Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2019-2020
Course Handout Part II

01-08-2019

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

Course No.	**:**	MATH F211
Course Title	**:**	MATHEMATICS - III
Instructor‑in‑charge	**:**	Anil Nemili
Instructors	**:**	A Ramu, P.K. Sahoo, T.S.L. Radhika, K. Venkata Ratnam, Kishore Kumar, P T V Praveen Kumar, Jagan Mohan J, Santanu Koley, Nirman Ganguly, A Karthik, K. Panduranga, T Ranjan Panigrahi, Tusharakanta Pradhan

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, 2nd Edition, 2003.

   Reference Book: **1.** Kreider D. L. and Others: An Introduction to Linear Analysis, A.W., 1966.
   2. Shepley L. Ross: Differential Equations, John Willy & Sons, 1984.

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

Lecture No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1	To study methods for solving first order differential equations	Introduction to First order equations	1-7
2-4		First order equations	8-10
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	To learn about some special functions of Mathematical Physics	Legendre Polynomials	44,45
23		Chebyshev Polynomials	Appendix D
		Hermite Polynomials (Self-study)	Appendix B
24-27		Bessel functions	46,47
28-31	To study Laplace transform technique for solving differential and Integral Equations	Laplace Transforms	48-53
32-34	To learn trigonometric series expansion of discontinuous functions	Fourier Series	33-36
35-38	To learn methods to solve Boundary Value Problems	Eigen values and Eigen functions Sturm Liouville Problems	40, 43
39-42	To learn methods to solve linear partial differential equations	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
Assignment-1		10%	To be announced	Open book
Mid-Semester Test	90 min.	35%	28/9, 9.00 -- 10.30 AM	Closed book
Assignment-2		10%	To be announced	Open book
Compre. Exam.	3 hrs.	45%	2/12 FN	Closed book

`Total Marks: 300`

5. Make-up: Make up will be granted only in genuine cases in Mid-Semester Test. Permission must be taken in advance except in extreme cases.

6. Chamber consultation hour: To be announced in their class by the respective 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

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