

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Differential Equations
Course Code:	2SC1040503
Pre-requisite Course:	

Course Objectives:

1. To understand the concept of Differential Equations.
2. To understand the methods of C.F. and P.I.
3. To know about the solution of linear and non linear differential equations which are exact.
4. To understand the concept of Laplace and Inverse Laplace Transforms.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	--	3	70	30	--	--	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Formation of Differential Equations, Symbolic Operator, Method of finding C.F., Sybolic Operator $1/f(D)$, Method of finding P.I., Shorter method of finding P.I., To find P.I. when $X=e^{ax}$, where a is constant, To finding P.I. when $X=\text{Cos}ax$ or $\text{Sin}ax$, To find the value of $1/f(D).x^m$, where m is positive integer, To find the value of $1/f(D).(e^{ax}V)$, where a is constant and V is a function of x. To evaluate $1/f(D).(XV)$, where V is a function of x.	18	34
2	Condition of Exactness of the linear differential equations, Solution of non-linear equations which are Exact, Equations of the form $y^{(n)}=f(x)$, Equations of the form $y^{(2)}=f(y)$, Equation do not contain y directly, Equation that do not contain x directly, Equation in which y appears in only two derivatives whose orders differ by two, Equation in which y appears in only two derivatives whose order differ by unity.	15	33
3	Laplace transform- Definition and its properties. Rules of manipulation. Laplace transform of derivatives and integrals Properties of inverse Laplace transform. Convolution theorem. Solve Differential equation using Laplace Transforms	15	33

Reference Books:

1. Erwin Kreyszing, Advanced Engineering mathematics, By. John Wiley & Sons Inc. New York, 1999.
2. D.A.Murray, Introductory course on Differential Equations, By. Orient Longman,(India), 1967.

3. A.R.Forsyth, A Terastise on Differential Equations, Macmillan and Co.Ltd., London.
- 4.Ian N. Sneddon, Elements of partial Differential Equations, McGraw-Hill Book Compony, 1998.
5. Fracis B. Hilderbrand, Advanced Calculus for Application, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential Equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Compony, 1972.
8. The Laplace Transform: Theory and applications, by Joel L. Schiff.
9. Schaum's outline of Laplace Transforms, by Murray Spiegel.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=uixx6olB398&t=2s>
2. https://www.youtube.com/watch?v=e_LTcO6bv4A&t=35s
3. <https://www.youtube.com/watch?v=XPMQ3pM-ql4&list=PLhSp9OSVmeylYLVvSJ8m6KvVwJs7M9QBm>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe Properties of inverse Laplace transform.	1 Remembering
CLO2	Discuss the knowledge on Differential Equation.	2 Understanding
CLO3	Use Laplace Transforms and solve differential equations using it.	3 Applying
CLO4	Explain Inverse Laplace Transform and using it solve the example of its.	4 Analysing, 3 Applying
CLO5	Know the properties of Laplace transforms to Justify the application of its.	5 Evaluating
CLO6	Create an example Laplace Transforms.	6 creating

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	L		M						M	H				L		M
CLO2	H	L	L	L					L				L	M		
CLO3	H	M	L		M				L	M		L	L	L		
CLO4	H	M	L		M				L	M		L	L	L		
CLO5	M	L	H			L			L			M		M		L
CLO6			H		M				L	M		M	M		L	

H: High, M: Medium, L: Low