

MATA GUJRI MAHILA MAHAVIDYALAYA (AUTO), JABALPUR

DEPARTMENT OF MATHEMATICS 2017-18

M.Sc. (MATHEMATICS) THIRD SEMESTER

Name of the Papers	Theory (MM)	Min. Pass. Mark	C.C.E.	Min. Pass. Mark	Practical M .M.	Min. Pass mark	Total
Paper I :Applied Functional Analysis	35	12	15	05	--	--	50
Paper II: Linear Programming	35	12	15	05	--	--	50
Paper III: Programming in C (Theory and Practical) -I	25	09	10	04	15	06	50
Paper IV: : Fuzzy Sets and their Applications	35	12	15	05	--	--	50
Paper V – Integral Transform-I	35	12	15	05	--	--	50
Internship and Attendance (Compulsory)							100=90 +10
Grand Total							350

Note:

In attendance 10 marks is allocated as per ordinance No. 79 of R.D. University Jabalpur.

The students, whose attendance is less as per ordinance No. 79 of R.D. University Jabalpur, will not allow to appear in the examination at the close of semester and he/she would be declared having failed in that semester.

At the end of IIIrd semester a Internship Viva-Voce is to be conducted by a board of at least three examiner which includes at least one external examiner.

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M.A./M.Sc. (MATHEMATICS) THIRD SEMESTER

PAPER I: APPLIED FUNCTIONAL ANALYSIS

Max. Marks: 35

Min. Pass. Marks: 12

Unit-1	Hilbert spaces obtained from Hilbert spaces, Cartesian and Tensor product of Hilbert spaces, convex sets and projections. Projection on a cone and a linear subspace.
Unit-2	Weak convergence, Weak compactness properties, Baire's Category Theorem, sequence of continuous linear functional, Banach Saks, Theorem, Weak semi continuity, Continuity of Projection on a closed convex set.
Unit-3	Convex sets and convex programming elementary notions, internal, bounding and external points. Support functional of a Convex set, simple example, Minkowski functional support plane through a boundary point, support mapping, Separation theorem.
Unit-4	Functions transformations and operators, Linear operators and their adjoints, bounded and unbounded operators projection operator and differential operator.
Unit-5	Spectral theory of operators, resolvent of operator, resolvent set and spectrum. Spectral radius, Compact operators, its characterizing property.

Text Books :

1. V. Balakrishnan : Applied Functional Analysis, Springer Verlag, New York.

Reference :

1. Ervin Kreyszig : introductory Functional Analysis with Applications, John Wiley and Sons.

2. B.V. Limaye : Functional Analysis II Edition, New Age International Publishers.

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PAPER II: LINEAR PROGRAMMING

Max. Marks: 35

Min. Pass. Marks: 12

Unit-1:	General Linear Programming Problem, Formulation of the Linear Programming Problem, Solution by Graphical method, Simplex method.
Unit-2:	Solution of a Linear Programming Problem by Big-M method, Two phase method, concept of duality, Fundamental theorem of duality, Dual simplex method.
Unit-3:	Assignment problem, Solution of assignment problem, Unbalanced Assignment Problem, Crew Assignment problem, Traveling Salesman problem.
Unit-4:	Transportation problem, Initial basic feasible solution, Vogel's Approximation method, Optimality test by MODI method, Stepping Stone method, Degeneracy in Transportation Problem.
Unit-5:	Sequencing problem, processing n jobs on two machines, n jobs on three machines, n jobs on m machines, processing two jobs through m machines.

TEXT BOOKS:

Kanti Swarup, P.K. Gupta and Manmohan, Operations Research, Sultan Chand & Sons, New Delhi.

REFERENCE BOOKS:

1.S. D. Sharma, Operations Research.

2.F. S. Hiller and G.J. Lieberman, Industrial Engineering Series, 1995(This book comes with a CD containing software)

3.H. Hadley, Linear and Dynamic programming, Addison-Wesley Reading Mass.

4.H.A. Taha, Operations Research- An introduction, Macmillan Publishing Co. Inc. New York.

5.Prem Kumar Gupta and D. S. Hira, Operations Research, an Introduction, S. Chand & Company Ltd. New Delhi.

6.N. S. Kambo, mathematical Programming Techniques, Affiliated East- West Pvt. Ltd. New Delhi, Madras.

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PAPER III: PROGRAMMING IN C (THEORY AND PRACTICAL) -I

Max. Marks: 25
Min. Pass. Marks: 09

Unit-1	An overview of programming languages.
Unit-2	Classification. C Essentials – Programs development, Functions.
Unit-3	Anatomy of a Function. Variables and Constants Expressions. Assignment Statements. Formatting Source files Continuation Character. the Preprocessor.
Unit-4	Scalar Data types – Declarations, Different Types of integers. Different kinds of Integer Constants Floating – point type Initialization.
Unit-5	Mixing types Explicit conversions – casts. Enumeration Types. the void data type , Typedefs. Pointers.

Reference Books:

1. Samuel P. Harkison and Gly L Steele Jr. C; A Reference manual , 2an Edition
Prentice hall 1984.

2. Brain W Kernigham & Dennis M Ritchie the C Programmed Language 2nd Edition
(ANSI features), Prentice Hall 1989.

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PAPER IV: FUZZY SETS AND THEIR APPLICATIONS – I

Max. Marks: 35

Min. Pass. Marks: 12

Unit-I	Idea of fuzzy set and membership function, Definition of a fuzzy set, membership function, representation of membership function, General definitions and properties of fuzzy sets, Support, height, equality of two fuzzy sets, containment, examples.
Unit-II	Union and Intersection of two fuzzy sets, Complement of a fuzzy set, normal fuzzy set, α -cut set of a fuzzy set, strong α -cut, convex fuzzy set, a necessary and sufficient condition for convexity of a fuzzy set (Theorem 1), Decomposition of fuzzy sets, Degree of sub sethood, Level set of a fuzzy set, Cardinality, fuzzy cardinality, examples.
Unit-III	Other important operations on fuzzy sets, Product of two fuzzy sets, Product of a fuzzy set with a crisp number, Power of a fuzzy set, Difference of two fuzzy sets, Disjunctive sum of two fuzzy sets, example.
Unit-IV	General properties of operations on fuzzy sets, Commutativity, associativity, distributivity, Idempotent law, identities for operations, Transitivity, involution, Demorgans laws, proofs and examples, Some important theorems on fuzzy sets, set inclusion of fuzzy sets and corresponding α -cuts and strong α -cuts (Theorem 1).
Unit-V	Comparison of α -cut and strong α -cut, Order relation of scalars α is inversely preserved by set inclusion of corresponding α -cuts and strong α -cuts, α -cut of union and intersection of two fuzzy sets, α -cut of complement of a fuzzy set (Theorem 2), Examples, α -cuts and strong α -cuts of union and intersection of arbitrary collection of fuzzy sets.

Text book –

- 1 Fuzzy Sets and their Applications by Pundir and Pundir, Pragati Prakashan (PP 30-76).

Reference Books:

1. Fuzzy sets and Fuzzy Logic by G.J. Klir and B. Yuan, Prentice Hall of India, New Delhi, 1995.
2. Fuzzy set Theory and its Applications by H.J. Zimmermann, Allied publishers Ltd, New Delhi 1991.

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PAPER V: INTEGRAL TRANSFORM-I

Theory Max.Marks:35

Max.PassingMarks:12

Unit-I	Application of Laplace Transforms to Differential Equations.
Unit-II	Laplace's Equations.
Unit-III	Laplace's Wave Equations.
Unit-IV	Applications of Laplace Transforms.
Unit-V	Heat Conduction Equation.

Text Books:

(1) Integral Transforms by Goyal and Gupta.

(2) Integral Transforms by Sneddon.