

GUJARAT TECHNOLOGICAL UNIVERSITY

POWER ELECTRONICS (29)
HIGHER ENGINEERING MATHEMATICS
SUBJECT CODE: 2712909
SEMESTER: I

Type of course: Foundation

Prerequisite: Algebra, Trigonometry and Basic Calculus, ODE, Basic Software skill

Rationale: To understand different methods of solution for various equations and compare them. This subject gives idea for the solution of different linear, non-linear and differential equation. It also covers importance and application of Fourier series

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits C | Examination Marks | | | | | | Total Marks |
|-----------------|-----|----|--------------|-------------------|--------|-----------------|--------|----|----|-------------|
| L | T | P | | Theory Marks | | Practical Marks | | | | |
| | | | ESE (E) | PA (M) | PA (V) | | PA (I) | | | |
| ESE | OEP | PA | | | RP | | | | | |
| 3 | 2# | 0 | 4 | 70 | 30 | 30 | 0 | 10 | 10 | 150 |

Content:

| Sr. No. | Topics | Teaching Hrs. | Module Weightage |
|---------|---|---------------|------------------|
| 1 | Fourier Series and Fourier Integral : Fourier Series for continuous function and discontinuous function, even-odd functions, Half range Fourier cosine and sine series, Fourier Integral, Case studies | 10 | 25 |
| 2 | Solution for System of Linear Equations Gauss Elimination method and Consistency for system of Linear equations, Inverse of matrix, Eigen value and Eigen vectors, Case studies | 8 | 20 |
| 3 | Interpolation and Numerical Integration Lagrange interpolation, Newton's divided difference, Newton's forward and backward interpolation, Trapezoidal rule, Simpson's rule, Weddle's rule, Case studies | 8 | 20 |
| 4 | Roots of Equations Bi-section method, Newton Raphson method, Secant method, Power method for Computation of Eigen Values, Case studies | 8 | 15 |
| 5 | Ordinary Differential Equations Taylor's method, Runge Kutta's method and Euler's method, Case studies | 8 | 20 |

Reference Books:

1. Numerical Methods for Engineers, Steven Chapra, Raymond Canale, Tata McGraw Hill Publication
2. Numerical Analysis, Richard, Cengage Publication
3. Advanced Engineering Mathematics, E. Kreyszig, John Wiley
4. Elementary Numerical Analysis – An algorithmic Approach, S. D. Conte and Carl de boor, McGraw Hill

5. Fourier Series and boundary value problems, R. V. Churchill and J. W. Brown, McGraw Hill

Course Outcome:

After learning the course the students should be able to:

1. Determine The Roots Of General Functions And Zeros Of Polynomial
2. Determine The Solution Of Linear And Non Linear Equations
3. Determine Interpolation
4. Determine The Numerical Differentiation And Numerical Integration
5. Determine Fourier Series And Fourier Integral Of A Function.

Major Equipments:

Computer System Possibly with Matlab or Scilab

List of Open Source Software/learning website:

NPTEL – Computational Techniques – Video Course by Prof. Dr. Niket S. Kaisare, IIT Madras

Link : <http://nptel.ac.in/courses/103106074/>