BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani

Pilani Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016
Course Handout (Part-II)

Date: 03/08/ 2015

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 : **ASHISH TIWARI**
Instructor : **Atasi Patra, B. K. Sharma, Balram Dubey, C. B. Gupta, Chandra Shekhar, J. N. Bandyopadhyay, Rakhee, Sangita Yadav, Shivi Agarwal, Suresh Kumar**

1. **Scopes and Objective of the Course:**

This Course reviews and continues the study of differential equations with the objective of introducing classical methods for solving boundary value problems. This course serves as a basis of the applications for differential equations, Fourier series and Laplace transform in various branches of engineering and sciences. This course 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, Tata McGraw Hill, 2nd ed., 1991.

   Reference Book:

   1. Zill, Differential Equations, Thomson Learning, 5th ed., 2004

   2. Shepley L. Ross: Differential Equations, John Willy & Sons, 3rd ed., 1984.

   3. Edwards & Penney: Differential Equation and Boundary value problems, Pearson Education, 3rd ed., 2009.

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

Lect No.	Learning Objectives	Topic	Sections	Home work (Page-questions)
1	To introduce the classical methods to solve 1st order ordinary differential equations	First order equations Exact differential equation.	1-7, 8, 9	**(Revision & self study)** All , page 53, 1-4, page 59
2		Linear differential equation.	10	1 to 4, page 61
3		Reduction of order.	11	1 to 3, page 65

4-5	To introduce the classical methods to solve 2nd order ordinary differential equations	Second order equations.	14, 15	4 to 8, page 86 1 to 9, page 91
6		Use of a known solution.	16	All ,page 94
7-12		Various methods to solve differential equations.	17, 18, 19, 23	1-2, page 97 & 5-7, page 98 All , page 103, All, page 106 1-25, page 135-136
13-14	Properties of solutions	Sturm Separation Theorem and Sturm Comparison Theorem.	24, 25	2-4, page 161 All, page 164
15-17	To introduce Series solutions method to solve 2nd order Linear differential equation with variable coefficients	Series Solutions.	26 to 30	1-2, page 175 All, page 182 1- 5, page 191 1–5, page 198
18-19		Hypergeometric equation.	31	All, page 203
20-22		Legendre Polynomials	44, 45	1-2, & 4, 341 1-5, page 347
23-25		Bessel functions	46, 47	1- 6, page 356 1- 5, page 363
26-29	Use of Laplace Transform to solve Differential Equations and Integral Equations	Laplace Transforms.	48, 49, 50, 51, 53	All, page 384 All, page 388 All, page 394 1- 4, page 397 2,3,4, page 410
30-31	To introduce system of differential equations	Systems of Equations.	54, 55, 56	1,2, page 420 5-9, page 426 1 and 5, Page 433
32-35	To introduce Fourier series	Fourier Series.	33, 34, 35, 36	1-6, page 256 1-5, page 263 All, page 269 1-7, page 274
36-37	To introduce classical methods to solve Partial Differential Equations	Eigenvalues and eigen functions, Sturm Liouville Problems.	40,43	1, page 308
38-40		One dimensional Wave equation	40	5, page 310
		One dimensional Heat equation	41	
		Laplace's equation **(Self Study)**	42	

4. **Home Assignment**: All problems listed are for Home work.
5. **Evaluation Scheme:**

EC No.	Evaluation Component	Duration	Weightage (in %)	Date & Time	Nature of Component
1.	Mid-Sem Exam.	90 min.	35	7/10 10:00 - 11:30 AM	Close Book
2.	Comprehensive Exam.	3 hrs.	45	5/12 AN	Close Book & Open Book
3.	One Quiz (Announced)	50 min.	20	Date will be announced later	Close Book

6. Make-up: Make-up will be given only in genuine cases.

7. Chamber consultation hour: To be announced in the class.

8. Notices: All notices regarding MATH F211 will be displayed on NALANDA and Mathematics department notice-board.

Instructor-In-Charge
MATH F211

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