# CE3330: Computer Methods in Civil Engineering

**Credit Distribution:** C:9 L:3 T:0 P:0 E:0 O:6 TH:0

**Course Type:** Theory

**Description:** To introduce different computational tools for different civil engineering problems.

**Course Content:** Revisit different mathematical models in engineering problems, ODE and PDE in engineering, Boundary value and initial value problem. Basic equations in engineering mechanics, stress-strain relations, strain displacement relations, boundary conditions,1D/2D/3D examples in civil engineering. Different methods to solve linear/non-linear equations, Practice problems on writing M-files in MATLAB. Introduction to finite difference method, Example application to civil engineering problems. Introduction to finite element method, Application to various fields in civil engineering, Case studies and practice sessions. Introduction to discrete element method, Application to civil engineering. Introduction to boundary element method, Application to civil engineering. Stability and dynamic problems, Solution to Eigen value problems, Implicit and explicit methods.

**Text Books**

- Notes/handouts given by the course instructor.
- Different software manuals

**Reference Books**

- Higher Engineering Mathematics, Dr. B. S. Grewal, 43$^{rd}$ ed., Khanna Publishers, Delhi.
- An Introduction to the Finite Element, Dr. J. N. Reddy.

**Prerequisite:** NIL