PVP20

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

KANURU, VIJAYAWADA-520007

I B.Tech – I Sem CSE (DATA SCIENCE)

CALCULUS AND LINEAR ALGEBRA

Course Code	20BS1101	**Year**	I	**Semester**	I
Course Category	Basic Science	**Branch**	CSE(Data Science)	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Examination**	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 eigenvectors of a matrix.	**L2**
CO3	**Apply** the concepts of calculus to find the series expansion and extreme of a given function, area enclosed by plane curves and volume of the solids.	**L3**
CO4	**Analyze**the solution set of linear system of equations and nature of the quadratic forms.	**L4**
CO5	**Analyze**the behavior of functions using mean value theorems, extreme 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													1	1
CO2	3								2	2			1	1
CO3	3								2	2			1	1
CO4		3											1	1
CO5		3											1	1
CO6	3								2	2			1	1

Syllabus		
Unit No.	**Contents**	**Mapped CO's**
I	**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**
II	**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**
III	**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**
IV	**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**
V	**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.	**CO1,CO3, CO5,CO6**

Learning Resources
Text Books:
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:
1. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, 2008.
e- Resources & other digital material:
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