MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by **NAAC** with '**A**' Grade Recognized by **UGC** under Section 2(f) & 12 (B)



www.muthayammal.in

DEGREE OF MASTER OF SCIENCE

Learning Outcomes - Based Curriculum Framework - Choice Based Credit System



(For Candidates admitted from the academic year 2021 - 2022 and onwards)

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

RASIPURAM – 637408

VISION

To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, thereby nurturing a generation of committed, Knowledgeable and socially responsible citizens.

MISSION

- ✤ To Ensure State of the world learning experience
- ✤ To espouse value based Education
- ✤ To empower rural education
- ✤ To instill the sprite of entrepreneurship and enterprise
- ✤ To create a resource pool of socially responsible world citizens

QUALITY POLICY

To seek – To strive – To achieve greater heights in Arts & Science, Engineering, Technological and Management Education without compromising on the quality of education.

DEPARTMENT OF MATHEMATICS

VISION

To train the students through Mathematical Analysis and Research of holistic persons to promote better living conditions of the under privileged.

MISSION

- ◆ To learn Mathematical concepts and develop capability through indications.
- ✤ To instill the spirit of humanity through value based training.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Post Graduates will be able to promote learning environment to meet the industry expectations.

PEO2: Post Graduates will be incorporated with the critical thinking, good Communication and Leadership skills to become self-employed.

PEO3: Post Graduates will be upholding the human values and environmental sustenance for the betterment of the society.

GRADUATE ATTRIBUTES (GAs)

The Graduate Attributes of M.Sc., Mathematics are

GA1: Research skills

GA2: Multicultural competence

GA3: Critical thinking

GA4: Problem solving

GA5: Disciplinary knowledge

GA6: Moral and Ethical awareness

GA7: Self directed learning

PROGRAMME OUTCOMES (POs)

PO1: Post graduates will attain profound proficiency and expertise.

PO2: Post graduates will be ensured with corporative self – directed learning.

PO3: Post graduates will acquire acumen to handle diverse contexts and function in domains of multiplicity.

PO4: Post graduates will exercise intelligence in research Investigations and Introducing innovations.

PO5: Post graduates will learn ethical values and commit to Professional ethics.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Students are able to understand the fundamental axioms in Mathematics and capability of developing ideas based on them.

PSO2: Students will be able to read, analyze and write logical arguments to prove Mathematical concepts and nurture problems solving skills, thinking, creativity through assignments, project works.

PSO3: Students will be enabled to acquire employability Skills that will enable the students to explore career in Teaching and Research in Mathematics.

PSO4: Students will acquire knowledge to develop the skill to solve problems which appear in the various examinations based on the concepts learned which in turn will hone the problem solving skills of students and help them to pass competitive examinations including CSIR-NET, SET, etc.,

PSO5: Students shall be made to realize the importance given to applications by applying the concepts studied for designing models to solve real life problems.

MUTHAYAMMALCOLLEGE OF ARTS AND SCIENCE(Autonomous)- Rasipuram- 637 408 Scheme of Examinations -LOCF-CBCS Pattern (For the Students Admitted from the Academic Year: 2021-2022 Onwards) Programme: M.Sc. MATHEMATICS

				Hrs./W			MAX.MARKS		
S.No.	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE		Lab.	CREDIT POINTS	CIA	ESE	TOTAL
	SEMESTER-I								
1	DSCTHEORY-I	21M1PMAC01	LINEAR ALGEBRA	6		4	25	75	100
2	DSCTHEORY-II	21M1PMAC02	REAL ANALYSIS - I	6	-	4	25	75	100
3	DSCTHEORY-III	21M1PMAC03	ORDINARY DIFFERENTIAL EQUATIONS	6		4	25	75	100
4	DSCTHEORY-IV	21M1PMAC04	MECHANICS	6	-	4	25	75	100
5	DSE–I		ELECTIVE - I			4	25	75	100
			TOTAL	30	0	20	125	375	500
	SEMESTER-II								
1	DSCTHEORY-V	21M2PMAC05	ABSTRACT ALGEBRA	6	-	4	25	75	100
2	DSCTHEORY-VI	21M2PMAC06	REAL ANALYSIS - II		-	4	25	75	100
3	DSCTHEORY-VII	21M2PMAC07	PARTIAL DIFFERENTIAL EQUATIONS			4	25	75	100
4	DSE–II		ELECTIVE -II			4	25	75	100
5	DSE–III		ELECTIVE -III			3	25	75	100
6	GEC-EDC-I		EDC-I	4		4	25	75	100
7	HUMANRIGHTS	21M2PHUR01	HUMAN RIGHTS	2	-	2	100		
			TOTAL	30	0	25	250	450	600

					Hrs./W		MAX.MARKS		
S.No.	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Lect.	Lab.	CREDIT POINTS	CIA	ESE	TOTAL
	SEMESTER-III				-				
1	DSCTHEOR Y-VIII	21M3PMAC08	COMPLEX ANALYSIS	6	-	4	25	75	100
2	DSCTHEORY-IX	21M3PMAC09	TOPOLOGY	6	-	4	25	75	100
3	DSCTHEORY-X	21M3PMAC10	MEASURE THEORY AND INTEGRATION	6		4	25	75	100
4	DSCTHEORY-XI	21M3PMAC11	GRAPH THEORY	6		4	25	75	100
5	DSE–IV		ELECTIVE -IV	6		4	25	75	100
6	INTERNSHIP	21M3PMAIS1	INTERNSHIP	-		2	100		
			TOTAL	30	0	22	225	375	500
SEMESTER-IV									
1	DSCTHEOR Y-XII	21M4PMAC12	FUNCTIONAL ANALYSIS	6	-	4	25	75	100
2	DSCTHEORY-XIII	21M4PMAC13	PROBABILITY THEORY			4	25	75	100
3	DSCTHEORY-XIV	21M4PMAC14	CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS			4	25	75	100
4	DSE–V		ELECTIVE -V			4	25	75	100
5	PROJECT	21M4PMAPR1	PROJECT WORK			5	50	150	200
6	ONLINE- COMPETITIVE EXAMINATION	21M4PMAOE1	MATHEMATICS FOR COMPETITIVE EXAMINATIONS	-	-	2	100		
			TOTAL		0	23	250	450	600
			OVER ALL TOTAL	120	0	90	850	1650	2200
	EXTRA CREDIT COURSE	21M4PMAEC1	MOOC Courses offered in SWAYAM/ NPTEL	-	-	2	-	-	-

	List of Elective Course (DSE) Details for M.Sc., Mathematics SYLLABUS -LOCF - CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards				
S.No.	COURSE_CODE	TITLEOFTHECOURSE			
1	21M1PMAE01	DISCRETE MATHEMATICS			
2	21M2PMAE02	NUMERICAL ANALYSIS			
3	21M2PMAE03	ADVANCED LATEX			
4	21M2PMAE04	PROGRAMMING WITH C++			
5	21M2PMAEP1	PRACTICAL: C++ PROGRAMMING			
6	21M3PMAE05	FLUID DYNAMICS			
7	21M4PMAE06	NUMBER THEORY			

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List of Extra Disciplinary Course(GEC) Details SYLLABUS - LOCF-CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	II	21M2PMAED1	NUMERICAL AND STATISTICAL METHODS
2	II	21M2PMAED2	STATISTICS
3	II	21M2PMAED3	OPERATIONS RESEARCH

PG – REGULATIONS

1. Internal Examination Marks - Theory

Components	Marks
CIA I & II	10
Attendance	5
Assignment	5
Seminar	5
Total	25

Attendance Percentage	Marks
96 %to 100%	5
91%to 95%	4
86%to 90%	3
81%to 85%	2
75%to 80%	1
Below 75%	0

2. Question Paper Pattern for CIAI,II AND ESE (for 75Marks) (3hours)	
<u>Section–A(10Marks</u>) (Objective Type)	10x 1=10Marks
Answer ALL Questions	
ALL questions carry EQUAL Marks	
<u>Section–B(15Marks)</u> (Analytical Type)	
Answer any THREE Questions out of FIVE questions	3 x 5=15 Marks
ALL questions carry EQUAL Marks	
<u>SECTION-C (50 Marks)</u>	
Answer ALL the Questions	$5 \ge 10 = 50 \text{ Marks}$
Either or Type.	
ALL Questions Carry EQUAL Marks	

75Marks

(Syllabus for CIA-I 2.5 Unit , Syllabus for CIA-II All 5 Unit)

2.a)Components for Practical CIA.

Total

Components	Marks
CIA –I	15
CIA - II	15
Observation Note	5
Attendance	5
Total	40

2.b)Components for Practical ESE.

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
Total	60

3. Internship/Industrial Training, Mini and Major Project Work

Internship/ Field Work Industrial Training		Project Work		
Components	Marks	Components		Marks
CIA* ¹ Work Diary Report Viva–voce Examination Total	25 50 25 100	<i>CIA</i> a)Attendance Marks b)Review Marks	20 30	50
		<i>ESE</i> * ¹ a)Final Report Marks b)Viva–voce Marks	120 30	150
			Total	200

*¹Evaluation of report and conduct of viva– voce will be done jointly by Internal and External Examiners

4. Components for Human Rights Course(CIA Only)

- a) The Course Human Rightsistobetreatedas100%CIA coursewhichisofferedinII Semester for I year PG students.
- b) Total Marks for the Course =100

Components	Marks
Two Tests	75
Assignments	25
Total	100

• In case the candidate fails to secure 50marks, which is the passing minimum, he/she may have to reappear for the same in the subsequent semesters.

5. Guidelines for Competitive Exams- Online Mode- Online Exam 3 hours

Components	Marks
100 Objective Type Questions 100*1=100 Marks	100

Objective type Questions from Question Bank.

- The passing minimum for this paper is 50%
- In case, the candidate fails to secure 50% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

N	Sc-Mathematics Syllal	ous LOCF-CBCS with effect	t from 2	021-202	2 On	wards	X u		
Course Code	Course Title	Course Type	Sem	Hours	L	Т	P	с	
21M1PMAC01	LINEAR ALGEBRA	DSC THEORY - I	1	6	4	2	- A	4	
Objective	The course aims to de canonical forms of lin matrices and determi	evelop a strong foundation i ear transformations, diagor nants.	n linear nalizatio	algebra ons of line	and p ear tr	orovide ansfor	e a b mat	asic for ions,	
Unit		Kn	owled Levels	ge	Session				
Linear Equations: Systems of Linear Equations -Matrices and Elementary Row operations - Row - reduced echelon - Matrix Multiplication - Invertible Matrices - Basis and Dimension. Chapter 1:Sections 1.2-1.6 Chapter 2:Section 2.3							К1-КЗ		
II Linear Transformations: Linear Transformations - The algebra of linear transformations-Isomorphism of vector spaces- Representations of linear transformations by matrices - Linear functional - The double dual - The transpose of a linear transformation.								15	
111	III Polynomials: Algebras - The algebra of polynomials - Lagrange interpolation - Polynomial ideals - The prime factorization of a polynomial -Determinants: Commutative Rings - Determinant functions. Chapter 4: Sections: 4.1 - 4.5 Chapter 5: Sections: 5 1-5 2							14	
IV	IV Determinants: Permutations and the uniqueness of determinants-Additional Properties of Determinants. Elementary Canonical Forms: Introduction -Characteristic values-Annihilating polynomials. Chapter5: Sections:5.3-5.4 Chapter6: Sections:6.1-6.3							14	
v	Elementary Canonical triangulations; Simulta decompositions-Invaria theorem. Chapter6: Sections:6.4		K4	14					

	CO1: Acquire knowledge about matrix elementary row operations, isomorphism of vector spaces, commutative ring, characteristic value and annihilating polynomials	K1	
	CO2: Understand the Representations of Linear transformation by a matrix, echelon matrix, permutations and simultaneous triangulation, simultaneous diagonalization and Direct sum decompositions.	K2	
Course Outcome	CO3: Illustrate representation of linear transformation by matrix prime factorization of polynomial and inverse of invertible matrix using determinants.	КЗ	
	CO4: Investigate the properties of row reduced echelon matrices and inverse of matrix.	K4	
	CO5: Evaluate the bases and dimensions of a vector spaces, characteristic values and construction of transpose of linear transformation.	К5	
	Learning Resources		
Text Books	1. Kenneth M.Hoffman and Ray Kunze, Linear Algebra, 2ndEdition, Pearson Ir New Delhi, 2015.	ndia Publi:	shing,
Reference Books	 M.Artin, Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2005 S.H.Friedberg, A.J.Insel and L.E.Spence, Linear Algebra, 4thEdition, Prent Pvt.Ltd., New Delhi,2009. I.N.Herstein, Topics in Algebra, 2ndEdition, Wiley Eastern Ltd., New Delhi 	ice Hall o , 2013.	f India
Website Link	1. https://nptel.ac.in/courses/111105112		an in An A
	L-Lecture T-Tutorial P-Practical C-Credit		

M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards										
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Ρ	С		
21M1PMAC01	LINEAR ALGEBRA	DSC THEORY - I	I	6	4	2	-	4		

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CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	м	S	S	м	S	S	S	м
CO2	S	S	M	S	S	м	S	S	S	м
CO3	S	S	S	S	S	M	S	S	S	M
CO4	S	м	S	S	S	M	S	S	S	M
C05	S	S	S	S	S	M	S	S	S	M
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-STF	RONG		×		i di	1 1
	2					-				3

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment and Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By Verified By Approved By R. Mahtle. A- h San K.DHINESH KUMAR R. MALATHI



M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards										
Course Code	Course Title	Course Type	Sem	Hours	L	Ť	P	C		
21M1PMAC02	REAL ANALYSIS I	DSC THEORY - II	1	6	4	2		4		
Objective	To provide a strong for have a good knowledg Continuity, Connected	n will enrich of Metric spa	them to ace,							
Unit		Course Conter	nt				Knowledge Levels	Sessions		
I	Basic Topology : Finite, Countable an Compact Sets - Conn Chapter 2: Pages 24	К1- КЗ	15							
II	Numerical Sequences and Series : Convergent sequences - Subsequences - Cauchy sequences - Upper and lower limits - Some special sequences - Series - Series of nonnegative terms - The number e - The root and ratio tests. Chapter 3: Pages 47 - 68							15		
111	Numerical Sequences and Series (Contd.): Power series - Summation by parts - Absolute convergence - Addition and multiplication of series- Rearrangements. Chapter 3: Pages 69 - 82							14		
IV	Continuity: Limit of Functions - Continuous functions - Continuity and Compactness - Continuity and Connectedness - Discontinuities - Monotonic functions - Infinite limits and Limits at infinity. Chapter 4: Pages 83 - 102							14		
v	Differentiation :The derivative of a real function - Mean value theorems - The continuity of the Derivative - L' Hospital's Rule - Derivatives of Higher order - Taylor's theorem - Differentiation of Vector-valued functions. Chapter 5: Pages103 - 119							14		
1	CO1: Acquire knowledge about countable and uncountable sets.									
Course Outcome	CO2: Understand the sequence.	concepts of Conve	ergent se	quences	and C	auchy	К2	1 Ø.		
e a contra	CO3: Demonstrate the	power series and	additior	n and mu	ltiplica	ation	К3			

			internet and the second second				
	CO4: Analyze the Continuous functions , Continuity and Compactness	K4					
1 - 2 	CO5: Evaluate the Mean value theorems, The continuity of the Derivative , L' Hospital's Rule and Taylor's theorem	К5					
	Learning Resources						
Text Books	1. Walter Rudin, "Principles of Mathematical Analysis", 3rd Edition, Mc Kogaskusha, 1976.	Graw Hill I	Book Co.,				
Reference Books	 1. Tom M. Apostol, "Mathematical Analysis", Narosa Publishers, New Delhi, 2002. 2. R. G. Bartle and D.R. Sherbert, "Introduction to Real Analysis", John Wiley & Sons, New York, 1982. 3. W.J. Kaczor and M.T. Nowak, "Problems in Mathematical Analysis I - Real Numbers Sequences and Series", American Mathematical Society, 2000. 						
Website Link	1. <u>https://nptel.ac.in/courses/111106053</u> 2. <u>https://youtu.be/R3yqx0wpQoc</u> 3.https://youtu.be/kSSb9cn9vWk	5					

M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Р	С	
21M1PMAC02	REAL ANALYSIS -I	DSC THEORY - II	1	6	4	2		4	

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	м	S	S	S	м	S	S	м
CO2	S	S	M	S	S	S	M	S	S	м
CO3	S	S	S	S	S	S	S	S	м	S
C04	S	M	S	S	S	S	S	M	S	S
C05	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW	м-мі	EDIUM	S- STRONG						

Tutorial Schedule	Problem solving session, Seminar and Group Discussion				
Teaching and Learning Methods	Chalk and talk method, Lecture, Power point presentation				
Assesment Methods	Assignment, unit test conducting, model test conducting.				

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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards										
Course Code	Course Title	Course Type	Sem	Hours	L	т	Р	C		
21M1PMAC03	ORDINARY DIFFERENTIAL EQUATIONS	DSC THEORY - III	1	6	4	2	•	4		
Objective	To acquire the knowledge about the various types of ODE and its method of finding the solution.									
Unit			Know Lev	ledge els	Sessions					
l	Linear Equations with Constant Coefficients: Introduction - Second order homogeneous equations - Initial value problem - Linear dependence and independence - A formula for the Wronskian - Problems. Chapter 2: Section 1 to 5							15		
11	Linear Equations with Co homogeneous equations o order n - Initial value pro constants -Non-homogene Chapter 2: Section 6 to 10	К2		15						
III	Linear Equations with Va value problems for homog homogeneous equations - Reduction of the order of Chapter 3: Section 1 to 5	ĸ	3	14						
IV	Linear Equations with Re equation - Euler equation singular points -Bessel eq Chapter 3: Section 8 &Ch	ŀ	(4	14						

V Course Outcome	First Order Equation - Existence and Uniqueness: Introduction - Equations with variable separated - Exact equations - Method of successive approximations - Lipschitz Condition - Convergence of the successive approximations. Chapter 5: Section 1 to 6 CO1: Recall the basic concepts and the genesis of ordinary differential equations such as determining roots and Wronskian. CO2: Understand the nature of linear dependence and independence of the differential equations and interpret their possible solutions. CO3: Apply the techniques like Wronskian and linear independence for solving problems. CO4: Analyze the concept of the Legendre equation and Euler equation. CO5: Analyze linear second order equations with regular singular points at infinity and boundary value problems of first order equations using Lipschitz condition.	K4 K1 K2 K3 K4 K4	14
Course Outcome	 CO1: Recall the basic concepts and the genesis of ordinary differential equations such as determining roots and Wronskian. CO2: Understand the nature of linear dependence and independence of the differential equations and interpret their possible solutions. CO3: Apply the techniques like Wronskian and linear independence for solving problems. CO4: Analyze the concept of the Legendre equation and Euler equation. CO5: Analyze linear second order equations with regular singular points at infinity and boundary value problems of first order equations using Lipschitz condition. 	K1 K2 K3 K4 K4	
Course Outcome	 CO2: Understand the nature of linear dependence and independence of the differential equations and interpret their possible solutions. CO3: Apply the techniques like Wronskian and linear independence for solving problems. CO4: Analyze the concept of the Legendre equation and Euler equation. CO5: Analyze linear second order equations with regular singular points at infinity and boundary value problems of first order equations using Lipschitz condition. Learning Resources 	K2 K3 K4 K4	
Course Outcome	 CO3: Apply the techniques like Wronskian and linear independence for solving problems. CO4: Analyze the concept of the Legendre equation and Euler equation. CO5: Analyze linear second order equations with regular singular points at infinity and boundary value problems of first order equations using Lipschitz condition. Learning Resources 	K3 K4 K4	
	CO4: Analyze the concept of the Legendre equation and Euler equation. CO5: Analyze linear second order equations with regular singular points at infinity and boundary value problems of first order equations using Lipschitz condition. Learning Resources	К4 К4	
	CO5: Analyze linear second order equations with regular singular points at infinity and boundary value problems of first order equations using Lipschitz condition. Learning Resources	К4	
	Learning Resources		
		х.	
Text Books	1. E.A.Codington, An Introduction to Ordinary Differential Equation, Prentic Delhi, 1994.	e Hall of Ir	ndia, New
Reference Books	 R.P Agarwal and Ramesh C.Gupta, Essentials of Ordinary Differential Equil NewYork, 1991. Somasundaram, Ordinary Differential Equations, NarosaPubl.House, Chen D.Raj, D.P. Choudhury and H.I. Freedman, A Course in Ordinary Different NarosaPubl.House, 2004. 	ation. McC nai - 2002. ial Equatio	Graw Hill, Dons,
Website Link	 http://staff.um.edu.mt/jmus1/diffeq1.pdf https://www.youtube.com/watch?v=HZ3c5T2OI0Y https://www.youtube.com/watch?v=yOdmeAo1szY 	х т _о й	n
L-Lect	ure T-Tutorial P-Practical C-Credit		

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CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	м	S	S	S	S	S	S	м
CO2	S	S	м	S	S	S	м	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	м	S	S	S	S	S	S	м	S
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S- STRONG						

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Chalk and talk method,Lecture,Power point presentation
Assesment Methods	Assignment, unit test conducting, model test conducting.

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P.SUBHA	R.MALATHI	Г	



M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Ρ	с
21M1PMAC04	MECHANICS	DSC THEORY - IV	I	6	4	2		4
Objective To know about the basic ideas of Mechanical System and the knowledge of Hamilton Objective Equations. Understand the special transformations and also know the difference between Lagrange and Poisson brackets.								
Unit		Kn	iowled Levels	Sessions				
1	Mechanical Systems: The Mechanical System - Generalized Coordinates - Constraints - Virtual Work - Energy and Momentum Chapter 1: Section 1.1 - 1.5							15
II ·	Lagrange's Equatic Examples - Integrals Chapter 2: Section2	-	K4	15				
111	Hamilton's Equations: Hamilton's Principle - Hamilton's Equations - Other Variational Principles. Chapter4: Section 4.1 - 4.3							
IV	Hamilton-Jacobi Theory: Hamilton's Principal Function - IV The Hamilton-Jacobi Equation - Separability. Chapter5: Section 5.1 - 5.3							14
v	Canonical Transf Generating Function and Poisson Bracker Chapter 6: Section	Formations: Differentiations - Special Transformations ts. 6.1 - 6.3	ll For	ms an Lagrang	and range K4			14

			8							
	CO1: Remember the basic concepts of the mechanical system, generalized coordinates, work, energy and momentum.	K1								
	CO2: Understand and analyze the Lagrange's equations and integral of motions with examples.	К2								
Course Outcome	CO3: Explore the Hamilton's principle and other variational principles and gain ability to analyze those principles to the problems arising in practical situations	КЗ								
	CO4: Discuss the Hamilton's principal function and Hamilton Jacobi equation	K4								
	CO5: Evaluate how the Lagrange and Poisson Brackets differ	K5								
	Learning Resources									
Text Books	Text Books 1. D.T.Greenwood, Classical Dynamics, Prentice Hall of India, New Delhi, 1985.									
Reference Books	Reference Books1. 1. H.Goldstein, Classical Mechanics, Narosa Publishing House, New Delhi, 2001.2. J.L.Synge and B.A.Griffth, Principles of Mechanics, McGraw Hill Book Co. New York, 1970.3. N.C.Rane and P.S.C.Joag, Classical Mechanics, Tata McGraw Hill, New Delhi, 1991.									
Website Link	1. https://www.britannica.com/science/mechanics 2. https://nptel.ac.in/courses/112106286 3. https://nptel.ac.in/courses/112103108	2	·							
	L-Lecture T-Tutorial P-Practical C-Credit									

CO Number	PO1	PO2	PO3	P04	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	м	S	S	S	S	м	W	M	S
C02	S	S	S	S	S	S	S	S	м	S
CO3	S	S	S	S	S	S	м	S	м	S
CO4	S	S	S	W	S	S	S	м	M	S
C05	S	S	S	W	S	S	S	м	M	S
Level of Correlation between CO and PO	L-LOW	м-ме	DIUM	S-STI	RONG				т. 	

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment and Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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Designed By	Verified By	Approved By
P.G.S.	R. Malith .	1.h. som
P.GOWRISHANKAR	R.MALATHI	



M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards											
Course Code	Course Title	Course Type	Sem	Hours	L	T	Р	С			
21M2PMAC05	ABSTRACT ALGEBRA	DSC THEORY - V	U	6	4	2	÷	4			
Objective	The course aims to Introduce the basic ideas of counting principle, Find the number Sylow subgroups, Find the number of non-isomorphic abelian groups, Develop the knowledge of Splitting Fields and Obtain the basics of Galois Theory.										
Unit			Knowle Leve	Sessions							
l	Sylow's Theorem: A Theorem. Chapter 2: Section 2	5	K1 -	КЗ	15						
11	Finite Abelian Grou Groups. Chapter 2: Section 2	1	K1 - K2		15						
111	Fields: Extension Fie Roots of Polynomials Chapter 5: Section 5		K3	14							
IV	Fields (Continued): Galois Theory - Solva Chapter 5: Section 5	of	K4	14							
v	Finite Fields: Finite Finite Division Rings Chapter 7: Section 7	n	K4		14						
	CO1: Remembering the Groups of prime orders					К1					
	CO2: Understanding the of Sylow's Theorem for Group of order prime subgroups						2				
Course Outcome	CO3: Applying the v	alue of Transcende	nce of	е		K	_				
	CO4: Analyzing whe by radicals or not	ther the given poly	nomial	is solval	ole	K					
	CO5: Evaluate the solution of the equation of degree more than 5						К5				

	Learning Resources
Text Books	1. I.N.Herstein, Topics in Algebra - 2nd Edition, John Wiley and Sons, New York, 1975.
Reference Books	 S.Lang, Algebra, 3rd Edition, Addison Wesley, Mass, 1993. John B.Fraleigh, A First Course in Abstract Algebra, Addison Wesley, Mass, 1982. M.Artin, Algebra, Prentice-Hall of India, New Delhi, 1991. V.K.Khanna and S.K.Bhambri, A Course in Abstract Algebra, Vikas Publishing House Pvt. Limited, 1993.
Website Link	1. https://nptel.ac.in/courses/111105112

L- Lecture

T- Tutorial

P - Practical

C- Credit

M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards										
Course Code	Course Title	Course Type	Sem	Hours	L	т	Р	C		
21M2PMAC05	ABSTRACT ALGEBRA	DSC THEORY - V	11	6	4	2	•	4		

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	м	S	M	м	S	S	м
C02	S	S	S	м	S	м	м	S	S	м
СО3	S	s	S	M	S	м	м	S	S	м
CO4	S	S	S	M	S	м	M	S	S	м
C05	S	S	S	M	S	м	M	S	S	м
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-STF	RONG					

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation.
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By	
K.DHINESH KUMAR	For Refer	y. p. son	2

	M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards										
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Р	С			
21M2PMAC06	REAL ANALYSIS II	DSC THEORY - VI	n	5	4	1	•	4			
Objective This course aims to provide students with the specialist knowledge necessary for basic concepts in Real Analysis. More precisely, it strives to enable students to learn basic concepts about functions of several variables, learn about Riemann-Stieltjes integrals, sequences and series of function											
Unit		Course Content				Know Lev	edge els	Sessions			
l	The Riemann - StieltjesIntegral: Definition and Existence of the Integral - Properties of the Integral - Integration and Differentiation - Integration of Vector-valued functions - Rectifiable curves. Chapter 6 : Pages 120 - 142						K3	12			
11	Sequences and Series of Functions: Discussion of main problem - Uniform Convergence - Uniform Convergence and Continuity - Uniform Convergence and Integration - Uniform Convergence and Differentiation.						,K2	12			
	Sequences and Series of Functions (contd): Equicontinuous families of functions - Stone-Weierstrass Theorems - Algebra of complex valued functions. Chapter 7 : Pages 155 - 171						,КЗ	12			
IV	Some special functions: Power series - The Exponential and Logarithmic functions - The Trigonometric Functions - (Algebraic completeness of the complex field - omitted) Fourier series - The Gamma functions Chapter 8: Pages 172 - 203 (Omitted Theorem 8.8)						,K4	12			
v	Functions of seve Differentiation - T function theorem Chapter 9 : Pages	eral variables: Linea The contraction prin - The implicit funct 204 - 228	ar transfo ciple - Tl ion theor	ormations ne invers rem.	s - e		K4	12			

	CO1: Remember the concept of Integration and Differentiation.	K1				
	CO2: Understand sequences and series of functions and its convergence.	K2				
Course Outcome	CO3: Apply the concepts equicontinuous families of functions.	К3				
	CO4: Analyze the Power series, The Exponential and Logarithmic functions and The Trigonometric Functions	K4				
	CO5: Evaluate the functions of several variables.	К5				
	Learning Resources					
Text Books	Text1. Walter Rudin, "Principles of Mathematical Analysis", 3rd Edition, McGraw Hill BookBooksCo., Kogaskusha, 1976.					
Reference Books1. Tom M. Apostol, "Mathematical Analysis", Narosa Publishers, New Delhi, 2002. 2. R. G. Bartle and D.R. Sherbert, "Introduction to Real Analysis", John Wiley & Sons, New York, 1982. 3. W.J. Kaczor and M.T. Nowak, "Problems in Mathematical Analysis I - Real Numbers Sequences and Series", American Mathematical Society, 2000.						
Website Link	1. https://nptel.ac.in/courses/111106053					

L- Lecture

T- Tutorial

P - Practical

C- Credit

M	.Sc-Mathematics Syllab	ous LOCF-CBCS with	effect fr	om 2021-	2022 0	nwards		
Course Code	Course Title	Course Type	Sem	Hours	L	Ť	P	С
21M2PMAC06	REAL ANALYSIS II	DSC THEORY - VI	IJ	5	4	1	•	4

					-						1
CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
C01	S	S	S	м	s	S	м	S	м	м	
CO2	S	S	S	M	S	S	м	м	м	м	-
CO3	S	S	S	м	S	S	S	м	м	м	10. 11
CO4	S	S	S	M	S	S	S	м	S	S	** a
CO5	S	S	S	м	S	м	м	S	S	м	
Level of Correlation between CO and PO	L- LOW	M-ME	DIUM	S-STROM	١G						

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation.
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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R.MALATHI	R.MALATHI	Arnor



	M.Sc-Mathematics Syllabu	s LOCF-CBCS with ef	fect fro	om 2021-	2022	Onwar	ds			
Course Code	Course Title	Course Type	Sem	Hours	L	Т	P	C		
21M2PMAC07	PARTIAL DIFFERENTIAL EQUATIONS	DSC THEORY - VII II 5 4			1	1 - 4				
Objective	To acquire the knowledge of various types of second order partial differential equation and understand the method of finding the solutions.									
Unit			Know	ledge /els	Sessions					
	Second order partial d order partial differentia equations with constan partial (linear) differentia order partial differentia Chapter 2 : Sections 2.	cond	К	1	12					
. II	Elliptic differential equipole of Laplace of Contract	,КЗ	12							
111	Parabolic Differential Equations: Parabolic differential equations - Occurrence of the diffusion equation - Boundary condition - Separation of variable method - Diffusion equation in cylindrical - Spherical co-ordinates. Chapter 4: Sections 4.1 to 4.5						3	12		

		A CONTRACTOR OF	Printersidenti edina apera dalari in tabahatan				
IV	Hyperbolic Differential Equations: Hyperbolic differential equations - Occurrence of wave equation - One dimensional wave equation - Reduction to canonical form - D'Alembert solution-Separation of variable method -Periodic solutions - Cylindrical -Spherical co-ordinates. Chapter 5 : Sections 5.1 to 5.6	К4	12				
v	Integral Transform: Laplace transforms - Solution of partial differential equation - Diffusion equation - Wave equation - Fourier transform - Application to partial differential equation - Diffusion equation - Wave equation - Laplace equation. Chapter 6 : Sections 6.2 to 6.4	K4,K5	12				
	CO1: Recall the basic concepts of second order partial differential equations (PDE's) and different methods of solving PDE's	K1	а.				
Course Outcome	CO2: Understand the solution of Laplace equation and separation of K2 variables.						
	CO3: Apply the Diffusion equation and Spherical co - ordinates.	КЗ					
	CO4: Analyze, Partial differential equations and their solutions. K4						
	CO5: Evaluate the Fourier transform and Wave equation.	К5	. L				
	Learning Resources						
Text Books	1. J.N. Sharma and K.Singh, Partial Differential Equation for Engineer Narosa publ. House, Chennai, 2001	s and Scienti	sts,				
Reference Books1. I.N.Snedden, Elements of Partial Differential Equations, McGraw Hill, New York 1964.2. K. SankarRao, Introduction to partial Differential Equations, Prentice Hall of India, New Delhi, 1995.3. S.J. Farlow, Partial Differential Equations for Scientists and Engineers, John Wiley sons, New York, 1982							
Website Link	 https://www.youtube.com/watch?v=7vvcb63T9IM https://www.youtube.com/watch?v=oXWbtYsNB_g https://www.youtube.com/watch?v=mHzxT_yQUd4 						

L- Lecture

T- Tutorial

C- Credit

M.	Sc-Mathematics Syllabus L	OCF-CBCS with effec	t from	2021-20	22 Onv	/ards		
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Ρ	C
21M2PMAC07	PARTIAL DIFFERENȚIAL EQUATIONS	DSC THEORY - VII	U	5	4	1		4

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CO Number	P01	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	м	S	S	S	S	S	S	S	м
CO2	S	S	S	S	S	S	S	м	S	S
CO3	S	S	S	S	s	S	S	S	S	S
CO4	S	S	S	м	S	S	S	S	м	S
CO5	S	S	S	м	S	S	S	м	S	S
Level of Correlation between CO and PO	L- LOW	M-ME	DIUM	S- STRONG						

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By			
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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards												
Course Code	Course Title	Course Type	Sem	Hours	L	τ	P	C				
21M3PMAC08	COMPLEX ANALYSIS	DSC PAPER VIII	111	6	4	2	•	4				
Objective	To study the local properties of analytic functions and harmonic functions, and to evaluate definite integrals.											
Unit	Course Content Knowledge Levels Session:											
I	Complex Integratio Fundamental Theor Integrals as function Rectangle and in a c Cauchy's Integral F closed curve- The In Chapter 4: Sections	omplex Integration: undamental Theorems - Line integrals -Rectifiable Arcs-Line ntegrals as functions of Arcs - Cauchy's Theorem for a ectangle and in a disk. auchy's Integral Formula - Index of point with respect to a losed curve- The Integral formula - Higher order derivatives. hapter 4: Sections 1.1 - 1.5 and 2.1 - 2.3K1- K3										
II	Complex Integratio Local properties of Singularities - Taylo mapping - The Mai Chapter 4: Sections	к	2,K3	15								
111	Complex Integration The general form of Simple connectivity Cauchy's theorem - differentials - Multip The Calculus of resi Principle-Evaluation Chapter 4 : Sections	ка	K2 - K4 14									
IV	Complex Integration Harmonic Functions Mean-Value Property Reflection Principle. Power series expan series -Laurent serie Chapter 4 : Sections		K4	14								
v	The Riemann Mapping. - A closure look at ha Chapter 6 : Sections	Dirichlet's Proble g Theorem- Confor armonic functions. 1.1 - 1.4,2.1 - 2.4 a	m: mal Mapp and 3.1 -	oing of Po 3.2	olygons	-	К4	14				

	CO1: Knowledge about complex numbers algebraically and geometrically.	К1					
	CO2: Understand Cauchy Riemann equations, analytic functions and various properties of analytic functions.	K2					
Course Outcome	CO3: Illustrate representation the functions of Taylor and Laurent series.	К3					
	CO4: Analyze limit, continuity and differentiation of functions of complex variables.	K4					
	CO5: Examine complex integrals using the residue theorem.	K5					
Learning Resources							
Text Books	L.V Ahlfors, Complex Analysis, 3rd edition, Mc Graw Hill Inter., Edition,	New Delhi,1	979.				
Reference Books	 J.B Conway, Functions of one Complex variable, Narosa Publ. House, S. Ponnusamy, Foundations of Complex Analysis, Narosa Publ. House, S. Lang, Complex-Analysis, Addison - Wesley Mass, 1977. 	New Delhi, New Delhi,	1980. 2004.				
Website Link	1.https://youtu.be/pEaz3A7ctKU 2.https://youtu.be/DVmQ8EyfcBU. 3.https://youtu.be/48aerHs9wL0.		ĩ				

L-Lecture

T-Tutorial

P-Practical

C-Credit

M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	τ	Р	C	
21M3PMAC08	COMPLEX ANALYSIS	DSC THEORY - VIII	UI.	6	4	2	-	4	

10

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CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
C02	S	S	S	S	S	S	S	S	S	S
СО3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	м	S	S	S	S	м	S	S
C05	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L- LOW	M-ME	DIUM	S- STRONG			•			

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Chalk and talk method, Lecture, Smart class presentation.
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By
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м	M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards										
Course Code	Course Title	Course Type	Sem	Hours	L	т	Р		с		
21/13PMAC09	TOPOLOGY	DSC - IX	III	6	4	2	-		4		
Objective To gain knowledge about various types of topologies and topological spaces. To familiarizes the concepts of connectedness and compactness of topological spaces. To inculcate knowledge about countability and separation axioms.											
Unit		Course Content	a L		Kr	nowled Level:	ige s	Sess	ions		
l	Topological spaces: The order Topology - subspace Topology- C Chapter 2: Sections 1	Topological spaces: Topological spaces - Basis for a topology - The order Topology - The product Topology on XxY - TheK11subspace Topology- Closed sets and Limit points. Chapter 2: Sections 12 - 1717									
11	Continuous function Topology - The metri Chapter 2: Section 18	Continuous functions:Continuous functions - The productTopology - The metric Topology - The metric Topology(continued)K2, K4Chapter 2:Section 18 - 21									
111	Connectedness: Con real line - Componen Chapter 3: Section 23	nnected spaces - Connected ts and Local connectedness 3 - 25	l Subspa 5.	ces of the	e	K3		1	14		
IV	Compactness: Compact spaces - Compact Subspaces of the real line - Limit point Compactness - Local Compactness. K2, K4 Chapter 3: Section 26 - 29								14		
v	Countability and Se separation axioms -N Theorem -The Tietze Chapter 4: Section 3	paration axioms: Countabil Iormal Spaces - The Uryson e extension theorem. 30- 35	lity axion n Metriz	ns - The ation		K4			14		

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1	CO1: Learn the concepts of topological spaces, Basic topology and order topology.	K1	к 1 1	
	CO2: Understand the attributes of continuous functions and metric topology.	K2	ан Алар	
Course Outcome	CO3: Apply the notions of Connected spaces, Components and Local connectedness.	КЗ		
	CO4: Analyze the notions of Compact spaces.	K4		
	CO5: Evaluate the concept of extreme value theorem, countability and separation axioms and inspect their applications.	К5		
	Learning Resources]	2	
Text Books	1. James R. Munkres, Topology, 2nd edition, Prentice Hall of India Ltd., New	v Delhi, 200	5.	
Reference Books	 J. Dugundji, Topology, Prentice Hall of India, New Delhi, 1975. G.F. Simmons, Introduction to Topology and Modern Analysis, Mc Graw Hi York, 1963. S.T. Hu, Elements of General Topology, Holden Day, Inc. New York, 1965. 	ll Book & Co	o, New	
Website Link	 http://www.uio.no/studier/emner/matnat/math/MAT4500/h13/topology http://home.iitk.ac.in/~chavan/topology_mth304.pdf https://thomasjohnbaird.files.wordpress.com/2011/11/pointsetlecturence 	y.pdf otes.pdf		
	L-Lecture T-Tutorial P-Practical C-Credit	7.5		

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	Μ	S	S	S	S	м	м
CO2	S	S	S	м	S	S	S	S	м	м
CO3	S	S	S	м	S	S	S	S	M	м
CO4	S	S	S	M	S	S	S	S	M	м
CO5	S	S	S	м	S	S	S	S	M	м
Level of Correlation between CO and PO	L-LOW	М-МЕ	DIUM	S-STF	RONG					

Tutorial Schedule	Problem solving session, Seminar and Group Discussion	
Teaching and Learning Methods	Lecture, Smart class presentation	
Assessment Methods	Assignment and Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.	

Designed By	Verified By	Approved By
k Josep	R. Muhtle.	1-1. Dar
Dr.K.LOGAARASI	Mrs.R.MALATHI	A


м	.Sc-Mathematics Syllat	ous LOCF-CBCS with effect	from 2	021-202	2 Onv	wards			
Course Code	Course Title	Course Type	Sem	Hours	L	т	P	,	с
21M3PMAC10	MEASURE THEORY AND INTEGRATION	DSC THEORY - X	4	2	-		4		
Objective The course aims to Generalize the concept of integration using measures and train the students understand the Outer Measure and Product Measure.									he
Unit	-	1.00 °	Kn	owled Levels	ge	Ses	sions		
Lebesgue measure: Introduction - Outer Measure - Measurable sets and Lebesgue measure - Measurable functions - Little wood's three principles. Chapter 3: Sections 1-3, 5-6						К1-КЗ 15			15
II	 The Lebesgue integral: The Lebesgue integral of a bounded function over a set of finite measure - The integral of a non-negative function - The general Lebesgue integral - Convergence in measure. Chapter 4: Section 2- 5 								15
Ш	Differentiation and integration: Differentiation of monotonic functions - Functions of bounded variation - Differentiation of an integral - Absolute continuity. Chapter 5: Section 1 - 4								14
IV	Differentiation and integration: Convex Functions The classical banach spaces: The LP spaces - The Minkowski and Holder inequalities. Chapter 5: Section 5 Chapter 6: Section 1,2								14
V	The classical banach spaces: Convergence and completeness - Approximation in the LP spaces - Bounded linear functional on the LP spaces. Chapter 6: Section 3- 5								14

	CO1: Remember the basic ideas of measure theory which generalizes the concept of length, area, volume, summation and integration in general setup.	K1	
	CO2: Understand and analyze the fundamental concept of Lebesgue outer measure and its properties.	К2	
Course Outcome	CO3: Classify the four derivatives and the relation between integration and differentiation.	К3	1 2.
	CO4: Discuss the LP spaces of functions of real variable and to establish several inequalities, involving the norm in the LP spaces.	K4	
	CO5: Evaluate the concepts of completeness of normed linear space and establish the Little wood's second principle.	К5	
	Learning Resources	L	
Text Books	1. H.L.Royden - Real Analysis, Mc Millan Publ. Co, New York, 1993.		
Reference Books	 G.De Barra, Measure Theory and integration, Wiley Eastern Ltd, 1981. P.K.Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age Int. Delhi, 2000. Walter Rudin, Real and Complex Analysis, Tata McGraw Hill Publ. Co.Ltd., 	(P) Ltd., N New Delhi	lew i, 1966
Website Link	1. https://nptel.ac.in/courses/111101100		
	L-Lecture T-Tutorial P-Practical C-Credit	Test 1	P

M	Sc-Mathematics Syllab	ous LOCF-CBCS with effect	from 20	021-202	2 Onv	vards		
Course Code	Course Title	Course Type	Sem	Hours	L	т	Ρ	c
21M3PMAC10	MEASURE THEORY AND INTEGRATION	DSC THEORY - X	111	6	4	2	-	4

CO Number	PO1	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO Number	101							-	c	
CO1	S	S	S	M	S	м	м	5	3	m
CO2	S	S	S	м	S	M	м	S	S S	M
CO3	S	S	S	м	S	м	м	S	S	м
C04	S	S	S	M	S	M	м	S	S	Μ
C05	S	S	S	M	S	, M _p	M	S	S	M.
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	s-st	RONG					

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment and Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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K.DHINESH KUMAR	R. MALATHI	A



M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards													
Course Code	Course Title	Course Type	Sem	Hours	L	Т	P		С				
21M3PMAC11	GRAPH THEORY	DSC THEORY -XI	4	2			4						
Objective The objective of this course to give a rigorous study of the basic conce study the applications of Graph Theory in other disciplines, to gain to Coloring and to imbibed knowledge on the concept of categorize graphs								heol of (ry, to Graph				
Unit		Course Content	8		Kr	nowled Level:	lge s	Ses	sions				
Basic Results: Basic Concepts - Subgraphs - Degrees of vertices - Paths and connectedness - Operations on graphs. Directed graphs: Basic concepts - Tournaments. Chapter 1: section 1.1 - 1.5, 1.8,							-		15				
Chapter 2 section 2.1-2.3 Connectivity: Vertex Cuts And Edge Cuts - Connectivity and Edge-Connectivity. Trees: Definition, Characterization and Simple Properties - Counting the number of Spanning Trees - Cayley's formula. Chapter 3 : section 3.1-3.3,						K2			15				
III	Chapter 4 section 4.1& 4.2, 4.4 & 4.5Independent Set and Matchings: Vertex Independent Sets and Vertex Coverings - Edge Independent sets - Matching's and Factors. Eulerian and and Hamiltonian Graphs: Eulerian graphs - Hamiltonian graphs.IIIChapter 5 : section 5.1 - 5.4, Chapter 5 : section 5.1 - 5.4,							1.1	14				
IV	Graph Colorings: Vertex colorings- Critical graphs - Triangle-free graphs - Edge colorings of graphs. Chapter 7: section 7.1 - 7.3, 7.5 & 7.6						Graph Colorings: Vertex colorings- Critical graphs - Triangle-free graphs - Edge colorings of graphs. Chapter 7: section 7.1 - 7.3, 7.5 & 7.6				(4		14
v	Planarity: Planar And Nonplanar Graphs - Euler formula and its consequences - K5 and K3,3 are nonplanar Graphs - Dual of a plane Graph - The Four-Color theorem and the Heawood Five-Color Theorem.				(3		14						

	CO1: Acquire in depth knowledge on vital concepts in graph theory.	K1	
	CO2: Understand the graphs, its types and on the theory of connectivity, colorings and planarity.	K2	
Course Outcome	CO3: Apply the imbibed knowledge on the concepts to categorize graphs.	К3	
	CO4: Analyze and infer properties of graphs and its associated concepts.	К4	
	CO5: Evaluate connectivity, Chromatic numbers etc, and construct graphs with specific properties.	К5	
ан 1	Learning Resources	8	
Text Books	1. R Balakrishnan, K.Ranganathan, A Textbook of Graph Theory, Springer (India) Priva Delhi, 2013.	ite Limited	, New
Reference Books	 J. A. Bondy, U. S. R. Murty, Graph Theory with Applications, Macmillan Press Ltd., F. Harary, Graph Theory, Addison - Wesley Publishing Company, Inc. 1969. Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, CRC press, 2010. 	1976.	
Website Link	1. https://youtu.be/mNzg7CoF3r0 2. https://youtu.be/7UZGUiG-Ucw 3. https://youtu.be/ZR-OJM3NETw		S D
	L-Lecture T-Tutorial P-Practical C-Credit	2.1	

CO-PO Mapping										
CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	м	S	S
CO4	S	м	S	M	S	S	s	S	S	S
C05	S	S	S	S	s	м	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-STF	RONG	1 Q	· // .			

Tutorial Schedule	Problem solving session, Seminar and Group Discussion.
Teaching and Learning Methods	Lecture, Smart class presentation,
Assesment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By	. *
Dr. S. REVATHY	R. MalaTH	A.h.o~	~



M	Sc-Mathematics Sylla	bus LOCF-CBCS with effe	ect from 2	021-202	22 On	wards		
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Р*	с
21M3PMAIS1	INTERNSHIP	INTERNSHIP		60	-	-	60	2
Objective	To give optimum expo	osure on the practical asp	ects of m	athemat	ics in	Indust	ries	
	Guidelines for Ir	nternship Programme			Knov Le	wledg evels	e Ses	ssions
 Duration of falls at the The individu practitioner charge. The student in which the attested by The departr Sections in the field. The Interns timings of ti The Interns internship fi A Staff men performance Schedule of Staff-in-cha All model fo Report eva the maxim Report sho training. 	the internship training end of the 2nd Semest- ual student has to iden is of their choice and in s hereafter will be call e daily work done shou the Section in-charge. nents should prepare a which they have to be should strictly adhere he institutions to which have to obtain a certif rom the Chief Executive ber of a Department (e of the Candidate. visit to be made by th rge. orms are to be attached luation: External Viva- um mark is 100. uld be properly submit	is 15 days during the Vac er. tify the institution / indust form the same to the HC led Interns should mainta ld be entered and the sam in work diary of the job to attached both in the offic to the rules and regulation to the rules and regulation to the rules and regulation ficate on successful complete of the organization. Guide) will be monitoring e staff is to be prepared I d wherever it is necessary Voce examination will be sted after the completion	ation whi stry / D / Staff- in a work ne should o be done, ce as well ons and off letion of t the by the HO y. conducte of interns	ch in- diary be as in fice he D / d and ship		K4		
Format for t preparation o Internship Report:	The final stage o 1.Front Page 2.Certificate 3.Certificate pro 4. Acknowledger 5.Abstract: * Organizatio * Programs a * Methodolog * Key parts o * Benefits of report 6.Index: * S. No 7.Objective 8.Work Diary	f work consists of the ovided by Industry ment on Information and opportunities gies of the report the company/Institution *Contents	through c *Page No	bur				

Typing Instruction Paper : 8 ½ * 11	on: inches in size. On	ly one side of the shee	t should be	en de est				
typed.		menes in sizer only one side of the sheet should be						
Margin: The left	side margin should	not be less than 1.5 in	ches (or 40	n 2 al an an an air air an	a signat			
mm) the right, to	p and Bottom Marg	gin one inch (or 25 mm).					
format Heading	New Roman, subject	as should be capitalize	n running					
size.	and Section heading	gs should be capitalize	d le lone		and the second			
Headings and Titles:	 Heading and Second capitalized and capitalized and capitalized and capitalized and capitalized and margin senta hand margin senta. Paragraphs shopica type and nin 	 Heading and Section headings should be capitalized and centered- 14 font sizes with Bold. Subdivision headings should be typed from the left hand margin sentence case -12 font sizes with Bold. Paragraphs should be indented seven space for pica type and pine for elite type. 						
	CO1: Understand t	he Selection of the Indus	try	K2				
	CO2: Analyze the I	К3						
Course Outcome	CO3: Able to work	K4						
	CO4: Evaluate the	К5						
	CO5: Create and co	port.	K6					
		Learning Resources						
	l C-	Credit						

М.	Sc-Mathematics Syllat	ous LOCF-CBCS with effe	ct from 2	021-202	22 On	ward	s	
Course Code	Course Title	Course Type	Sem	Hour s	L	, T - 2	Р*	с
21M3PMAIS1	INTERNSHIP	INTERNSHIP	ш	60	-	•••	60	2

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	м	м	M	M	м	м	м	S	S
CO2	S	M	M	M	M	м	м	Μ	S	S
CO3	S	м	M	M	M	м	м	M	S	S
C04	S	M	M	M	M	M	M	M	S	S
C05	S	м	M	M	M	м	м	м	S	S
Level of correlation between CO and PO	L-LOW	M-ME	DIUM	S-STF	RONG		1 	5. X.J.		(tang). (* - y

Tutorial Schedule		
Teaching and Learning Methods		
	CIA -100 %	
Assessment Methods	 Work Diary - 40% Training Report - 40% Viva-voce - 20% 	

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M.S	M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	т	Р		с
21M4PMAC12	FUNCTIONAL ANALYSIS	DSC THEORY - XII	IV	6	4	2			4
Objective	The objectives of th Analysis and the ma spaces, the basic re spaces and the spec	e course are to study the in properties of bounded op sults associated to different tral theorem and some of it	three st perators t types o ts applic	ructure t between of conver ations	heore Bana gence	ems o ach ar es in r	f Fur nd Hi norm	lbe ed	onal rt
Unit		Course Content	1		Kr	lowled Levels	lge s	Ses	sions
l	Banach Spaces: B Continuous linear Chapter 9: sectior	anach Spaces - Definition transformations - Hahn B ns 46 to 48.	and ex anach t	amples heorem		K1-K3	3		15
11	Banach Spaces Ar embedding of N ir Closed Graph theo space - Definition Chapter 9: section	Banach Spaces And Hilbert Spaces: The natural embedding of N in N ^{**} - Open mapping theorem - The Closed Graph theorem -Conjugate of an operator - Hilbert space - Definition and some simple properties. Chapter 9: sections 49 to 51. Chapter 10 sections 52.							15
	Hilbert Spaces: O sets - Conjugate s Chapter 10: sectio	Hilbert Spaces: Orthogonal complements - Orthonormal sets - Conjugate space H* - Adjoint of an operator. Chapter 10: sections 53 to 56.							14
IV	Operations On Hilbert Spaces: Self-adjoint operator - Normal and Unitary operators - Projections. Chapter 10: sections 57 to 59.					K4			14
v	Finite Dimensional Spectral Theory : Matrices - Determinants and spectrum of an operator - The spectral theorem. Chapter 11: sections 60-62.					K4			14

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	CO1: Acquire more knowledge on Banach space through Hahn Banach theorem.	K1	I,
	CO2: Demonstrate and discuss Open mapping theorem and Conjugate of an operator.	K2	12
Course Outcome	CO3: Apply domain knowledge for Hilbert Spaces and Banach spaces.	К3	12
	CO4: Analyze the study of finite dimensional spectral theory.	K4	
	CO5: Distinguish between the Hilbert Space and Banach spaces, with an operator	К5	
	Learning Resources		
Text Books	1.G.F.Simmons, Introduction to Topology and Modern Analysis, Tata McGraw New York, 2014, (21st Reprint)	Hill Inter.	Book Co,
Reference Books	 Balmohan V. Limaye, Functional Analysis, New Age International Pvt. Ltd., (2005). M.Thamban Nair, Functional Analysis, A First Course, Prentice Hall of India 3. Sudhir Kumar Pundir, Functional Analysis, CBS Publishers and Distributors F 	Second Ec (2002). Pvt. Ltd., (1ition 2016).
Website Link	1.https://youtu.be/imYQJOgUx7Y 2.https://youtu.be/xaHkXIWcgP8 3.https://youtu.be/U9JZaM7al0Q 4.https://en.wikipedia.org/wiki		2
	L-Lecture T-Tutorial P-Practical C-Credit		

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СО-РО Марр	ing									
CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	S	S	S	S	S	S	м
CO2	S	S	S	S	S	S	S	S	S	м
CO3	S	S	S	S	S	S	м	S	S	м
CO4	S	M	S	M	S	S	S	S	S	м
CO5	S	S	S	S	S	S	S	S	S	м
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-ST	RONG					I

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Tutorial Schedule	Problem solving session and Group Discussion, Seminar.
Teaching and Learning Methods	Lecture, Smart class Presentation.
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	т	Ρ	с	
21M4PMAC13	PROBABILITY THEORY	DSC THEORY - XIII	IV	6	4	2	•	4	
Objective	The objective of the probability, Random parameters. Develop probability & distribu	course Understanding the c events and to learn concep ing the Characteristic func ition.	oncepts ts Rando ctions, tl	of resul om variat he stand	ts relations, land	ated to Noment esults re	s and lated	to	
Unit		Course Content			Kn	owledge Levels	Ses	sions	
	Random events : Random events - Probability axioms - Combinatorial formulae - conditional probability - BayesK115theorem - Independent events. Chapter I : Section 1.1 - 1.717								
II	Random Variables: distribution - Margi distribution - Indep random variables. Chapter II: Section	Distribution function - Jo nal distribution - Conditio endent random variables 2.1 - 2.9	oint onal - Funct	ions of		<1-K3		15	
111	Parameters of the distribution of a Random Variables : Expectation - Moments - The chebyshev Inequality - Absolute moments - Order parameters - Moments of random vectors - Regression of the first and second types.K314Chapter III: Section 3.1 - 3.8							14	
IV	Characteristic func- functions- Character invariants- Character independent randor distribution function Chapter IV : Section	ction: Properties of chara ristic functions and mom eristic function of the sur m variables - Determinati n by the characteristic fu n 4.1 - 4.5.	cteristi ents -Se n of the on of Inction.	c emi-		K4		14	
v	Some probability d Binomial - Polya- Hy distribution- Unifor Chapter V : Section	listributions: One point - ypergeometric-Poisson (d m distribution. 5.1- 5.6	Two po iscrete)	pint -		K4		14	

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	CO1: Recall the concept of conditional probability, the principles of Bayesian statistical inference and Independent events.	K1	
	CO2: Understand the Properties of characteristic functions, moments & Semi-invariants.	К2	
Course Outcome	CO3: Apply the concepts of independence, jointly distributed random variables and independent random variables, their sums.	КЗ	
	CO4: Analyze the importance of continuous distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper- Geometric, Normal & Uniform distributions.	K4	
	CO5: Evaluate the Binomial, Poisson, Geometric, Normal & Uniform distributions.	К5	
	Learning Resources		
Text Books	1. M. Fisz , Probability Theory and Mathematical Statistics, John wiley and so York, 1963	ons, New	
Reference Books	 R.B.Ash, Real Analysis and Probabilty, Academic Press, New York, 1972. K.L. Chung, A Course of probability, Academic Press, New York, 1974 S.I.Resnick, A Probability Path, Birhauser, Berlin, 1999. 		
Website Link	1. <u>https://nptel.ac.in/courses/111101004</u> 2. <u>https://youtu.be/sTxZ_ek92EY</u>		
	L-Lecture T-Tutorial P-Practical C-Credit		

L-Lecture 1

C-Credit

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CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	м	S	м	S
CO2	S	S	S	S	S	S	м	S	м	S
CO3	S	S	S	S	S	S	м	S	S	S
CO4	S	м	S	M	S	S	м	S	S	S
C05	S	S	S	S	S	S	м	S	S	S
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-ST	RONG		1	L	1	

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class Presentation.
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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	c-Mathematics Sylla	bus LOCF-CBCS with effe	ect from	2021-20	22 0	nwards		
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Ρ	
21M4PMAC14	CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS	DSC THEORY - XIV	IV	6	4	2	-	
Objective	The objective of the equations through problems with fixed	nis course to Introduce th different methods and Kn d boundaries and moving b	e concep ow the d ooundarie	t of Fred ifference s	lholm betv	& Volte ween the	erra i e var	
Unit		Course Content			Kn	owledge Levels	S	
1	CALCULUS OF VAR Variational Proble variation and its Problems for Funct on Higher - Order functions of seve problems in Param Chapter I : Section	IATIONS ms with Fixed Boundarie properties - Euler's Equa ionals of the form - Funct Derivatives - Functiona eral Independent variable etric form. 1.1-1.6 of (1)	s: The co ation- Va ionals de als Deper les - Va	oncept of iriational ependent ident on iriational		К2		
11	Variational Proble of the form I[y(x) boundary for a Fun sided Variations Diffraction of Ligh Chapter II: Section	Chapter I : Section 1.1- 1.6 of (1)Variational Problems with moving Boundaries: Functionals of the form I[y(x)] - Variational problems with a Movable boundary for a Functional Dependant on Two Functions - One sided Variations -Reflection and Refraction of Extremals- Diffraction of Light rays.K4						
III	INTEGRAL EQUAT Preliminary conce equations definition - Fredholm Integral e equations of convertions of convertions of converting a mult differentiation und converting a mult Regularity condit Solution of an integral of (2)	Chapter II: Section 2.1 - 2.5 of (1) INTEGRAL EQUATIONS Preliminary concepts:Introduction - Abel's Problem- Integral equations definition - Linear and non-linear integral equations - Fredholm Integral Equation -Volterra integral equation - Singular integral equation - special kinds of kernels - Integral equations of convolution type - Iterated kernels - Resolvent kernel- Eigen Values and Eigen Functions -Leibinitz rule of differentiation under integral sign - An important formula for converting a multiple integral into single ordinary integral - Regularity condition - Inner product of two functions - Solution of an integral equations - problems.						
IV	Chapter I of (2) Conversion of ordinary differential equations into Integral Equation: Introduction - Initial value problem - Method of converting an initial value problem into a Volterra integral equation -Alternative method of converting an initial value problem into a Volterra integral equation - Boundary value problem - Method of converting a boundary value problem into a Freholm Integral equation. Chapter II of (2)							

v	Homogeneous Fredholm integral equations of the second kind with separable kernel: Characteristic values, Characteristic functions -Solution of homogeneous Fredholm integral equation of second kind with separable kernels - Solved examples. Chapter III of (2)	К4	14
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	CO1: Recall the concept of Variations ,functional, Integral equations and Integral Transformation	K1	
	CO2: Understand various methods in variations, integral equations and integral transforms	К2	
Course Outcome	CO3: Apply the real life problem and find solution by applying suitable method	К3	
	CO4: Analyze the existence of solution to a problem	K4	
	CO5: Evaluate variational problem relevant to a real - life situation	K5	
	Learning Resources		
Text Books	 A.S Gupta, Calculus of Variations with Application, Prentice Hall of India, 2008. (unit -I and unit -II) Dr.M.D.Raisinghania, Integral Equations and Boundary Value Problems, S.C pvt ltd, New Delhi, Sixth edition, 2013. (unit -III, unit -IV and unit -V) 	New Delhi, Thand& cor	npany
Reference Books	 F.B. Hildebrand, Methods of Applied Mathematics, Prentice - Hall of India 1968. R. P. Kanwal, Linear Integral Equations, Theory and Techniques, Academic York, 1971. L. Elsgolts, Differential Equations and Calculus of Variations, Mir Publisher 	Pvt. New I c Press, Ne rs, Moscow	Delhi, w , 1973.
Website	1. http://www.physics.usu.edu/Torre/3550_Fall_2012/Lectures/06.pdf		
Link	2. http://www.mcs.st-and.ac.uk/~rac/MT5802/Integral%20equations.pdf		
	L-Lecture T-Tutorial P-Practical C-Credit		

	201			201	DOF	DCOA	0000	DCO2	DSO4	DSO5
CO Number	P01	P02	P03	P04	P05	PS01	P302	P303	F304	1303
CO1	S	S	S	м	S	S	S	S	м	S
CO2	S	S	S	м	S	S	S	S	м	м
CO3	S	S	S	м	S	S	S	S	S	м
CO4	S	S	S	м	S	S	S	S	S	S
C05	S	S	S	м	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-STI	RONG					

Tutorial Schedule	Problem solving session and Group Discussion				
Teaching and Learning Methods	Lecture, Smart class presentation, Seminar				
Assignment and Periodical assessment will be cond Followed the common pattern of Internal andExternal suggested in the regulations.					

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P.Gowrishankar	R.Malathi	71
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	M.Sc. Mathematics	Syllabus LOCF-CBCS with e	ffect from	n 2021-20	022 On	wards	FR. BREE	
Course Code	Course Title	Course Type	Sem.	Hours	L	т	Р	C
21M4PMAPR1	PROJECT WORK	PROJECT	IV	6			6	5
Objective	 Apply relevant concepts to f Apply scientific principles ar Understand live organization The primary objective of ful problem from the real life si solving skills. Project Period: The project 	ormation of problems. Ind investigations of Researchal situations. I semester project is to pro ituation and finding the solu commences from IV semest	h Method vide an o ution to th er.	ology to o oportunity ne problen	ffer so to ou n by us	lutions r stude sing and	to the probler nts to format t alytical and pro	ns. :he oblem
Details			Knowledge Levels	Session				
Format for the preparation of Project Report:	The final stage of work co 1. Title Page 2. Bonafide Certificate 3. Acknowledgement/Pre 4. Table of contents 5. Main Chapter 6. List of table, diagram a 7. Conclusion 8. References	onsists of the face and charts	1	**				
Text of the Project	 7. Conclusion 8. References The following structure of project work should be followed to maintain the uniformity in preparation and presentation. Chapter 1 - Introduction In this chapter Selection and relevance problem, historical background of the problem, definitions of related aspects, characteristics, different concepts pertaining to the problem etc can be covered by the candidate. Chapter 2 - Research Methodology This chapter will include Objectives, Hypothesis, Scope of the study, Selection of the problem, Data collection, Tabulation of data, Techniques and tools to be used, limitations of the study, significance of the study etc. Chapter 3 - Literature Review This chapter will provide information about studies done on the respective issue. This would assist students to undertake further study on the same issue. Chapter 4 - Data Presentation and Data Analysis This chapter is the core part of the study. The analysis pertaining to collect data will be used to arrive at findings. In this table of information, presentation of graph etc. should be provided by the students. Chapter 5- Conclusion In this unit, findings of work will be covered by the candidate and suggestion will be mentioned by the candidate to validate the objectives and hypotheses. 							

	Typing Instruction: Paper : 8 ½ * 11 inches in size. Only one side of the sheet should be typed. Margin: The left side margin should not be less than 1.5 inches (or 40 mm) the right, top and Bottom Margin one inch (or 25 mm). Font : Times New Roman, subject matter -12 font size in running format, Heading and Section headings should be capitalized - 14 font size.		
Headings and Titles:	 Heading and Section headings should be capitalized and centered- 14 font sizes with Bold. Subdivision headings should be typed from the left hand margin sentence case -12 font sizes with Bold. Paragraphs should be indented seven space for pica type and nine for elite type. 		- Y
Tables, Graphs and Diagrams:	 The table number (Example: TABLE 1.5) typed in capitals, should be separated from the text by two or three spaces. If an explanatory note to a time is necessary, an asterisk should be used. The note should be placed immediately below the table. 		1
	Line Spacing: The text of the thesis should be 1.5 lines spacing Pagination: Pages of the text are numbered continuously in Arabic numerals.		
	Foot note: Footnote citation is indicated by placing an index number i.e. a superscript or numeral. The superscript numeral must appear at the top of the line both in the text and in a footnote. Footnotes are single spaced, with double spacing between two consecutive citations. Footnote is numbered consecutively within each chapter or throughout the entire report. Basic Format: Author's name, title of the work, Place of publication: Publisher's name, year, Page no, (s). Note of punctuations. Page number to be preceded by "p" if single or "pp" if two or more pages. Title to be underlined.	*	
	 By p in single of pp in the or more pages tritle to be an entired. Bibliography: The format for bibliographical listing for books, reports, articles are the same for footnote also. Books and articles can be arranged either chronological order or year wise. For citing Books: Mann, R.S Social Change and Social Research, New Delhi: Concept Publishing Company, 2018, p.27 Publication of Government and Public Organization: Government of India, India 2016: A Reference Annual, New Delhi: Publication Division, 201, p.127 Quoting from Secondary Sources: Gand, William. S., "Foreign Aid: What it is; how it works; why we provide it", Department of State Bulletin, 59, No.1537, 1958, quoted in Todaro, Michael p, Economic Development in the Third world, New York, Longman, 1981, p.40. Citing Journal: GoelRanjan, "Achievement through Human Engineering", Indian Management, 28, No.8, July, 2016, pp.14-16 Citing Thesis or Dissertation: Ganapathy , A study of organizational and Individual Characteristics in R & D Organizations, unpublished Ph.D Thesis, Bangalore: Indian Institute of 		

and the second	Science, 2016. For Citing Seminar Pape Krishnaswami O.R., "Tow Presented at a Seminar o College, Bangalore, July				
SCHEDULE	IV Semester: 1. December -Identi 2. January - Revie 3. February - Data Project report. 4. March - First Correc 5. April - Revie	fication of problem &Sele ew of Literature&Finalizat collection& Analysis and & & Second draft and Fin ection. ew Presentation & Submis			
	CO1: Understand the Select	К2			
	CO2: Interpret Hypothesis a	КЗ			
Course Outcome	CO3: Analyze the literature	1010. Ing Seminar Paper: swami O.R., "Towards Excellence in Cooperative Management" (Paper ed at a Seminar on "Excellence in Management", Cooperative Training Bangalore, July 2019). ester: ember -Identification of problem & Selection of topic Jary - Review of Literature& Finalization of Questionnaire Tuary - Data collection& Analysis and preparation of report. - First & Second draft and Final draft Correction. - Review Presentation & Submission of Project. iderstand the Selection of the problem. K2 terpret Hypothesis and Objectives. K3 nalyze the literature review based on the research problem. K4 aluate the data collection. K5 eate and conclude the Project report. K6 L-Lecture T-Tutorial P-Practical C-Cred	K4		
	CO4: Evaluate the data coll	ection.		К5	
	Presented at a seminar on "Excellence in Management", Cooperative Haming College, Bangalore, July 2019). IV Semester: 1. December -Identification of problem & Selection of topic 2. January - Review of Literature&Finalization of Questionnaire 3. February - Data collection& Analysis and preparation of Project report. 4. March - First & Second draft and Final draft Correction. 5. April - Review Presentation & Submission of Project. C01: Understand the Selection of the problem. K2 C02: Interpret Hypothesis and Objectives. K3 C03: Analyze the literature review based on the research problem. K4 C04: Evaluate the data collection. K5 C05: Create and conclude the Project report. K6 L-Lecture T-Tutorial P-Practical	К6			
	L-Lecture	T-Tutorial	P-Practical	C-Credit	

M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	Ţ	Ρ	с	
21M4PMAPR1	PROJECT WORK	PROJECT	IV	6		-	6	5	

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CO Number	PO1	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	м	M	м	м	м	м	м	S	S
C02	S	M	M	M	M	м	м	м	S	S
CO3	S	м	M	м	M	м	м	м	S	S
CO4	S	M	M	M	M	м	м	м	S	S
C05	S	M	M	M	M	м	м	м	S	S
Level of correlation between CO and PO	L-LOW	M-ME	DIUM	S-STF	RONG				s p ^r	

Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	Internal Evaluation - 50 Marks External Evaluation - 150 Marks

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M.Sc., Mathem	atics – Mathematics for Comp	petitive Examination Sy 2021 – 2022 Onward	llabus – İs	LOCF -	CB	CS -	Pattern with ef	fect from
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Р	С
21M4PMAOE1	Mathematics for Competitive Examinations	Self study Online - Competitive Examination	IV	-	-	-	0	2
Objective	Creating the awareness on c appearing for Competitive F such exams.	g knowledge a itude of appear	ing for					
		Course Content					Knowledge Levels	Sessior
	Assemblage of different particular, Linear Algebr Complex Analysis, Mech Differential Equations, P Graph Theory, Measure Fluid Dynamics, Probab Calculus of Variations and has been put forth to incl This course aims to give comprised of some factur (MCQ), it is extremely s degree in University/inst preparing for various nat exams such as ICAR-JR SAUs; CSIR/UGC-NET IISc, JNU, BHU, etc. to addition, it is also useful Rules for creating MCC 1. Objective type online of 4 th semester. 2. Questions must be tak CSIR-NET, SET, NEET Test for Ph.D. 3. Test critical thinking Multiple choice question Learners to interpret facts effect, make inferences, a	topics related to Matra, Abstract Algebra, hanics, Discrete Matra Partial Differential Eco Theory and Integrati- ility Theory, Function ond Integral Equations lude recent developm e a holistic view of a tal text points, multip witable for students partitute for their entran- tional and state level F/SRF/NET/ARS, IA /JRF/SRF; ICMR, D get admission in Ph. for UPSC and states Q pattern. examination will be then from all previous f, UPSC, IBPS and C g. ons to test the superfi- s, evaluate situations, and predict results.	themat Real A hemati quation on, Nu nal An s. Majo hents in ll the to oble cho bursuin ce exa compe ARI/NI BT, G D. in N s PSC. condu	ics in Analysis cs, Ordi as, Topo umber T alysis, or emph a the sul opics whice ques ag their ms, stud etitive en ORI Ph. ATE, B Mathema on pape on Entra	s, inary olog heorich asiss ojec hich high dent high dent ntrai D., AR atics the o ers o nce	y gy, ry, ts. s her s nce C, s. In end	K1-K6	

4. Emphasize Higher-Level Thinking

Use memory-plus application oriented questions. These questions require students to recall principles, rules or facts in a real life context.

Eg.1

Ability to Justify Methods and Procedures

Which one of the following is true if o(G)=49?

a. G is abelian group

b. G is non-abelian group

c. G is infinite group

d. G is finite abelian group.

Eg.2

Ability to Interpret Cause-and-Effect Relationships

When the inverse of the matrix is possible?

a. Singular Matrix.

b. Zero Matrix.

c. Symmetric Matrix.

d. Non-singular Matrix.

5. Mix up the order of the correct answers

Keep correct answers in random positions and don't let them fall into a pattern that can be detected

6. Use a Question Format

Multiple-choice items to be prepared as questions (rather than

incomplete statements)

Incomplete Statement Format:

	The capital of California is in Direct Question Format Less		8
	effective.		
	In which of the following cities is the capital of California? -This is Best format.	×.	
	7. Keep Option Lengths Similar		
	Avoid making your correct answer the long or short answer		
	8. Avoid the "All the Above" and "None of the Above" Options		
	Students merely need to recognize two correct options to get the		
	answer correct		
	9. HOD's instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate among the students.		
	10. Each Department to prepare the Questions (MCQ pattern with four answers) and submit to ICT.	1 - 7	
	CO1: Able to attend competitive Examinations CO2: Able to attend Computer Based Examinations		1
Course Outcome	CO3: Understand the UGC CSIR Syllabus and Question PatternsCO4: Analyze the all concepts in one examinationCO5: Create the Problems with UGC CSIR Level		
Learning Resources	Pawan Sharma, Neha Sharma, Suraj Singh - UGC CSIR NET/SET (JRF & LS) Mathematical Sciences, Arihant Publications		1 <u>-</u>
Website Link	 <u>https://onlinecourses.nptel.ac.in/noc23_ma17/preview</u> <u>https://onlinecourses.nptel.ac.in/noc23_ma08/preview</u> https://onlinecourses.nptel.ac.in/noc23_ma06/preview 	Č.	

					and the second second second					
	CO-POMapping									
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
COI	s	м	м	М	М	М	S	М	М	М
CO2	S	М	м	М	М	М	S	М	М	М
CO3	S	м	м	М	М	М	S	М	М	М
CO4	S	м	М	M	М	М	S	М	М	М
CO5	s	M	M	М	М	м	S	М	М	М
l	Level of Correlation between CO and PO				L-LOW M-MEDIUM S-STRON			RONG		
	Tutorial S	chedule			NET/SET/GATE/CET/TRB /NEET Old question papers -solution: -online mock test					-solutions
Teachir	Teaching and Learning Methods				Self study, Group discussion, Chalk and Talk, Audio-Video Learning, learning through mock test					
Assessment Methods				100 multiple choice questions through computer based online examinations passing minimum is 50%						
Designed By				~	R. Malith: Arh-5mm				sy ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type Sem Hours L					LTP		C
21M1PMAE01	DISCRETE MATHEMATICS	DSE I	I	6	4	2			4
Objective Understand the basic ideas of logic, proof methods and strategy. Apply Boolean algebra to circuits and gatting networks. Use finite state-machines to model computer operations. Ability the Permutations and Combinations.									
Unit		Course Content Level							sions
l	The Foundations : Logic and Proofs: Propositional-Applications of Propositional-Propositional Equivalences-Predicates and Quantifiers. Chapter1: Sections 1.1-1.4 Algorithms :The Growth of Functions. Chapter3: Section3.2						К1-КЗ		
11	Counting: The Basics of Counting-The Pigeonhole Principle- Permutations and Combinations-Generalized Permutations and Combinations - Generating Permutations and Combinations. Chapter 6: Sections 6.1-6.3, 6.5 and 6.6						2		14
	Advanced Counting Techniques: Applications of Recurrence Relations-Solving Linear Recurrence Relations Generating Functions. Chapter 8: Sections 8.1, 8.2 and 8.4.								14
IV	Boolean Algebra: Boolean Functions-Representing Boolean IV Functions-Logic Gates-Minimization of Circuits. Chapter12: Sections 12.1-12.4								15
v	Modeling Computation: Finite-State machines with Output - Finite- State machines with No Output-Turing Machines. Chapter 13: Sections 13.2, 13.3 and 13.5								15

	CO1: Express a logic sentence interms of predicates, quantifiers and logical connectives.	K1	
	CO2: Have knowledge of Pigeonhole Principal, Permutations and Combinations.	К2	
Course Outcome	CO3: Apply the Recurrence Relations and Generating Functions	КЗ	
	CO4: Analyze the Rules of Boolean Algebra and Boolean Functions	K4	
	CO5: Evaluate the Finite- State Machines with Output and no output	К5	
	Learning Resources	ŝ.	
Text Books	1. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th Editio Hill Education, New York, 2008.	n, WCB/Mc G	raw
Reference Books	 J.P. Trembley and R. Manohar, Discrete Mathematical Structures applica Science, Tata McGraw Hills, New Delhi. T. Veerarajan, Discrete Mathematics with Graph Theory and Combinaton Hills Publishing Company Limited, 7th Reprint, 2008. 	ations to Com rics,Tata McG	iputer raw
Website Link	 https://www.youtube.com/watch?v=URejLdTlnas https://www.youtube.com/watch?v=yLhqCylzlx4 https://www.youtube.com/watch?v=dUst2h2zf44 https://www.youtube.com/watch?v=rZdBAJsV_go 		
	L-Lecture T-Tutorial P-Practical C-Credit		

CO Number	PO1	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	м	S	M	S	S	S	S
C02	S	S	S	м	S	м	S	S	S	S
C03	S	S	S	M	S	м	S	S	S	S
C04	S	S	S	м	S	M	S	S	S	S
C05	S	S	S	м	S	м	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-ST	RONG					

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment and Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By
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	Course little	Course Type	Sem	Hours	L	T	- p	The
MZPMAEO	2 NUMERICAL ANALYSIS	DSE	12-11-12 12-11-12	5	4	1		4
bjective	Provide numerical methodifferentiation, integration	ods for solving the on, ordinary and p	non-linea partial dif	ar equatio	ons, int	terpolations	tion,	
Unit		Course Content	194. S			Kr	nowledge	
I	Numerical solutions to Numerical solutions to series solution - Pointw Taylor's series method equations - Taylor's ser equations - Predictor - (Adam Bash forth method Chapter 11: Sections 11)	ordinary differen ordinary differen ise method - Solu for simultaneous ies method for Hi Corrector method d. .1 to 11.6 and Sec	ential equa tial equa ition by first ord igher orc is - Milne ctions 11	juation: ation - Po Taylor's s ler differ der Differ e's metho	ower series ential rential od -	-	Levels	12
11	Picard and Euler Metho approximations - Picard differential equations - I second order differentia Euler's method - Modifie Chapter 11: Sections 11.	ds: Picard's Met 's method for sim Picard's method f l equations - Eule d Euler's Method 7 to 11.12.	hod of so ultaneou for simul er's Meth	uccessive us first or taneous ad - Imp	rder roved	ĸ	1-КЗ	12
111	Runge - Kutta Method: R - Higher order Runge-Kut simultaneous first order o methods for simultaneous Chapter 11: Sections 11.1	tunge's method - ta methods- Rung differential equat s second order dif 3 to 11.17.	Runge-k ge-Kutta ions - Ru fferentia	Kutta met methods unge- Kut al equatio	thods for tta ons.		(4	12
IV C	Numerical Solutions to Pa Introduction Difference Qu of partial differential quot differential equations - Ell equation by Liebmann's ite	artial Differentia Jotients - Geome Lients - Classifica Iptic equation - eration process.	l Equati trical re tions of Solution	ons: presenta partial n to Lapla	tion ace's	K4,	К5	12

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V	Numerical Solutions to Partial Differential Equations (Contd.): Poisson equation - its solution - Parabolic equations - Bender - Schmidt method - Crank - Nicholson method - Hyperbolic equation - Solution to partial differential equation by Relaxation method. Chapter 12: Sections 12.7 to 12.10.	К5	12
	CO1: Recall the single-step and multi-step methods to solve the ordinary differential equations of first order	K1	
	CO2: Understand the direct and iterative methods to determine the solution of the system of simultaneous linear algebraic equations.	К2	
Course Outcome	CO3: Apply each type of differential equations and kind of numerical methods are best suited for.	КЗ	
	CO4: Analyze a programming language or mathematical software to implement and test the numerical schemes	K4	
	COS: Evaluate the partial differential equations and determine their solutions using Bender - Schmidt method and Hyperbolic equation - Solution to partial differential equation by Relaxation methods in order to equip themselves to get through CSIR-NET, SET and GATE etc.	К5	,
	Learning Resources		
Text Books	1. V.N Vedamurthy and Ch. S.N. Iyengar, Numerical Methods, Vikas Publish Ltd., 1998	ing House Pvt	
Reference Books	 S.S. Sastry, Introductory methods of Numerical Analysis, Prentice of Indi C.F. Gerald, and P.O. Wheathy, Applied Numerical Analysis, Fifth Edition Wesley, 1998. M.K. Venkatraman, Numerical methods in Science and technology, Natio Company, 1992. 	a, 1995. n, Addison nal Publishers	
Website Link	1.https://youtu.be/QugqSa3GI-w 2.https://youtu.be/QQFIWwDA9NM 3.https://youtu.be/8Ta-VNONoMg	.81	

L-Lecture

T- Tutorial

P - Practical

C- Credit

M.Sc-	Mathematics Syllabus LOCI	F-CBCS with e	ffect from	m 2021-	2022 0	nwards		
Course Code	Course Title	Course Type	Sem	Hours	E.	Т	P	C
21M2PMAE02	NUMERICAL ANALYSIS	DSE	1	5	.4	1	the second	4

CO Number	PO1	PO2	PO3	P04	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	s	s	s	м	S	s	M	м	S	S
C02	S	s	s	s	s	s	S	S	s	S
C03	s	5	M	s	s	s	м	s	S	м
C04	s	s	s	s	s	s	s	S	s	5
C05	s	s	s	s	M	s	s	S	s	s
Level of Correlation between CO and PO	L- LOW	M-ME	DIUM	S-STR	ONG			1		

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation.
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.



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		LOCF-CBCS with effect in	om 202	1-2022	Unwards				
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C	
21M2PMAE03	ADVANCED LATEX	ELECTIVE THEORY - II	11	5	4	1	2.	3	
Objective	Understand about the l easy tools by using LaT	LaTeX Software and prepa eX	are the	present	tation	with	simp	le	
Unit		Course Content			Know	vledge vels	Se	ssions	
l	Introduction and the S Installation of the soft commands - Classes a - How to use LAEX at Counters and Length p organization - Page by Matrix-like environme Chapter - 1 and 2 in I & Chapter - 5 in II; Ch	Structure of a LaTeX Doc tware LaTeX - Environme nd packages - Errors - Fil CUED - Document Classes parameters - Document a reaks, footnotes. Environ ents. & Chapter - 1 in II ; Chap hapter - 8 (Section 8.3	ument ents an les cre s - Aran and pay iments pter - 4) in III	: d ated ra- ge , 4 in I	K1	-K3		12	
II	Display and alignment structures for equation - A single equation on several lines: no align lines: with alignment alignment - Equation Multiple alignments: a environments as mini Variable symbol comr Chapter - 8 (Section 8	Visplay and alignment structures: Display and alignment tructures for equations Comparison with standard LaTeX A single equation on one line - A single equation on everal lines: no alignment - A Single equation on several ines: with alignment - Equation groups without alignment - Equation groups with simple alignment- Aultiple alignments: align and flalign - Display environments as mini-pages- Interrupting displays, /ariable symbol commands - Symbols in formulas						12	
111	Figures Directly in La Images, List of Figure LaTex, TikZ package, graphics in LaTeX, sin Plotting of functions.	Figures Directly in LaTex: Inserting Images, Positioning Images, List of Figures, Drawing diagrams directly in LaTex, TikZ package, Graphics and PSTricks Pictures and graphics in LaTeX, simple pictures using PS Tricks, Plotting of functions.							
IV	Presentations (The be Assignments and Exar exsheets Package - Th data tool Package for Random Numbers. Ch datapie Package - The bchart Package - The Plots.	eamer Class): Overlays ninations The exam Class he probsoln Package - U Exams or Assignment Sh arts Flow Charts - Pie Ch e pgf-pie Package - Bar G databar Package - Gant	-Them s - The lsing th neets - narts - Charts t Chart	es he The - The ts -	K	4-K6		12	

V	Structuring Your Document: Author and Title Information, Abstract, Chapters, Sections, Subsections, Creating a Table of Contents, Cross-Referencing, Creating a Bibliography, Page Styles and Page Numbering, Multi- Lingual Support: using the babel package. Chapter - 8, 5.1-5.7 in V	К4-К6	12			
-	CO1: Recall the basic concept of typing the mathematical equation	К1				
	CO2: Understand the alignment of the mathematical equation while publishing a paper	К2				
Course Outcome	CO3: Apply the concept of typing the Journal	К3				
	CO4: Analyze the word document for publishing a journal	К4				
	CO5: Evaluate the word document of the journal papers	К5				
	Learning Resources					
Text Books	1. Advanced LATEX by Tim Love, 2006.2.TextBooks3. LaTeX for Administrative Work by Nicola L. C. Talbot4. The LaTeX Companion by Frank Mittelbach and Michel Goossens, Addison-Wesh5. Nicola L. C. Talbot, LATEX for Complete Novices Version 1.4					
1. Bindner, Donald & Erickson, Martin. (2011). A Student's Guide to the Study, Practice, and Tools of Modern Mathematics 2. Lamport, Leslie (1994). LaTeX: A Document Preparation System, User's Guide and Reference Manual 3. George Gratzer, More Math into LATEX, 4th Edition, 2007 Springer Science 4. Frank Mittelbach, Michel Goossens, The LaTex Companion, Second Edition, Addision-Wesley, 2004 5. A Primer, Latex, Tutorials, Indian TEX users group, Trivandrum, India.						
Website Link	1. https://latex-tutorial.com/ 2. https://www.maths.tcd.ie/-dwilkins/LaTeXPrimer/					

L- Lecture

T- Tutorial

P - Practical

C- Credit

٨	A.Sc-Mathematics Syll	abus LOCF-CBCS with effe	ect from	2021-20	22 Onw	vards		
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PMAE03	ADVANCED LATEX	ELECTIVE THEORY - II	1	5	4	1		3

	1000								DCO4	DCOS
CO Number	P01	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	P504	FJUJ
						S	S	S	M	M
CO1	S	S	S	S	M					
		-				S	S	S	M	M
CO2	S	S	S	M	S					
						S	S	S	M	M
CO3	S	S	S	S	S					
						s	S	S	M	M
CO4	S	M	S	S	S	1	5			
						S	S	S	M	M
CO5	S	S	S	S	S	5				
Level of	1.			C CT	ONG					
between CO and PO	LOW	M-M	EDIUM	5-511	KUNG					

Tutorial Schedule	Problem solving session and Group Discussion
Teaching and Learning Methods	Chalk and talk method, Power Point Presentation
Assessment Methods	Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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P.GSC P.GOWRISHANKAR	For p. p.	men h. Bar
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(1) (1)	M.Sc. Mathematics Syllab	us LOCF-CBCS with effect	from 202	21-2022	Onw	vards	1992 V 113	NAME OF
Course Code	Course Title	Course Type	Sem	Hours	L	т	Р	С
21M2PMAE04	PROGRAMMING WITH C++	DSE	II	5	4	1		4
Objective	1. To introduce the basic knowledge of one of the programming language of							5.
Unit	Course Content						Knowle dge Levels	Sessi ons
1	Basic concepts of object oriented programming - Benefits of oops - Object oriented Languages - Application of OOP - Beginning with C++ - what is C++ - Application of C++ - A simple C++ Program - More C++ Statements - An Example with class - Structure of C++ Program.						К1	12
Ц	Token, Expressions and control structures: Tokens - Keywords - Identifiers and Constants - Basic Data types - User defined Data types - Derived data types - Scope resolution operator - Manipulators- Expressions and their types - Operator precedence - Control Structure.						K1,K2	12
ш	Function in C++: Main Function - function prototyping - Call by reference - Return by reference - Inline functions - default arguments - Function overloading - Friend and Virtual functions - Math library function. Class and Objects: Specifying a class - Defining member functions - A C++ program with class - Making an outside function inline - Private member functions - Arrays within a class - Memory allocations for objects - Static member functions - Array of the object - Object as function arguments - Friendly functions.						к2,К3	13
IV	Constructors and Destructors: Constructors - Parameterized Constructors in a Constructor - Multiple constructors in a class - Constructors with default arguments - Copy constructors -Destructors. Operator overloading and type conversions: Defining operator overloading - overloading unary operators - overloading binary operators- Rules for overloading operators.						K4	12
v	Files: Introduction - Class for file stream operations - opening and closing a file - detecting End-of file - More about open () File modes - File pointer and their manipulations - Sequential input and output operations. Exception Handling: Introduction - Basics of Exception Handling - Exception Handling Mechanism - Throwing Mechanism - Catching Mechanism - Rethrowing an Exception.						К5	11
1	CO1: Remember the primary things of C++ programming language					K1		
	CO2: Understand and use various constructs of the programming language					K7		
Course	such as conditionals, iteration, and recursion							
Outcome	CO3: Apply the concept of class and ODJects					K3		
· •	COE: Evaluate the concept of files					K4		
							L V2	
Text Books	1. Object-Oriented Programming with C++ 5th Edition, E.Balagrurusamy , Tata McGraw Hill Pub. 2011.							
Reference Books	Reference Books 2. Allan Neibaver - Office 2000.							algotia
Website Link	1.https://www.codecademy. 2.https://www.simplilearn.c	.com/learn/learn-c-plus-p om/free-course-to-learn-	olus cpp-bas	ics-skillu	P		1. Alt	
х.	L-Lecture	T-Tutorial P-Practical		C-Cred	it		4	

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M.Sc. Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards											
Course Code	Course Title	Course Type	Sem	Hours	L	т	P	c			
21M2PMAE04	PROGRAMMING WITH C++	DSE		5	4	1		4			

CO Number	P01	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	м	M	S	S	S	S	S
CO2	S	S	M	S	L	м	S	м	L	S
CO3	M	S	S	S	M	S	S	S	S	S
CO4	S	M	S	м	L	S	M	S	S	L
CO5	M	S	S	S	S	M	S	м	S	S
Level of Correlation between CO and PO	L-LOW	M- M	EDIUM	S-STRONG						

Tutorial Schedule	Discussion about new apps, group discussions.
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Attendance, Assignments, Class Test, Internal I and II

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	M.Sc. Mathemati	cs Syllabus LOCF-	CBCS w	ith effect	t from 2	021-2022 Onward	ds	
Course Code	Course Title	Course Type	Sem	Hours	L	- 1 T .	Ρ	С
21M2PMAEP1	C++ PROGRAMMING	3	3					
Objective	1. Familiarize the arrays, strings and	different control files.	and de	cision m	aking st	atements, Build p	programs us	sing
S.No.	List of Experimen	ts / Programs					Knowle dge Levels	Sessi ons
1	Write a C++ progra integer	m to find the su	m of ind	tividual o	ligits of	a positive	К1	2
2	Write a C++ progra order.	K1,K2	2					
3	Write a C++ progra		К2					
4	Write a C++ progra of integers.	К2	2					
5	Write a C++ progra using inline function	К2						
6	Write a C++ progra	К2,КЗ	2					
7	Write a C++ progra	КЗ	3					
8	Write a C++ progra	K3,K4	3					
9	Write a C++ progra	K3,K4	3					
10	Write a C++ progra	m for copy conte	ent of o	ne file to	anothe	er file	K4,K5	3
	CO1: Remember al	l the statements	in C++	Program	ming	_	K1	100
6	CO2: Understand t	he problem and	constru	ct the alg	gorithm		K2	1
Outcome	CO3: Apply the alg	orithm that are i	relevan	t to the o	asual		К3	
	CO4: Analyze the s	ource lines that	are ma	tch up wi	ith the	casual	K4	1
	CO5: Evaluate the	flow of execution	n				К5	1
		Learn	ing Res	ources				
Text Books	1. Object-Oriented Hill Pub. 2011.	d Programming v	with C+	+ 5th Ed	ition, E	.Balagrurusamy	, Tata McG	iraw
Reference	1. Robert Lafore - Galgotia Publicatio	"The Waite Gro on Pvt. Ltd. 199	up's Ol 8.	oject Or	iented	Programming In	Turbo C++	-
Books	2. Allan Neibaver -	Office 2000.				l.		
Website Link	1.https://www.cod 2.https://www.sim	ecademy.com/le plilearn.com/fre	earn/le e-cour	arn-c-plu se-to-lea	ıs-plus rn-cpp-	basics-skillup	d'	

M.Sc. Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	T	Р	с	
21M2PMAEP1	C++ PROGRAMMING	DSE PRACTICAL- I	II is	3	Sala A		3 ·	3	

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CO Number	P01	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	S	S	S	S	м	M
CO2	S	M	M	ι	м	S	S	M	M	M
CO3	S	M	M	ι	M	S	M	м	M	M
CO4	M	M	M	S	S	S	M	M	M	M
CO5	M	M	M	M	м	м	M	ι	M	M
Level of Correlation between CO and PO	L-L	.ow	M	M-MEDIUM		S-STRONG				

Tutorial Schedule	To give more sample programs to related topic
Teaching and Learning Methods	Handling practical session through projector
Assessment Methods	Attendance, Observation, Model practical's

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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards												
Course Code	Course Title	Course Type	Sem	Hours	L	т	1	P	с			
21M3PMAE05	FLUID DYNAMICS	DSE IV		6	4	2			4			
Objective	The objective of th behavior under vario knowledge of equati concept of viscous flu	The objective of this course to give fundamental knowledge of fluid, its properties and behavior under various conditions of internal and external flows, to understand the depth knowledge of equation of motion of a fluid and to enable the students to understand the concept of viscous fluid										
Unit		Course Content Knowledge Levels Session										
I	Kinematics of Fluids of a fluid at a point Unsteady flows - The and Particle Rates of Examples.	Kinematics of Fluids in Motion: Real fluids and Ideal fluids - Velocity of a fluid at a point –Stream lines and path lines - Steady and Unsteady flows - The Velocity Potential - The Vorticity Vector - Local and Particle Rates of Change - The Equation of Continuity - Worked K2 15 Examples.										
II	Chapter 2: Sections 2.1 - 2.8 Equations of Motion of a Fluid: Pressure at a point in a fluid at rest - Pressure at a point in a moving fluid - Euler's equations of Motion - Bernoulli's equation -Worked Examples - Discussion of the case of steady motion under Conservative Body Forces - Some flows involving axial symmetry (examples 1 and 2 only).											
111	Some Three-Dimensional Flows: Introduction - Sources, Sinks and Doublets-Images in rigid infinite plane - Images in solid spheres. K3 Chapter 4: Sections 4.1 - 4.4					14	4					
IV	Some Two-Dimension Velocity Potential for Flow - Complex Veloc Flows - Some Worked The Milne-Thomson Cir Chapter 5: Sections 5.3	Some Two-Dimensional Flows: The Stream Function - The Complex Velocity Potential for Two Dimensional Irrotational, Incompressible Flow - Complex Velocity Potentials for Standard Two-Dimensional Flows - Some Worked Examples - Two Dimensional Image Systems - The Milne-Thomson Circle Theorem.										
v	Viscous Fluid: Stress of Cartesian Components element - The Coefficie Stokes equation of a vis flow - Steady motion be Chapter 8: Sections 8.1	components in a real fluid - R of Stress - Translational ent of Viscosity and Laminar fl scous fluid - Some solvable pro etween parallel planes only. - 8.3, 8.8, 8.9 and 8.10.1	Relation I motion ow - The oblems in	oetween of fluid Navier- viscous		K4		14				

	CO1: Acquire knowledge about the concept of flow in fluid.	K1	
	CO2: Understand the measure Fluid pressure, related to flow velocity and various equation of Bernoulli's	К2	
Course Outcome	CO3: Classify the concept of some three dimensional flow, two dimensional in complex fluid.	КЗ	
	CO4: Examine the existence of solution to a problem.	K4	
	CO5: Compare a real-life problem to a practical problems.	К5	
	Learning Resources		
Text Books	1. Frank Chorlton, Textbook of Fluid Dynamics, CBS Publishers & Distributors, 2004.		
Reference Books	1. L.M. Milne-Thomson, Theoretical Hydrodynamics, Macmillan, London, 1955. 2. G.K. Batchelor, An Introduction to Fluid Dynamics Cambridge Mathematical Librar	y, 2000	
Website Link	1.https://youtu.be/luGzHVdE4TE 2. https://youtu.be/0pbSGmjFo68 3. https://youtu.be/uku1apYt-z0 4. https://nptel.ac.in/courses/103/106/103106159/ 5. <u>https://nptel.ac.in/courses/112/105/112105269/</u>		
	L-Lecture T-Tutorial P-Practical C-Credit		

L-Lecture

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CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	s	s	s	s	S	s	S	S	S
CO2	S	S	s	s	s	S	S	S	S	S
CO3	S	S	м	s	s	S	S	S	м	S
CO4	S	м	s	s	s	S	s	S	S	S
C05	S	S	s	s	s	S	м	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STI	RONG					

Tutorial Schedule	Problem solving session ,Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation.
Assesment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By
and By.	R. Makth.	- h. b. sur
Dr. S. REVATHY	R. MALATHI	1



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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type Sem Hours				т	Р	С	
21M4PMAE06	NUMBER THEORY	DSE	IV	6	4	2	-	4	
Objective To know about the basic concepts of number theory. To get a complete grip of various concepts to present modern Mathematics in elementary terms. To develop the skill of solving problems in number theory.									
Unit		Course Content			Knov Le	vledg vels	e Se	essions	
I	Divisibility: Introdu Chapter 1: Sections	iction-Divisibility-Primes. 5 1.1 - 1.3				K1		14	
11	Congruences: Cong Chinese Remainder modulus. Chapter 2: Section	Congruences: Congruences-Solutions of congruences-The Chinese Remainder theorem - Prime power moduli - Prime Modulus. Chapter 2: Section 2.1 - 2.3, 2.6,2.7K2,K314							
111	Primitive Roots an Power Residues-Co -Number Theory fr Rings and Fields. Chapter 2: Section	Primitive Roots and Power Residues: Primitive Roots and Power Residues-Congruences of degree Two, Prime Modulus -Number Theory from an Algebraic view point - Groups,K414Rings and Fields. Chapter 2: Section 2.8 - 2.1114							
IV	Quadratic Recipro residues - Quadrat Quadratic Forms. Chapter 3: Section	Quadratic Reciprocity and Quadratic Forms: Quadratic residues - Quadratic reciprocity -The Jacobi symbol - Binary Quadratic Forms. Chapter 3: Section 3.1 - 3.4K415							
v	Some Functions of Number Theory: Arithmetic functions - The Mobius inversion formula-The Recurrence Functions.K515Chapter 4: Section 4.2- 4.4							15	

	CO1: Have knowledge of congruences of first and higher degree and problems on simple continued fractions	K1	
	CO2: Understand the important properties of congruences, congruences of higher degree, quadratic residue, greatest integer function, arichmetic functions and continued fractions.	K2	
Course Outcome	CO3: Apply Fermat's theorem, Lemma of Gauss, Gaussian reciprocity law, The Moebius inversion formula and Hurwitz theorem for solving problems	К3	
	CO4: Analyse the applications of Binary Quadratic Forms in number theory	К4	
	CO5: Evaluate some important results in the number theory including Chinese reminder theorem, Wilson's theorem and their consequences	К5	
	Learning Resources		
Text Books	1. Ivan Niven and Herbert.S Zucherman, An introduction to theory of Number Wiley Eastern Limited, New Delhi, 1972.	rs -3rd Edit	ion,
Reference Books	 T. M Apostol, Introduction to Analytic Number Theory, Narosa Publication 1980. Kenneth and Rosan, Elementary Number theory and its applications, Addit Publishing Company, 1968. George E Andrews, Number Theory, Hindustan Publishing, New Delhi, 1989. 	House, Che tion Wesley 9.	ennai,
Website Link	 https://www2.math.uconn.edu/~stein/math103/Slides/math103-08.pdf http://homepages.math.uic.edu/~leon/mcs425-s08/handouts/chinese_registers https://crypto.stanford.edu/pbc/notes/numbertheory/quadrecip.html https://math.berkeley.edu/~stankova/MathCircle/Multiplicative.pdf 	emainder.po	jt
	L-Lecture T-Tutorial P-Practical C-Credit		

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CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S S	S	S	S	S	S	S	S	S	м
CO2	S 🦿	S	S	S	S	S	S	S	S	м
CO3	S	S	S	S	S	S	S	S	S	м
CO4	S	S	S	S	S	S	S	S	S	м
CO5	S	S	S	M	S	S	S	S	M	M
Level of Correlation between CO and PO	L-LOW	M-ME	DIUM	S-ST	RONG					

Tutorial Schedule	Problem solving session, Seminar and Group Discussion
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment and Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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Designed By	Verified By	Approved By
Dr.K.LOGAARASI	R. Unlith Mrs.R.MALATHI	A. L. sam



Extra Disciplinary Course (GEC) Subjects for Degree M.Sc., Computer Science, offered by the Department of PG- Mathematics SYLLABUS - CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards											
Course Code	Course Title	T	P	C							
21M2PMAED1	NUMERICAL AND STATISTICAL METHODS	GEC - EDC	I	4	4			4			
Objective	To acquire knowledge about the equations.	To acquire knowledge about the methods of obtaining numerical solutions to various types of equations.									
Unit	Co	urse Content				Kr	iowledge Levels	Sessions			
I	Solution to Numerical, Alge Equations: Bisection Method Approximation - Method of F Method - Rate of Convergence Method. (Problems only). Chapter 3: 3.2- 3.5 & 3.8	Solution to Numerical, Algebraic and Transcendental Equations: Bisection Method - Method of Successive Approximation - Method of False Position - Newton's Iteration Method - Rate of Convergence of Newton - Rapson Method. (Problems only). Chapter 3: 3.2- 3.5 & 3.8K1,K2									
11	Simultaneous Linear Algebraic Equations: Gauss Elimination Method - Gauss Jordon Method - Method of Factorisation or Triangularisation - Jacobi Method of Iteration Chapter 4 :4.2-4.3, 4.5 & 4.9K2										
111	Central Difference Interpolation Formulae: Gauss's Forward interpolation formula - Gauss 's Backward interpolation formula - Stirling's formula - Bessel's Formula. Numerical Differentiation and Integration : Trapezoidal Rule - Simpson's 1/3rd Rule - Simpson's 3/8 Rule. Chapter 7 & 9: 7.2 - 7.5 & 9.8 - 9.10K2,K3							8			
IV	Correlation Coefficient - Rank correlation coefficient of determination - Linear regression - Method of least squares - Fitting of the curve of the form ax+b, ax^2+bx+c, ab^x and ax^b - K3,K4 10 Multiple and partial correlation (3-variable only).										

v	Binominal distribution - Poisson distribution - Normal distribution - Properties and Applications. K4,K5							
	CO1: Recall the Basic concept of Rate of Convergence of Newton's method.	К1						
	CO2: Understand the concept of Factorisation method.	К2						
Course Outcome	CO3: Apply the difference between Simpson's 1/3rd and 3/8 rule.	К3						
	CO4: Analyze the concept of correlation.	K4						
	CO5: Evaluate the Binominal distribution and Poisson distribution.	K5						
	Learning Resources							
Text Books	1.Dr. V. N. Vedamuruthy, Dr. N. Ch. S. N. Iyengar, Numerical Methods, Vi Pvt Ltd. 2008. (For Units I, II and III). 2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, (1994).(For Units IV and V).	kas Publishing Sultan Chand	g House & Sons,					
Reference Books	 S.S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Private Limited, New Delhi, 2003, Third Edition. S.Kalavathy, Numerical Methods, Vijay Nicole, Chennai, 2004. Dr.Kandasamy, Numerical Methods, Sultan Chand, New Delhi. 							
Website Link	1. https://www.youtube.com/watch?v=-5e2cULI3H8 2. https://www.youtube.com/watch?v=jPv5pP1kOco 3. https://www.youtube.com/watch?v=FKZ1cgqhQ							

L- Lecture

T- Tutorial

P - Practical

C- Credit

Extra	Disciplinary Course (GEC)	Subjects for D	egree A	A.Sc., Co	mpute	r Scien	ce,	T. C. La
No. State	offered	by the Depart	ment of	le is n	auter and a			
	PG- Mathemat	ICS SYLLABUS	- CBCS F	attern	wards			
Course Code	Course Title	Course	Sem	Hours	L	т	P	С
		Туре	Acres 6	101223-0016	A CALLER	See 200		10000
21M2PMAED1	STATISTICAL METHODS	GEC - EDC	11	4	4	State 1	-	4

CO Number	PO1	PO2	PO3	PO4	P05	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	s	S	S	S	s	S	M	s	s
C02	S	s	s	S	S	s	м	s	S	s
C03	S	s	M	S	S	s	м	s	S	s
C04	S	s	M	S	s	M	s	s	S	s
C05	s	s	M	S	S	S	s	s	S	s
Level of Correlation between CO and PO	L- LOW	м-ме	EDIUM	S-STRONG						

Tutorial Schedule	
Teaching and Learning Methods	Lecture, Smart class presentation, Chalk and talk method
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

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M.Sc-Mathematics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards											
Course Code	Course Title	Course Type	Sem Hours I		L	Ţ	Р		с		
21M2PMAED2	STATISTICS	GEC - EDC	II	4	4				4		
Objective	Objective The objective of this course to teach the students about the basis of measuring ideas a calculations methods and to gain knowledge about the correlation and regression coefficient and different types of distributions with examples										
Unit		Course Content			Kr	nowled Levels	ige s	Ses	sions		
l	Measures of Central Tendency: Definition -Function of an Average - Characteristic of a Typical Average -Arithmetic Mean -Mathematical characteristics - Discrete Series - Continuous series - Charlier's Accuracy Check - Open end classes - Cumulative series -Merits of Arithmetic Mean - Uses of Arithmetic Mean - Correcting incorrect mean - Combined Arithmetic Mean										
11	Measures of Central Tendency: Median - Discrete Series - Continuous series- Merits and Demerits of Median- Characteristics of Median - Mode - Discrete series - Continuous series - Merits and Demerits of Mode -Uses of Mode -Geometric Mean- Discrete series - Continuous series - Harmonic Mean - Discrete Series - Continuous series.								10		
111	III Dispersion: Concept of Variation - Purpose of Measuring variation - Absolute and Relative Measure of Variation - Methods of Measuring Dispersion - Range - Inter- Quartile Range and Quartile Deviation - Mean deviation or average deviation - Standard deviation. Chapter 10: (Pg. No. 241-278).								10		
IV	Correlation : Defin correlation - Correla correlation - Correla Pearsonian coefficie correlation - Math Correlation - Correla	f f f f	K4-K3	3		10					
v	Chapter 12: (Pg. No. Regression: Definition Regression - Differen Regression Equation Mean of X on Y- Devis Chapter 13: (Pg. No.	* -4	К5			8					

- 3	CO1: Recall the concepts of Discrete serious and continuous series in Arithmetic and Geometric Mean	K1					
1	CO2: Understand Mean, Median and Mode in series of individual observations.	К2					
Outcome	CO3: Apply the concept of Quartile deviation, Mean deviation or average deviation	КЗ					
	CO4: Analyze the properties of expectation, variance correlation and Solve the related problems	K4					
	CO5: Evaluate the problems for Regression method						
	Learning Resources	-					
Text Books	1. R.S.N. Pillai and Bagavathi, Statistics, S.Chand & Company Ltd., New Delhi 2012.						
Reference Books	 Freund. J.E., Mathematical Statistics, Prentice Hallof India. (2001) Goon, A.M., Gupta M. K., Dos Gupta, B. Fundamentals of Statistics, Vol.I, World Press S.C. Gupta and V.K. Kapoor, Fundamental of Mathematical Statistics, Sultan Chand and Delhi, 1994. 	ss, Calcutta. (1991) and Sons, New					
Website Link	1. https://youtu.be/E6jNADpaY2Q 2. https://youtu.be/TWd42yUBZkk 3. https://youtu.be/fNI.eog5iNeru						
	L-Lecture T-Tutorial P-Practical C-Credit						

CONUME			1	1	1					
CO Number	PO1	PO2	PO3	P04	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	s	S	м	S	S	S
CO3	S	M	S	S	S	S	м	S	S	м
CO4	S	S	S	S	S	S	S	S	S	s
C05	S	S	s	м	S	S	S	S	S	s
Level of Correlation between CO and PO	L-LOW	M-MED	MUIM	S-STR	ONG					

Tutorial Schedule	
Teaching and Learning Methods	Lecture, Smart class presentation
Assessment Methods	Assignment, Periodical assessment will be conducted and Followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By
Dr. S. REVATHY	R. M <u>alith</u> . R.MALATHI	A-h.Dur
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М.	Sc-Mathematics Syllabus L	OCF-CBCS v	with eff	ect from	2021	-2022	Onwards	14			
Course Code	Course Title	Course Type	Sem	Hours	L	T	Р	C			
21M2PMAED3	OPERATIONS RESEARCH	GEC-ED	c II	4	4		• ***	4			
Objective	Objective To describe with application of Linear Programming Problem ,Game and Strategies in real life situation and methods of solving related problems.										
Unit	c	ourse Cont	tent				Knowledge Levels	Sessions			
1	Linear Programming P O.R Characteristic fe of O.R - Linear Program Formulation - Graphica and standard forms of computational procedu Chapter 1: Sections 1.1 to 2.3, 2.5, 2.6 & Chapter 3: Sections 3.1	nt of tions ical ns 2.1	К1-КЗ	10							
11	Linear Programming P Techniques - surplus va M' method - Two phase Duality - Formulation of simplex method - Dual algorithm. Chapter 3: Section 3.5 to 4.7	K1,K2	10								
111	Transportation and As Problem-Introduction transportation problem solutions - Moving tow Transportation Problem problem - Balanced an method - Degeneracy Chapter 6: Sections 6. 7.3	to 4.7 Transportation and Assignment Problem: Transportation Problem-Introduction - Mathematical formulation of the transportation problem - Finding initial basic feasible solutions - Moving towards optimality - Degeneracy in a Transportation Problems - Unbalanced T.P. Assignment problem - Balanced and unbalanced A.P Hungarian method - Degeneracy in A.P. Chapter 6: Sections 6.1 to 6.9 & Chapter 7: Sections 7.1 to									

IV	Games and Strategies: Introduction - Two person zero sum games-The Maximin-Minimax Principle - Games without saddle points- mixed strategies-Graphical solution of 2×n and m×2games-Dominance property Chapter 9: Sections 9.1 to 9.7	кз	10			
v	Sequencing Problems: Sequencing problems - Introduction - Basic assumptions - problem with n jobs and 2 machines - problems with n jobs with 3 machines - n jobs to be operated on m machines - problems with two jobs on m machines (graphical method) Chapter 10: Sections 10.1 to 10.5	К5	8			
	CO1: Recall the concept of Linear Programming problem	K1	2			
	CO2: Understand simple reasoning and learning optimization problems	К2				
Course Outcome	CO3: Apply an appropriate method to obtain the solution to a problem	КЗ				
	CO4: Analyze a problem and can select a suitable strategy.	K4				
	CO5: Evaluate analytically the limitations of these methods.	К5				
	Learning Resources	1				
Text Books	1. Kanti Swarup, P.K. Gupta and Man Mohan, Operations research, Reprint 2000 - Sultan Chand & sons, New Delhi.	Eighth editio	n,			
 Reference Books P.K. Gupta and D.S.Hira - Operations Research year of publication 2002, Vikas publishing house, New Delhi, P.K. Gupta and D.S.Hira - Operations Research year of publication 2004 second edition, S.Chand and Co, New Delhi Hamdy Taha - Operations Research year of publication 1996, Prentice Hall publications, New Delhi. 						
Website Link	1.https://youtu.be/7mPHY8NvGFY 2.https://youtu.be/WkaZwm2g-9s 3.https://youtu.be/EuaELBNfHNk					

L-Lecture

T-Tutorial

P-Practical

C-Credit

M.Sc-	Mathematics Syllabus LO	CF-CBCS with	effect from	m 2021-:	2022 Or	nwards		
Course Code	Course Title	Course Type	Sem	Hours	L.	т	P	C
21M2PMAED3	OPERATION RESEARCH	GEC -E D	C	4	4			4

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CO-PO Mapping

CO Number	PO1	PO 2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	S	S	S	S	S	S	S	S	S
CO2	S	s	м	S	s	S	S	S	S	S
C03	м	S	s	S	S	S	S	S	S	S
CO4	S	S	S	м	s	S	м	м	S	м
C05	S	s	S	S	S	S	S	S	S	м
Level of Correlation between CO and PO	L- LOW	ME	M- DIUM	S-STR	ONG					

Tutorial Schedule	Problem solving session and Seminar.
Teaching and Learning Methods	Lecturer, Smart class presentation.
Assessment Methods	Periodical assessment will be conducted and followed the common pattern of Internal and External assessment suggested in the regulations.

Designed By	Verified By	Approved By
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