15MA101	Calculus and Solid Geometry	L	T	P	C
		3	2	0	4
	Total contact hours = 60 hours				
	(Common to all Branches of Engineering except 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 equip themselves familiar with the functions of several variables.
3	To familiarize with the applications of differential equations.
4	To improve their ability in solving geometrical applications of differential calculus problems
5	To expose to the concept of three dimensional analytical geometry.

UNIT I MATRICES
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Cayley – Hamilton theorem orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformations. **(12 Hours)**

UNIT II FUNCTIONS OF SEVERAL VARIABLES
Function of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and Minima – Constrained Maxima and Minima by Lagrangian Multiplier method – Jacobians – Euler's theorem for homogeneous function. **(12 Hours)**

UNIT III ORDINARY DIFFERENTIAL EQUATIONS
Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form – Variation of parameter – Simultaneous first order with constant co-efficient. **(12 Hours)**

UNIT IV GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS
Curvature – Cartesian and polar coordinates – Circle of curvature – Involutes and Evolutes – Envelopes – Properties of envelopes. **(12 Hours)**

UNIT V THREE DIMENSIONAL ANALYTICAL GEOMETRY
Equation of a sphere – Plane section of a sphere – Tangent Plane – Orthogonal Sphere - Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.
(12 Hours)

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, "Calculus and Solid Geometry", Revised Edition, 2013.

REFERENCES:

1. Grewal B.S, Higher Engineering Mathematics, 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.