BHARATHIAR UNIVERSITY, COIMBATORE-641 046
M. Sc. MATHEMATICS DEGREE COURSE
(AFFILIATED COLLEGES – CBCS PATTERN)
(For Candidates Admitted During the Academic Year 2011-2012 Batch & Onwards)

Note :
The revised syllabus for the candidates admitted from the academic year **2011-12** in M.Sc. Mathematics degree programme for the papers *PAPER – IX TOPOLOGY and* PAPER XIV: MATHEMATICAL METHODS are furnished below. There is no change in remaining papers.

PAPER – IX TOPOLOGY

Unit I:

Topological spaces – Basis for a Topology – The Order Topology – Product Topology – Closed sets and Limit Points – Continuous Functions – Metric Topology.

Unit II:

Connectedness and Compactness: Connected Spaces – Connected sets in R – Components and path components – Local connectedness – Compact Spaces – Limit Point Compactness – Urysohn Metrization Theorem.

Unit III:

Countability and Separation Axioms: Countability Axioms – Separation Axioms Urysohn's Lemma – Urysohn Metrization Theorem.

Uni IV:

The Tychonoff Theorem – Completely regular spaces – The stone-Cech Compactification.

Unit V:

Complete Metric Spaces – Compactness in Metric Spaces – Pointwise and Compact Convergences – The Compact-Open Topology – Ascoil's Theorem.

Text Book:

Topology; A First Course by James R. Munkres, Prentice Hall of India Private Limited, New Delhi, 2000.

Unit-I:	Chapter 2:	Sections 2.1 – 2.9
Unit-II:	Chapter 3:	Sections 3.1 – 3.8
Unit-III:	Chapter 4:	Sections 4.1 – 4.4
Unit-IV:	Chapter 5:	Sections 5.1 – 5.3
Unit-V:	Chapter 7:	Sections 7.1, 7.3 – 7.6

References:

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (Reprinted in India by Prentice Hall of India Private Limited.).

2. George F. Simmons, Introduction to Topology and Modern Analysis, McGraw Hill Book Company, 1963.
3. J.L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1995.
4. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
5. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
6. Sze – Tsen Hu, elements of General Topology, Holden – Day, Inc. 1965.

PAPER XIV: MATHEMATICAL METHODS

Unit I:

FOURIER TRANSFORMS: Fourier sine and cosine transforms – Fourier transforms of derivatives - Fourier transforms of simple functions - convolution integral – Parseval's Theorem - Solution of PDE by Fourier transform – Laplace equation in half plane in infinite strips; in semi infinite strip. The Linear diffusion equation on a semi infinite line – the two dimensional diffusion equation.

Unit II:

HANKEL TRANSFORMS: Properties of Hankel Transforms – Hankel inversion theorem of derivatives of functions (proof deleted)- The Parseval's relation – relation between Fourier and Hankel transforms - Axisymmetric Dirichlet problem for a half space - Axisymmetric Dirichlet problem for a thick plate.

Unit III:

INTEGRAL EQUATIONS: Types of Integral equations – Integral Fredholm Alternative - Approximate method – Equation with separable Kernel - Volterra integral equations.

Unit IV:

Application of Integral equation to ordinary differential equation – initial value problems – Boundary value problems – singular integral equations – Abel Integral equation

Unit V:

CALCULUS OF VARIATIONS: Variation and its properties – Euler's equation – Functionals of the integral forms - Functional dependent on higher order derivatives – functionals dependent on the functions of several independent variables – variational problems in parametric form –applications.

Treatment as in: For Units I and II:
The Use of Integral Transforms by I.N.Sneddon, Tata Mc Graw Hill, New Delhi, 1974.
For Units III and IV:

Linear Integral Equations Theory and Technique by R.P.Kanwal, Academic Press, New York, 1971.
For Unit V:

Differential Equations and Calculus of Variations by L.Elsgolts, Mir Publishers, Moscow, 1970.

Unit I	:	Chapter 2:	2.4 - 2.7, 2.9 – 2.10, 2.16 – 2-(a).(b).(c) 2.16.		
Unit II	:	Chapter 5:	5.2 – 5.4, 5.6 – 5.7, 5.10 – 5.12.		
Unit III	:	Chapter 2:	2.3 - 2.5,	Chapter 3:	3.3 - 3.4.
Unit IV	:	Chapter 5:	5.1 – 5.2,	Chapter 8:	8.1 – 8.2.
Unit V	:	Chapter 6:	6.1 – 6.7.		