MATHEMATICS – II (Mathematical Methods)
(ECE & EEE)

Course Objectives:
1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
3. Understand the most basic numerical methods to solve simultaneous linear equations
4.

Course Outcomes: At the end of the Course, Student will be able to:
1. Determine the numerical solution of the algebraic and transcendental equations and discuss the difference operators.
2. Use interpolation techniques for data analysis and numerically solve the initial value problems
3. Calculate the Fourier series and Fourier Transforms for certain functions
4. Appling the Partial differential equations to solve the Wave, Heat and Laplacian equations
5.

UNIT I: Solution of Algebraic and Transcendental Equations:
Introduction- Bisection method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation:
Introduction- Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences –Central differences – Symbolic relations and separation of symbols - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:
Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations-Euler's method - Runge-Kutta method (second and fourth order)

Unit-IV: Fourier Series:
Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet's conditions – Even and odd functions –Change of interval– Half-range sine and cosine series

Unit-V: Fourier Transforms:
Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

Unit-VI: Applications of Partial Differential Equations
Method of separation of Variables- Solution of One dimensional Wave, Heat and two-dimensional Laplace equation

Text Books:
1. **B.S.GREWAL,** Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **T.K.V.Iyengar, B.Krishna Gandhi, S.Ranganathan, M.V.S.S.N.Prasad**, Engineering Mathematics (Volume-II), S Chand Publications

Reference Books:
1. **DEAN G. DUFFY,** Advanced engineering mathematics with MATLAB, CRC Press
2. **V.RAVINDRANATH and P.VIJAYALAKSHMI,** Mathematical Methods, Himalaya pubHouse.
3. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 10th Edition, Wiley-India
4. **DAVID KINCAID, WARD CHENEY**, Numerical Analysis-Mathematics of Scientific Computing, 3rd Edition, Universities Press