ENGINEERING MATHEMATICS - IV

Sub Code	:	10MAT41	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

UNIT 1:

Numerical Methods

Numerical solutions of first order and first degree ordinary differential equations – Taylor's series method, Modified Euler's method, Runge – Kutta method of fourth order, Milne's and Adams-Bashforth predictor and corrector methods (All formulae without Proof).

UNIT 2:

Complex Variables

Function of a complex variable, Limit, Continuity Differentiability – Definitions. Analytic functions, Cauchy – Riemann equations in cartesian and polar forms, Properties of analytic functions. Conformal Transformation – Definition. Discussion of transformations: $W = z^2$, $W = e^z$, $W = z + (1/z)$, $z \neq 0$ Bilinear transformations.

UNIT 3:

Complex Integration

Complex line integrals, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series (Statements only) Singularities, Poles, Residues, Cauchy's residue theorem (statement only).

UNIT 4:

Series solution of Ordinary Differential Equations and Special Functions

Series solution – Frobenius method, Series solution of Bessel's D.E. leading to Bessel function of fist kind. Equations reducible to Bessel's D.E., Series solution of Legendre's D.E. leading to Legendre Polynomials. Rodirgue's formula.

UNIT 5:

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Statistical Methods

Curve fitting by the method of least squares: $y = a + bx$, $y = a + bx + cx^2$, $y = ax^b$ $y = ab^x$, $y = ae^{bx}$, Correlation and Regression.

Probability: Addition rule, Conditional probability, Multiplication rule, Baye's theorem.

UNIT 6:
Random Variables (Discrete and Continuous) p.d.f., c.d.f. Binomial, Poisson, Normal and Exponential distributions.

UNIT 7:
Sampling, Sampling distribution, Standard error. Testing of hypothesis for means. Confidence limits for means, Student's t distribution, Chi-square distribution as a test of goodness of fit.

UNIT 8:
Concept of joint probability – Joint probability distribution, Discrete and Independent random variables. Expectation, Covariance, Correlation coefficient.
Probability vectors, Stochastic matrices, Fixed points, Regular stochastic matrices. Markov chains, Higher transition probabilities. Stationary distribution of regular Markov chains and absorbing states.

Text book:
1. **Higher Engineering Mathematics** by Dr. B.S. Grewal, 36th Edn. Kanna Publications.
2. **Probability** by Seymour Lipschutz (Schaum's series)

Reference Books:
1. **Higher Engineering Mathematics** by B.V. Ramana (Tata-Macgraw Hill).
2. **Advanced Modern Engineering Mathematics** by Glyn James – Pearson Education.

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