

SEMESTER-1

15MA103	Matrices and Calculus	L	T	P	C
		3	2	0	4
Total contact hours = 60 hours					
(For Bio group)					

Purpose:
To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

Instructional objectives:	
1	To apply advanced matrix knowledge to Engineering problems.
2	To improve their ability in trigonometry.
3	To equip themselves familiar with the concepts of Differential calculus
4	To expose to the concept of integral calculus
5	To familiarize with the applications of differential and integral calculus

UNIT I MATRICES

*Review types of matrices, properties. Inverse matrix Cramer’s rule for solving a system of linear equations. – Rank of Matrix – Consistency and Inconsistency of a system of m linear equations in ‘n’ unknowns –Cayley Hamilton theorem – Eigen values and Eigen vectors of a real matrix. **(12 Hours)**

UNIT II TRIGONOMETRY

*Review of complex numbers. De Moiver’s theorem and its applications. Expansion of $\sin n\theta$, $\cos n\theta$ in terms of $\sin \theta$ and $\cos \theta$. Expansion of $\tan n\theta$ in terms of $\tan \theta$. Expansion of $\sin^n \theta$ and $\cos^n \theta$ in terms of sines and cosines of multiples of θ . Hyperbolic functions and inverse hyperbolic functions. **(12 Hours)**

UNIT III DIFFERENTIAL CALCULUS

Differentiation and Derivatives of simple functions – Successive Differentiation – Various forms of Algebraic and Trigonometric functions – Problems. **(12 Hours)**

UNIT IV INTEGRAL CALCULUS

Methods of integration – Definite integrals and its properties-Reduction formula for e^{ax} , $\sin^n x$, $\cos^n x$, $\sin^n x \cos^m x$ (without proof) - Problems **(12 Hours)**

UNIT V APPLICATIONS OF DIFFERENTIAL CALCULUS & INTEGRAL CALCULUS

Applications of differential calculus & integral calculus. Tangent & Normal-Radius of curvature – Velocity and acceleration . Integral calculus - Length & Area. **(12 Hours)**

***No questions should be asked in the Review part**

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TEXT BOOKS:

1. Kreyszig.E, “Advanced Engineering Mathematics”, John Wiley & Sons. Singapore, 10th edition, 2012.
2. K.Ganesan, Sundarammal Kesavan, K.S.Ganapathy Subramanian & V.Srinivasan, “*Matrices and Calculus*”, Revised Edition, 2013.

REFERENCES:

1. Grewal B.S, Higher Engg Maths, Khanna Publications, 42nd Edition,2012.
2. Veerajan, T., Engineering Mathematics I, Tata McGraw Hill Publishing Co., New Delhi, 5th edition, 2006.
3. Kandasamy P etal. Engineering Mathematics, Vol.I (4th revised edition), S.Chand &Co., New Delhi,2000.
4. Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., Advanced Mathematics for Engineering students, Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.
5. Venkataraman M.K., Engineering Mathematics – First Year (2nd edition), National Publishing Co., Chennai,2000.
6. David E.Penney and C.Henry Edwards, Single Variable Calculus, Prentice Hall; 6th edition, 2002.