COMPUTATIONS LAB
(Lab Elective-II)

II Semester

Course Code: 19ME2165

L	P	C
0	3	1.5

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply various commands to do various matrix operations and plot 2D/3D figures to analyze data.
CO2: Develop programs to find roots of an equation and solve system of linear equations.
CO3: Create programs for interpolation and regression of give data.
CO4: Develop programs to solve ordinary differential equations.
CO5: Use software toolboxes to solve problems related to neural networks, fuzzy logic and genetic algorithms.

List of Experiments:

Note: Any ten exercises from the following.

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Transpose, determinant, inverse, Eigenvalues and Eigenvectors of a matrix.
3. Plotting tools for 2 dimensional and 3 dimensional plots, putting legends, texts, using subplot tool for multiple plots.
4. Write a program for finding the roots of an equation using (1) Bisection (2) Newton methods.
5. Write a program for solving system of linear equations using Gauss elimination method.
6. Write a program for finding natural cubic spline that interpolates a table of values.
7. Write a program for determining least square polynomial fit of degree m for given data.
8. Write a program for solving ordinary differential equation by numerical methods.
9. Training and testing data using neural networks
10. Interpretation of data using fuzzy logic toolbox
11. Solve optimization problems using genetic algorithms
12. Design a simple mechanical system using Simulink/SimMechanics.

TEXT BOOKS:

1. Abdel Wahhab Kharab, Ronald B Guenther, *Introduction to Numerical Methods, A Matlab Approach*, 4th Edition, Chapman & CRC Press, 2018.

REFERENCE BOOK:

1. Chapman S.J., *Essentials of MATLAB Programming*, Cengage Learning, 2nd Edition, 2008.