DEPARTMENT OF MATHEMATICS

Semester : IV **Integrated M.Sc. Mathematics** **Academic Year : 2017-18**

Subject : 060090401 CC8 Advanced Real Analysis

Teaching Schedule

Course Objectives: Summarize concepts of real analysis to enhance ability of analysing pure and applied mathematical problems

Unit	Sub Unit	No. of Lect.(s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used
Unit 1: Function of Bounded Variation					**[10]**
1	1.1	2	Function of Bounded Variation and its properties	Ch#6 Mathematical Analysis Apostol T	Chalk & Talk
	1.2	3	Total Variation and its additive properties,		
	1.3	2	Continuous functions of Bounded Variation		
	1.4	3	Necessary and Sufficient condition for Bounded Variation		
Unit 2: Metric Spaces					**[22]**
2	2.1	2	Introduction to Metric Spaces	Ch#19 Elements of Real Analysis S. Narayan	Chalk & Talk
	2.2	4	Boundedness of Metric Spaces		
	2.3	4	Closure of Metric Space, Product of Metric Space		
	2.4	3	Continuous functions on metric spaces, Uniform continuity on metric spaces		
	2.5	3	Compact metric spaces and connected metric spaces		
	2.6	3	Differentiation, Sequences in Metric Space		
	2.7	3	Cauchy Sequences, Complete Metric Spaces.		
Unit 3: Riemann Integrability					**[12]**
3	3.1	2	Introduction, Riemann sums, Properties of Darboux	Ch#13 Elements of Real Analysis S. Narayan	Chalk & Talk
	3.2	2	Upper and Lower Riemann integral, Riemann integral		
	3.3	2	Necessary and Sufficient condition for integrability		
	3.4	3	Properties of Integrable function		
	3.5	3	Partition of a set, Lower and upper Riemann-Stieltjes integrals, Riemann-Stieltjes integrals, Reduction		
Unit 4: Measurable function and Lebesgue Integral					**[21]**
4	4.1	3	Concept of Lebesgue measure, Inner and outer measure	Ch#11 Introduction to Real Analysis R.G. Bartle and D. R. Sherbert	Chalk & Talk
	4.2	3	Properties, Modulus of measurable function		
	4.3	3	Lebesgue integral of a bounded function over a set A of finite measure.		

	4.4	4	Simple properties. Lebesgue integral for unbounded function		
	4.5	4	Bounded convergence theorem for a sequence of function,		
	4.6	4	Monotone Convergence theorem		

Text books:

1. S. Narayan and M. D. Raisinghania, "Elements of Real Analysis", Sultan Chand & Sons Educational Publishers, New Delhi, 2015.

2. Apostol T., "Mathematical Analysis", 2nd ed., Narosa Publishers, 2002

Reference books:

1. P. K. Gupta and S. Gupta-"Real Analysis", 1st Edition, Sultan Chand & Sons Educational Publishers, New Delhi.

2. R. R. Goldberg, - "Methods of Real Analysis", Oxford & IBH Publishing House, New Delhi.

3. R.G. Bartle and D. R. Sherbert –" Introduction to Real Analysis" - 3rd Edition, John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.

4. S.C. Malik and Savita Arora, "Real Analysis" – New Age International (P) Ltd., Publishers, New Delhi, 2009.