सत्र 2019-20

Devi Ahilya University, Indore

Scheme of Examination

Class M.A./M.Sc. (Semester – I)

Subject : Mathematics

Paper	Title of the Paper	Max. Marks		Minimum Passing Marks	
		Theory	C.C.E.	Theory	C.C.E.
I	Advanced Abstract Algebra –I	85	15	28	05
II	Real Analysis	85	15	28	05
III	Topology – I	85	15	28	05
IV	Complex Analysis –I	85	15	28	05
V	(Any one of the following) 1. Differential Equations –I	85	15	28	05
	2. Advanced Discrete Mathematics –I	85	15	28	05
	3. Programming in C-I (Theory and Practical)	Theory-50 Practical - 35	15	Theory- 17 Practical – 12	05

14-2-19

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14.2.19

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14-02-2019

Department of Higher Education Govt. of M.P.
Semester wise syllabus for P.G.
As recommended by Central Board of Studies and Approved by HH the Governor of M.P.

(Partially revised by the Board of Studies in Mathematics, DAVV, Indore on 11-05-2015 and to be effective from academic session ~~2015-2016~~ 2017-18.)

Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: I**
Title of subject/Group	**: ADVANCED ABSTRACT ALGEBRA-I**
Paper No.	**: I**
Compulsory / Optional	**: Compulsory**

UNIT – I

Normal & Subnormal series of groups, Composition series, Jordan-Holder series, Solvable & Nilpotent groups.

(1.Chapter 6 Sections 1-3)

UNIT-II

Algebraic extension of fields, Irreducible polynomials and Eisenstein criterion, Adjunction of roots, Algebraic and Transcendental extension of a field. Algebraically closed fields.

(1.Chapter 15 Sections 1-4)

UNIT-III

Splitting fields, Normal extensions, Multiple roots, Finite fields, Seperable and Inseperable extension.

(1.Chapter 16 Sections 1-5)

UNIT-IV

Galois theory, Automorphism groups and fixed fields, Fundamental theorem of Galois theory, Fundamental theorem of algebra.

(1.Chapter 17 Sections 1-3)

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UNIT-V

Application of Galois Theory to classical problems, Roots of unity and cyclotomic polynomials, Cyclic extensions, Polynomials solvable by radicals, Insolubility of general equation of degree 5 by radicals.

(1. Chapter 18 Sections 1- 3)

NOTE: Exercise based on theory are expected to be solved.

TEXT BOOK:

1.P.B.Bhattacharya, S.K.Jain and S.R. Nagpaul, Basic Abstract Algebra, Cambridge University Press.

REFERENCE:

2. I.N.Herstein, Topics in Algebra, Wiley Eastern, New Delhi.
3. N.Jacobson, Basic Algebra, Vol.I, II and VIII, Hindustan Publishing Company.
4. Surjeet Singh and Qazi Zameeruddin, Modern Algebra, Eighth edition,Vikas Publishing House.
5. V.Sahai & V.Bisht, Algebra, Narosa Publishing House.

14.02.19

K.Rajeswari 14.2.19

14/2/19

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14/2/19

14.02.19

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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: I**
Title of subject/Group	**: Real Analysis**
Paper No.	**: II**
Compulsory / Optional	**: Compulsory**

Unit-I

Definition and Existence of Riemann-Stieltjes Integral and Its Properties,Integration and differentiation, The fundamental theorem of Calculus, integration by parts.

(1.Chapter 6 Sections 6.1 - 6.22)

Unit-II

Integration of vector-valued functions, Rectifiable curves. Sequences and Series of Funtions: Uniform convergence, Uniform convergence and Continuity.

(1.Chapter 6 Sections 6.23 - 6.27 , Chapter 7 Sections 7.1 - 7.15)

Unit–III

Uniform Convergence and Integration, uniform convergence and differentiation, Equicontinuous Families of Functions , Stone-Weierstrass theorem.

(1.Chapter 7 Sections 7.16 - 7.33)

Unit-IV

Some Special Functions: Power series,The Exponential and Logarithmic Functions, The Trigonometric Functions , The Algebraic Completeness of the complex field, Functions of several variables: linear transformations.

(1.Chapter 8 Sections 8.1 - 8.8, Chapter 9 Sections 9.1 - 9.9)

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Unit-V

Functions of several variables: Differentiation , Chain rule, Partial derivatives, The Contraction Principle ,The Inverse function theorem, The Implicit function theorem Derivatives of higher order, differentiation of integrals.

(1.Chapter 9 Sections 9.10 - 9.29, Sections 9.39 - 9.43)

NOTE: Exercise based on theory are expected to be solved.

Text books

1. Walter Rudin, Principles of Mathematical Analysis, McGraw Hill.

Reference

2. T.M. Apostal, Mathematical Analysis Narosa.

3. H.L. Royden, Real Analysis,Macmillan (Indian Edition)

P. Ic Jose 14/2/19

IC Rajeswari 14.2.19.

M Benkatte 14-02-2019

14/2/19

Ak Ramdas 14.2.19

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Department of Higher Education Govt. of M.P.
Semester wise syllabus for P.G.
As recommended by Central Board of Studies and
Approved by HH the Governor of M.P.
2017-18
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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: I**
Title of subject/Group	**: Topology -I**
Paper No.	**: III**
Compulsory / Optional	**: Compulsory**

Unit I

Finite and infinite sets.Countable and uncountable sets.Schroeder-Bernstein Theorem. Axiom of Choice. Well-ordered set. Cardinal numbers and its arithmetic. Cantor's Theorem. The Continuum Hypothesis. Zorn's Lemma.

(1. Sections 6,7,9,10,11)

Unit II

Definition and examples of topological space. Bases and Subbases. Order topology, Product topology. Subspaces and relative topology.

(1.Sections 12, 13, 14, 15, 16)

Unit III

Closed sets and Limit points. Closure of a set. Dense subsets. Interior, exterior and boundary of sets.Neighborhoods and Neighborhood system.Continuous functions and Homeomorphism. Examples.

(1. Sections 17.1 to 17.7 and 18)

Unit IV

Connected Spaces. Connected subspaces of the Real Line, Path Connectedness. Components and Local Connectedness.

(1.Sections 23,24,25)

Unit V

The countability axioms: First and Second countable space,Lindeioff's Theorem, Scparable space, Second Countability and Separability .Housdorff Space.

(1.Sections 30, 17.8 to 17.10)

NOTE: Exercise based on theory are expected to be solved.

Text book

1.James R. **Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd. New Delhi.**

Refrence

2.G.F.Simmons. Introduction to Topology and Modern Analysis. McGraw Hill.

3.K.D.Joshi ; Introduction to general Topology, Kelley, Eastern

4.K.P.Gupta:- Topology; Pragrati Prakashan.

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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: I**
Title of subject/Group	**: Complex Analysis – I**
Paper No.	**: IV**
Compulsory / Optional	**: Compulsory**

Unit – I

Complex numbers, Geometrical representation, Complex conjugate, Modulus and argument, Properties of modulus, Properties of arguments, Inequalities of modulus, Cauchy's inequality, Demoiver's theorem, Limit and continuity, Continuous function, Uniform continuity, Analytic function, Cauchy's Riemann equations [Necessary and sufficient condition for f(z) to be analytic], Conjugate functions, Harmonic functions.

(2.Chapter 1 and 2)

Unit – II

Complex integration, Cauchy's fundamental theorem, Cauchy – Gaursat theorem, Cauchy integral formula, higher order derivatives, extension of the Cauchy's theorem to multiply connected regions.

(2.Chapter 3 sections 3.1-3.4,3.6)

Unit – III

Morera's theorem, Cauchy's inequality, Liouville's theorem, the fundamental theorem of algebra, Taylor's theorem, Problems based on Taylor's theorem.

(2.Chapter 3 section 3.7,3.8,3.10 (Only Taylors Th.), Theorem 5-8,13

Unit – IV

The Maximum modulus principal, Schwartz lemma, Laurent series, problems based on Laurent's series, Uniqueness of Laurent expansion.

(2.Chapter 3 sections 3.9,3.10 (Laurent Theorem) Theorem 9,10,11,14,15

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Unit – V

Bilinear Transformation, Fixed points ,Critical points, cross Ratio, normal form of a Bilinear Transformation, Problems on Bilinear Transformation, Mapping by Elementary Transformation (Transition, Rotation, Magnification, Rotation and Magnification, Inversion),Conformal mapping, Necessary and sufficient condition for conformal mapping.

(2.Chapter 6)

NOTE: Exercise based on theory are expected to be solved.

Text Book

1. J.B. Convey, Functions of one complex variable, Springer – verlag
2.Complex Analysis – Dr. Brijendra singh,Dr. Varsha Karanjgokar , Dr. R.S. Chandel, Golden Valley Publications Agra.

References

3.S. Ponnuswamy, Foundations of complex analysis, Narosa Publishing House.
4.L.V. Ahlfors,Complex analysis, McGraw Hill

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2017-18.

Department of Higher Education, Govt. of M.P.

Semester Wise Syllabus For Post Graduates

As recommended by Central Board of Studies and

Approved by HH the Governor of M.P

Class - M.Sc./M.A.

Subject - Mathematics

Paper - V (Optional (II)

Paper Title - Mathematics Differential Equitation - I

Semester - I

Max.Marks. 100
Theory 85
C.C.E. 15

Unit - I

Initial value problem and inn equivalent integral equation,mth.order equation in d-dimensions as a first order system, Concepts of local existence Existence uniqueness of solutions with examples.

Unit - II

Basic Theorem,Ascoli—Arzela theorem,-. Theorem on convergence of solutions of a family of initial value problems.

Unit -III

Picard-Lindelof theorem, Peano's existence theorem and corollary. Maximal intervals of existence.Extension theorem and corollaries,Kamkes convergence theorem. Kneser's theorem (statement only).

Unit - IV

Differential inequalities and Uniqueness -Gronwall's inequality. Maximal and Minimal solutions. Differential inequalities. A Theorem of wintner. Uniqueness Theorems. Nagumo's and Osgood's criteria.

Unit - V

Egres points and Lyapunov Functions. Successive approximations.

Linear Differential Equations--Linear Systems, Variation of constants, reduction to smaller systems. Basic inequalities, constant coefficients. Floquet theory, Adjoint systems, Higher order equations.

Recommended Text

R Hartman, Ordinary Differential Equations, John Wiley (1964).

References

1. W.T. Reid, Ordinary Differential quations, John Wiley a Sons, NY (1971).

14/2/19 P.K Josi 14/2/19 14/2/19 14.02.2019 14.02.19 14.2.19.

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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: I**
Title of subject/Group	**: Advanced Discrete Mathematic-I**
Paper No.	**: V**
Compulsory / Optional	**: Optional**

UNIT - I

Formal logic: Statement, Connectives, Tautologies, Normal Forms, Ordering and uniqueness of Normal Form.

(1 Chapter 1 Sections 1.1-1.3)

UNIT - II

Semigroups and Monoids: Definition and examples of Semigroups and Monoids (including those pertaining to concatenation operation) Homomorphism of semigroups and monoids, Congruent relation and Quotient Semigroups and Subsemigroups and submonoids Direct products, Basic homomorphisms theorem.

(1. Chapter 3, Scetion 3.2)

UNIT- III

Lattices: Lattices as partially ordered sets, their properties, Lattices as algebraic systems. Sublattices, Direct products and homomorphism, Some Special lattices e.g. Complete Complemented and Distributive Lattices.

(1 Chapter 4, Section 4.1)

UNIT- IV

Boolean Algebras: Boolean Algebras as lattices, Various Boolean identities, Sub-algebras, Direct products and Homomorphisms. Join- irreducible elements,

(1 Chapter 4 Section 4.2)

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UNIT- V

Boolean Functions: Boolean Forms and Free Boolean Algebras, Sum- of- products canonical forms, Product-of- sum canonical forms .Value of Boolean Expressions and Boolean functions. Representation and Minimization of Boolean functions, Application of Boolean algebra to switching theory (using AND,OR and NOT gates). The Karnaugh map method.

(1. Chapter 4, Section 4.3, 4.4)

Note :Exercise based on theory are expected to be solved.

Recommended Books

1.J. P. Trembly and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill book Co.,1997 .

References

2.C.L.Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.

3. N. Deo, Graph Theory with Application to Engineering and Computer Sciences, Prentice Hall of India.

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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: I**
Title of subject/Group	**: Programming in C-I**
Paper No.	**: V**
Compulsory / Optional	**: Optional**

Unit 1

An overview of programming languages. Programming Basics: Basic Structure of C-program(First C program),Identifiers, Keywords, Constants, Variables and Arithmetic expression, Variable Names, Data Types and Sizes, constants, Scalar Data Types – declarations, different types of integers, Different kinds of Integer Constants, Character Constants, Floating – point type Constant, Initialization.

(1. Chapter 1 sections 1.1,1.2,1.4 Chapter 2 sections 2.1,2.2,2.3,2.4 Appendix A2.3-2.5)

Unit 2

Operators and Expressions – precedence associatively and order of evaluation, unary plus and minus operators, Arithmetic operators, increment and decrement operators, comma Operator, relational operators, logical operators, bit- manipulation operators, Bitwise assignment operators and expressions, Conditional expressions, cast operators ,size of Operators , conditional Operators , memory operator. Input and Output functions (formatted and unformatted).

(1. Chapter 2 sections 2.5,2.6,2.8-2.12,Chapter 7 Sections 7.1,7.2,7.4, Appendix A 7.4, 7.5)

Unit 3

Control Flow – Statements and blocks, conditional Branching if, if-else, nested if-else, Looping: do while, while and for loop, nested loops.

(1. Chapter 3 sections 3.1,3.2,3.3,3.5,3.6)

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Unit 4

The break and continue statement, the Goto statement and Labels, exit statement, switch statement, infinite loop.

(1. Chapter 3 sections 3.4,3.7,3.8)

Unit 5

Type Conversions, Mixing types explicit conversions – casts, enumeration types. void data type , Typedefs, preprocessor directives, formatting source files ,continuation Character, integer and float conversions, type conversion in assignment.

(1. Chapter 2 section 2.7, Chapter 6 section 6.7, Appendix A 6, A 8.9, A 12,)

NOTE: Algorithms and Programs based on theory are expected to be developed.

Text Book :

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

Reference Book

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

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सत्र - 2019-20

Devi Ahilya University, Indore

Scheme of Examination

Class M.A./M.Sc. (Semester – II)

Subject : Mathematics

Paper	Title of the Paper	Max. Marks		Minimum Passing Marks	
		Theory	C.C.E.	Theory	C.C.E.
I	Advanced Abstract Algebra –II	85	15	28	05
II	Lebesgue Measure & Integration	85	15	28	05
III	Topology – II	85	15	28	05
IV	Complex Analysis –II	85	15	28	05
V	(Any one of the following) 1. Differential Equations –II	85	15	28	05
	2. Advanced Discrete Mathematics –II	85	15	28	05
	3. Programming in C-II (Theory and Practical)	Theory-50 Practical - 35	15	Theory- 17 Practical – 12	05

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P.K.Jain 14/2/19

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As recommended by Central Board of Studies and Approved by HH the Governor of M.P.

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Class	**: M.Sc./M.A. (Mathematics)**
Semester	**: II**
Title of subject/Group	**: ADVANCED ABSTRACT ALGEBRA-II**
Paper No.	**: I**
Compulsory / Optional	**: Compulsory**

UNIT – I

Introduction to Modules.Examples, Submodules and direct sums, Cyclic module, R-homomorphisms and Quotient modules, Isomorphism.

(1.Chapter 14 Sections 1-3)

UNIT-II

Completely reducible modules Schur's lemma, Free modules, Representation of linear mappings, Rank of linear mapping.

(1.Chapter 14 Sections 4 - 7)

UNIT-III

Noetherian & Artinian modules and rings, Hilbert basis theorem.Weddeburn-Artin theorem.

(1. Chapter 19 Sections 1-3)

UNIT-IV

Uniform modules, Primary modules, Finitely generated modules over a PID, Decomposition theorem, Uniqueness of the decomposition. Application to finitely generated abelian groups.

(1. Chapter 19 Section 4, Chapter 21 Sections 1-3)

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UNIT-V

Linear Transformation ,The Algebra of Linear Transformation, Characteristic Roots, Canonical forms (Triangular form, Nilpotent Transformations, Generalized Jordan form over any field, Rational canonical form).

(1. Chapter 21 Sections 4,5) (2. Chapter 6 Sections 6.1,6.2,6.5,6.6,6.7)

NOTE: Exercise based on theory are expected to be solved.

TEXT BOOK:

1.P.B.Bhattacharya, S.K.Jain and S.R. Nagpaul, Basic Abstract Algebra, Cambridge University Press.
2 I.N.Herstein,Topics in Algebra,Wiley Eastern,New Delhi

REFERENCE:

3.V.Sahai & V.Bisht,Algebra,Narosa Publishing House

4.N. Jacobson, Basic Algebra I and II, 2nd Ed., W. H. Freeman, 1985 and 1989

KMRajeshwari/14.2.19 14.02.2019

14/2/19 14/2/19 14.02.19

P.L.Sahu 14/02/19

Department of Higher Education Govt. of M.P.
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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: II**
Title of subject/Group	**: Lebesgue Measure & Integration**
Paper No.	**: II**
Compulsory / Optional	**: Compulsory**

Unit-I

F_σ, G_δ sets, Introduction to Lebesgue Outer Measure, Measurable sets and Lebesgue Measure, Non-Measurable sets.

(1. Chapter 2 sections 7, Chapter 3 sections 1- 4)

Unit-II

Measurable Functions, Egoroff'theorem, Lusin's theorem, Little-wood's Three Principles , A non-Borel Measurable Set. The Riemann Integral, The Lebesgue Integral of a Bounded Function over a set of Finite Measure.

(1.Chapter 3 sections 4 – 6, Chapter 4 sections 1,2)

Unit-III

The Integral of a Non-Negative Function , The General Lebesgue Integral, Convergence in Measure, Differentiation of Monotone Functions, The Four Derivatives.

(1.Chapter 4 sections 3 - 5 , Chapter 5 section 1)

Unit-IV

Functions of Bounded Variation, Differentiation of an Integral, Absolute Continuity, Convex Functions, Jensen Inequality. The L^p-spaces, The Holder and Minkowski Inequalities.

(1.Chapter 5 sections 2 - 5, Chapter 6 sections 1,2)

Rejected/14.2.19

Unit-V

Convergence and Completeness , Riesz-Fischer Theorem, Approximation in L^p , Bounded Linear Functionals on the L^p-spaces , Riesz Representation Theorem.

(1.Chapter 6 sections 3 - 5)

NOTE: Exercise based on theory are expected to be solved.

Text Book

1. H.L. Royden, Real Analysis Third Edition, PHI

References

2.Walter Rudin, Principles of Mathematical Analysis, McGraw-Hill, International Student Edition

3.G. De Barra. Measure Theory and Integration, Wiley Eastern (Indian Edition).

4. Inder K Rana, An Introduction to Measure and Integration, Second Edition, Narosa Publication.

14.02.2019

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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: II**
Title of subject/Group	**: Topology -II**
Paper No.	**: III**
Compulsory / Optional	**: Compulsory**

Unit- I

Compactness, Continuous functions and compact sets, Basic properties of compactness.Compactness and F.I.P. (Finite intersection property).Sequential and countably compact spaces. Local compactness and one point compactification. Compactness in metric space. Equivalence of compactness. Countable compactness.

(1.Sections 26, 27, 28 and 29)

Unit- II

The Separation axioms.Regular and Normal spaces.Urysohn's Lemma. Tietze's Extension Theorem

(1.Sections 31, 32, 33 and 35)

Unit-III

Tychnoff product topology in terms of standard sub-base and its characterizations, Embedding and metrization. Embedding lemma and Tychnoff embedding. The Urysohn's metrization.

(1.Section 37) and (2.chapter 9)

Unit –IV

Nets and filters. Topology and convergence of nets. Hausdorffness and nets. Compactness and nets. Filters and their convergence. Canonical way of converting nets to filters.Ultra-filters and compactness.

(2.Chapter 10 Sections 1 to 4)

Unit-V

The Fundamental group and covering spaces- Homotopy of paths. The Fundamental group .Covering spaces. The Fundamental group of the circle and the fundamental theorem of algebra.

(1.Sections 51 , 52, 53, 54 and 56)

NOTE: Exercise based on theory are expected to be solved.

Text book

1. James R. Munkres: Topology, A First Course, Prentice Hall of India Pvt. Ltd. New Delhi.

2. K.D.Joshi : Introduction to general Topology, Wiley Eastern Limited.

Reference

3.G.F.Simmons: Introduction to Topology and Modern Analysis. McGraw Hill.

K.M.Rajeswari/14.2.19.

14.02.2019

14/2/19

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P.K JOSH
14/2/19

Department of Higher Education Govt. of M.P.
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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: II**
Title of subject/Group	**: Complex Analysis – II**
Paper No.	**: IV**
Compulsory / Optional	**: Compulsory**

Unit – I

Isolated Singularities, Problems based on Singularities, Meromorphic functions, Poles and zeros, N - P theorem, The argument principle, Rouche's theorem, Problem based on Rouche's theorem.

(2.Chapter 4)

Unit – II

Residues, Computation of Residue at a finite pole, Cauchy's Residue theorem, Problems based on Residue, Integration Round the circle, Evaluation of the integral $\int_0^{2\pi} f(cos\theta, Sin\theta)d\theta$

(2.Chapter 5 page (81-98)

Unit – III

Jordan's inequality, Jordan's lemma,Evaluation of improper real integrals of the type $\int_{-\infty}^{\infty} f(z)dz$, Evaluation of integrals $\int_{-\infty}^{\infty} f(z)dz$ when poles of f (z) lie on real axis,Integrals of the type $\int_0^{\infty} x^{a-1}f(x)dx$, $\int_0^{\infty} \frac{logxdx}{g(x)}$ Evaluation of integrals involving Quadrant, Sector and Rectangular contours.

(2.Chapter 5 page (99-121)

Unit – IV

Gamma function, Infinite product, Properties of gamma functions, Legendre's duplication formula, Riemann Zeta function, Riemann functional equation, relation between gamma and Zeta functions, weierstrass factorization theorem.

Unit – V

Analytic Continuation, Uniqueness of direct analytic Continuation, Uniqueness of analytic Continuation along a curve, Schwartz reflection principle, Harmonic function, Mean value theorem, Poisson kernel, Problem based on analytic Continuation.

(2.Chapter 11 page (211-217) Article 3.1, Chapter 13 page 252 – 259)

NOTE: Exercise based on theory are expected to be solved.

Text Book:

1.J.B. Convey, Functions of one complex variable, Springer – verlag

2.Complex Analysis – Dr. Brijendra singh,Dr. Varsha Karanjgokar, Dr. R.S. Chandel Golden Valley Publications Agra.

References:

3. S. Ponnuswamy, Foundations of complex analysis, Narosa Publishing House.
4. L.V. Ahlfors,Complex analysis, McGraw Hill

Department of Higher Education, Govt. of M.P.

Semester Wise Syllabus For Post Graduates

As recommended by Central Board of Studies and

Approved by HH the Governor of M.P

Class - M.Sc./M.A.

Subject - Mathematics

Paper - V (Optional (II)

Paper Title - Differential Equations-II

Semester - II

Max.Marks. 100
Theory 85
C.C.E. 15

Unit - I

Dependence on initial conditions and parameters, Prliminaries, conyinuity, differentiability,Higer order differentiability.

Unit II

Poincare-Bendixson Theory-Autonomous systems. Umlanfsatz. Index of a stationary point.

Poincare-Bendixson theorem Stability of periodic solutions, rotation points, foci, nodes and saddle points

Unit III

Linear second order equations—Preliminaries ,s. Basic facts. Theorems of Sturm. Sturm Liouville Boundary Value Problems. Number ot zeroes,.. Nonoscillatory equations and principal solutions. Nonoscillation theorems,

Unit IV

Use of Implicit function and fixed point iheorems-Periodic solutions. Linear equations. Nonlinear problems.

Unit V

Second order Boundary' value problems, Linear problems, Nonlinear problems, Aprori bounds.

Recommended Text

1.R Hartman, Ordinary Differential Equations, John Wiley (1964).

References

1. W.T. Reid, Ordinary Differential Liquations, John Wiley a Sons, NY (1971).

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Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: II**
Title of subject/Group	**: Advanced Discrete Mathematic-II**
Paper No.	**: V**
Compulsory / Optional	**: Optional**

UNIT-I

Graph theory :Definition of undirected & directed graph ,Simple graph, Multi graph, Isomorphic graph, Path, Reachability and Connectedness , Simple path ,Simple cycle , Unilaterally connected ,Strongly connected.

(1. Chapter 5 Section 5.1 (5-1.1 & 5-1.2))

UNIT-II

Matrix Representation of Graphs, adjacency matrix, Reachability matrix, Warshal's algorithm,Trees, Directed tree, Terminal node .

(1. Chapter 5 Section 5.1 (5-1.3 & 5-1.4))

UNIT-III

Grammars and Languages: Phrase –Structure Grammars. Rewriting rules. Derivations, Sentential Forms, Language generated by a Grammar. Regular, Context-free, and Context-sensitive Grammars and Languages, Notion of Syntax Analysis, Polish Notation ,Conversion of Infix Expressions to Notations.

(1. Chapter 3 Section 3.3)

UNIT-IV

Finite State Machine: Introductory Sequential Circuits, Equivalence of Finite State Machines, Finite-state machines and their transition table diagram .Reduced Machines, Homomorphism.

(1. Chapter 4, Section 4.6)

UNIT-V

Introductory Computability Theory: Finite-state Acceptors and Regular Grammars, Nondeterministic finite automation, Turing Machines and Partial Recursive Functions

(1. Chapter 6, Sections 6.1 ,6.2)

Note : Exercise based on theory are expected to be solved.

Text Book

1.J.P .Trembly and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill book Co.,1997 .

References

2.C.L.Liu, Elements of Discrete Mathematics,McGraw-Hill Book Co.

3.N.Deo,Graph Theory with Application to Engineering and Computer Sciences, Prentice Hall of India.

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14.2.19

Department of Higher Education Govt. of M.P.
Semester wise syllabus for P.G.
As recommended by Central Board of Studies and Approved by HH the Governor of M.P.

(Partially revised by the Board of Studies in Mathematics, DAVV, Indore on 11-05-2015 and to be effective from academic session 2015-2016.)

Class	**: M.Sc/ M.A. (Mathematics)**
Semester	**: II**
Title of subject/Group	**: Programming in C-II**
Paper No.	**: V**
Compulsory / Optional	**: Optional**

Unit I

Functions: Basics and Anatomy of function : definition, declaration & prototypes, calling, use and features of function. Passing values b\w function. External Variables, scope rule, call by value, call by reference (only concept), Static Variables, Register Variables, Block Structure. Recursion: need of recursion, types of recursion.

(1. Chapter 1 sections 1.7,1.8 Chapter 4 sections 4.1 – 4.4,4.6—4.8, 4.10)

Unit II

Arrays and multidimensional Arrays: array concept and initialization, memory map of 1D and 2D array, Multidimensional array, storage classes – automatic, extern, static, register, global variable, Command line arguments.

(1. Chapter 1 section 1.6 , Chapter 5 sections 5.7,5.10 Appendix A4.1,A8.1)

Unit III

Array of characters, string constant and variable, Character Input/output statements, array of strings, string handling functions, standard library string function strlen(), strcpy(), strcat(), strcmp() etc, Mathematical functions <math.h>.

(1. Chapter 1 sections 1.9,1.5, Appendix B3, B4)

Unit IV

Pointer: Definition & declaration, Address, pointers and function arguments, pointer & arrays, Address arithmetic, character pointers and functions, pointer arrays, Initialization of pointer arrays, Pointer to function, use of pointer, malloc(), calloc() library function.

(1. Chapter 5 sections 5.1-5.6)

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Unit V

Structures : Basics of Structures, Structure and Functions, Array of Structure, Pointer to Structure, Self referential structure, Unions.

(1. Chapter 6 sections 6.1-6.5, 6.8)

NOTE: Algorithms and Programs based on theory are expected to be developed.

Text Book :

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

Reference Book

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

14.2.19.

14/2/19.