SHIV NADAR UNIVERSITY

GRADUATE COURSE DESCRIPTION

I. **COURSE TITLE: Numerical Methods**

II. **COURSE CODE :** CED643

III. **COURSE CREDITS (L:T:P):** 4 (3 L: 1 T: 0 P)

IV. **TOTAL CONTACT HOURS/ BATCH/WEEK (L:T:P):** 4 (3 L: 1 T: 0 P)

V. **COURSE TYPE (Core/Elective):** Elective

VI. **PREREQUISITE/S (IF ANY):** None

VII. **SCHOOL/ DEPARTMENT:** Civil Engineering

VIII. **COURSE CONTENT & SYLLABUS:**

1. Introduction to MATLAB
2. Error Analysis and Error Propagation
3. Visualization
4. Matrix Representation, Operations and Vectorization
5. Linear Systems
6. Roots and Optimization
7. Interpolation
8. Regression and Model Fitting
9. Integration and Differentiation
10. Ordinary Differential Equations
11. Monte Carlo Simulations
12. Nonlinear Equations
13. Evolutionary Computations

IX. **EVALUATION SCHEME:**

Project/Homework Assignments – 30%

Quizzes (Quiz 1 & 2) – 20 %

Mid-term examination – 20 %

Final examination – 30%

A student has to score minimum 50% to pass the course.

X. **RECOMMENDED READINGS:**

1. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, 3rd Edition, McGraw-Hill, 2012.
2. Jaan Kiusalaas, Numerical Methods in Engineering with MATLAB, 3rd Edition, Cambridge University Press, 2016.
3. Abhishek Gupta, Numerical Methods using MATLAB, APress, 2014.
4. C. Woodford, C. Phillips, Numerical Methods with Worked Examples: Matlab Edition, Springer, 2012.
5. John H. Mathews and Kurtis D. Fink, Numerical Methods with MATLAB, 4th Edition, Pearson, 2004.
6. Abdelwahab Kharab and Ronald B. Guenther, An Introduction to Numerical Methods: A MATLAB Approach, 3rd Edition, 2011.
7. Ramin S. Esfandiari, Numerical Methods for Engineers and Scientists Using MATLAB, CRC Press, 2013.
8. Won Y. Yang, Wenwu Cao, Tae-Sang Chung and John Morris, Applied Numerical Methods Using MATLAB, Wiley, 2005.