Numerical Methods	COE213
Prerequisite : E201 and COE207	(3-2-0-2)

Modeling, Computers, and Error Analysis. Roots of Equations: Bracketing Methods: Graphical Methods, The Bisection Method, The False-Position Method, Incremental Searches and Determining Initial Guesses; Open Methods: Simple Fixed-Point Iteration, The Newton-Raphson Method, The Secant Method, Multiple Roots, Systems of Nonlinear Equations. Roots of Polynomials: polynomials in Engineering and Science, Computing with Polynomials, Conventional Methods, Müller's Method, Bairstow's Method. Linear Algebraic Equations: Gauss Elimination: Solving Small Numbers of Equations, Naïve Gauss Elimination, Pitfalls of Elimination Methods, Nonlinear Systems of Equations, Gauss-Jordan; LU Decomposition and Matrix Inversion: LU Decomposition, The Matrix Inverse, Error Analysis and System Condition. Optimization: One-Dimensional Unconstrained Optimization: Golden-Section Search, Quadratic Interpolation, Newton's Method; Multidimensional Unconstrained Optimization: Direct Methods, Gradient Methods; Constrained Optimization: Linear Programming, Nonlinear Constrained Optimization.

Practical part: Roots of Equations. Roots of Polynomials. Linear Algebraic Equations. Gauss Elimination. Matrix Inversion. Optimization, One-Dimensional Unconstrained Optimization, Multidimensional Unconstrained Optimization.