

Department of Freshman Engineering

Calculus and Linear Algebra

Course Code	20BS1101	Year	I	Semester	I
Course Category	Basic Science	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Understand the basic concepts of calculus and linear algebra.(L2)
CO2	Apply the echelon form to obtain the solution of system of linear equations and eigen vectors of a matrix.(L3)
CO3	Apply the concepts of calculus to find the series expansion and extremum of a given function ,area enclosed by plane curves and volume of the solids. (L3)
CO4	Analyse the solution set of linear system of equations and nature of the quadratic forms. (L4)
CO5	Analyse the behaviour of functions using mean value theorems, extremum of the given function and limits of integration. (L4)
CO6	Apply the concepts of calculus and linear algebra to the given problem and submit a report

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1													2	1
CO2	3								2	2			2	1
CO3	3								2	2			2	1
CO4		3											2	1
CO5		3											2	1
CO6	3								2	2			2	1

Syllabus

Unit No.	Syllabus	Mapped CO's
1	Matrices-Linear System of Equations: Rank of a matrix by Echelon form, Normal form, PAQ form, solving system of homogeneous and non-homogeneous linear equations.	CO1,CO2, CO4,CO6
2	Eigen values and Eigen Vectors: Eigen values, Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, quadratic forms and nature of the quadratic forms.	CO1,CO2, CO4,CO6
3	Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proofs).	CO1,CO3, CO5,CO6
4	Multivariable Calculus: Functions of several variables, Jacobian, Functional dependence, maxima and minima of functions of two variables, method of Lagrange's multipliers.	CO1,CO3, CO5,CO6

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5	<p>Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates, Triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates, volume as triple integral. Application- Areas enclosed by plane curves.</p>	CO1,CO3, CO5,CO6
Learning Resources		
Text Books		
<ol style="list-style-type: none"> 1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44/e, 2019. 2. Erwin Kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006 		
Reference Books		
<ol style="list-style-type: none"> 1. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, 2008. 		
e- Resources & other digital material		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/111/108/111108157/ 2. https://www.nptel.ac.in/courses/111/104/111104125/ 3. https://youtu.be/xDSejIvZmg4 4. http://202.53.81.118/ -> PVPSIT FED-Moodle 		