# NUMERICAL SIMULATION LAB (MATLAB)
## (Skill Oriented Course Elective – I/II)

**Course Code: 22ME11S1**

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**Course Outcomes:** At the end of the course the student shall be able to **CO1**
use MATLAB commands to perform matrix operations.

**CO2** illustrate plotting of two dimensional and three dimensional plots

**CO3** use MATLAB commands to solve linear and non-linear equations

**CO4** solve engineering optimization problems

**CO5** solve mechanical engineering problems

## LIST OF EXERCISES

Note: Any 12 exercises of the following are to be performed.

1. MATLAB environment and commands.
2. Linear Algebra and matrices
3. 2-D and 3-D plotting
4. Finding the minimum of an unconstrained function
5. Finding the minimum of an constrained function using tool box
6. Solutions to systems of linear equations
7. Solutions to systems of nonlinear equations
8. MATLAB scripts and functions
9. Calculate and plot the bending stress and deflection in different types of beams
10. Solve kinematic equations of slider crank mechanism
11. Determine Eigen values (natural frequencies) and Eigen vectors (mode shapes) of cantilever beam
12. Calculate design parameters of closed coil helical sprigs and spur gears
13. Determine and plot fully developed velocity profile for internal flow through a circular pipe
14. Calculate and plot temperature distribution along composite wall due to heat conduction

**Software used: MATLAB**