Prasad V. Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada

PVP20

Department of Freshman Engineering

Differential Equations and Vector Calculus

Course Code	20BS1201	**Year**	I	**Semester**	II
Course Category	Basic Science	**Branch**	CE	**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 differential equations and vector calculus (L2).
CO2	Apply different methods to solve differential equations (L3).
CO3	Apply the differential operator to calculate the divergence and flux of vector point functions (L3).
CO4	Analyse the given differential equation to find the solution (L4).
CO5	Calculate work done and flux by applying vector integral theorems (L4).
CO6	Apply the concepts of differential equations and vector calculus to the given problem and submit a report (L3).

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	
CO2	3								2	2			2	
CO3	3								2	2			2	
CO4		3											2	
CO5		3											2	
CO6	3								2	2			2	

Syllabus

Unit No.	Syllabus	Mapped CO's
1	**Ordinary Differential Equations Of First order and First degree**: Exact differential equations, Equations reducible to exact equations, orthogonal trajectories in Cartesian and polar coordinates. **Applications**: Newton's Law of cooling, Law of Natural growth and decay.	CO1,CO2, CO4,CO6
2	**Linear Differential Equations of Higher Order: O**perator D, rules for finding complementary function, inverse operator, rules for finding particular integral, method of variation of parameters.	CO1,CO2, CO4,CO6
3	**Partial Differential Equations:** Formation of partial differential equations, Linear equations of first order, Non-Linear equations of first order, Charpit's method.	CO1,CO2, CO4,CO6
4	**Vector Differentiation:** Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions- Divergence and Curl.	CO1,CO3, CO5,CO6
5	**Vector Integration:** Line integral, surface integral, volume integral, Green's theorem in the plane, Stoke's theorem, Divergence theorem (All theorems without proof).	CO1,CO3, CO5,CO6

	Applications: work done, flux.	

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. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha science International Ltd,2002

e- Resources & other digital material

1. https://nptel.ac.in/courses/111/105/111105121/
2. https://nptel.ac.in/courses/111/105/111105122/
3. https://nptel.ac.in/courses/111/107/111107108/
4. http://202.53.81.118/ -> PVPSIT FED Moodle