



# P. E. S. COLLEGE OF ENGINEERING, MANDYA

(An Autonomous Institution affiliated to VTU, Belgaum)

## DEPARTMENT OF MATHEMATICS

Sub. Code: P18MAO751

Credits: 4-0-0

Total hours: 52

Hours per week: 04

### VII SEMESTER B.E. – ACADEMIC YEAR: 2021-22 GRAPH THEORY, NUMBER THEORY AND ANALYSIS (Open Elective Common to all Branches)

#### UNIT-1

**Numerical Method:** Errors in numerical Techniques, Machine computation and computer software. Transcendental and Polynomial Equations: Introduction, Secant method, Birge–Vieta method, Bairstow method, Graffe’s root squaring method (Problems only). [10 hours]

**Self-study component:** Multipoint iteration methods-Muller’s method.

#### UNIT-2

**Divisibility and Primes:** Recapitulation of Division algorithms, Euclid’s algorithm, Greatest common divisor, Linear Diophantine equations. Fundamental theorem of Arithmetic, Prime numbers and Prime - power factorisations. Euler’s  $\phi$  –function and divisor function. [10 hours]

**Self-study component:** Basics of number systems, algebraic operations with integers.

#### UNIT-3

**Congruence’s:** Residue classes and complete residue systems, Polynomial congruence’s modulo “P”, Lagrange’s theorem and Wilson’s theorem, Simultaneous Linear congruences, simultaneous non-linear congruences, Chinese Remainder Theorem, Solving Congruences modulo Prime powers. [12 hours]

**Self-study component:** Basics of modular arithmetic, Congruence’s and its properties, system of equation.

#### UNIT-4

**Matrix of Graphs:** Introduction – Sub-graphs, graph isomorphism, connectedness, the centre of a graph, distant vertices, locating number of graphs, Incidence Matrix of a graph, rank of a graph, Adjacency matrix, Eigen values of some graphs, Energy of a graph. [10 hours]

**Self-study component:** Walk path, trail in a graph, radius and geodesics of graphs, adjacency and incidence of vertices and edges.

#### UNIT-5

**Graph theory:** Graph colouring, application of graph colouring, chromatic number and chromatic polynomial, the time table problem, Kirkman’s schoolgirl problem, Domination number of graphs and bounds for the domination. [10 hours]

**Self-study component:** Partition of vertices and edges, edges and vertex labeling, basics of simple electrical circuits