



FIRST SEMESTER 2020-2021

Course Handout Part II

17-08-2020

In addition to part I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No.	:	MATH F211
Course Title	:	MATHEMATICS - III
Instructor-in-charge	:	Santanu Koley
Instructors	:	B Mishra, Anil Nemili, PK Sahoo, Kishore Kumar, TSL Radhika, Nirman Ganguly, Santanu Koley, PTV Praveen Kumar, Jagan Mohan J, K Bhargav Kumar, Sabyasachi Dey, A Ramu, K Panduranga, Kshma Trivedi, N S Gopal, Simran Arora, Sanjay Mandal, Tusharakanta Pradhan, SSS Anupindi

1. Scopes and Objective of the Course:

This course reviews and continues with the study of differential equations with an objective to introduce classical methods for solving higher order ordinary differential equations, boundary value problems and partial differential equations. It also introduces an elegant method to solve some differential equations occurring in mathematical physics. Further, this course presents Fourier series and Laplace transform technique that finds applications in various branches of engineering and sciences. It also emphasizes the role of orthogonal polynomials in dealing with Sturm-Liouville problems.

2. **Text Book:** Simmons G.F., Differential Equations with Applications and Historical Notes, TMH Edition 2003, 12th reprint 2008.

Reference Book: 1. Shepley L. Ross: Differential Equations, John Wiley & Sons, Inc. 2018.
2. Kreider D.L. and Others: An Introduction to Linear Analysis, A.W., 1966.

3. **Course Plan:** (Sections- refer to Text Book)

Lecture No.	Learning Objectives	Topics to be covered	Sections
1	To study methods for solving first order differential equations	Introduction to First order equations.	1-6
2-4		First order equations	7-10
5		Reduction of order	11
6-7	To learn about second and higher order differential equations and various methods for solving them	Second order equations	14,15
8		Use of a known solution	16
9-12		Various methods to solve differential equations	17-19,22,23
13-14	To understand the method of solving system of differential equations	Systems of Equations	54-56

	To study qualitative properties of solutions of differential equations	Sturm Separation Theorem and Sturm Comparison Theorem (Self Study)	24, 25
15-16	To study an elegant method to solve higher order differential equations	Series Solutions	26-30
17-19		Hypergeometric equation	31
20-22		Legendre Polynomials	44,45
23		Chebyshev Polynomials	Appendix D
		Hermite Polynomials (Self-study)	Appendix B
24-27	To learn about some special functions of Mathematical Physics	Bessel functions	46,47
28-31		Laplace Transforms	48-53
32-34		Fourier Series	33-36
35-38		Eigen values and Eigen functions, Sturm Liouville Problems	40, 43
39-42		One dim. Wave equation, One dim. Heat equation, Laplace's equation	40, 41, 42

4. Evaluation Scheme :

Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
Test-1	30 min.	15%	September 10 –September 20 (During scheduled class hour)	Open book
Assignment-1		10%	To be announced	Open book
Test-2	30 min.	15%	October 09 –October 20 (During scheduled class hour)	Open book
Assignment-2		10%	To be announced	Open book
Test-3	30 min.	15%	November 10 – November 20 (During scheduled class hour)	Open book
Compre. Exam.	120 min.	35%	To be announced	Open book

5. Make-up: Make-up for any component will be given only for very genuine cases and it also depend upon feasibility. Prior permission has to be obtained from Instructor In-charge.

6. Chamber consultation hour: To be announced by the individual instructors.

7. Notices: All notices regarding MATH F211 will be put on CMS.

8. Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable

**Instructor-in-charge
MATH F211**

