MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
M. A. / M. Sc. MATHEMATICS (FINAL)
2016-17
Non-Collegiate

Note- There will be five papers in all. Paper-I: Topology and Functional Analysis and Paper-II: Discrete Mathematics will be compulsory. Each paper will be assigned six hours per week.

Paper I	Topology and Functional Analysis	100	3 Hrs.	6
Paper II	Discrete Mathematics	100	3 Hrs.	6

Optional Papers
Any three of the following paper with the permission of the Head of the Department of Mathematics & Statistics.

Paper III	Relativity and Cosmology	100	3 Hrs.	6
Paper IV	Viscous Fluid Dynamics	100	3 Hrs.	6
Paper V	Number theory	100	3 Hrs.	6
Paper VI	Numerical Analysis	100	3 Hrs.	6
Paper VII	Integral Equations and Internal Transforms	100	3 Hrs.	6
Paper VIII	Optimization Techniques	100	3 Hrs.	6
Paper IX	Advanced Topology	100	3 Hrs.	6
Paper X	Computer Programming	Th. 75 Per. 25	3 Hrs. 2 Hrs.	Th. 04 Pre. 02
Paper XI	Mathematical Theory of Statistics	100	3 Hrs.	6
Paper XII	Space Dynamics	100	3 Hrs.	6
Paper XIII	Astronomy	100	3 Hrs.	6
Paper XIV	Compressible Fluids and Magneto hydro Dynamics	100	3 Hrs.	6

Note:

* **Scheme of Examination:**

Question Paper Pattern for Examination: 100 marks

Section A: Total 10 Question will be set from five units i.e. two question from each unit. These questions require very short answer. Each question will be of one (1) mark (Total 10 marks). All the questions in section A are compulsory.

Section B: Total 10 questions will be set from five units i.e. two question from each unit. Students are required to attempt at least one question from each unit. Each question carries 10 marks (Total 50 marks). The answer of each question should be given approximately in 250 words.

Section C: Total 4 descriptive question will be set from five units of the paper, not more than one question from each unit. Each question may also have two sub-division. Students are required to answer two questions in about 500 words. Each question carries 20 marks (Total 40 marks).

** The right to information act, 2005 is applicable.
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PAPER-I
TOPOLOGY & FUNCTIONAL ANALYSIS

TIME: 3 hours   **Max. Marks: 100**
UNIT-I
Topological spaces: open sets, closed sets, Closure of a set, Limit point of a set, Derived set, Boundary of a set. Kuratowaskis theorem, Open bases, Open subbases, second countable space, separable space, Lindel of theorem, continuous functions in topological spaces, continuity in Metric spaces.

UNIT-II
Compact Topological spaces: Continuity and compactness, compactness and base, Compactness and subbase, Product of compact spaces, Tychonoff theorem compactness, sequentially compactness and Bolzano-Weirstrass Property and their equivalences in Metric spaces.

Seperation Axioms: T_O - space, T_1 - space, Hausdroff space, Regular and completely regular and normal spaces separation Axioms and compactness.

UNIT-III
Connectedness: Connectedness and continuity, Product .of connected topological spaces, Components, connectedness in metric spaces.
Approximation: Weirstrass approximation theorem, function algebra, C(X, R) and C (X, C) the real Stone-Weirstrass theorem, Complex Stone-Weirstrass theorem.

UNIT-1V
Normed linear spaces; Banach spaces; Continuous linear transformations, Hahn-Banach theorem; the natural embedding of a normed linear space into its second conjugate, the open mapping theorem; the closed graph theorem, the uniform boundedness theorem.

UNIT-V
Hillbert spaces; Schwartz's inequality: orthogonal complements, Orthonormal sets, conjugate space, Riesz representation theorem, Adjoint of an operator, self adjoint operator, Normal operator, Matrix representation of a linear operator.

Books recommended:

1. George F.Simmons   : Introduction to Topology and modern analysis, McGraw Hill Book Co.
2. S.I.Hu   : Elements of Real Analysis.
3. H.L.Royden   : Real analysis.
4. W.J.Thron   : Topological structure.
5. J.Kelley   : General Topology.