

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.

PAPER-II

DISCRETE MATHEMATICS

TIME: 3 hours

Max. Marks: 100

UNIT-I

Formal logic– Statement, Symbolic Representation and Tautologies, Quantifiers, Predicate validity, Propositional logic.

Semi groups and monoids, Relations and ordering. Functions definitions and examples of semi groups and monoids (including those pertaining to concatenation operation). Homomorphism of semi groups and monoids. Quotient subgroups, sub semigroups and sub monoids. Direct products. Basic Homomorphism theorem

Lattices: - Lattices as partially ordered sets. lattices, direct products and Homomorphism

UNIT-II

Their properties. Lattices as Algebraic systems. Sub complete, Complemented and distribution lattices.

Boolean Algebras:- Boolean Algebras as lattices. Various Boolean identities. The switching Algebras examples. Sub Algebras. Direct products and Homeomorphisms, Join- irreducible elements, Atoms and miterms, Boolean forms and their equivalence. Minterms Boolean forms. Minimization of Boolean functions. Application of Boolean Algebras to switching theory (usj and, OR and not gates).The karnaugh map method.

UNIT-III

Graph theory: Definition of (Undirected) graphs, Paths, Circuits, Cycles and Sub graphs. Indeed subgroups... Degree of vertex. Connectivity. Planner graphs and their properties.

Trees. Euler's formula for connected planar graphs complete and complete Bipartite graphs. Non Planer graph Kuratoueskis theorem (Statematonly). Spanning trees. Cut sets, Fundamental cut-sets, and Cycles. Minimal spanning trees and kruskal's Algerian. Euler's theorem on the existence of eulerian paths and circuits. Directed graphs. In degree and out degree of a vertex.

Weighted undirected graphs, Dijkstra's Algorithm. Strong connectivity and marshal's Algorithm.

Directed trees. Surch trees. Tree traversals.

UNIT-IV

Introductory computability Theory – Finite state machines and their Transition Table Diagrams. Equivalence of finite state machines. Reduced machines. Homomorphism. Finite Automata. Acceptors. Non- deterministic Finite Automata and equival ends of it are power to that of Deterministic Finite Automata.

UNIT-V

Phrase structure Grammar. Rewriting Rules. Derivations, Sentential forms. Language generated by a Grammar. Regular context – free, and context sensitivity Grammars and Languages. Regular sets, Regular expressions and pumping Lemma Kleene's Theorem

Books recommended:

1. J.P. Tremblay & R. Manohar : Discrete Mathematical structure with applications to computer science.
2. J.L. Gerstling : Mathematical Structures for Computer Science, (3rd edition).
3. N. Arsing Deo : Graph theory with applications to Engineering and Computer Science.
4. K.D. Joshi : Foundation of Discrete Mathematics
5. S. Wiitala : Discrete mathematics – A Unified Approach
6. C. L. Liu : Elements of Discrete Mathematics.