

ENGINEERING MATHEMATICS-III
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2017-2018)

SEMESTER – III

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| Subject Code | 17MAT31 | IA Marks | 40 |
| Number of Lecture Hours/Week | 04 | Exam Marks | 60 |
| Total Number of Lecture Hours | 50 | Exam Hours | 03 |

CREDITS – 04

Module -1

Fourier Series: Periodic functions, Dirichlet's condition, Fourier Series of periodic functions with period 2π and with arbitrary period $2c$. Fourier series of even and odd functions. Half range Fourier Series, practical harmonic analysis-Illustrative examples from engineering field.

Teaching Hours

10Hours

Module -2

Fourier Transforms: Infinite Fourier transforms, Fourier sine and cosine transforms. Inverse Fourier transform.
Z-transform: Difference equations, basic definition, z-transform-definition, Standard z-transforms, Damping rule, Shifting rule, Initial value and final value theorems (without proof) and problems, Inverse z-transform. Applications of z-transforms to solve difference equations.

10 Hours

Module – 3

Statistical Methods: Review of measures of central tendency and dispersion. Correlation-Karl Pearson's coefficient of correlation-problems. Regression analysis- lines of regression (without proof) –problems
Curve Fitting: Curve fitting by the method of least squares- fitting of the curves of the form, $y = ax + b$, $y = ax^2 + bx + c$ and $y = ae^{bx}$.
Numerical Methods: Numerical solution of algebraic and transcendental equations by Regula- Falsi Method and Newton-Raphson method.

10 Hours

Module-4

Finite differences: Forward and backward differences, Newton's forward and backward interpolation formulae. Divided differences- Newton's divided difference formula. Lagrange's interpolation formula and inverse interpolation formula (all formulae without proof)-Problems.
Numerical integration: Simpson's $(1/3)^{th}$ and $(3/8)^{th}$ rules, Weddle's rule (without proof) – Problems.

10 Hours

Module-5

Vector integration: Line integrals-definition and problems, surface and volume integrals-definition, Green's theorem in a plane, Stokes and Gauss-divergence theorem(without proof) and problems.
Calculus of Variations: Variation of function and Functional, variational problems. Euler's equation, Geodesics, hanging chain, problems.

10 Hours

Course outcomes:

After Studying this course, students will be able to

- Know the use of periodic signals and Fourier series to analyze circuits and system communications.
- Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.
- Employ appropriate numerical methods to solve algebraic and transcendental equations.
- Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
- Determine the extremals of functionals and solve the simple problems of the calculus of variations.

Question paper pattern:

The question paper will have ten questions.

There will be 2 questions from each module.

Each question will have questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. B. S. Grewal, "Higher Engineering Mathematics", Khanna publishers, 42nd edition, 2013.
2. B.V. Ramana "Higher Engineering Mathematics" Tata McGraw-Hill, 2006.

Reference Books:

1. N. P. Bali and Manish Goyal, "A text book of Engineering mathematics", Laxmi publications, latest edition.
2. Kreyszig, "Advanced Engineering Mathematics" - 9th edition, Wiley.
3. H. K Dass and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand, 1st ed.



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