Birla Institute of Technology & Science, Pilani
Hyderabad Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout Part II

Date: 18-07-2016

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 F214*
Course Title : *Elementary Real Analysis*
Instructor in charge : MANISH KUMAR
Instructor : Manish Kumar

Scope and Objective of the Course:
The objective of this course is to train the students with the basic tools of modern mathematical analysis, train them in art of logical, deductive & constructive thinking and thus equip them with enough back ground for courses which involve deeper mathematical analysis. Real analysis is needed in several science & engineering disciplines, in study of dynamical systems, which are solutions of differential equations, theoretical study of differential equations, concept of fractal & fractal dimension is usually studied in metric spaces. Riemann integral is basic integral on which advance theory of integration is developed. Integration theory is needed in study of theoretical & numerical solution of partial differential equations.

Textbooks:
1. W. Rudin, Principles of Mathematical Analysis, McGraw, Hill 3rd edition, 1976.

Reference books
1. Apostal: Mathematical Analysis, Addision Wesley, 1983.
2. John M Howie: Real Analysis, Springer Verlag, 2000.
3. Kenneth Ross: Elementary Analysis, Springer international edition, 2000.

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-5	Representation of real numbers	Ordered field, Construction of real numbers, the set of real numbers as ordered field, extended real numbers	Chapter 1, Sec : 1.1 to 1.23
6-8	Difference between countable & uncountable set	Finite, Countable & uncountable sets	Chapter 2, Sec : 2.1 to 2.14
9-15	Generalization of concept of distance to	Metric spaces, compact sets, different Definition of compact sets, Cantor	Chapter 2, Sec : 2.15 to 2.47

	abstract sets	Intersection theorem, Contraction Principle	
16-21	Generalization of concept of limit & continuity to metric spaces	Continuous & uniformly continuous functions& their properties	Chapter 4
22-29	Integration with respect to a function	Riemann Stieltjes integral & properties	Chapter 6
30-37	Distinguish between uniform & point wise convergence of sequence of functions. Functions not differentiable but continuous	Point & uniform convergence of functions & related properties of Integrability & differentiability	Chapter 7
38-42	How continuity & differentiability have generalization for function of several variables	Linear Transformations, Differentiation of functions of several variables	Chapter 9 sec: 9.1 to 9.15

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Test I	60 min.	30%	----------	Closed Book
Test II	60 min.	30%	----------	Open Book
Comprehensive Exam	180 min.	40%	----------	Closed Book

Chamber Consultation Hour: To be announced in the class.

Notices: Notices concerning this course will be displayed on the LTC Notice Board only

Make-up Policy: Prior permission is needed for makeup; makeup will be given only for genuine cases.

INSTRUCTOR-IN-CHARGE
MATH F214