

CE 306	
Properties and Testing of Structural Materials	
Department of Civil Engineering	
King Saud University	
Course Description: CE 306 Properties and Testing of Structural Materials. (Required for a BSCE degree)	Engineering materials (general properties, testing and specifications). Stress-strain behavior of concrete and reinforcing bars. Properties and testing of concrete making materials (cement, aggregates, mixing water and admixtures). Requirements and design of concrete mixes. Mixing, placing and curing of concrete. Quality control and statistical evaluation. 3 (2,0,2)
Prerequisite	CE 302 (Mechanics of Materials), Prerequisite by Topics: 1. Determining the area properties of various cross sections. 2. Understanding stress-strain relationship – normal stresses. 3. Understanding of equilibrium equations to analyze engineering problems.
Course Learning Outcomes	Students completing this course successfully will be able to 1. Describe and discuss the mechanical properties of structural materials. 2. Practice the method of testing according to standards and specifications and interpretation of test results. 3. Describe the properties of the constituent materials of concrete. 4. Design of concrete mixture, including batching, mixing and curing. 5. Application of statistical tools for quality control of concrete.
Topics Covered	1. Introduction, properties and testing of engineering materials (2 hours) , 2. Mechanical behaviour (stress-strain diagram), (3 hours) , 3. Standards and specifications (2 hours) , 4. Portland Cements: Manufacture, Chemical composition, Types, physical properties, Special cements (4 hours) . 5. Aggregates: Types, grading, properties and quality tests (3 hours) . 6. Mixing Water for Concrete (1 hour) . 7. Introduction to admixtures, (2 hours) . 8. Proportioning Normal Concrete Mixtures: Selecting Mix Characteristics (strength, durability, water-cement ratio, Aggregates, Cement content, Slump), (5 hours) . 9. Batching, Mixing, Placing and Curing of Concrete (2 hours) . 10. Quality control and statistical evaluation for concrete. (4 hours) .

Class/ tutorial Schedule	Lecture is held twice a week 50-minute each session. Lab is held twice a week 50-minute each session.												
Computer Applications	MS word and Excel												
Project	None												
Contribution of Course to Meeting the Professional Component	<ol style="list-style-type: none"> 1. Use of engineering codes and standards (primarily ACI318 or SBC 304) and SBC 301 2. The students are given an open-ended design project as compared to guided design calculations in typical homework assignments. 3. Preliminary design and final design are expected. 												
Relationship of Course to Program Outcomes	<ol style="list-style-type: none"> 4. An ability to apply knowledge of mathematics, science, and engineering 5. An ability to design and conduct experiments, as well as to analyze and interpret data 6. An ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, Environmental, social, ethical, health and safety, and sustainability. 7. An ability to identify, formulate, and solve engineering problems including the ability to evaluate and synthesize information and develop alternative solutions 8. An understanding of professional and ethical responsibility 												
Textbook(s) and/or Other Required Material	1. Kosmatka, S. H., W. C. Panarese, et al. (2002). <u>Design and control of concrete mixtures</u> , Portland Cement Association Skokie, IL.												
Grade Distribution	<table> <tr> <td>1st Mid-Term Exam</td> <td>20%</td> </tr> <tr> <td>2nd Mid-Term Exam</td> <td>25%</td> </tr> <tr> <td>Final Exam</td> <td>40%</td> </tr> <tr> <td>Lab Reports, and Attendance</td> <td>12%</td> </tr> <tr> <td>Lectures' Attendance</td> <td>3%</td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </table> <p>1st Mid Term Exam: Sunday 01/12/1434 H,(06/11/2013),(6:00 PM) 2nd Mid Term Exam: Sunday, 27/01/1435 H, (01/12/2013), (5:30 PM)</p>	1 st Mid-Term Exam	20%	2 nd Mid-Term Exam	25%	Final Exam	40%	Lab Reports, and Attendance	12%	Lectures' Attendance	3%	Total	100%
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Instructors	Prof. Abdulrahman Alhozaimy and Prof Abdulaziz Al-Negheimish, Prof. Mohammad Al-Shannag												
Date of Preparation	01 September 2013												