

Part A: Introduction

Program: Diploma Course		Class: B.Sc. Sem III	Year: 2023	Session: 2023-2024
1	Course Code	MSC-3		
2	Course Title	Differential Equations		
3	Course Type	Theory		
4	Course Learning Outcome (CLO)	<p>This Course will enable the students to:</p> <ul style="list-style-type: none"> • Understand the genesis of ordinary as well as partial differential equations. • Learn various techniques of getting exact solutions of certain solvable first order differential equations and linear differential equations of second order. • Learn about solution of first order linear partial differential equations using Lagrange's method. • Know how to solve second order linear partial differential equations with constant coefficients. 		
5	Credit Value	Theory & Tutorial: 4		
6	Total Marks	Maximum Marks : 100 (Ext. 80 + Int. 20)	Minimum Passing Marks : 40	

Part B: Content of the Course

Module	Topics	No. of Hours
I	First and second Order Differential Equations : Differential equations of first order and first degree, Equations in which variables are separable, Homogeneous equations, Linear differential equations and equations reducible to linear form, Exact differential equations, Integrating factor, First order higher degree equations solvable for x, y and p, Clairaut's form and singular solutions, orthogonal trajectories. Linear differential equations with constant coefficients.	15
II	Linear and Ordinary simultaneous differential equations: Homogeneous linear ordinary differential equations. Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable. Method of variation of parameters. Ordinary simultaneous differential equations.	15
III	First order Partial differential equations:	15

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	Lagrange's solution, Some special types of equation which can be solved by methods other than general method, Charpit's general method of solution	
IV	Second and higher order Partial differential equations and Applications of differential equations: Classification of Linear partial differential equation of second order, Homogeneous and non-homogeneous equation with constant coefficients, Partial differential equation reducible to equation with constant coefficients. Monge's Method. Applications of differential equation to real world System- Newton's law of cooling, Population Growth and Decay, Mixture Problem and Radioactive decay.	15

Part C - Learning Resource

Text Books, Reference Books, Other Resources

1. Erwin Kreyszig (2011). *Advanced Engineering Mathematics* (10th edition). J. Wiley & Sons
2. B. Rai & D. P. Choudhury (2006). *Ordinary Differential Equations - An Introduction*. Narosa Publishing House Pvt. Ltd. New Delhi.
3. Shepley L. Ross (2007). *Differential Equations* (3rd edition). Wiley.
4. George F. Simmons (2017). *Differential Equations with Applications and Historical Notes* (3rd edition). CRC Press. Taylor & Francis.
5. Ian N. Sneddon (2006). *Elements of Partial Differential Equations*. Dover Publications.
6. Dr. M. D. Rajsinghania, Ordinary and partial Differential Equation, S. Chand and company Pvt. Ltd.
7. A.H. Siddiqi and P. Manchanda, A first course in Differential Equations with Applications, Macmillan India Ltd.
8. Suggested Equivalent **online courses**: Web link NPTEL/ SWAYAM/ MOOCs

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Comprehensive Evaluation (CCE):	20 Marks
Semester End Exam (SEE):	80 Marks

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Internal Assessment: Continuous Comprehensive Evaluation(CCE)	Internal Test -02 of 10 Marks each Assignment/Seminar-01 Of 10 Marks	Sum of best of two test and assignment marks
Semester End Exam (SEE)	Paper-Two Section-A&B Section-A: Objective and short answer type question-1x10+3x10= 40 Marks Section-B: Descriptive answer type question Module wise- 10x4 =40 Marks	
Amendment or Modification shall may be made by course coordinator as per situation or directed by the department/Examination cell/NEP-20 Scheme coordinator		

Name and signature of convener & member of BOS:

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 (u.k. Shrivastava)











