SHIV NADAR
INSTITUTION OF EMINENCE DEEMED TO BE
UNIVERSITY
DELHI NCR

Office of The Dean of Academics
Course Description Form
Monsoon 2025

Section A:

Course Code	MAT3XX								
Course Title	Differential Equations								
Course Credits	4	**No. of Contact Hours/week**	**L:**	3	**T:**	1	**P:**	0	
School	School Of Natural Sciences								
Offered By	Mathematics								
Method of Instruction:	In Person		**Offered in:**	Monsoon Semeste	Full Semster				

Check each box, when applicable, if the course covers one or more of the below listed attributes

☒	**REALS**	☐	**VELS**	☒	**DISE**

Prerequisites	MAT101 or MAT103

List The Courses Which May Be Like This Course. So, If A Student Has Already Done A Course From This List, They Should NOT Register For This Course, I.E. It's A Negative List

Fill this, if applicable: A Similar Course Was Offered With Code .... In Year ....

NOTE:

Section B:This course is offered as (use checkbox) for which Programs

☒	Major Core for:	Mathematics	Not required
☐	Major Elective for:		Not required
☒	UWE for:	All	Not required
☐	Project /UG Thesis / Internship	Any Other Information	Instructor's Approval
☐	CCC for:	Choose a Category	Instructor's Approval
☐	Specialization (If applicable)	Mention The Specialization	Instructor's Approval
☒	Minor (If applicable)	Mathematics	Not required
Estimated No. of Seats:		30	Estimated Number of Sections	1

Section C: State the Program Learning Goals of the Major Degree Program mapped to the Core Course (Applicable to Major Core courses only)
PLG 1
PLG 3
PLG 4

Section D: State the Course Objectives / Aim (Specific details of what the course intends to achieve in terms of student knowledge and ability. Items should begin with phrases such as "To provide students with …", "To enable students to …", "To develop students' skills in …" and so on.)

• Understand all of the concepts relating to the order and linearity of ODEs and PDEs, analytic and computational solution methods for ODEs & PDEs, and the real-world applications of ODEs.
• Introduce different methods to solve linear ODEs and partial differential equations.
• Explain the concepts of linear systems, ODE solution methods, and related ideas at a fundamental level, as well as how and why we use the solution techniques that we use.
• To derive heat and wave equations, use separation of variables to solve PDEs and analyze the behaviour of solutions in terms of eigenfunction expansions.
• Application of ODEs and PDEs to model real-world problems from physics and Biology.

Section E: State the Learning Outcomes (A list of what students will know or be able to do as a result of successfully completing the course. Should be expressed as knowledge, skills, or attitudes.)

On successful completion of the course, students will be able to:

• Analyse Many Physical Phenomena By Looking At The Nature Of The Solutions Of The ODE And PDE.
• They Will Know When The Solution Exists.
• Classify Partial Differential Equations And Transform Them Into Canonical Form.
• Solve Linear Partial Differential Equations Of Both First And Second Order.
• Apply Specific Methodologies, Techniques, And Resources To Conduct Research And Produce Innovative Results In The Area Of Specialisation

Section F: State if course contributes to any skill development

Section G: Module-wise Curriculum Content (Syllabus, Lab work, Project, Term paper, Group work, etc.)

• First Order ODEs: Modelling, Geometrical Meaning, Solution techniques, Existence of Solutions (only conditions)
• Second and Higher Order Linear ODEs: Modelling,
• Systems of ODEs: Phase Plane and Qualitative Methods
• Series Solutions & Laplace Transforms
• Examples of PDEs, classification of PDEs
• Heat & Wave equation, Separation of variables methods, D'Alembert's method

Add additional sheet(s), if required

Section H: Text Book(s), Reference book(s) and any other study material

1. G.F. Simmons and S. Krantz, Differential Equations: Theory, Technique, and Practice, McGraw Hill Publishing Company, 2006.
2. Partial Differential Equations for Scientists and Engineers, by Stanley J. Farlow
3. J. Polking, D. Arnold, A. Boggess, Differential Equations, Pearson, 2005.
4. C. Henry Edwards and David E. Penney, Differential Equations and Boundary Value Problems: Computing and Modelling, 3rd edition, Pearson, 2010.
5. Erwin Kreyszig, Advanced Engineering Mathematics, 9th edition, Wiley India, 2012.
6. Partial Differential Equations, an Introduction , Second Edition, by Walter A. Straus.
7. Applied Partial Differential Equations by Paul DuChateau, David Zachmann
8. Hirsch, Morris W., Stephen Smale, and Robert L. Devaney, Differential Equations, Dynamical Systems, and an Introduction to Chaos. Academic Press, 2012.

Course Description Form
Monsoon 2025

Section I: Please fill in all the rows for the applicable rows. For evaluation component not included in the list, use the last two rows and mention the evaluation component in the corresponding last column. Please see the NOTE below this box for the prorate policy.

	Component	Weightage %	Missed Graded Component Policy	Use of Gen AI policy	Any Other Information
☒	Mid Sem Exam	0.30	Retake of Graded Component	Prohibited: No Gen AI	other info
☒	End Sem Exam	0.40	I grade awarded on approval from De	Prohibited: No Gen AI	other info
☒	Quiz(s)	0.10	Retake of Graded Component	Prohibited: No Gen AI	other info
☒	Assignment(s)	0.20	Retake of Graded Component	Prohibited: No Gen AI	other info
☐	Lab	0.00	Please Select	Please Select	other info
☐	Project	0.00	Please Select	Please Select	other info
☐	Case Studies	0.00	Please Select	Please Select	other info
☐	Group Discussion	0.00	Please Select	Please Select	other info
☐	Any Other Component	0.00	Please Select	Please Select	other info
☐	Any Other Component	0.00	Please Select	Please Select	other info
	Total **Weightage** (%)	1.00			

Note:

a) While you may mark multiple evaluation components for pro-rate. However, if a particular student misses multiple evaluations, *not more than 20% of the evaluation can be prorated for that student*.

b) *The best n out of m: Please make sure that n < m.*

c) *Award of 'I' grade is applicable only in the case of the End-term Exam. Additionally, end-term exams or final assessments cannot be prorated or waived*.

d) *Individual faculty can decide the prorate policy for each component.*

e) *'None' as an option can only be used in exceptional cases, for example lab evaluated by an external expert*

Section J: Grading Policy (*Tick the one You intend to follow*)			
☒ **Relative** Grading	Atleast 90% To Get An "A" Grade		Roundup Policy
☐ Absolute Grading	**Grade**	**Range** (*replace M's appropriately*)	
	A	M1 <= marks <= M2	
	A⁻	M1 <= marks <= M2	
	B	M1 <= marks <= M2	
	B⁻	M1 <= marks <= M2	
	C	M1 <= marks <= M2	Please Mention The Rounding Off Policy And Any Other Information
	C⁻	M1 <= marks <= M2	
	D	M1 <= marks <= M2	
	E	M1 <= marks <= M2	
	F	M1 <= marks <= M2	

Section K: Details about instructors teaching this course. For multiple instructors in a course, mention each name once after the other					
Name of the Instructor(s):	Dr Samit Bhattacharyya Prof XYZ Prof ABC		**Section(s)**	L1 L1, L2, L3	
Office Location	A111 K 120 L 325	**Tel. Extension***		**Email:**	samit.b@snu.edu.in abc@snu.edu.in xyz@snu.edu.in
About the Instructor(s): Click Here To Enter About 250 Words about each instructor teaching the course`					

* - Optional

Section L: Office Hours
Please let the students know the day(s) and time slot(s) for any consultation. You may update this at the start of the semester.

Section M: Any other information
Any other information you would like to specify in relation to the above course