

Scheme of M.Sc. Mathematics Program under Semester System
Program Code& Name: DPMS03 - M.Sc. (Mathematics)

Session 2024-25


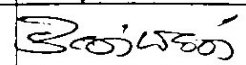

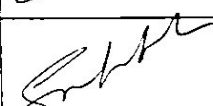
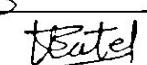
Semester	Course Code	Course Name	Credit			Total Credit	Marks			
			L	T	P		ESE	CIA	Total	
									MAX	MIN
First	MMAT -101	Advanced Abstract Algebra	3	1	-	4	70	30	100	40
	MMAT -102	Mathematical Analysis-I	3	1	-	4	70	30	100	40
	MMAT -103	Topology -I	3	1	-	4	70	30	100	40
	MMAT -104	Complex Analysis -I	3	1	-	4	70	30	100	40
	MMAT -105	Advanced Discrete Mathematics-I	3	1	-	4	70	30	100	40
		Total	20	350	150	500	200			
Second	MMAT -201	Advanced Abstract Algebra -II	3	1	-	4	70	30	100	40
	MMAT -202	Mathematical Analysis -II	3	1	-	4	70	30	100	40
	MMAT -203	Topology -II	3	1	-	4	70	30	100	40
	MMAT -204	Complex Analysis -II	3	1	-	4	70	30	100	40
	MMAT -205	Advanced Discrete Mathematics-II	3	1	-	4	70	30	100	40
		Total	20	350	150	500	200			
Third	MMAT - 301	Integration Theory and Functional Analysis -I	3	1	-	4	70	30	100	40
	MMAT -302	Partial Differential Equations , & Gravitation	3	1	-	4	70	30	100	40
	MMAT - 303	Fuzzy sets and their Application – I	3	1	-	4	70	30	100	40
	MMAT - 304	Operations Research – I	3	1	-	4	70	30	100	40
	MMAE- 305	Fluid Mechanics- I	3	1	-	4	70	30	100	40
	MMAE- 306	Fundamental of computer science	3	1	-	4	70	30	100	40
	MMAE- 307	Numerical Analysis	3	1	-	4	70	30	100	40
		Total	20	350	150	500	200			
Fourth	MMAT - 401	Integration Theory and Functional Analysis -II	3	1	-	4	70	30	100	40
	MMAT - 402	Classical Mechanics & Gravitation	3	1	-	4	70	30	100	40
	MMAT - 403	Fuzzy sets and their Application - II	3	1	-	4	70	30	100	40
	MMAT - 404	Operations Research – II	3	1	-	4	70	30	100	40
	MMAE- 405	Fluid Mechanics- II	3	1	-	4	70	30	100	40
	MMAE- 406	Number Theoryand Cryptography	3	1	-	4	70	30	100	40
	MMAE- 407	Spherical Harmonic	3	1	-	4	70	30	100	40
		Total	20	350	150	500	200			
		Grand Total	80	1400	600	2000	800			

Program Code and Name	DPMS03, M.Sc.(Mathematics)			Semester	II
Exam Code and Name	2032 - M.Sc .MATHEMATICS SECOND SEMESTER			Paper	I
Course Code	MMAT -201			Course Type	T
Course Title	ADVANCED ABSTRACT ALGEBRA -11				
Total Credit	4				
Total Marks	CIA: 30	ESE: 70	Max Marks: 100	Min. Pass. Marks: 40	
Prerequisites (if any)					
Course Outcomes	<p>The end of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Gain knowledge of Field theory. 2. Gain knowledge of Galois Theory. Gain knowledge to test if a polynomial is irreducible finite field (Galois field). 3. Gain knowledge of Smith Normal Form, principal ideal domain in details. 4. Know about finitely generated modules over PID. 				

Contents of Course		
Unit	Contents	No. of Period
I	Linear Transformation - Algebra of linear transformation Characteristic roots, matrices and linear transformation	15
II	Canonical forms: Similarity of linear transformations, Invariant subspaces, Reduction to triangular Forms,	15
III	Nilpotent transformations, Index of nilpotency Invariants of a nilpotent transformation, the primary decomposition theorem Jordan blocks and Jordan forms	15
IV	Smith normal form over a principal ideal domain and rank Fundamental structure theorem for finitely generated abelian groups, Rational canonical form.	15
	Total no. of Lectures	60

Text books	1. ADVANCED ABSTRACT ALGEBRA -11	
	<p>Reference books :</p> <ul style="list-style-type: none"> • P.B. Bhattacharya, S.K. Jain and S. R. Nagpaul, Basic Abstract Algebra (2nd Ed.), Cambridge University Press Indian Edition, 1997. eference Books: • Luther & IBS Passi, Algebra vol. 1, 11 & 111 Narosa Pub. House, New Delhi. • I.N. Herstein, Topic in Algebra, Wiley Eastern, New Delhi. • S. Lang: Algebra, 3rd Edition Addison-Wesley, 1993. • N. Jacobson. Basic Algebra vols I & II, Hindustan Publishing company, 1980. <p>E-Resources:</p> <p>https://onlinecourses.nptel.ac.in https://epqp.inflibnet.ac.in https://swayam.gov.in</p>	

Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 100 Marks	Continuous Internal Assessment (CIA): 30 Marks	End Semester Exam (ESE) : 70 Marks
Continuous Internal Assessment (CIA)	Internal Test/Quiz- (2): 20 & 20 Assignment / Seminar: 10 Total Marks: 30	Better marks out of the two Test / Quiz + obtained marks is Assignment shall be considered against 30 Marks
End Semester Exam (ESE)	Three Section - A, B & C Section A: Q1. Objective- 10 x 1 = 10 Mark; Section B: Long Answer type questions 1 out of 2 from each unit- 4 x 5 = 20 Marks; Section C: Descriptive answer type questions 1 out of 2 from each unit- 4 x 10 = 40 Marks;	

Sr. no	Member Name	Signature
1.	Dr. P. P. Murthy Professor, Guru Ghasidas Vishwavidyalaya Bilaspur	
2.	Dr. S.K.Tiwari Professor Head , Department of Mathematics . Dr. C.V.Raman University Kota Bilaspur	
3.	Dr. Sanjay Kumar Professor G.B.Pant University Uttarkhand	
4	Dr. Ashutosh Pandey Asst.Prof. D.P.Vipra P.G.College Bilaspur	
5.	Dr.smt. Snehalata Mishra Asst. Prof. Head , Department of Mathematics, D.P.Vipra P.G.College Bilaspur	
6.	Bhupesh Patel. Ex-Student. D.P.Vipra P.G.College Bilaspur	
7		
8.		

Program Code and Name	DPMS03, M.Sc.(Mathematics))			Semester	II
Exam Code and Name	2032 - M.Sc .MATHEMATICS SECOND SEMESTER			Paper	II
Course Code	MMAT -202			Course Type	T
Course Title	2032 & Mathematical Analysis -II				
Total Credit	4				
Total Marks	CIA: 30	ESE: 70	Max Marks: 100	Min. Pass. Marks: 40	
Prerequisites (if any)					
Course Outcomes	<p>The end of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Measurable Sets, Measurable Functions, Lebesgue Integrals, 2. Measurability or Non Measurability of Sets and Functions. 3. the Fundamental Theorem of Calculus is context of Lebesgue Integration. 4. Differentiation and Integration as Inverse Operations in the more general context of Lebesgue Theory. 				

Contents of Course		
Unit	Contents	No. of Period
I	Power Series - Uniqueness theorem for Power Series, Abel's Theorem and Taylor's Theorem, Tauber's Theorem. Lebesgue Outer Measure Regularity, Measurable Set Measurable Functions,	15
II	Borel and Lebesgue measurability. Non- negative furth The General integral , Integration of series Measure and cuter measures, Extension of measure,	15
III	Uniqueness of Extension Completion of a measure, Measure Spaces, Integration with respect to a measure.Riemann and Lebesgue integrals The Four derivatives, Lebesgue Differentiation theorem, Differentiation Integration Functions of Bounded variation, L^p -Space,	15
IV	Convex Functions,Jensen's Inequality, Holder and Minkowski inequalities,Completeness of L^p -space, convergence in measure.	15
	Total no. of Lectures	60

Text books	1. Mathematical Analysis
Reference books	<p>Reference Books:</p> <ul style="list-style-type: none"> • 1. Lebesgue Measure and Integration, P. K. Jain and V. P. Gupta, New Age International(P) Limited Publication, New Delhi,1986, (Reprint 2000). • Real Analysis, H. L. Royden, Macmillan Pub. Co. Inc., Fourth Edition, New York 1962. • R.R Goldberg Methods of Real Analysis • W. Rudin, Principle of Mathematical Analysis • R.G Bartle Je The Elements of Real Analsi 2nd ed Ed. J. Wiley Ny, London <p>E-Resources:</p> <p>➤ https://onlinecourses.nptel.ac.in https://epqp.inflibnet.ac.in</p>

Assessment and Evaluation

Suggested Continuous Evaluation Methods:


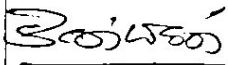
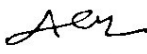
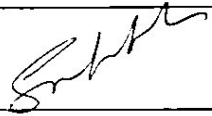
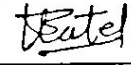
Maximum Marks: 100 Marks	Continuous Internal Assessment (CIA): 30 Marks	End Semester Exam (ESE) : 70 Marks
Continuous Internal Assessment (CIA)	Internal Test/Quiz- (2): 20 & 20 Assignment / Seminar: 10 Total Marks: 30	Better marks out of the two Test / Quiz + obtained marks is Assignment shall be considered against 30 Marks
End Semester Exam (ESE)	Three Section - A, B & C Section A: Q1. Objective- 10 x 1 = 10 Mark; Section B: Long Answer type questions 1 out of 2 from each unit- 4 x 5 = 20 Marks; Section C: Descriptive answer type questions 1 out of 2 from each unit- 4 x 10 = 40 Marks;	

Program Code and Name	DPMS03, M.Sc.(Mathematics)			Semester	II
Exam Code and Name	2032 - M.Sc .MATHEMATICS SECOND T SEMESTER			Paper	III
Course Code	MMAT -203			Course Type	T
Course Title	Topology -II				
Total Credit	4				
Total Marks	CIA: 30	ESE: 70	Max Marks: 100	Min. Pass. Marks: 40	
Prerequisites (if any)					
Course Outcomes	<p>The end of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Gain ability to express regularity and normality separation axioms and use them to prove various properties. 2. Gain skills to construct the product topology on product spaces. 3. Prove basic results about completeness, connectedness and convergence within these structures. 4. Learn about NETS and Convergence, Filter and Ultra filter 				

Contents of Course		
Unit	Contents	No. of Period
I	First and second countable spaces Lind theorem, Separable spaces, Second Countability and separability	15
II	Separation axioms T_0, T_1, T_2, T_3, T_4 their characterization and basic properties Urysohn's lemma and Tietz the extension theorem	15
III	Projection Mats, Product invariant properties finite products Tychonoff products, Tychonoff theorem, Alexander Sub-base lemma Embedding and Matrization theorem, Urysohn's embedding theorem	15
IV	Filters and their comparison Ultrafilter Filters base, Convergence of filters characterization of continuity by filters, converge nets Hausdorffness and nets	15
	Total no. of Lectures	60

Text books	1. Topology
Reference books	<p>Reference Books:</p> <ul style="list-style-type: none"> • G F Simmons: Introduction to Topology and Modern Analysis, McGraw-Hill. • M.J Mansfield: Introduction to Topology Van Nostrand, Princeton, New Jersey, 1963. • Jame R. Munkres: Topology, A First Course. Prentice Hall, incorporated, 1974. • J. Dugundji: Topology, Boston: Allyn and Bacon, 1966 [OP]. • B Mendelson: introduction to Topology, Dover Publications, 1990. • Topology A First Course: Jamet. Munkres • Introduction to General Topology: K.D Joshi • Topology :Dugundsi • Introduction to topology : B. Mendelson • Topology : J.N.Sharma Advanced General Topology: K.K Jha. <p>E-Resources:</p> <p>https://onlinecourses.nptel.ac.in ➤</p> <p>https://epqp.inflibnet.ac.in</p> <p>https://swayam.gov.in</p>

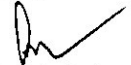
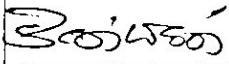
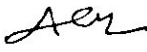
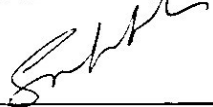

Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 100 Marks	Continuous Internal Assessment (CIA): 30 Marks	End Semester Exam (ESE) : 70 Marks
Continuous Internal Assessment (CIA)	Internal Test/Quiz- (2): 20 & 20 Assignment / Seminar: 10 Total Marks: 30	Better marks out of the two Test / Quiz + obtained marks is Assignment shall be considered against 30 Marks
End Semester Exam (ESE)	Three Section - A, B & C Section A: Q1. Objective- 10 x 1 = 10 Mark; Section B: Long Answer type questions 1 out of 2 from each unit- 4 x 5 = 20 Marks; Section C: Descriptive answer type questions 1 out of 2 from each unit- 4 x 10 = 40 Marks;	

Sr. no	Member Name	Signature
1.	Dr. P. P. Murthy Professor, Guru Ghasidas Vishwavidyalaya Bilaspur	
2.	Dr. S.K.Tiwari Professor Head , Department of Mathematics . Dr. C.V.Raman University Kota Bilaspur	
3.	Dr. Sanjay Kumar Professor G.B.Pant University Uttarkhand	
4	Dr. Ashutosh Pandey Asst.Prof. D.P.Vipra P.G.College Bilaspur	
5.	Dr.smt. Snehalata Mishra Asst. Prof. Head , Department of Mathematics, D.P.Vipra P.G.College Bilaspur	
6.	Bhupesh Patel. Ex-Student. D.P.Vipra P.G.College Bilaspur	
7		
8.		

Program Code and Name	DPMS03, M.Sc.(Mathematics))			Semester	II
Exam Code and Name	2032 - M.Sc .MATHEMATICS SECOND SEMESTER			Paper	IV
Course Code	MMAT -204			Course Type	T
Course Title	Complex Analysis-II				
Total Credit	4				
Total Marks	CIA: 30	ESE: 70	Max Marks: 100	Min. Pass. Marks: 40	
Prerequisites (if any)					
Course Outcomes	<p>The end of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Taylor, power and Laurants series, classify singularities and poles, find residue 2. diverse situation in physics, Engineering and other Mathematical contexts. 3. Express entire function in the form of canonical products. Also, they knowing about theory related to convergence of infinite product 4. expression of some well-known functions in the form of Infinite products. 				

Contents of Course		
Unit	Contents	No. of Period
I	Power series method of analytic continuation, Schwartz Reflection Principle. Monodromy theorem and its consequences Harmonic Junction on a disc, Harnack's inequality and theorem	15
II	Weierstrass factorization theorem, Gamma function and its properties, Riemann Zeta function, Riemann's functional equation, Runge's theorem, Mittag Leffler's theorem,	15
III	,The range of an analytic function, Bloch's theorem, The little picaed theorem, Schottky's theorem, Univalent functions, Bieberbach's conjecture and the $1/4$ -theorem	15
IV	Entire Functions : Order of an entire function Exponent convergence Borel's theorem, Hadamard's factorization theorem The Gamma functions	15
	Total no. of Lectures	60

Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 100 Marks	Continuous Internal Assessment (CIA): 30 Marks	End Semester Exam (ESE) : 70 Marks
Continuous Internal Assessment (CIA)	Internal Test/Quiz- (2): 20 & 20 Assignment / Seminar: 10 Total Marks: 30	Better marks out of the two Test / Quiz + obtained marks is Assignment shall be considered against 30 Marks
End Semester Exam (ESE)	Three Section - A, B & C Section A: Q1. Objective- 10 x 1 = 10 Mark; Section B: Long Answer type questions 1 out of 2 from each unit- 4 x 5 = 20 Marks; Section C: Descriptive answer type questions 1 out of 2 from each unit- 4 x 10 = 40 Marks;	

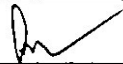
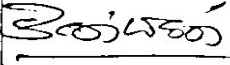

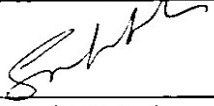
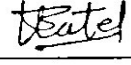
Sr. no	Member Name	Signature
1.	Dr. P. P. Murthy Professor, Guru Ghasidas Vishwavidyalaya Bilaspur	
2.	Dr. S.K.Tiwari Professor Head , Department of Mathematics . Dr. C.V.Raman University Kota Bilaspur	
3.	Dr. Sanjay Kumar Professor G.B.Pant University Uttarkhand	
4	Dr. Ashutosh Pandey Asst.Prof. D.P.Vipra P.G.College Bilaspur	
5.	Dr.smt. Snehalata Mishra Asst. Prof. Head , Department of Mathematics, D.P.Vipra P.G.College Bilaspur	
6.	Bhupesh Patel. Ex-Student. D.P.Vipra P.G.College Bilaspur	
7		
8.		

Program Code and Name	DPMS03, M.Sc.(Mathematics)			Semester	II
Exam Code and Name	2032 - M.Sc .MATHEMATICS SECOND SEMESTER			Paper	V
Course Code	MMAT -205			Course Type	T
Course Title	Advanced Discrete Mathematics -II)				
Total Credit	4				
Total Marks	CIA: 30	ESE: 70	Max Marks: 100	Min. Pass. Marks: 40	
Prerequisites (if any)					
Course Outcomes	<p>The end of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Gain ability to demonstrate traversal methods for trees and graphs. 2. Assimilate various graph theoretic concepts and familiarize with their applications. 3. finite state machine and their transition, machine minimization 4. Understand countable methods and Probability and Probability Inequalities. 				

Contents of Course		
Unit	Contents	No. of Period
I	Formel Languages, Grammar and finite state Machines, Grammars, Finite state Machines and their Transition, Table diagrams, Equivalence of Anite state Machines, Machine Minimization Reduced machines, Homomorphism Finite automata, and equivalences of its power to that of Deterministic finite Automata, Turing machines and partial recursive functions	15
II	Logical Circuits: Application of Bodean Algebra, switching theory (Using AND, OR, NOT gates)	15
III	Graph Theory- Graphs, Sub graphs and Complements, WalkPaths, Circuits, Connected Graphs andComponents, Operations on graphs, types of graphs Eulerian Graphs, Fleury Algorithm, Hamiltonian Graphs, Weighted wader undirected Graphs Dijkstra Algorithm, strong connectivity and Warshall's Algorithms,	15
IV	Sees Planar Graphs, Matrices of Graphs Directed Graphs: Trees, Spanning Trees, Directed trees, Search trees, Tree traversals, Fundamental Circuits, Planar Graphs, Euler's formula for Connected Planner Graphs	15
Total no. of Lectures		60

Text books	1. Advanced Discrete Mathematics
Reference books	<p>Reference Books:</p> <ul style="list-style-type: none"> • J P. Tremblay & R. Manohar: Discrete Mathematical structure with application to computer sciences. [McGraw Hill Book Co. 1997]. • Seymour Lepschutz. Finite Mathematics (international edition 1993) [McGraw Hill Book co New York]. N Deo: Graph Theory with applications to • Engineering and Computer Sciences. Prentice Hall of India. S Wiitala: • Discrete Mathematics - A unified approach McGraw Hill Book Co New York. C. L. Liu: Elements of Discrete mathematics McGraw Hill Book Col. <p>E-Resources: https://onlinecourses.nptel.ac.in https://epqp.inflibnet.ac.in https://swayam.gov.in</p>

Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 100 Marks	Continuous Internal Assessment (CIA): 30 Marks	End Semester Exam (ESE) : 70 Marks
Continuous Assessment (CIA)	Internal Test/Quiz- (2): 20 & 20 Assignment / Seminar: 10 Total Marks: 30	Better marks out of the two Test / Quiz + obtained marks is Assignment shall be considered against 30 Marks
End Semester Exam (ESE)	Three Section - A, B & C Section A: Q1. Objective- 10 x 1 = 10 Mark; Section B: Long Answer type questions 1 out of 2 from each unit- 4 x 5 = 20 Marks; Section C: Descriptive answer type questions 1 out of 2 from each unit- 4 x 10 = 40 Marks;	

Sr. no	Member Name	Signature
1.	Dr. P. P. Murthy Professor, Guru Ghasidas Vishwavidyalaya Bilaspur	
2.	Dr. S.K.Tiwari Professor Head , Department of Mathematics . Dr. C.V.Raman University Kota Bilaspur	
3.	Dr. Sanjay Kumar Professor G.B.Pant University Uttarkhand	
4	Dr. Ashutosh Pandey Asst.Prof. D.P.Vipra P.G.College Bilaspur	
5.	Dr.smt. Snehalata Mishra Asst. Prof. Head , Department of Mathematics, D.P.Vipra P.G.College Bilaspur	
6.	Bhupesh Patel. Ex-Student. D.P.Vipra P.G.College Bilaspur	
7		
8.		