APPLIED MATHEMATICS-I

Paper Code : ETMA-101	**L**	**T**	**C**
Paper : Applied Mathematics-I	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

UNIT- I

Successive differentiation: Leibnitz theorem for n^{th} derivative (without proof). Infinite series: Convergence and divergence of infinite series, positive terms infinite series, necessary condition, comparison test (Limit test), D'Alembert ratio test, Integral Test, Cauchy's root test, Raabe's test and Logarithmic test(without proof). Alternating series, Leibnitz test, conditional and absolutely convergence. Taylor's and Maclaurin's expansion(without proof) of function (e^x, log(1+x), cos x , sin x) with remainder terms ,Taylor's and Maclaurin's series, Error and approximation.

[T1], [T2][No. of hrs. 12]

UNIT- II

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar curves. Integration: integration using reduction formula for $\int_0^{\frac{\pi}{2}} sin^n\theta\, d\theta$, $\int_0^{\frac{\pi}{2}} cos^n\theta d\theta$, $\int_0^{\frac{\pi}{2}} sin^n\theta cos^m\theta d\theta$. Application of integration : Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

[T1],[T2][No. of hrs. 12]

UNIT- III

Matrices: Orthogonal matrix, Hermitian matrix, Skew-Hermitian matrix and Unitary matrix. Inverse of matrix by Gauss-Jordan Method (without proof). Rank of matrix by echelon and Normal (canonical) form. Linear dependence and linear independence of vectors. Consistency and inconsistency of linear system of homogeneous and non homogeneous equations . Eigen values and Eigen vectors. Properties of Eigen values (without proof). Cayley-Hamilton theorem (without proof). Diagonlization of matrix. Quadratic form, reduction of quadratic form to canonical form.

[T1], [T2][No. of hrs. 12]

UNIT-IV

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli's equation. Exact differential equations , Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters. Bessel's and Legendre's equations (without series solutions), Bessel's and Legendre's functions and their properties.

[T1],[T2][No. of hrs. 12]

Text:

[T1] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
[T2]. R. K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications.

References:

[R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
[R2] G.Hadley, " Linear Algebra" Narosa Publication
[R3] N.M. Kapoor, " A Text Book of Differential Equations", Pitambar publication.
[R4] Wylie R, " Advance Engineering mathematics" , McGraw-Hill
[R5] Schaum's Outline on Linear Algebra, Tata McGraw-Hill
[R6] Polking and Arnold, " Ordinary Differential Equation using MatLab" Pearson.