

College of Engineering

Department of Civil Engineering

جامعة
الملك سعود
King Saud University



CE 477 Concrete Technology

Credit and Contact hours	3 / 3 (Lectures), 1 (Tutorials), 0 (Laboratory)	
Required, or Elective	Elective for a BSCE degree	
Course Description	Chemical composition of Portland cement. Structure of hydrated cement paste. Chemical and mineral admixtures. Properties of fresh concrete. Hot weather concreting and influence of curing. Durability of concrete. Quality of concrete and compliance with specifications. Field visits and group project.	
Prerequisites or Co-requisites	CE 306 (Properties and Testing of Structural Materials)	
Course Learning Outcomes	Students completing this course successfully will be able to	
	Course Learning Outcomes	<i>Related Student Outcomes (SO)</i>
	CLO1. Identify the proper type of cement and cementitious materials for use in concrete mixtures based on relevant current standards to achieve the required properties as per project specification.	SO6
	CLO2. Investigate different stages of concrete manufacturing including batching, mixing, transporting, placing, and curing of concrete, and assess its effects on quality of concrete mixtures.	SO6
	CLO3. Evaluate concrete mixtures for compliance with workability, strength and durability requirements by codes and standards taking into consideration environmental and economic aspects	SO4
	CLO4. Evaluate hot weather conditions and apply precautions to avoid practical field problems.	SO4
	CLO5. Analyze compressive strength data to assess production control, concrete quality and compliance with project specifications	SO6
CLO6. Develop solution when faced with new concrete problems utilizing self-learning strategies..	SO7	
Student Outcomes related to this Course	<p>SO 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. [ABET 6]</p> <p>SO 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. [ABET 4]</p>	

	SO 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [ABET 7]	
Topics Covered	List of Topics	Related CLOs
	1. Introduction	CLO1
	2. Chemical composition of Portland cement and their characteristics	CLO1
	3. Structure of hydrated cement paste (hydration products, voids and properties)	CLO1
	4. Supplementary Cementitious Materials (SCMs)	CLO1
	5. Chemical Admixtures for concrete	CLO3
	6. Properties of fresh concrete (workability, slump loss, segregation, bleeding)	CLO3
	7. Concrete production, handling, placing and finishing	CLO2
	8. Curing of concrete	CLO2
	9. Hot weather and its impact on fresh and hardened concrete properties with emphasis on plastic shrinkage and control of concrete temperature	CLO4
	10. Durability of concrete (basic concept & durability requirements, permeability, chemical attacks and corrosion of steel in concrete)	CLO3
	11. Quality concrete and compliance with specifications	CLO5
	12. Group Presentation	CLO6
13. Field Visit	CLO2	
Textbook(s) and Other Required Material	<ol style="list-style-type: none"> Design and Control of Concrete Mixtures by Steven Kosmatka and Michelle Wilson, 16th edition, PCA, USA. Concrete (Second Edition) by S. Mindess, J.F. Young and D. Darwin, Prentice-Hall Inc. NJ. Saudi Construction Code (SBC 302) Saudi Concrete Structures Code (SBC 304) 	
Grading System	Assignments	5%
	Quizzes	5%
	Field visit report	5%
	Term Project	10%
	Mid-term exams	35 %
	Final Exam:	40%
Instructors	Prof. Abdulaziz Al-Negheimish, email; negaimsh@KSU.EDU.SA	
Date of Review	September 2020	