College of Engineering

Department of Civil Engineering

CE 572 Computer Applications in Civil Engineering

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required
Course Description	Problem-solving programs: Spreadsheet and MATLAB. Mathematical programs: numerical integration, solution of differential and nonlinear equations. Statistical programs: analysis, modeling, and testing of data. Logical and optimization programs. Database, artificial intelligence, and expert system programs. Applications to all civil engineering disciplines. 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. Illustrate the solution of civil engineering-related mathematical problems by numerical techniques and computer programs. K1	**SO1**
CLO2. Learn the available statistical tools for presenting, analyzing, and interpreting civil engineering data. K1	**SO1**
CLO3. Solve constrained optimization problems of civil engineering by analytical techniques and computer-based optimization tools. S1	**SO2**
CLO4. Produce improved solutions for complex engineering problems using the Expert System. S1	**SO2**
CLO5. Design a database management system (DBMS) to store and retrieve database information conveniently and efficiently. S4	**SO5**
CLO6. Demonstrate professional engineering and ethical values in assigned projects and assignments with high academic integrity. 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.

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<tr><td></td><td>SO5 Design novel advanced Civil Engineering systems and evaluate their performance, sustainability, and effectiveness for engineering practice and their impact in global, economic, environmental, and societal contexts

SO6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.</td></tr>
<tr><td>Topics Covered</td><td>
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<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Course Description and Introduction to MATLAB</td><td>-</td></tr>
<tr><td>2. Numerical Integration</td><td>CLO1</td></tr>
<tr><td>3. Solution of Differential Equations</td><td>CLO1</td></tr>
<tr><td>4. Curve fitting, Regression, and Correlation</td><td>CLO2</td></tr>
<tr><td>5. Descriptive Statistics</td><td>CLO2</td></tr>
<tr><td>6. Probability Distributions</td><td>CLO2</td></tr>
<tr><td>7. Determination of Probability Distributions</td><td>CLO2</td></tr>
<tr><td>8. Linear Inequalities and Modeling of Decision-Making Problems</td><td>CLO3</td></tr>
<tr><td>9. Fundamentals of Optimization and Linear Programming</td><td>CLO3</td></tr>
<tr><td>10. Linear and Nonlinear Optimization using MATLAB</td><td>CLO3, CLO6</td></tr>
<tr><td>11. Design of a Database Management System</td><td>CLO5, CLO6</td></tr>
<tr><td>12. Artificial Intelligence and Expert System</td><td>CLO4, CLO6</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>Dependent on the chosen special topic(s)
Students are encouraged to search the internet for relevant research materials in reputable journals and scientific websites.</td></tr>
<tr><td>Grading System</td><td>
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<tr><td>Assignments</td><td>15%</td></tr>
<tr><td>Lecture Attendance</td><td>--</td></tr>
<tr><td>Mini Project and its presentation</td><td>15%</td></tr>
<tr><td>Mid-term exam</td><td>30%</td></tr>
<tr><td>Final Exam</td><td>40%</td></tr>
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<tr><td>Instructors</td><td>Prof. Nadeem A. Siddiqui; Office 2A89; email: nadeem@ksu.edu.sa
Prof. Husain Abbas; Office 1A65; email: habbas@ksu.edu.sa</td></tr>
<tr><td>Date of Review</td><td>March, 2025</td></tr>
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