Dated: 12/01/2016

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

Course Number   : **MATH F343**
Course Title   : **Partial Differential Equations**
Instructor   : **Dr. T S L Radhika**

1.**Course Description**

        Non linear equations of first order, Charpit's Method, Method of Characteristics; Elliptic, parabolic and hyperbolic partial differential equations of order 2, maximum principle, Duhamel's principle, Green's function, Laplace transform & Fourier transform technique, solutions satisfying given conditions, partial differential equations in engineering & science.

2.Scope and Objectives

Enables one to understand the nature of partial differential equations, find solutions to these equations along with some applications in the field of Science and Engineering.

3.**Textbook**

    1.   Tyn Myint-U and Lokenath Debnath, Linear Partial Differential Equations for Scientists and Engineers, Birkhauser, 4th Edition.

4.Reference Book(s)

    1.   Ian N. Sneddon, Elements of Partial Differential Equations, International Series in Pure and Applied Mathematics.
    2.   Walter A. Strauss, Partial Differential Equations, An introduction, John Wiley & Sons
    3.   T. Amarnath, An Elementary Course in Partial Differential Equations, Narosa Publishing House, 2nd Edition.
    4.   K. Sankara Rao, Introduction to Partial Differential Equations, PHI Learning Private Limited, 3rd Edition.

5.Course Plan

Lec.No.	Topics to be covered	Learning Objectives	Chapter in the Text Book
1-2	Introduction of Partial differential equations	Motivation for studying partial differential equations	1.1-1.6
3-4	Introduction, First order linear equations	Introduction and overview of first order partial differential equations	2.1-2.4
5-8	Methods of Characteristics, Canonical Form, Method of Separation of variables, Charpit's Method, Jacobi Method	Geometrical interpretation of first order PDEs, Canonical form of first order linear equations, To Find solutions of first order PDEs	2.5-2.7, R1-2.10-2.14
9	Second order equations in two variables	Introduction of second order partial differential equations	4.1

10-11	Canonical Form	To convert the second order differential equations into the standard form Characterization of 2nd order PDE's and its solutions	4.2
12-13	Equations with constant Coefficients		4.3, R1-3.4
14	General solution	Difference between general solution of ODEs and PDEs	4.4
15-21	Wave equation	Solution of Homogeneous and inhomogeneous wave equations, D'Almbert Principle, Duhamel Principle, Spherical and cylindrical wave equations	5.1-5.2, 5.3-5.6, 5.10-5.11
22-26	Maximum-minimum principles	To obtain the maximum and the minimum of solutions of PDEs	9.1-9.9
27-29	Laplace Equation	Solution of Laplace equations in different domains with homogeneous boundary condition	10.1-10.4
30-32	Heat and Wave Equations	Analysis and behavior of solutions of heat and wave equations in two and three dimensions	10.5-10.9
33-36	Green's Functions	Solution of PDEs in terms of Green's functions	11.1-11.5
37-38	Fourier Transform	Use of Fourier techniques in finding the solutions of PDEs	12.2-12.11
39-40	Laplace Transform	Use of Laplace techniques in finding the solutions of PDEs	12.8-12.10

6. Evaluation Scheme:

ECNo.	Evaluation Component	Duration	Weightage %	Date	Nature of Component
1	Test-I	1 hr	20	26/2, 10.00 - 11.00 AM	Closed Book
2	Test-II	1 hr	20	12/4, 10.00 - 11.00 AM	Open Book
3	Assignments , Presentations		20		Open Book
4	Comprehensive Exam	3 hr	40	05/05 FN	Closed Book

7. Notices: All notices about the course will be put only on CMS.

8. Chamber Consultation Hour: To be announced in the class.

9. Make UP Policy:

(i) NO MAKE UP will be given in Assignment and Presentation components under any circumstances.

(ii) Make up of other evaluation components will be granted only in genuine cases. Permission must be taken in advance except in extreme cases.
(iii) No MAKE-MAKE-UP will be entertained.

Instructor-In-Charge
MATH F343