22MYB01-CALCULUS AND LINEAR ALGEBRA
(Common to All Branches)

		L	T	P	C
		3	I	0	4

PRE-REQUISITE : NIL

| **Course Objectives:** | • To understand the mathematical concepts of matrices and analytical geometry in real time problems. |
| | • To formulate differential and integral equations to model physical, biological, and engineering systems |

	Course Outcomes The Student will be able to	Cognitive Level	Weightage of COs in End Semester Examination
CO1	Apply the concepts of matrix theory for find solutions to complex problems efficiently.	Ap	20%
CO2	Analyze the geometric configurations and relationships by using Analytical geometry.	An	20%
CO3	Interpret the partial derivatives which involve heat conduction problems modeled by the heat equation.	Ap	20%
CO4	Apply the differential and integral techniques to solve the differential equations and multiple integrals in heat conduction, fluid mechanics and potential theory.	Ap	40%
CO5	Demonstrate the importance of matrix theory, analytical geometry and integral methods using programming tools.	Ap	Internal Assessment

UNIT I – MATRICES	**(9+3)**

Characteristic Equation-Eigen values and Eigen vectors of a matrix- Cayley Hamilton Theorem (excluding proof) and its applications-Quadratic Form-Reduction of a Quadratic form to canonical form by orthogonal transformation.

UNIT II – ANALYTICAL GEOMETRY OF THREE DIMENSIONS	**(9+3)**

Equation of plane–Angle between two planes–Equation of straight lines-Coplanar lines–Equation of sphere –Orthogonal spheres.

UNIT III - GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	**(9+3)**

Curvature–Curvature in Cartesian co-ordinates-Centre and Radius of curvature-Circle of curvature-Evolutes and Involutes.

UNIT IV - FUNCTIONS OF SEVERAL VARIABLES	**(9+3)**

Partial derivatives-Euler's theorem on homogeneous function-Jacobian-Maxima and Minima of functions of Two variables-Constrained Maxima and Minima by Lagrange's multiplier method.

UNIT V - MULTIPLE INTEGRALS	(9+3)

Double integration in Cartesian Co-ordinates-Change of order of integration-Area as double integral-Triple Integration in Cartesian Co-ordinates-Volume as triple integrals.

TOTAL(L:45+T:15) :60PERIODS

LIST OF PROGRAMS USING MATLAB (Assignment/Online Test):

1. Introduction to MATLAB
2. Matrix operations–Addition, Multiplication, Transpose and Inverse
3. Characteristic equation of a Matrix
4. Eigen values and Eigen vectors of Higher order Matrices.
5. Curve Tracing
6. Determining Maxima and Minima of a function of one variable.
7. Determining Maxima and Minima of a function of two variables.
8. Evaluating double integrals
9. Evaluating triple integrals
10. Finding area between two curves.

TEXT BOOKS:

1. Grewal,B.S., "Higher Engineering Mathematics", Khanna publications,42nd Edition,2012.
2. ErwinKreyszig, "Advanced Engineering mathematics", JohnWiley & Sons, 9th Edition, 2013.
3. Veerarajan,T.,"Engineering Mathematics of semester I & II", TataMcGrawHill, 3rdEdition,2016.

REFERENCES:

1. Bali,N.P. ,Manish Goyal, "A Textbook of Engineering Mathematics-Sem-II", Laxmi Publications,6th Edition,2014.
2. Kandasamy, P., Thilagavathy, K., Gunavathy, K., "Engineering Mathematics for first year", Scand & Co Ltd, 9th Revised Edition, 2013.
3. GlynJames, "Advanced Engineering Mathematics", Wiley India, 7th Edition, 2007.

Mapping of COs with POs / PSOs														
COs	**POs**												**PSOs**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3												1	
2		2											1	
3		2											1	
4	3												1	
5	3				2				3			2	1	
CO (W.A)	3	2			2				3			2	1	

*Approved by Eleventh Academic Council