15MA103	MATRICES AND CALCULUS	L	T	P	C
		3	1	0	4
Co-requisite:	NOT APPLICABLE				
Prerequisite:	NIL				
Data Book / Codes/Standards	NA				
Course Category	B PROFESSIONAL CORE	MATHEMATICS			
Course designed by	Department of Mathematics				
Approval	-- Academic Council Meeting -- 2016				

PURPOSE	To emphasize the concepts and the problem solving techniques as applicable to the respective branches of Bio Engineering.	
INSTRUCTIONAL OBJECTIVES		**STUDENT OUTCOMES**
At the end of the course, student will be able to		
1	To apply matrix knowledge to Engineering problems	**a** **e**
2	To improve their ability in trigonometry	**a** **e**
3	To equip themselves familiar with Differential calculus	**a** **e**
4	To expose to the concepts integral calculus	**a** **e**
5	To familiarize with the applications of differential and integral calculus	**a** **e**

Session	**Description of Topic**	**Contact Hours**	**C-D-I-O**	**IOs**	**Reference**
UNIT I – MATRICES		**12**			
1.	Introduction to Matrices	1	C,I	1	1 – 7
2.	Rank of matrix	1	C,I	1	1 – 7
3.	Consistency of a system of ‘m’ linear equations in ‘n’ unknowns.	2	C,I	1	1 – 7
4.	Inconsistency of a system of ‘m’ linear equations in ‘n’ unknowns	1	C,I	1	1 – 7
5.	Introduction to Cayley- Hamilton theorem	1	C,I	1	1 – 7
6.	Cayley- Hamilton theorem applications	2	C,I	1	1 – 7
7.	To find Eigen Values for real matrices	1	C,I	1	1 – 7
8.	To find Eigen vectors for real matrices	2	C,I	1	1 – 7
9.	Properties of Eigen values and Eigen vectors.	1	C,I	1	1 – 7
UNIT II – TRIGONOMETRY		**12**	C,I	1	1 – 7
10.	Basic Trignometric concepts	1	C,I	2	1 – 7
11.	DeMoivre’s theorem and its applications	2	C,I	2	1 – 7
12.	Expansion of $\sin n\theta$ *and* $\cos n\theta$ in terms of sinθ & cosθ	2	C,I	2	1 – 7
13.	Expansion of tannθ interms of tanθ	2	C,I	2	1 – 7
14.	Expansion of $\sin^n \theta$ in terms of sines and cosines of multiples of θ.	2	C,I	2	1 – 7
15.	Expansion of $\cos^n \theta$ in terms of sines and cosines of multiples of θ.	1	C,I	2	1 – 7
16.	Hyperbolic functions	2	C,I	2	1 – 7

UNIT III – DIFFERENTIAL CALCULUS		**12**			
17.	Introduction to Differentiation	2	C,I	3	1 – 7
18.	Derivatives of simple functions	2	C,I	3	1 – 7
19.	Successive Differentiation-I	2	C,I	3	1 – 7
20.	Successive Differentiation-II	2	C,I	3	1 – 7
21.	Introduction to Leibnitz theorem	2	C,I	3	1 – 7
22.	Leibnitz theorem ‘s Applications	2	C,I	3	1 – 7
UNIT IV –INTEGRAL CALCULUS		**12**			
23.	Introduction to integration	2	C,I	4	1 – 7
24.	Methods of integration	2	C,I	4	1 – 7
25.	Introduction to Definite integrals	2	C,I	4	1 – 7
26.	Properties of Definite integrals	2	C,I	4	1 – 7
27.	Reduction formulae for $\sin^n x, \cos^n x$ (without proof)-Problems	2	C,I	4	1 – 7
28.	Reduction formulae for $\sin^m x \cos^n x$ (without proof)-Problems	2	C,I	4	1 – 7
UNIT V – APPLICATIONS OF DIFFERENTIAL CALCULUS & INTEGRAL CALCULUS		**12**			
29.	Differential calculus: Tangent	2	C,I	5	1 – 7
30.	Differential calculus: Normal	2	C,I	5	1 – 7
31.	Differential calculus: Radius of curvature	2	C,I	5	1 – 7
32.	Differential calculus: Velocity	2	C,I	5	1 – 7
33.	Differential calculus: Acceleration	2	C,I	5	1 – 7
34.	Integral calculus: Length & Area	2	C,I	5	1 – 7
	Total Contact Hours	**60**			

LEARNING RESOURCES:	
Sl. No.	**TEXT BOOKS**
1.	E.Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley & Sons, Singapore, 2012.
2.	K. Ganesan, Sundarammal Kesavan, K. S. Ganapathy Subramanian, V. Srinivasan, Matrices and Calculus, Gamma Publications, 7th Edition, 2015.
	REFERENCE BOOKS/OTHER READING MATERIAL
3.	Grewal B. S, Higher Engineering Mathematics, Khanna Publications, 42nd Edition.2012.
4.	Veerarajan T., Engineering Mathematics, Tata McGraw Hill Publishing Co., New Delhi, 5th Edition, 2006.
5.	Kandasamy P et al. Engineering Mathematics, Vol. I (4th revised edition), S. Chand & Co., New Delhi, 2000.
6.	Narayanan S., Manicavachagom Pillay T. K., Ramanaiah G., Advanced Mathematics for Engineering students, Volume I (2nd edition), S. Viswanathan Printers and Publishers, 1992.
7.	Venkataraman M.K., Engineering Mathematics – I Year (2nd edition), National Publishing Co., Chennai, 2000.

Course nature				**Theory**			
Assessment Method (Weightage 100%)							
In-semester	**Assessment tool**	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	**Total**
	Weightage	**10%**	**15%**	**15%**	**5%**	**5%**	**50%**
					End semester examination Weightage :		**50%**