College of Engineering

Department of Civil Engineering

CE 563 Advanced Structural Analysis

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Elective for a MSCE degree
Course Description	Energy principles, stiffness and flexibility methods, and their applications to non-prismatic members, arches, rings, curved members, cables, frames with semi-rigid connections.
Prerequisites or Co-requisites	None
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	Related Program Outcomes
CLO1: Recognize energy principles, stiffness and flexibility methods for the analysis of different types of structures.	**K1**
CLO2: Apply energy principles, stiffness and flexibility methods for the analysis of different types of structures.	**S1**
CLO3: Develop stiffness and flexibility matrices of structures for their implementation in the computer software.	**S1**
CLO4: Analyze different types of structures including frames, arches, rings, curved members, and cables using MATLAB and advanced computer programs.	**S1**

Student Outcomes related to this Course	**K1**. Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.

	S1. Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.

Topics Covered	List of Topics	Related CLOs
	1. Historical developments	CLO1
	2. Energy principles	CLO2
	3. Introduction to MATLAB	CLO4
	4. Stiffness and flexibility methods, and their applications to non-prismatic members	CLO3
	5. Arches, rings, curved members, cables	CLO4
	6. Overview of frames with semi-rigid connections	CLO1

Textbook(s) and Other Required Material	• Igor A. Karnovsky and Olga Lebed (2010). Advanced Methods of Structural Analysis. Springer. • William McGuire, Richard Gallagher, and Ronald Ziemian. Matrix Structural Analysis. 2nd Edition, John Wiley & Sons, Inc.

Grading System	Assignments and Homework 20% Presentation on a given topic 10% Midterm Exam 30% Final Exam 40%

Instructors	Prof. Husain Abbas; Office: 1A65; Email: habbas@ksu.edu.sa

Date of Review	February, 2021