations.

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- Group discussion.
- Laboratory experimentation
- iii) Methods of assessment of knowledge acquired**
- Exams.
- Quizzes.
- Homework assignments.
- Term projects.

### **b- Cognitive (Intellectual) Skills**

#### **i) Cognitive skills to be developed**

- Advanced concepts of cement and secondary raw materials.
- Advanced knowledge of rheological properties of high and normal strength concrete
- Special topics of concrete like concrete under fire, hot and cold weather concrete

#### **ii) Teaching strategies to be used to develop these cognitive skills**

- Class lectures.
- Case studies analysis.
- Term projects.

#### **iii) Methods of assessment of students' cognitive skills**

- Students' seminars and presentations.
- Term projects.
- Written reports.

### **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.
- Communication skills.
- Team work.

#### **ii) Teaching strategies to be used to develop these skills**

- Class lectures.
- Term projects.
- Case studies analysis.

#### **iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility**

- Term project.

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- Written reports.
- Students' seminars and presentations.

#### **d. Communication, Information Technology and Numerical Skills**

##### **i) Description of the skills to be developed in this domain**

- Literature research.
- Problems modeling.
- Utilization of computer applications in analysis and design.

##### **ii) Teaching strategies to be used to develop these skills**

- Class lectures.
- Case studies analysis.
- Computer lab sessions.
- Term projects.

##### **iii) Methods of assessment of students numerical and communication skills**

- Term projects.
- Written reports.
- Students' seminars and presentations.

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

##### **i) Description of the psychomotor or other skills to be developed and the level of performance required**

- NA
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##### **ii) Teaching strategies to be used to develop these skills-**

- NA
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##### **iii) Methods of assessment of student's psychomotor skills**

- NA
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#### **4- Student Assessment Schedule**

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

- Mehta, P. and Monteiro, M. J. M. "Concrete: Microstructure, Properties, and Materials," McGraw-Hill Professional; 3 edition, 2005.
- Neville, A. M. "Concrete Technology," Prentice Hall; 2nd Revised edition, 2010. ISBN-10: 0273732196, ISBN-13: 978-0273732198.
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### *ii) Course Notes*

- NA
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### *iii) Electronic Books & Web Sites:*

- Cement and concrete composite
- Cement and concrete research

### *iv) Periodicals*

- ASCE scientific journals.
- Manual of concrete practice.
- ACI committee reports on concrete

## 7- Course Evaluation and Improvement Processes

### *i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching*

- Students' questioners.

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- 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 students 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.
- Periodic exchange and remarking of a sample of assignments/exams with a 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.