جامعة الملك سعود
King Saud University 1957

CE 576   Structural Reliability

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Elective
Course Description	Common probability models. Principles of structural reliability. First and second order methods. Simulation techniques. Probabilistic models for loads and resistance variables. Probability-based design criteria and Design Codes; quantitative risk evaluation, safety and load factor determination. Project
Prerequisites or Co-requisites	None

Course Learning Outcomes	Students completing this course successfully will be able to:	

Course Learning Outcomes (CLOs)	Related Student Outcomes (SO)
CLO1. Recognize the role of structural reliability in the development of probability-based design codes. K1	**SO1**
CLO2: Determine the reliability of structural components and structural systems using approximate and simulation techniques. S1	**SO2**
CLO3: Use related computer programs to calculate the reliability of structural components and systems. S1	**SO2**
CLO4. Compare the computer programs' reliability results of structural components and systems with manual solutions. S1	**SO6**
CLO5. Demonstrate professional engineering and ethical values with high academic integrity in assigned projects and assignments. V1	**SO6**

Student Outcomes related to this Course	SO1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems. SO2 Provide solutions for complex and real-life engineering problems through critical thinking and the use of modern engineering tools, and identify their impact on social, global, cultural, environmental, safety, and economic factors. SO6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.

Topics Covered	**List of Topics**	**Related CLOs**
	1. Principles of structural reliability and quantitative risk evaluation	**CLO1**
	2. Common probability models	**CLO2, CLO3**
	3. First and second order methods	**CLO2, CLO3**
	4. Simulation techniques	**CLO2, CLO3**

	5. Probabilistic models for loads and load factor determination	**CLO2, CLO4, CLO5**
	6. Probabilistic models for resistance variables and safety factor determination	**CLO2, CLO4, CLO5**
	7. Probability-based design criteria and Design Codes	**CLO1, CLO4, CLO5**
Textbook(s) and Other Required Material	Nowak, A. S., & Collins, K. R. (2012). Reliability of structures. CRC press.	
Grading System	Assignments 20% Lecture Attendance -- Mini project and/or seminar 10% Mid-term exam 30% Final Exam 40%	
Instructors	Prof. Dr. Nadeem A. Siddiqui; Office 2A89; email: nadeem@ksu.edu.sa	
Date of Review	March, 2025	