

AHL-103-A	APPLIED MATHEMATICS-I	L	T	P	Cr.
		3	1	0	4

(Common for B. Tech, Integrated M. Tech, Dual Degree MBA)

Total: 150 Marks

Duration of Exam: 3 Hrs

SECTION – A

UNIT-I

LINEAR ALGEBRA–MATERICES & ITS APPLICATION: Elementary transformations, elementary matrices, Inverse of matrix by elementary operations, Rank of a matrix, normal form of a matrix, Consistency of linear simultaneous equations, Eigen values and Eigen vectors, properties of eigenvalues Caley – Hamilton theorem (without proof)

UNIT-II

CALCULUS OF ONE & MORE VARIABLE WITH APPLICATIONS: Successive differentiation, Leibnitz theorem Mc Lauren’s and Taylor’s expansion of functions, Asymptotes of Cartesian curves, Curvature of curves in Cartesian, parametric and polar coordinates

UNIT-III

ORDINARY DIFFERENTIAL EQUATIONS: First order differential equations – exact and reducible to exact form. Solution of first order differential equation, Applications of differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories

SECTION – B

UNIT-IV

INFINITE SERIES: Sequences, Series, Convergence and Divergence of Infinite series, Comparison test, D’Alembert’s ratio test, Cauchy’s root test, Raabe’s test, Logarithmic test, Gauss test, Cauchy’s Integral test, Alternating series; Leibnitz test, Series of positive or negative terms, Absolute and conditional convergence

UNIT-V

PARTIAL DIFFERENTIATION AND ITS APPLICATIONS: partial derivatives, total differential and differentiability, derivatives of composite and implicit functions, jacobians, higher order

partial derivatives, homogeneous functions, Euler's Theorem and applications Taylor's series for functions of two variables (without proof), maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT-VI

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations, Lagrange's linear partial differential equation, first order non-linear partial differential equation, Charpit's method, method of separation of variables.

Suggested Readings:

1. Advanced Engineering Mathematics by Kresyzig, E. John Wiley and Sons. (Latest edition).
2. Higher Engineering Mathematics by B.S. Grewal
3. Engineering Mathematics by N.P. Bali, Laxmi Publications.
4. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar. Narosa
5. Foundations of mathematical analysis by S. Ponnusamy. Springer
6. Advanced Engineering Mathematics by Wylie, R., McGraw-Hill, 1995.
7. Advanced Engineering Mathematics by Dr. A. B. Mathur, V. P. Jaggi (Khanna publications)

AHL-104-A	APPLIED MATHEMATICS-II	L	T	P	Cr.
		3	1	0	4

(Common for B. Tech, Integrated M. Tech, Dual Degree MBA)

Total: 150 Marks

Duration of Exam: 3 Hrs

SECTION – A

UNIT – I

VECTOR CALCULUS: Differentiation of vectors, Scalar and Vector point functions, Gradient, Divergence, Curl with geometrical physical interpretations, Directional derivatives, Properties. Integration of vector functions, Line integrals

UNIT – II

APPLICATIONS OF VECTOR: Green's theorem in the plane, Surface integrals and Volume integrals, Stoke's theorem and Gauss divergence theorem (both without proof) and their applications.

UNIT – III

HIGHER ORDER DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS: Linear differential equations of second and higher order, Complete solution, complementary function and particular integral, method of variation of parameters to find particular integral, Cauchy's and Legendre's linear equations. Simultaneous linear equations with constant co-efficient, Applications of linear differential equations to simple pendulum, oscillatory electric circuits,

SECTION – B

UNIT-IV

LAPLACE TRANSFORMATION AND ITS APPLICATIONS: Existence condition, Laplace transform of standard functions, Properties, Inverse Laplace transform of functions using partial fractions and Convolution, Solution of linear differential equations and integral equation using Laplace transform. Unit step function, Impulse function and Periodic function and their transforms

UNIT-V

INTEGRAL CALCULUS: Beta and gamma functions and relationship between them. Dirichlet's integral , Double integral, change of order of integration, double integral in polar coordinates, triple integral , change of variables

UNIT-VI

APPLICATIONS OF INTEGRAL CALCULUS: Applications of double integral to find area enclosed by plane curves, volume as double integral , volume as triple integral , volume of solids of revolution

Suggested Readings:

1. Kresyzig, E. "Advanced Engineering Mathematics", John Wiley and Sons.(Latest edition).
- 2 . Higher Engineering Mathematics : B.S. Grewal
- 3.Engineering Mathematics by N.P. Bali ,Laxmi Publications.
- 4.Advanced engineering Mathematics by R.K.Jain & S.R.K.Iyengar
- 5FOUNDATIONS OF MATHEMATICAL ANALYSIS byS. Ponnusamy.Springer
6. Wylie, R., "Advanced Engineering Mathematics", McGraw-Hill, 1995.
- 7."Advanced Engineering Mathematics", Dr. A. B. Mathur, V. P. Jaggi (Khanna publications)