(Autonomous)

(Re-accredited With B⁺⁺ grade by NAAC in 3rd Cycle)

PG DEPARTMENT OF MATHEMATICS

TANSCHE SYLLABUS FROM THE ACADEMIC YEAR 2023-2024 ONWARDS

Choice Based Credit System(CBCS)

BACHELOR OF SCIENCE

SYLLABUS



PG DEPARTMENT OF MATHEMATICS B.SC. MATHEMATICS SYLLABUS (2023-2024 onwards)

(Affiliated to Mother Teresa Women's University, Kodaikanal) Nationally Reaccredited with B⁺⁺ Grade by NAAC in 3rd Cycle Chinnakalayamputhur, Palani - 624 615.



PREAMBLE

The Department of Mathematics was established in 1971. Our Department pursues a mission of excellent service with the vision of imparting quality teaching, developing sound mind and sound body inculcating social responsibilities and helping in the blossoming of human values for moral excellence.

COLLEGE VISION

• Enlightenment and Empowerment of Rural Women.

COLLEGE MISSION

- Providing high quality teaching learning environment with practical exposure
- Imbibing research culture and collaborate programs with local communities
- Imparting strong and supportive education to promote employability
- Encouraging questioning spirit and self reliance

PG DEPARTMENT OF MATHEMATICS

VISION

- To continue innovative practices for academic excellence.
- To make rural women students best academicians.
- Imparting education towards the upliftment of the individual of the society.
- Providing employable opportunities.
- Motivating the students in pursuing rich values & richer traditions.

MISSION

- Moulding the overall personality of the students.
- Paying greater attention to the low achievers drawn from rural area.
- Including first generation learners and from the lower socio economic strata.
- Providing job oriented papers.
- Conducting coaching classes for employment opportunities encouragement.
- To faculty and students to update their knowledge in the latest science and technology.

PG DEPARTMENT OF MATHEMATICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The B.Sc. Mathematics program describe accomplishments that graduates are expected to attain within five to seven years after graduation

DEO1	Acquire knowledge in functional areas of Mathematics and apply in all
PEUI	the fields of learning.
DEO2	Recognize the need for lifelong learning and demonstrate the ability to
FEO2	explore some mathematical content independently.
DEO2	The graduates will become successful professionals through logical and
I LOJ	analytical thinking abilities.
	Employ mathematical ideas encompassing logical reasoning,
PEO4	analytical, numerical ability, theoretical skills to model real-world
	problems and solve them.
DEO5	Analyze, interpret solutions and to enhance their Entrepreneurial
reus	skills, Managerial skill and leadership

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	Graduates will acquire a comprehensive knowledge and sound
	understanding of fundamentals of Mathematics.
PSO2	Graduates will develop numerical, analytical and mathematical skills.
PSO3	Graduates will be prepared to acquire a range of general skills, to solve problems, to evaluate information using computers productively to develop software programming and analog to communicate with the society effectively and learn independently.
PSO4	Graduates will acquire a job efficiently in diverse fields such as Science and Engineering, Education, Banking, Public Services, Business etc.,
PSO5	Graduates will identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.

PG DEPARTMENT OF MATHEMATICS

B.Sc., Mathematics

PROGRAM OUTCOME

PO 1	To develop important analytical skills and problem solving strategies to assess a broad range of issues in real life.
PO 2	To expose a wide range of modern mathematical ideas from pure and applied mathematics to graduate with both technical and quantitative skills that are in demand in the modern world.
PO 3	To formulate and develop mathematical arguments in a logical manner.
PO 4	To acquire a core of mathematical knowledge and understanding in advanced areas of mathematics from the given courses that provides a solid foundation for future learning
PO 5	To meet the global challenges and accomplish various rewarding positions in the society

PG DEPARTMENT OF MATHEMATICS B.Sc. MATHEMATICS TANSCHE SYLLABUS FROM THE ACADEMIC YEAR 2023-2024 ONWARDS

Γ

SEMESTER-I												
Part	Course Category	Title of the Course	Course	Hr We	s/ ek	No.of Credit	Max.Mark					
			Code	L	P	S	Int.	Ext.	Total			
Ι	LANGUAGEC OURSE-I	TAMIL–I		6	-	3	25	75	100			
II	LANGUAGE COURSE-II	ENGLISH-I		6	-	3	25	75	100			
III	CORE COURSE-I	CLASSICAL ALGEBRA AND TRIGONOMETRY		5	-	5	25	75	100			
III	CORE COURSE-II	DIFFERENTIAL CALCULUS		4	-	4	25	75	100			
	CENEDIC	Allied PHYSICS – I		3	-	2	25	75	100			
III	ELECTIVE-I	Allied PHYSICS – I Practical		-	2	2	25	75	100			
III	SEC-I	SEC-I-Non-Major Elective : APTITUDE FORCOMPETITIVE EXAMINATION-I		2	-	2	25	75	100			
IV	FOUNDATION COURSE	VEDIC MATHEMATICS		2	-	2	25	75	100			
		Total		28	2	23	200	600	800			

	SEMESTER-II								
Part	Course Category	Title of the Course	Course Code	Hrs Wee	/ ek	No.of Credits	N	lark	
			_		r	2	Int.	Ext.	Total
1	COURSE-I	TAMIL-II		6	-	3	25	75	100
II	LANGUAGE COURSE-II	ENGLISH-II		6	-	3	25	75	100
III	CORE COURSE-III	ANALYTICAL GEOMETRY 2D&3D		5	-	5	25	75	100
III	CORE COURSE-IV	INTEGRAL CALCULUS		4	-	4	25	75	100
III	GENERIC	Allied Physics – II		3	-	2	25	75	100
	ELECTIVE-II	Allied Physics -II Practical		-	2	2	25	75	100
IV	SEC-II	SEC-II- Non-Major Elective:APTITUDE FOR COMPETITIVE EXAMINATIONS-II		2	-	2	25	75	100
IV	SEC-III	SEC-III – MATHEMATICS FOR COMPETITIVE EXAMINATIONS-I		2	-	2	25	75	100
		Total		28	2	23	200	600	800

SEMESTER-III									
Part	Course Category	Title of the Course	Course Code	Hr We k L	s/ ee P	No.of Credits	Max.Mark		[ark Total
Ι	LANGUAGE COURSE-I	TAMIL–III		6	-	3	25	75	100
II	LANGUAGE COURSE-II	ENGLISH-III		6	-	3	25	75	100
III	CORE COURSE-V	VECTOR ANALYSIS		5	-	5	25	75	100
III	CORE COURSE-VI	DIFFERENTIAL EQUATIONS		5	-	5	25	75	100
III	GENERIC ELECTIVE-III	GEC-III- MATHEMATICAL STATISTICS-I		4	-	3	25	75	100
IV	SEC-IV	SEC-IV-MATHEMATICS FOR COMPETITIVE EXAMINATIONS - II		2	-	2	25	75	100
IV	SEC-V	SEC-V-BUSINESS OPTMIZATION TECHNIQUES		1	-	1	25	75	100
IV	ENHANCEMEN T COMPULSORY COURSE–I	ENVIRONMENTAL STUDIES		1	-	-	-	-	-

		SEMESTER-I	V						
Part	Course Category	Title of the Course	Course Code	Hrs Wee	/ ek	No.of Credits	Μ	[ax.M	ark
				L	Р		Int.	Ex	Total
I	LANGUAGE COURSE-I	TAMIL–IV		6	_	3	25	75	100
II	LANGUAGE COURSE-II	ENGLISH-IV	6	-	3	25	75	100	
III	CORE COURSE-VII	TRANSFORM TECHNIQUES		6	-	5	25	75	100
III	CORE COURSE-VIII	ELEMENTS OF MATHEMATICAL ANALYSIS		5	-	5	25	75	100
III	GENERIC ELECTIVE-IV	GEC-IV-MATHEMATICAL STATISTICS-II		4	-	3	25	75	100
IV	SEC-VI	SEC-VI –MATHEMATICS FOR COMPETITIVE EXAMINATIONS-III		2	-	2	25	75	100
IV	SEC-VII	SEC-VII –MATHEMATICS FOR COMPETITIVE EXAMINATIONS-IV		2	-	2	25	75	100
IV	ENHANCEMENT COMPULSORY COURSE–I	ENVIRONMENTAL STUDIES		1	-	2	25	75	100
		Total		30	-	25	200	600	800

	SEMESTER-V								
Part	Course Category	Title of the Course	Course	Hr We	s/ eek	No.of Credits	N	lax.M	ark
			Code	L	Р		Int.	Ext.	Total
III	CORE	ABSTRACT		5	-	4	25	75	100
	COURSE-IX	ALGEBRA							
III	CORE	REAL ANALYSIS		5	-	4	25	75	100
	COURSE-X								
III	CORE	MATHEMATICAL		5	-	4	25	75	100
	COURSE-XI	MODELING							
	CORE	PROJECT		5	-	4	25	75	100
	COURSE-XII								
	DISCIPLINE	OPTIMIZATION TECHNIQUES					25	75	
III	ELECTIVE-V			4	-	3			100
		ASTRONOMY							
	DISCIPLINE	NUMERICAL							
111	ELECTIVE-VI	METHODS		4		2	25	75	100
		DIFFERENCE EQUATIONS		4	-	3	25	/5	100
		WITH APPLICATIONS							
	ENHANCEMENT								
IV	COMPULSORY	VALUE EDUCATION		2	-	2	25	75	100
	COURSE-II								
IV	INTERNSHIP	INTERNSHIP		-	-	2	100	-	100
			Total	30	-	26	275	525	800

		SEMESTER	R-VI						
Part	Course Category	Title of the Course	Course	H W	rs/ 'eek	No.of Credits		Max.	Mark
			Code	L	Р		Int	Ex t.	Tota 1
III	CORE COURSE-XIII	LINEAR ALGEBRA		6	-	4	25	75	100
III	CORE COURSE-XIV	COMPLEX ANALYSIS		6	-	4	25	75	100
III	CORE COURSE-XV	MECHANICS		6	-	4	25	75	100
III	DISCIPLINE ELECTIVE-VII	PROGRAMMING LANGUAGE WITH C++ WITH PRACTICAL COMBINOTORIAL MATHEMATICS		3	2	3	25	7 5	100
ш	DISCIPLINE ELECTIVE-VIII	GRAPH THEORY FUZZY SETS AND APPLICATIONS		5	-	3	25	7 5	100
IV	SEC-VII	SEC-VII-PROGRAMMING IN C		2	-	2	25	75	100
V	EXTENSION ACTIVITIES	EXTENSION ACTIVITIES				1	100	-	100
			Total	28	2	21	250	450	700

Credit Distribution for B.Sc Mathematics

Sem I	Cr edi t	Н	Sem II	Cr edi t	Н	Sem III	Cr edi t	Н	Sem IV	Cr edi t	Н	Sem V	Cr edi t	Ħ	S
Part 1. Language – Tamil	3	6	Part1. Language – Tamil	3	6	Part1. Language – Tamil	3	6	Part1. Language – Tamil	3	6	5.1 Core Course –\CC IX – Abstract Algebra	4	C.	6. C C L A
Part.2 English	3	6	Part2 English	3	6	Part2 English	3	6	Part2 English	3	6	5.2 Core Course – CC X- Real Analysis	4		6. C C C A
13 Core Course – GC I Classical Algebra and Trigonometry	5	5	23 Core Course – C C III – Analytical Geometry 2D&3D	5	5	3.3 Core Course – CC V – Vector Analysis	5	5	4.3 Core Course – CC VII Core Industry Module - Transform Techniques	5	6	5. 3.Core Course CC -XI- Mathematical Modeling	4	5	6. C C N
14 Core Course – CC II-Differential Calculus	4	4	2.4 Core Course – CC IV- Integral Calculus	4	4	3.4 Core Course – CC VI- Differential Equations	5	5	4.4 Core Course –CC VIII-Elements Of Mathematical Analysis	5	5	5. 4.Core Course –/ CC - XII- Project with viva- voce	4	Bernard and an entering on the second sec	6.4 Gei Dis Spe Pro Lar C+ Pra Co
1.5 Elective I Generic/ Discipline Specific - Allied Physics–I Allied Physics-I Practical	2	3	2.5 Elective II Generic/ Discipline Specific - Allied Physics–II Allied Physics–II Practical	2	3	3.5 Elective III Generic/ Discipline Specific - Mathematical Statistics-I	3	4	4.5 Elective IV Generic/ Discipline Specific - Mathematical Statistics-II	3	4	5.5 Elective V Generic/ Discipline Specific - Optimization Techniques/ Astronomy	3		6. V Ger Dis Spe Th Ser Ap
1.6 Skill Enhancement Course SEC-1- Aptitude for Competitive Examination-I	2	2	2.6 Skill Enhancement Course SEC-2 – Aptitude for Competitive Examinations-II	2	2	3.6 Skill Enhancement Course SEC-4, (Entrepreneurial Skill)- Mathematics For Competitive Examinations - II	2	2	4.6 Skill Enhancement Course SEC-6- Mathematics For Competitive Examinations- III	2	2	5.6 Elective VI Generic/ Discipline Specific - Numerical Methods/ Difference Equations With Applications	3		6. A
1.7 Skill Enhancement - (Foundation Course) Vedic Mathematics	2	2	2.7 Skill Enhancement Course –SEC-3- Mathematics for Competitive Examinations-I	2	2	3.7 Skill Enhancement Course SEC-5- Business Optmization Techniques	2	2	4.7 Skill Enhancement Course SEC-7- Mathematics For Competitive Examinations -IV	2	2	5.7 Value Education	2		6.7 Cor Ski Pro Iı
	22	20		22	20	3.8 E.V.S.	-	1	4.8 E.V.S	2	1	5.8 Summer Internship /Industrial Training	2	Station in the internet	
	23	30	I	23	- 30		22	- 30	1	23	30		20	U JU	

Total – 140 Credits

Bloom's Taxonomy in fixing the Learning Objectives:

K1 / Knowledge = Remember K2 / Comprehension = Understand

K3 / Application = Apply

- K4 / Analysis = Analyze
- K5 / Evaluation = Evaluate
- K6 / Synthesis = Create

Bloom's Taxonomy Action Verbs:

K1 / Knowledge: Arrange, Define, Describe, Duplicate, Identify, Label, List, Match, Memorize, Name, Order, Outline, Recognize, Relate, Recall, Repeat, Reproduce, Select, State

K2 / Comprehension: Classify, Convert, Defend, Describe, Discuss, Distinguish, Estimate, Explain, Express, Extend, Generalize, Give example(s), Identify, Indicate, Infer, Locate, Paraphrase, Predict, Recognize, Rewrite, Review, Select,

Summarize, Translate

K3 / Application: Apply, Change, Choose, Compute, Demonstrate, Discover, Dramatize, Employ, Illustrate, Interpret, Manipulate, Modify, Operate, Practice, Predict, Prepare, Produce, Relate, Schedule, Show, Sketch, Solve, Use, Write

K4 / Analysis: Analyze, Appraise, Breakdown, Calculate, Categorize, Compare, Contrast, Criticize, Diagram, Differentiate, Discriminate, Distinguish, Examine, Experiment, Identify, Illustrate, Infer, Model, Outline, Point out, Question, Relate, Select, Separate, Subdivide, Test

K5 / Evaluation: Appraise, Argue, Assess, Attach, Choose, Compare, Conclude, Contrast, Defend, Describe, Discriminate, Estimate, Evaluate, Explain, Judge, justify, Interpret, Relate, Predict, Rate, Select, Summarize, Support, Value

K6 / Synthesis: Arrange, Assemble, Categorize, Collect, Combine, Comply, Compose, Construct, Create, Design, Develop, Devise, Explain, Formulate, Generate, Plan, Prepare, Rearrange, Reconstruct, Relate, Reorganize, Revise, Rewrite, Set up, Summarize, Synthesize, Tell, Write

PG Department of Mathematics -Outcome Based Education Syllabus 2022-2025

Bloom's Taxonomy Based Assessment Pattern

K1-Remember; K2- Understanding; K3- Apply; K4-Analyze; K5 – Evaluate; K6 -Create

Knowledge	Section	Marks	Total
Level			
K1	A (Answer all) Q.No. 1 to 6	6x1	6
K2 and K3	B (Either or Pattern) Q.No. 7 and 8	2x4	8
K4	C (Either or Pattern) Q. No. 9 and	2x8	16
	10		
		Total	30

Internal Question pattern Part III

Components of Continuous Assessment (Part III)

C	omponents	Calculation	CIA Total
CA1	30 Marks	$\frac{30+30}{2}=15$	
CA2	30 Marks	4	25 Martra
Assignment	5 Marks	5	23 Warks
Seminar	5 Marks	5	

Internal Question pattern Part IV

	<u> </u>			
Knowledge	Section		Marks	Total
Level				
K1	A (Answer all)	Q.No. 1 to 3	3x1	3
K2 and K3	B (Either or Pattern) Q.No. 4 and 5	2x3	6
K4	C (Either or Pattern)	Q. No. 6	1x6	6
			Total	15

Components of Continuous Assessment (Part IV)

Со	omponents	Calculation	CIA Total
CA1	15 Marks	$\frac{15+15}{2} = 15$	
CA2	15 Marks		25 Marks
Assignment	5 Marks	5	
Seminar	5 Marks	5	

External Question Paper pattern Part III (Theory) (Except Elective VII)

Ma	ax. Ma	rks: 75	Time: 3	Hrs.
S.No.	Part		Туре	Marks
1	А	10x1=10	Two questions from each Unit	10
2	В	5x7=35	Two questions from each Unit with Internal Choice (either / or)	35
3	С	3x10=30	Open Choice: Any three questions out of 5 : one question from each unit	30
			Total Marks	75

External Question pattern Part III (Theory Elective VII Programming Language with C++ with Practical)

Ma	x. Mar	ks: 50	Time: 3 Hr	·S.
S.No.	Part		Туре	Marks
1	А	5x1=5	One question from each Unit	5
2	В	5x3=15	Two questions from each Unit with Internal Choice (either / or)	15
3	С	3x10=30	Open Choice: Any three questions out of 5 : one question from each unit	30
		•	Total Marks	50

External Question	n pattern Part III (Practical)
Record	10 Marks
Programme and Output	10 Marks
Viva	5 Marks
TOTAL	25 Marks

External Question pattern Part IV (Theory)

Section	Pattern	Marks	Total
А	1-8 (any five out of eight)	5x3	15
В	9-16 (any five out of eight)	5x6	30
С	17-21 (any three out of five)	3x10	30
		TOTAL	75

SEMESTER-I

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024	onwards	Semester	I
		GODE	
Course Code		CORE-I	CLASSICAL ALGEBRA AND TRIGONOMETRY
Hours/week	5	Credits:	5

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of algebra and trigonometry. The main objective is to impart the knowledge on fundamental topics such as

- Formation of equations & Relation between roots and coefficients
- To increase or decrease the roots of a given equation by a given quantity Descarte's rule of signs
- Biquadratic Equations
- Expansions of sinn θ , cosn θ , tann θ , sin θ , cos θ and tan θ interms of θ
- Hyperbolic and inverse hyperbolic functions

In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

On the successful completion of the course , students will be able to

CO.	Statement	Knowledge
Number		level
	Define the formation of equation, Descarte's rule of signs,	
CO1	Transformation of Equations, $sinn\theta$, $cosn\theta$, $tann\theta$,	K1
	Hyperbolic Functions.	
	Classify Relation between roots and coefficients of	
CO2	equations, Removal of terms, Multiple Roots, sinn θ ,	K2
	Inverse hyperbolic functions.	
	Apply the Theory of equations and Hyperbolic	
CO3	Functions Descarte's rule of signs, cardon's Method,	K3
	Logarithm of a complex number.	
CO4	Analyze the idea about, theory of equation,	K4
	trigonometry.	
	Show the Relation between roots and coefficients,	
CO5	Descarte's rule of signs, Biquadratic Equations, sinnθ,	K4
	cosnθ, tannθ, inverse hyperbolic functions.	
L		1

(15 Hours)

UNIT I:

Formation of Equation - Relation between roots and coefficients of equations - Sum of the Powers of the Roots - Newton's Theorem -Reciprocal equations – problems.

UNIT II:

To increase or decrease the roots of a given equation by a given quantity. Removal of terms - Descarte's rule of signs-problems.

UNIT III:

Transformation of Equations – Multiple Roots, Nature and Position of Roots - Cubic Equations Solutions by cardon's Method - Biquadratic Equations – Solution by Ferrari's Method, Horner's method.

UNIT IV:

Expansions of sinn θ , cosn θ , tann θ , sin θ , cos θ and tan θ interms of θ – Expansions of sinn θ , cosn θ and tann θ .

UNIT V:

(15 Hours)

Hyperbolic and inverse hyperbolic functions and their properties-Logarithm of a complex number – problems.

Teaching Methods:

Chalk and Talk / PowerPoint presentation / Seminar / Quiz / Discussion / Assignments.

TEXT BOOK:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Theory of	Arumugam.S	New Gamma Publishing	2001
	Equations and	&	House, Palayamgakottai-	
	Trigonometry	Thangapandi	627002	
		Issac.A		

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	Algebra-Volume I	T.K.Manicka vachagom Pillai and S.Narayanan.	Vijay Nicole Imprints Pvt, Ltd, #c7 , Nelson Manickam Road ,Chennai- 600029	2004
2.	Trigonometry	T.K.Manicka vachagom Pillai and S.Narayanan	Vijay Nicole Imprints Pvt, Ltd,#c7, Nelson Manickam Road, Chennai-600029	2004

(15 Hours)

(15 Hours)

(15 Hours)

Mapping with programme specific outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	Μ	Μ	S	М
CO2	Μ	S	S	Μ	S
CO3	S	Μ	S	Μ	S
CO4	S	S	Μ	S	М
CO5	М	S	S	М	S

S-Strong ; M-Medium.

SEMESTER-I

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 or	nwards	Semester	Ι
Course Code		CORE-II	DIFFERENTIAL CALCULUS
Hours/week	4	Credits:	4

OBJECTIVES:

This course focuses on basic technical concepts and to develop an idea of Differential calculus. The main objective is to impart the knowledge on fundamental topics such as

- nth derivatives.
- Trigonometric transformations.
- Radius of curvature in Cartesian and polar forms.
- Centre of curvature
- Evolute
- Envelope
- Maxima and Minima of function of two variables
- Jacobians.
- In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO. Number	Statement	Knowledge level
CO1	Explain the logic behind the differentiation	K1
CO2	Solve the Differentiation of implicit function and related problems.	К2
CO3	Analyze the concepts nth derivatives and Leibnitz theorem	К3
CO4	Simplify the Tangent and normal Polar curves -p-r equations-Curvature.	K4
CO5	Distinguish of Evolute–Envelope–Maxima and Minima of function.	K4

(12 Hours)

(12 Hours)

Differentiation: Differentiability– Algebra of derivatives –Derivative of standard functions- the chain rule-Differentiation of inverse functions

UNIT II:

Differentiation(Continued): Differentiation by transformation-Logarithmic differentiation – Parametric differentiation Differentiation of function w. r. t. function-Differentiation of implicit function.

UNIT III:

Higher Differentiation: Higher derivatives- nth derivatives and Leibnitz theorem-Partial differentiation- Eulers theorem.

UNIT IV:

Applications of differentiation: Tangent and normal – Polar curves - p-r equations-Curvature.

UNIT V:

Applications of differentiation (Continued): Evolute– Envelope – Maxima and Minima of function of two variables–Jacobians.

TEACHING METHODS:

Chalk and Talk/ Power Point presentation/ Seminar/ Quiz/ Discussion/ Assignments

TEXT BOOK:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	Calculus	Arumugam .S & Thangapandi Issac .A	New Gamma Publishing House, Palayamkottai-627002	2001

UNIT I:

- 1)-r

(12 Hours)

(12 Hours)

p-r

REFERENCE BOOK:

S.No	Title of the Book	Author	Publisher	Year
				of Publication
4	Calculus	H.Anton,	John Wiley and	2002.
1		I.Birens and	Sons, Inc.,	
		S.Davis	Newyork.	
2	Calculus	T.Apostol	John Wiley and	1991
2	Volume I		Sons, Inc.,	
	and II.		New york	

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S - Strong; M- Medium; L- Low

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 on	wards	Semester	Ι
Course Code		SEC-I- Non-Major	APTITUDE FOR COMPETITIVE
		Elective	EXAMINATION-I
Hours/week	2	Credits:	2

OBJECTIVES:

The objective of this syllabus is to make the students to clear competitive examination like Banking recruitment, Postal recruitment, Railway recruitment and TNPSC exams.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to

K1	CO1	remember the meaning of HCF and LCM of numbers.
K2	CO2	understand the basic concepts of Quantitative ability
K2	CO3	understand the basic concepts of logical reasoning
К3	CO4	apply the concepts of percentage in profit & loss in real life problems
K4	CO5	analyze the concepts of problems on ages

Unit I:

H.C.F and L.C.M of numbers : Problems on H.C.F and L.C.M of numbers. Decimal Fractions: Decimal Fractions –Conversion of a Decimal into Verbal Fraction-Operations on Decimal Fractions –Comparison of Fractions -Recurring Decimal [6 Hours] Unit II:

Simplification: Introduction - BODMAS rule - Modulus of a real number - Simple problems. Square Roots and Cube Roots : Square Roots - Cube Roots - Simple problems [6 Hours]

Unit III:

Average : Simple Problems. Problems on numbers: Simple problems on numbers

[6 Hours]

Unit IV:

Problems on ages: Problems on ages - Simple problems. [6 Hours]

Unit V:

Percentage : Simple Problems. Profit and loss: Introduction - Cost price - Selling price - Profit and loss - Simple Problems. [6 Hours]

Prescribed Text Book:

S.No	Title of the Book	Author	Publisher	Year of
				Publication
1.	Quantitative Aptitude	R.S.	Seventh Edition.	2017
		Aggarwal	S.Chand &	
			Company LTD	

Unit 1 Chapter 2 & Chapter 3

- Unit 2 Chapter 4 & Chapter 5
- Unit 3 Chapter 6 & Chapter 7
- Unit 4 Chapter 8
- Unit 5 Chapter 11& Chapter 12

Reference Books:

S.No	Title of the Book	Author	Publisher	Year of
				Publication
1.	Test of Reasoning for competitive examinations	Edgar Thorpe	Third Edition Tata McGraw-Hill Publishing Company Limited	

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	Μ	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	Μ	S	S	S

S - Strong; H- High; M- Medium; L- Low

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 onwards		Semester	II
Course Code		FOUNDATION COURSE	VEDIC MATHEMATICS
Hours/week	2	Credits:	2

OBJECTIVES:

- This course focuses on basic theoretical concepts and to develop an idea of Vedic Mathematics. The main objective is to impart the knowledge on fundamental topics such as
 - Miscellaneous simple method
 - Criss-cross system of multiplication
 - Base of squaring
 - General Equations
 - In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO.	Statement	Knowledge level
Number		
CO1	Remembering various techniques in Vedic	K1
	Mathematics	
	Understanding the steps involved in each	
CO2	technique	K2
CO3	Solving general equations	K3
	Analyzing the different methods available for	
CO4	effective calculation	K4
CO5	Exploring the Vedic sutras in arithmetic.	K4

UNIT I Basic Level; Miscellaneous simple method.	[6 Hours]
UNIT II Criss- cross system of multiplication- squaring numbers.	[6 Hours]
UNIT III Base method of multiplication– Base of squaring.	[6 Hours]
UNIT IV *Magic squares–Dates and calendars.	[6 Hours]
UNIT V General Equations–Tips for competitive exams.	[6 Hours]

*denotes self study–Questions may be asked from these portions also

TEACHING METHODS:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments

TEXT BOOK:

S.No	Title of the Book	Author	Publisher	Year of Publication
1.	Vedic Mathematics Made easy	Dhaval Bathia	Jaico Publications 8th Edition- Mumbai-400001	2017

Unit 1 (Chapter1- Pgno.13 - 33)

Unit 2 (Chapter 2- Pg no.35 -43 & Chapter 3- Pg no. 50-56)

Unit 3 (Chapter 6-Pg no.81-103 & Chapter 7-Pg no.104-109)

Unit 4 (Chapter 9-Pg no .120-131& Chapter 10-Pg no .132-144)

Unit 5 (Chapter11-Pg no.145-147) & Special Section- Pg no.205-212.

REFERENCE BOOK:

	S.	Title of the	Author	Publisher	Year of
	No	Book			Publication
1		Vedic	V.S.	Motilal Banarsi dass	2014
		Mathematics	Agrawal	Publisher.	
				1st Edition	
2		Vedic Mathematics	Pandit	Arihant	2011
		Made Easy	Ramnandan	Publications, Meerut	

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	M	M	S	M
CO2	S	S	S	M	S
CO3	М	M	S	М	S
CO4	S	S	S	М	S
CO5	S	М	M	S	М

S- Strong;M-Medium.

SEMESTER-II

Programme	B.Sc	Programme	Mathematics
Code		Title	
2023–2024 of	nwards	Semester	Π
Course Code		CORE-III	
			ANALYTICAL GEOMETRY
			2D&3D
Hours/week	5	Credits:	5

OBJECTIVES

This course focuses on basic analytical concepts and to develop an idea of analytical geometry. The main objective is to impart the knowledge on fundamental topics such as

- Analytical geometry of 2D,Straight line
- Polar coordinates,Polar Equation of a conic
- Analytical Geometry 3D
- Straight lines,Coplanarity of straight line
- Sphere, Tangent plane
- Cone and cylinder, Equation of Cone

In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO. Number	Statement	Knowledge level
	Find the logic behind the straight lines, Polar	
CO1	coordinates, Analytical Geometry 3D, Sphere, Cone	K1
	and cylinder.	
	Give Example of Straight line, polar coordinates,	
CO2	Coplanarity of straight line, Tangent plane, Equation	K2
	of Cone.	
	Analyze the concept of straight lines in	
CO3	2D&3D,coplanarity and shortest distance between	K3
	two lines.	
	Calculate the Simple problems, Polar Equation of a	
CO4	conic, Equation of S.D between two lines, Tangency	K4
	of Spheres, Quadric Cone with the	
	Vertex at the origin.	
COS	Analyze the cone and cylinder concepts to the	K/
0.05	2D&3D problems.	114

UNIT I:

(15 Hours)

Analytical geometry of 2D-Straight line–Simple problems

UNIT II:

(15 Hours)

(15 Hours)

Analytical geometry of 2D - Polar coordinates– Equation of Straight Line - Polar Equation of a conic.

UNIT III:

Analytical Geometry 3D – Straight lines - Co planarity of straight lineshortest distance(S.D) and Equation of S.D between two lines – simple problems.

UNIT IV:

(15 Hours)

(15 Hours)

Sphere :Tangent plane,Circle of intersections–Tangency of Spheres –Coaxial system of Sphere-Radical planes - Orthogonal Spheres.

UNIT V:

Cone and cylinder : Equation of Cone-Cone whose vertex is at the origin – Quadric Cone with the vertex at the origin-Right circular cone –Equation of a cylinder-Right circular cylinder.

TEACHING METHODS:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments

TEXT BOOKS:

S. No	Title of the Book	Author	Publisher	Yearof Publication
1.	Analytical	Т. К.		
	Geometry of 2D	Manickavachagom	Viswanathan	2005
	(Unit I&II)	Pillay	Publications.	
2.	Analytical Geometry		Emerald	
	(Unit III,IV&V)	P.DuraiPandian	Publications	2003

REFERENCE BOOK:

S.No	Title of the Book	Author	Publisher	Year of Publication
1.	A Text book Of Analytical Geometry Of Three Dimensions	P.K.Jain	New Age International	2005

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	Μ	Μ	S	Μ
CO2	S	S	S	М	S
CO3	Μ	Μ	S	М	S
CO4	S	S	S	М	S
CO5	S	Μ	Μ	S	Μ

S-Strong; M-Medium.

SEMESTER-II

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 onwards		Semester	Π
Course Code		CORE-IV	INTEGRAL CALCULUS
Hours/week	4	Credits:	4

OBJECTIVES

This course focuses on basic technical concepts and to develop an idea of Integral calculus. The main objective is to impart the knowledge on fundamental topics such as

- Integration by parts Definite integral
- Bernoulli formula
- Multiple Integral
- Application of Beta and Gamma Functions

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO. Number	Statement	Knowledge level
CO1	Explain the logic behind the concept of Integration	K1
CO2	Solve the Definite Integral and Integration by Parts Problems.	K2
CO3	Analyze the Reduction formula	K4
CO4	Simplify the multiple integrals and its problems.	K4
CO5	Distinguish of Beta and Gamma Functions in evaluation of Double and Triple Integrals.	К3

(12 Hours)

(12 Hours)

(12 Hours)

Simple Integrals–Method of substitution-Integration of Rational function and Irrational functions-Simple Problems.

UNIT-II:

Integration of Trigonometric functions–Evaluation of Definite Integral –Integration by Parts- Simple Problems.

UNIT-III:

Reduction formula – Bernoulli's formula-Integration as the Limit of sum-Simple Problems.

UNIT-IV:

Double integrals –Evaluation of double Integrals –Triple Integrals-Change of Variables-Simple Problems.

UNIT-V:

Beta and Gamma functions –The Properties of Beta and Gamma functions - relation between Beta and Gamma function - Applications - Simple Problems.

Teaching Methods:

Chalk and Talk / Power Point presentation/ Seminar/ Quiz/ Discussion/ Assignments

TEXTBOOK:

S.No	Title of the	Author	Publisher	Year of
	Book			Publication
1.	Calculus	Arumugam.S	New Gamma	2001
		&	Publishing House,	
		Thangapandi	Palayamgakottai-	
		Issac.A	627002	

(12 Hours)

(12 Hours)

UNIT-I:

REFERENCE BOOK:

S. No	Title of the Book	Author	Publisher	Year of Publication
	Integral Calculus	D.	Tata-Mc Graw	1999
1	and	Chatterjee	Hill	
	Differential		Publishing	
	Equations		Company	
			Ltd.	
	Calculus,	T.Apostol	JohnWiley	1991
2	Volumes I and		and Sons,	
	П		Inc.,	
	11.		Newyork	

Mapping with Programme Specific Outcomes:

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	М	М	S	М
CO2	Μ	М	S	S	Μ
CO3	S	М	S	М	S
CO4	Μ	S	S	М	М
CO5	Μ	S	Μ	S	S

S-Strong; M-Medium.

Programme Code	B. Sc	Programme Title	Mathematics
Batch	2023- 2024 onwards	Semester	П
Course Code		SEC-II	Non-Major Elective: APTITUDE FOR COMPETITIVE EXAMINATIONS-II
Hours/week	2	Credits:	2

OBJECTIVES

The objective of this syllabus is to make the students to clear competitive examination like Banking recruitment, Postal recruitment, Railway recruitment and TNPSC exams.

K1	CO1	remember the meaning of partnership
K2	CO2	understand the basic concepts of Quantitative ability
K2	CO3	understand the basic concepts of logical reasoning
K3	CO4	Apply the concepts of time and work on real life problems
K4	CO5	analyze the concepts of boats and streams

UNIT I:

Partnership: Partnership-Ratio of Division of Gains-Working and Sleeping Partners [6 Hours]

UNIT II:

Chain Rule: Direct Proportion- indirect Proportion	[6 Hours]
UNIT III: Time and Work : Time and Work - Simple problems	[6 Hours]
UNIT IV: Time and Distance: Time and Distance- Simple problems	[6 Hours]
UNIT V: Boats and Streams: Speed downstream- Speed up stream	[6 Hours]

TEXT BOOK:

S.No	Title of the Book	Author	Publisher	Year of Publication
1.	Quantitative Aptitude	R.S. Aggarwal	Seventh Edition. S.Chand & Company LTD	

- Unit 1 Chapter 14
- Unit 2 Chapter 15
- Unit 3 Chapter 17
- Unit 4 Chapter 18
- Unit 5 Chapter 19

Reference Books:

S.	Title of the Book	Author	Publisher	Year of
No				Publication
_	Test of	Edgar Thorpe	Third Edition	
1	Reasoning for		Tata-McGraw Hill	
	competitive		Publishing	
	examinations		Company Ltd.	

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	S	S
CO2	S	S	S	Μ	S
CO3	S	S	S	S	S
CO4	S	S	Μ	S	Μ
CO5	S	S	S	S	S

S - Strong; M- Medium; L- Low

SEMESTER II SKILL ENHANCEMENT COURSE–III

Programme Code	B. Sc	Programme Title	Mathematics
Batch	2023- 2024 onwards	Semester	II
Course Code		SEC-III	MATHEMATICS FOR COMPETITIVE EXAMINATIONS-I
Hours/ week	2	Credits:	2

OBJECTIVES:

This course focuses on basic technical concepts and to develop an idea of aptitude examination. The main objective is to impart the knowledge on fundamental topics such as

- Partnership, Chain Rule, Time and Work
- Simplification, Square roots and Cube roots, Average
- Problems on Numbers, Problems on Ages, Surds & Indices
- Percentage, Profit and Loss, Ration and Proportions
- Numbers, H.C.F &L.C.M of Numbers

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO. Number	Statement	Knowledge level
CO1	Identify the logic behind Numbers, Simplification, Problems on Numbers, Percentage, Partnership	K1
CO2	Give Example H.C.F & L.C.M of Numbers, Square roots and Cube roots, Problems on Ages, Profit and Loss, Chain Rule	K2
CO3	Discover the problem son Decimal Fractions, Average, Surds & Indices, Ration and Proportions, Time and Work	К3
CO4	Show the Numbers, Square roots and Cube roots, Problems on Numbers, Ration and Proportions, Chain Rule Problems.	K4
CO5	Simplify Develop the problems on Percentage, Profit and Loss, Ration and Proportions and its problem.	K4

UNIT I: Numbers, H.C.F & L.C.M of Numbers, Decimal Fractions.	(6 Hours)
(Section-I: 1-3)	
UNIT II: Simplification ,Square roots and Cube roots, Average.	(6 Hours)
(Section-I: 4-6)	
UNIT III:	(6 Hours)
Problems on Numbers, Problems on Ages, Surds & Indices.	
(Section-I: 7-9)	
UNIT IV:	(6 Hours)
Percentage, Profit and Loss, Ration and Proportions. (Section-	I:10-12)
UNIT V:	(6 Hours)

Partnership, Chain Rule, Time and Work (Section-I:13-15)

TEACHING METHODS:

Chalk and Talk/ Power Point presentation/ Seminar/ Quiz/ Discussion/ Assignments **TEXT BOOK:**

Name of the Book	Author	Publisher	Year of
			Publications
Quantitative Aptitude for	R.S. Aggarwal	S.Chand Co	2001
competitive Examinations		Ltd,152,	
		Anna salai,	
		Chennai.	
	Name of the Book Quantitative Aptitude for competitive Examinations	Name of the Book Author Quantitative Aptitude for competitive Examinations R.S. Aggarwal	Name of the BookAuthorPublisherQuantitative Aptitude for competitive ExaminationsR.S. AggarwalS.Chand CoLtd,152,Ltd,152,Anna salai, Chennai.

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Year of Publicat ion
1.	Wiley's Quantitative Aptitude	P. A. Anand	Wiley's Publications	2015 First Edition

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	S	Μ	S	Μ
CO2	S	Μ	S	Μ	S
CO3	Μ	S	Μ	S	Μ
CO4	S	М	S	М	М
CO5	S	S	Μ	S	S

Mapping with Programme Specific Outcomes:

S-Strong ; M-Medium.
SEMESTER-III

Programme	B. Sc	Programme	Mathematics
Code		Title	
2023-2024 on	wards	Semester	III
Course Code		CORE-V	Vector Analysis
Hours/week	5	Credits:	5

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of vector analysis. The main objective is to impart the knowledge on fundamental topics such as

- Vector Point function, scalar point function, Gradient to scalar point function
- Solenoidal and irrotational functions
- Line Integral ,Surface integral,Volume Integral
- Stoke's Theorem, Gauss-Divergence Theorem,
- Green'sTheorem in two dimension

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

CO. Number	Statement	Knowledge level
CO1	Define Vector Point function, Line Integral, Dirichlet's Conditions	K1
CO2	Classify scalar point function, Surface integral, General	K2
CO3	Apply the Derivative of sum of vectors, Volume Integral.	K3
CO4	Analyze the derivative of scalar Product, Stoke's Theorem,	K4
CO5	Show the Solenoidal and irrational functions, Green's Theorem in two dimension.	K4

UNIT I:

Vector differentiation : Vector differentiation-Limit of a vector function –continuity of vector function–some standard results-geometrical and physical application of vector-Partial derivative of vector functionsimple problems.

UNIT II:

Scalar point function - Vector Point function - level surface-Gradient of ascalar point functions-directional derivatives of a scalar point function-equation of tangent plane and normal line to a level urface-simple problems.

UNIT III:

Divergence and curl of a vector point function-Solenoidal and irrational functions-vector identities-simple problems.

UNIT IV:

Vector integration : Definition-Line Integral–Surface integral–Volume Integral- (Statement only)–Problems.

UNITV:

Stoke's Theorem-Gauss-Divergence Theorem-Green's Theorem in two dimension(Statement only)–Problems.

TEACHING METHODS:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments.

TEXT BOOK:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1	Analytical	Arumugam.S	New Gamma	2008.
	Geometry 3D and	&	Publishing	
	Vector Calculus.	Thangapandi	House,	
		Issac.A	Palayamkottai-	
			627002	

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Vector	Paul	Springer	2005
	Calculus	C.Matthews		Seventh
				Edition

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	Μ	S	Μ
CO2	S	S	М	М	S
CO3	S	Μ	М	S	Μ
CO4	S	М	S	М	S
CO5	S	М	Μ	S	S

S-Strong ; M-Medium.

SEMESTER-III

Programme Code	B.Sc	Programme Title	Mathematics
Batch	2023 – 2024 onwards	Semester	III
Course Code		CORE-VI	DIFFERENTIAL EQUATIONS
Hours/week	5	Credits:	5

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of differential equations. The main objective is to impart the knowledge fundamental to pics such as

- Second order Linear Differential Equations with constant co-efficient
- Special method so finding particular integral
- Clairaut's form, Simultaneous Differential Equation
- Partial differential equations
- Elimination of arbitrary constants, arbitrary functions
- Definition so general, particular r& Complete

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

CO. Number	Statement	Knowledge level
CO1	Identify the first order differential equation and its solutions.	К1
CO2	Illustrate the standard form of differential equations	K3
CO3	Idea behind the Homogenous equations and Lagrange equations.	K2
CO4	Formulate the Partial differential equations and Derivation of partial differential equations by elimination of constants, arbitrary functions.	K4
CO5	Execute the standard type of Partial differential equations.	K4

UNIT I :

Differential Equations : Differential equation first order and Higher degree–Equation solvable for p, Equation solvable for y, Equation solvable for x – Clairaut's equation. Exact Differential equation.

UNIT II :

Second order differential equation with constant coefficients – Standard types- e^{ax} , or cosax,,,,Where V is a sinax or $cosax,x^n$.

UNIT III :

Method of variation of parameters – Linear Homogenous equation -Lagrange Linear equation-Simple problems.

UNIT IV :

(15 Hours)

Partial Differential Equation : Partial differential equations-Derivation of partial Differential Equations by elimination of constants, arbitrary functions–Definitions of general, particular & Complete Solutions of P.D.E.

UNITV:

(15 Hours)

Standard types of first order equations–Solving Standard forms1.f(p,q)=0 2.f(x,p,q)=0, f(y,p,q)=0, f(z,p,q)=0 3.f(x,p)=f(y,p) 4.z=px+qy+f(p,q). Lagrange's Differential equations Pp+Qq=R Charpit's Methods-Equations reducible to the standard forms.

Teaching Methods:

Chalk and Talk/ Power Point presentation/Seminar/Quiz/Discussion/Assignments

TEXT BOOK:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	Differential	Arumugam.S&	New Gamma	
	Equations	Thangapandi	Publishing	2008
	and Applications	Issac.A	House,Palayamkottai	
			-627002	

(15 Hours)

(15 Hours)

(15 Hours)

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Yearof Publication
1.	Differential Equations and Integral Transforms	S.Sudha	Emerald Publishers	2003
2.	Calculus Volume III	S.Narayanan& T.K.Manickav achagomPillay	S.Viswanathan Pvt.Ltd.	2008

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	М	S	Μ	S
CO2	M	S	S	Μ	S
CO3	Μ	S	Μ	Μ	S
CO4	S	М	Μ	S	S
CO5	S	М	S	Μ	S

S-Strong; M-Medium.

Programme Code	B.Sc	Programme Title	Mathematics
2023 – 2024 o	nwards	Semester	III
Course Code		ELECTIVE-III	MATHEMATICAL STATISTICS – I
Hours/week	4	Credits:	3

OBJECTIVES:

The aim of this course is to introduce the concept of Correlation and its types, discrete and continuous random variables, probability functions, expectations, moment generating functions and some discrete and continuous distributions and should have developed skills to apply them to various real life situations.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to

K1	CO1	calculate mean, median and mode
K1	CO2	acquire the knowledge by using Binomial distribution, Poisson distribution etc
K2	CO3	understand random variables and probability distributions.
K3	CO4	Use the different methods of finding the correlation coefficient.
K4	CO5	compute expected value and variance of discrete and continuous random variables.

UNIT I

Skewness - Definition of skewness - Tests of Skewness - Measure of Skewness - Karl Pearson's Coefficient of Skewness – Bowleys coefficient of skewness – - Moments-Moments about mean - Moments about arbitrary origin – moments about zero –Measure of skewness based on moments- Measure of kurtosis - Simple problems only. [12 Hours]

UNIT II

Correlation - Karl Pearson's coefficient of correlation – Direct method of finding out correlation coefficient-Calculation of correlation coefficient when change of scale and origin is made-Deviations are taken from an assumed mean-Correlation of grouped data- Rank correlation coefficient- Regression : Regression equation of Yon X - Regression equation of X on Y-Deviations taken from Arithmetic means of X and Y-Deviations taken from assumed mean. [12 Hours]

UNIT III

Theorems of Probability – Addition Theorem – Multiplication Theorem –

Conditional Probability - Baye's theorem - Mathematical Expectation – Random Variables and Probability distribution - Simple problems only. [12 Hours] UNIT IV

Binomial Distribution - Properties of Binomial Distribution - Mean, Mode, Variance, Moment, Moment Generating Function - Fitting a Binomial Distribution [12 Hours]

UNIT V

Poisson Distribution-Mean & Variance - Role of the Poisson Distribution – Fitting a Poisson Distribution - Poisson Distribution as an Approximation of the Binomial Distribution. [12 Hours]

TEXT BOOK:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	STATISTICAL METHODS	S.P.Gupta	S.Chand & sons	2002

UNIT 1 Vol I - Chapter 9 : Page No.332 to 352

UNIT 2 Vol I - Chapter 10 : Page No. 386 to 390 : 394 to 398 ; 404 to 411 ; Chapter 11 : Page No : 439 to 451

- UNIT 3 Vol II Chapter 1 : Page No : 765 to 774
- UNIT 4 Vol II Chapter 2 : Page No : 809 to 824
- UNIT 5 Vol II Chapter 2 : Page No : 826 to 835

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Yearof Publication
1.	Fundamentals of Mathematical Statistics	Veerarajan .T	Yes Dee Publishing Pvt.Ltd	2017
2.	Mathematical Statistics	P.R.Vittal	Margham Publications.	2002- Reprint 2012
	Funtamentals of Mathematical Statistics	S.C.Gupta and V.K.Kapoor	Sulton Chand Publications 10 th edition	2002.

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	Μ	Μ	S
CO2	S	S	S	S	S
CO3	S	S	S	Μ	S
CO4	S	S	Μ	S	S
CO5	S	S	Μ	S	S

S - Strong; M- Medium; L- Low

SEMESTER–III SKILL ENHANCEMENT COURSE-IV

Programme Code	B.Sc	Programme Title	Mathematics
2023 – 2024 onwards		Semester	III
Course Code		SEC-IV	MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II
Hours/week	2	Credits:	2

OBJECTIVES:

This course focuses on basic technical concepts and to develop an idea of aptitude examination. The main objective is to impart the knowledge on fundamental topics such as

- Pipes and Cisterns, Time and Distance
- Problems on Trains.Boats and Streams
- Alligation or mixture, Simple Interest, Compound Interest
- Logarithms, Area, Volumea nd Surface
- Clock and Calender.Permutation and Combination
- Probability,Oddman out Series

Inaddition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

CO. Number	Statement	Knowledge level
CO1	State the Pipes and Cisterns, Boats and Streams, Compound Interest, Volume and Surface,.	K1
CO2	Illustrate the Time and Distance, Alligationor mixture, Logarithms ,Clock and Calender, Probability	K2
CO3	Solve the Problems on Trains, Simple Interest, Area,.	K3
CO4	Apply the Boats and Streams, Alligation or mixture, Simple Interest.	K4
CO5	Show the Area, Volume and Surface Area	K4

UNIT I:	(6 Hours)
Pipes and Cisterns, Time and Distance	
UNIT II:	(6 Hours)
Problems on Trains, Boats and Streams, Alligation	n or mixture
UNIT III:	(6 Hours)
Simple Interest,Compound Interest, Logarithms	
UNIT IV:	(6 Hours)
Area, Volume and Surface Area	

UNIT V:

Calender and Clocks (Section-I:27,28)

TEXT BOOK:

S.	Name of the Book	Author	Publisher	Year Of
No				Publications
1.	Quantitative Aptitude for	R.S.Aggarwa	S.Chand &	2001
	competitive	1	Со	
	Examinations		Ltd,152,	
			Annasalai	
			Chennai.	

(6 Hours)

UNIT 1	(Section-I:16-17)
UNIT 2	(Section-I:18-20)
UNIT 3	(Section-I:21-23)
UNIT 4	(Section-I:24,25,)
UNIT 5	(Section-I:27,28)

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Wiley's	P.A.Anand	Wiley's Publications	2015
	Quantitative			First Edition
	Aptitude			

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	S	М	S	М
CO2	S	M	S	M	S
CO3	М	S	Μ	S	М
CO4	S	M	S	Μ	S
CO5	S	M	М	S	S

S-Strong ; M-Medium.

SEMESTER-III

SKILL ENHANCEMENT COURSE-V

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 onwards		Semester	III
Course Code		SEC-VI	BUSINESS OPTIMAIZATION TECHNIQUES
Hours/week	1	Credits:	1

OBJECTIVES:

This course focuses on basic technical concepts and to develop an idea of operation research. The main objective is to impart the knowledge on fundamental topics such as

- Problems with n Jobs through Two Machines
- Processing N Jobs through three Machines
- Rules of Network Construction ,Time Analysis
- Critical Path Method,Programme Evaluation and Review Technique
- Cost Consideration In PERT/CPM.Inventory Costs
- Variables in the Inventory Problem
- Other Factors Involved in Inventory Analysis
- Deterministic Inventory Model
- EOQ Problems with Price Breaks
- Queuing Theory, Network Routing Problems, Game Theory

In addition, It also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

CO. Number	Statement	Knowledge level
CO1	Identify the Problems with n Jobs through Two Machines,	IZ 1
COI	Basic Terms, Reasons for Maintaining Inventories,	K1
	Queuing System, Payoff-types of games.	
	Classify the Processing N Jobs through three Machines A,B,C	
CO2	Common Errors, Inventory Costs, Kendall's Notation for	K2
	representing Queuing Models, The Maximin–Minimax	
	Principal.	
	Apply the Problems with N Jobs and K Machines, Numbering	
CO3	the Events, Other Factors Involved in Inventory Analysis,	K3
	Classification of Queuing Models, Games without Saddle	
	Points.	
	Analyze the Problems with 2 Jobs through K	
CO4	Machines, Programme Evaluation and Review	K4
	Technique, Deterministic Inventory Model, Games without	
	Saddle Points.	
CO5	Show the Cost Consideration InPERT/CPM, Re-order Level	K4
	an Optimum Buffer Stock.	

UNIT I : Sequencing problem – Basic terms – Processing n jobs through 2	(3 Hours) machines
UNIT II :	(3 Hours)
Sequencing problem - processing n jobs through 3 machines	
UNIT III:	(3 Hours)
Games - Strategies - Introduction - Two person zero - Sum games	
UNIT IV:	(3 Hours)

Graphical solution of 2xn and mx2 games-Dominance Property.

UNIT V :

(3 Hours)

The Maxmin – Minimax Principle – Games without Saddle Point –

Mixed strategies

S.	Title of the	Author Publisher		Year of
No	Book			Publication
	OPERATIONS	Kanti swaroop,	Sixteenth Edition ,Sultan	
1.	RESEARCH	P.K. Gupta &	Chand & Sons. New	2014
		Manmohan	Delhi	

UNIT 1	Chapter 10:10.1 to 10.4
UNIT 2	Chapter 17:17.1 to 17.3
UNIT 3	Chapter 17 : 17.4&17.5
UNIT 4	Chapter 17 : 17.6 & 17.7
UNIT 5	Chapter 18:18.2,18.3

Teaching Methods:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Year of Publicatio n
1.	Operations Research15th Edition	Kanti Swarup, P.K.Gupta and Manmohan	Sultan Chand & Sons,Chennai	2010
2.	Operations Research,Second Edition	P.K.Gupta and D.S.Hira	S.Chand&Co, New Delhi	2004
3.	Operations Research	Hamdy Taha	Prentice Hall Publications, New Delhi	1996
4.	Operations Research	Nita Hshah Ravi M.GorHardik soni	PHI,P,Ltd,	2010

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	М	М	S	S
CO2	S	М	S	S	М
CO3	S	S	S	М	S
CO4	Μ	S	Μ	М	S
CO5	S	S	М	М	S

S-Strong ; M-Medium.

SEMESTER-IV

Programme B.Sc		Programme	Mathematics
Code		Title	
2023–2024on	wards	Semester	IV
Course Code		CORE-VII	TRASNFORMS TECHNIQUES
Hours/week	6	Credits:	5

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of Transforms Techniques. The main objective is to impart the knowledge on fundamental topics such as

- Laplace Transform
- Z-Transform
- Fourier Transform

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO. Number	Statement	Knowledge level
CO1	Define Laplace Transform and its properties	K1
CO2	Classify the idea of the inverse Laplace transform and its applications.	K2
CO3	Apply the Fourier Transform and related problems.	K3
CO4	Analyze the Parsevals identies and the boundary value problem	K4
CO5	Show the Condition for Z–Transform and its problems.	K4

UNIT I:

(18 Hours)

Laplace Transforms : Introduction–Definition Transforms of Elementary functions–Properties of Laplace Transforms-Transform of periodic functions– Evaluation of integrals by Laplace Transforms–Problems.

UNIT II:

(18 Hours)

Inverse Laplace Transforms : Method of partial fractions –other Methods of finding inverse Transforms convolution Theorem-Application of differential equations–properties.

UNIT III:

(18 Hours)

Fourier Transforms : Introduction - Definition–fourier integrals theorem— Fourier transforms–properties of fouier Transform–Fourier sine and cosine Transforms-Problems.

UNIT IV:

(18 Hours)

Fourier Transforms continued :Convolution, Parsevals identies for Four transforms–Application of Transforms to boundary value problems – Problems. **UNIT V :** (18 Hours)

Z-Transforms : Definition–Some Standard Z-Transforms – Linearity properties–Damping rule-Some standard results – multiplication by n-Two basic theorem-Convolution theorem- convergence of Z-Transforms Evaluation of Inverse Z-Transforms –Application to difference Equations

TEACHING METHODS:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments.

TEXT BOOKS:

S.	Title of the Book	Author	Publisher	Year of
No				Publication
1	Higher	Dr.B.S.Grewal	Khanna	2012
	Engineering		Publishers	
	Mathematics			

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Higher	John Birds	Elviser	2010
	Engineering			
	Mathematics			6 th Edition

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	М	S	М
CO2	S	S	Μ	М	S
CO3	S	М	М	S	М
CO4	S	М	S	М	S
CO5	S	М	М	S	S
	C (Time and M	Madimu		

S-Strong;M-Medium.

SEMESTER-IV

Programme Code	B.Sc	Programme Title	Mathematics
2023 – 2024 onwards		Semester	IV
Course Code		CORE-VIII	ELEMENTS OF MATHEMATICAL ANALYSIS
Hours/week	5	Credits:	5

OBJECTIVES :

This course focuses on basic analytical concepts and to develop an idea of real analysis. The main objective is to impart the knowledge on fundamental topics such as

- Functions,Sequence,Series
- MetricspaceandContinuous
- convergenceanddivergence
- Rearrangementofseries
- BoundedsetsandTotallyBoundedsets

In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

CO.	Statement	Knowledge				
Number		level				
	Define Functions, Bounded sequences, Series of					
CO1	real numbers, Limits and Metric spaces ,Open sets And closed sets.	K1				
	Demonstrate the Real Valued functions,					
CO2	Monotonic sequences, convergence and	K2				
	divergence, metric spaces limits in metric					
	spaces, Discontinuous					
	Functions on R'.					
	Examine Countablity, operations on convergent					
CO3	sequences, alternating series, Continuous functions	K3				
	On metric spaces, Connected sets.					
	Differentiate the Convergent sequences and					
CO4	Divergent Sequences, Cauchy	K4				
	sequences,Rearrangement of series,Reformulation, Bounded sets and Totally Bounded sets.					

CO5	Analyze the Convergent sequences and Divergent Sequences, Cauchy sequences, Rearrangement of series, Reformulation, Bounded sets and Totally Bounded sets.	K4
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UNIT I:

(15 Hours)

(15 Hours)

(15 Hours)

Functions – Real Valued functions – Equivalence – Countablity – Real Numbers – Least upper bounds. Sequence of real numbers – Definition of sequence and subsequence – Limit of a sequence – Convergent sequence Divergent Sequences.

UNIT II:

Bounded sequences- Monotonic sequences - operations on convergent sequences - operations on Divergent sequences - Limit superior and limit inferior-Cauchy sequences

UNIT III:

Series of real numbers – convergence and divergence – series with non negative terms–alternating series–conditional convergence and absolute convergence–Rearrangement of series–Test for absolute convergence – series whose terms form an on increasing sequence.

UNIT IV:

Limits and Metric spaces – limit of a function on the real line – metric spaces limits in metric spaces. Continuous functions on metric spaces-Functions continuous at a point on the real line – Reformulation – functions continuous on a metric space

UNIT V:

Open sets– closed sets–Discontinuous functions on R'.More about open sets– Connected sets–Bounded sets and Totally Bounded sets

Teaching Methods:

Chalk and Talk/ PowerPoint presentation/Seminar/Quiz/Discussion/Assignments

TEXT BOOK:

S.No	Title of the	Author	Publisher	Year of
	Book			Publication
1.	Methods of Real	Richard R.	Oxford &IBH	1970
	Analysis	Goldberg.	Publishing Co.Pvt.Ltd.	

(15 Hours)

(15 Hours)

UNIT 1	(Chapter1:Section:1.3to1.7Chapter 2:Section:2.1-2.4)
UNIT 2	(Chapter 2 :Section :2.5to2.10)
UNIT 3	(Chapter 3 :Section :3.1to3.7)
UNIT 4	(Chapter 4 :Section :4.1to4.3Chapter 5,Section :5.1to5.3)
UNIT 5	(Chapter 5 :Section :5.4to5.6, Chapter 6, Section:6.1to6.3)

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	A First course in Real	Sterling	Springer(India)	2004
	Analysis.	K.Barberian.	Private Limited,	
			New Delhi.	
2.	Mathematical Analysis	Tom M.Apostel	Narosa	2002
			Publications,	
			NewDelhi	
3.	Real Analysis	M.S.Rangachari	New Century	1996
			Book House,	
			Chennai.	

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	S	Μ	S	М
CO2	М	М	S	М	S
CO3	М	S	М	S	М
CO4	S	М	М	S	S
CO5	S	S	S	S	S

S-Strong;M-Medium.

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 on	wards	Semester	IV
Course Code		GENERIC ELECTIVE-IV	MATHEMATICAL STATISTICS - II
Hours/week	4	Credits:	3

OBJECTIVES :

To make students experts in data collections, classifications, tabulation, analysis and interpretation of numerical data to arrive at reasonable conclusions.

COURSE OUTCOMES :

On completion of this course, the students will be able to

K1	CO1	Acquiring knowledge of continuous random variables and
		testing hypothesis
K2	CO2	Understand the concepts of t, F, z-distributions and its
		applications and acquire the knowledge by using Normal
		distribution.
K3	CO3	Demonstrate the use of chi-square distribution
K4	CO4	Analyze the concepts of sampling techniques and procedure
		for testing of hypothesis for large samples.
K4	CO5	Analyze the association between two or more groups and
		populations.

UNIT I:

(12 Hours)

Normal distribution - Importance of Normal Distribution - Properties of Normal Distribution - Condition for normality - Area under the normal curve - Fitting of normal distribution (Method of Ordinates and Method of Areas).

UNIT II:

(12 Hours)

Hypothesis Testing - Procedure of Testing Hypothesis - Standard Error and Sampling Distribution - Tests of Significance for Attributes - Test of Significance for Large Samples.

UNIT III:

(12 Hours)

Test of Significance for Small Samples - Student's t-Distribution and its Applications - To Test the significance of Single Mean Difference of two Means for both Dependent and Independent Samples - Testing the Significance of an Observed Correlation Coefficient –The Variance Ratio Test-F-test.

UNIT IV:

(12 Hours)

Uses of Chi-Square Test-1-Chi-Square test as of Independence - 2.Chi-square test as a test of goodness of fit - 3.Chi-square test as a test of Homogeneity - Chi-Square test for Specified value of Population Variance.

UNIT V:

(12 Hours)

Analysis of Variance-One Way Classification-Two Way Classification -Latin Squares.

TEXT BOOK:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	STATISTICAL METHODS	S.P.Gupta	S.Chand & sons	2002

UNIT 1 Chapter 2 : Page No: 836 to 858

UNIT 2 Chapter 3 : Page No: 882 to 890 & 895 to 910

UNIT 3 Chapter 3 : Page No: 910 to 923

UNIT 4 Chapter 4 : Page No: 960 to 972

UNIT 5 Chapter 5 Page No: 1009 to 1038 & Chapter 6 : Page No: 1044 to 1048

REFERENCE BOOKS:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	Fundamentals of Mathematical Statistics	Veerarajan .T	Yes Dee Publishing Pvt.Ltd	2017
2.	Mathematical Statistics	P.R.Vittal	Margham Publications.	2002- Reprint 2012
3.	Funtamentals of Mathematical Statistics	S.C.Gupta and V.K.Kapoor	Sulton Chand Publications 10 th edition	2002.

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	М	М	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	М	S	S
CO5	S	S	М	S	S

S - Strong; M- Medium; L- Low

SEMESTER-IV

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024	4onwards	Semester	IV
Course Code		SEC-VI	MATHEMATICS FOR COMPETITIVE EXAMINATIONS-III
Hours/week	2	Credits:	2

OBJECTIVES:

The objective of this syllabus is to make the students to clear competitive examination like Banking recruitment, Postal recruitment, Railway recruitment and TNPSC exams.

COURSE OUTCOMES :

K1	CO1	Acquire the basic knowledge of area and volume
K2	CO2	understand the basic concepts of Quantitative ability
K2	CO3	understand the basic concepts of logical reasoning
K3	CO4	Apply the problems on train with solved examples
K4	CO2	Analyze the concepts of simple and compound interest in
		real life

UNIT I:

Problems on trains: Problems on trains with solved examples

[6 Hours]

UNIT II:

Simple Interest and Compound Interest : Problems on Simple and Compound interest.

[6 Hours]

UNIT III:

Area: Area of four walls of room- Area of parallelogram and Semicircle [6 Hours]

UNIT IV:

Volume and Surface Areas : Cubiod – Cube – Cylinder- Cone Volume and Surface Areas : Frustum of Cone – Sphere-Hemisphere – Pyramid [6 Hours]

UNIT V:

Calendar: Calendar-Odd Days-Leap year – Ordinary Year – Counting of Odd days

[6 Hours]

TEXT BOOK:

S.	Name of the Book	Author	Publisher	Year Of
No				Publications
1.	Quantitative Aptitude for competitive Examinations	R.S.Aggarwal	S.Chand & Co Ltd, New Delhi	2013

- Unit 1: Chapter 20
- Unit 2: Chapter 22 & Chapter 23
- Unit 3: Chapter 24
- Unit 4: Chapter 25
- Unit 5: Chapter 27

REFERENCE BOOKS:

S.	Name of the Book	Author	Publisher	Year Of
No				Publications
1.	Test of Reasoning for	Edgar Thorpe	Tata McGraw-	
	competitive examinations		Hill Publishing	
	•		Company	
			Limited,	
			New Delhi.	

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S - Strong; M- Medium

SEMESTER–IV SKILL ENHANCEMENT COURSE-IV

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024	onwards	Semester	IV
Course Code		SEC-VII	MATHEMATICS FOR
			COMPETITIVE
			EXAMINATIONS-IV
Hours/week	2	Credits:	2

OBJECTIVES:

This course focuses on basic technical concepts and to develop an idea of aptitude examination. The main objective is to impart the knowledge on fundamental topics such as

- Races and games of skills
- Stocks and Shares
- Permutation and combination.
- True discount and Bankers Discount
- Clock and Calender.
- Probability,Odd Man Out Series

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES:

CO Number	Knowledge Level	Statement
CO1	K1	State the Races and games of skills
		and Stocks and Shares.
CO2	K2	Illustrate the Permutation and
		combination, Probability
CO3	K3	Solve the Problems on True discount
		and Bankers Discount.
CO4	K4	Apply the Heights and Distances,
		Odd Man Out and series.
CO2	K5	Show the Tabulation, Bar Graphs.

UNIT I:	(6 Hours)
Races and games of skills, Stocks and Shares.	
UNIT II:	(6 Hours)
Permutation and combination, Probability.	
UNIT III:	(6 Hours)
True discount and Bankers Discount.	
UNIT IV:	(6 Hours)
Heights and Distances, Odd Man Out and Series.	
UNIT V:	(6 Hours)

Tabulation, Bar Graphs

TEXT BOOK:

S.	Name of the Book	Author	Publisher	Year Of
No				Publications
1.	Quantitative Aptitude	R.S.Aggarwal	S.Chand &	2001
	for competitive		Co Ltd,	
	Examinations		152,	
			Annasalai	
			Chennai.	

UNIT 1	(Section -I:26,29)
UNIT 2	(Section -I:30,31)
UNIT 3	(Section -I:32-33)
UNIT 4	(Section -I:34,35)
UNIT 5	(Section -II:36,37)

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Wiley's	P.A.Anand	Wiley's Publications	2015 First Edition
	Quantitative			First Edition
	Aptitude			

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	Μ	S	Μ
CO2	S	Μ	S	Μ	S
CO3	M	S	М	S	M
CO4	S	М	S	Μ	S
CO5	S	Μ	Μ	S	S

Mapping with Programme Specific Outcomes:

S-Strong;M-Medium.

SEMESTER-V

Programme B.Sc		Programme	Mathematics
Code		Title	
2023–2024 o	nwards	Semester	V
Course Code		CORE-IX	ABSTRACT ALGEBRA
Hours/week	5	Credits:	4

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of modern algebra. The main objective is to impart the knowledge on fundamental topics such as

- Groups, cyclic groups
- Normal groups, homomorphism, Automorphism
- Rings, integral domain
- Quotient Rings– Maximum and Prime Ideals
- Field and Principal ideal Ring In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

CO. Number	Statement	Knowledge level
CO1	Define Groups, Normal Subgroups, Rings, Sub Rings, Integral Domain.	K1
CO2	Give Example of Subgroups, Quotient groups, Elementary Properties of Rings, Ideals, Order Integral Domain.	K2
CO3	Apply the Cyclic groups, Isomorphism, Types of Rings, Maximum and Prime Ideals, Euclidean Domain.	K3
CO4	Analyze Order of an elements, Permutation groups, Characteristic of a Ring, Homomorphism of Rings, Every P.I. Disa U.F.D, Co sets and Lagrange's Theorem, Unique factorization Domain.	K4
CO5	Differentiate the Order of an elements, Permutation groups, Characteristic of a Ring, Homomorphism of Rings, Every P.I.Disa U.F.D, Cosets and Lagrange's Theorem, Unique factorization Domain.	K4

UNIT I:

(15 Hours)

Groups (Binary Operations)- Subgroups – Cyclic groups –Order of an elements- Cosets and Lagrange's Theorem.

UNIT II:

(15 Hours)

Normal Subgroups and Quotient groups–Isomorphism–Homomorphism, Permutation groups.

UNIT III:

(15 Hours)

Rings Definitions and Examples - Elementary Properties of Rings – Isomorphism - Types of Rings - Characteristic of a Ring.

UNIT IV:

(15 Hours)

(15 Hours)

Sub Rings– Ideals– Quotient Rings– Maximum and Prime Ideals-Homomorphism of Rings.

UNIT V:

The Field of Quotient of an Integral Domain– Order Integral Domain- Unique factorization Domain- Euclidean Domain–Every P.I.Disa U.F.D.

TEACHING METHODS:

Chalk and Talk/ Power Point presentation/ Seminar/ Quiz/ Discussion/ Assignments

TEXT BOOK:

S.No	Title of the	Author	Publisher	Year of
	Book			Publication
1.	Modern	Arumugam.S &	Sci tech	July 2008
	Algebra	Isaac. A.T.	Publications	-
			PVT LTD	
			Chennai.	

UNIT 1	Chapter : 3 Section $3.5 - 3.8$
UNIT 2	Chapter : 3 Section 3.9-3.11
UNIT 3	Chapter: 4 Section 4.1-4.5
UNIT 4	Chapter: 4 Section 4.6-4.10
UNIT 5	Chapter : 4 Section 4.11-4.15

REFERENCE BOOKS:

S.No	Title of the Book	Author	Publisher	Year of Publication
1.	A first course in modern algebra	A.R.Vasistha	Krishna Prekasan Mandhir, 9, ShivajiRoad,	1983
2.	Modern Algebra	M.L. Santiago	Meerut(UP) Tata Mc Graw Hill, New Delhi.	1994
3.	Modern Algebra	K.Viswanatha Naik	Emerald Publishers, 135, AnnaSalai, Chennai.	1988
4.	Topics in Algebra	I. N. Herstein.	John Wiley, New york.	1975

Mapping with Programme Specific Outcomes

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	Μ	S	Μ	S
CO2	S	S	Μ	Μ	S
CO3	S	S	М	S	S
CO4	Μ	S	М	S	S
CO5	S	М	М	S	S

S-Strong; M-Medium.

SEMESTER-V

Programme B. Sc		Programme	Mathematics
Code		Title	
2023 – 2024 o	nwards	Semester	V
Course Code		CORE X	REAL ANALYSIS
Hours/week	5	Credits:	4

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of real analysis. The main objective is to impart the knowledge on fundamental topics such as

- Complete metric spaces and Compact metric spaces
- Continuous functions
- Sets of measure zero
- Existence of Riemann integrals
- Rolle's theorem and Law of Mean
- Uniform convergence of sequence of functions
- Hyperbolic Functions
- The Exponential Function Logarithmic Function
- Trigonometric Function Taylors Theorem
- The Binomial Theorem
- Theorems on Improper integrals

In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

CO.	Statement	Knowledge
Number		level
CO1	Define Complete metricspaces, Sets of measure zero, Rolle's theorem, Hyperbolic Functions, The Binomial Theorem.	K1
CO2	Express the Compact metric spaces, Riemann integral, Law of Mean, The Exponential Function Logarithmic Function, L'Hospital Rule.	K2
CO3	Apply the Continuous functions on Compact Metric spaces, Existence of Riemann integrals, Improper integrals, Trigonometric Function, uniform, convergence	K3
	of sequence of functions.	

CO4	Analyze the Continuity of the inverse functions–Uniform continuity. Properties of Riemann integrals, Theorems on Improper integrals, Taylors Theorem, consequences of uniform convergences.	K4
CO5	Discover the Complete metric spaces, Existence of Riemann integrals, Derivatives, Uniform continuity.	K4

UNIT I:

(15 Hours)

Complete metric spaces - Compact metric spaces-Continuous functions on Compact Metric spaces – Continuity of the inverse functions –Uniform continuity.

UNIT II:

(15 Hours)

Sets of measure zero – Definition of the Riemann integral–Existence of Riemann integrals – Properties of Riemann integrals–Derivatives.

UNIT III:

(15 Hours) Rolle's theorem – Law of Mean – Fundamental theorem of calculus – Improper integrals–Theorems on Improper integrals.

UNIT IV:

Hyperbolic Functions – The Exponential Function-Logarithmic Function-The Trigonometric Function-Taylors Theorem.

UNIT V:

(15 Hours)

(15 Hours)

The Binomial Theorem – L'Hospital Rule-Pointwise convergence of sequence of functions – uniform convergence of sequence of functions – consequences of uniform convergences

Teaching Methods:

Chalk and Talk/ Power Point presentation/ Seminar/ Quiz/ Discussion/ Assignments

TEXT BOOK:

S.	Title of the	Author	Publisher	Year of
No.	Book			Publication
1.	Methods of	RichardR.	IBM	1970
	Real Analysis.	Goldberg.	Publishing	
		C	NewDelhi.	

- UNIT 1 (Chapter 6. Section: 6.4 6.8)
- UNIT 2 (Chapter7, Section 7.1 7.5).
- UNIT 3 (Chapter 7, Section 7.6 to 7.10).
- UNIT 4 (Chapter 8, Section 8.1-8.5)
- UNIT 5 (Chapter 8, Section 8.6 to 8.7, Chapter 9, 9.1 to 9.3)

REFERENCE BOOKS:

S. No.	Title of the	Author	Publisher	Year of
	Book			Publication
1.	A First	Sterlin K	Springer	2004
	course in	Barberian.	(India) Private	
	RealAnalysis.		Limited,	
			New Delhi.	
2.	Mathematical	Tom M.	Narosa	2002
	Analysis	Apostal	Publications,	
			NewDelhi	
3.	Real Analysis	M.S.	New Century	1996
		Rangachari	Book	
		C	House,	
			Chennai.	

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	S	Μ	S	М
CO2	S	S	Μ	S	S
CO3	S	Μ	Μ	S	М
CO4	S	Μ	Μ	Μ	S
CO5	М	S	Μ	S	S

S-Strong; M-Medium.

SEMESTER-V

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 ог	nwards	Semester	V
Course Code		CORE XI	MATHEMATICAL MODELING
Hours/week	5	Credits:	4

OBJECTIVES:

This course focuses on basic technical concepts and to develop an idea of mathematical modeling. The main objective is to impart the knowledge on fundamental topics such as

- Linear growth model
- Non-linear growth and decay models
- Modeling in population dynamics
- Modeling of epidemics
- Modeling in second order O.D.E.
- Elliptic motion of a satellites
- Modeling through difference equations
- Harrod model
- Modeling through graphs
- Communication network and Detection of clique

In addition, it also provides technical thinking to solve the

problems related to the above concepts.

ĈOURSE OUTCOMES:

CO .Number	Statement	Knowledge level
CO1	Find the Ordinary differential equation, Modeling in population dynamics, Modeling in second order O.D.E. Modeling through difference equations,	
	Modeling through graphs.	
CO2	Give Example Linear growth model, Prey predator models, Modeling of planetary motion, Linear difference equation, representing results of tournament.	
CO3	Generlize the Non-linear growth and decay models, Multi-species models, Circular motion, Harrod model, Foodweb– Communication network.	

CO4	Analyze the Diffusion of glucose or a medicine in the blood stream, A model for diabetic mellitus,Elliptic motion of a satellites, Applications of Actuarial science, Terms of Signed graph.	
CO5	Sketch out the Diffusion of glucose or a medicine in the bloodstream, A model for diabetic mellitus, Elliptic motion of a satellites, Detection of clique, Terms of signed graph.	

UNIT I:

Ordinary differential equation – Linear growth model–Growth of science and scientists – Non-linear growth and decay models – Diffusion of glucose or a medicine in the blood stream.

UNIT II:

Modeling in population dynamics – Prey-predator models– Competition models–Multi – species models–Modeling of epidemics– Simple epidemic models–A model for diabetic-mellitus.

UNIT III:

Modeling in second order O.D.E.–Modeling of planetary motion– Motion under central force– Circular motion–Elliptic motion of a satellites Rectilinear motion.

UNIT IV:

Modeling through difference equations– Linear difference equation– Obtaining complementary function by use of matrices–Harrod model– cob-web model– Applications of Actuarial science.

UNIT V:

Modeling through graphs – seven bridge problem– representing results of tournament–Genetic graph–Food web – Communication network–Matrices associated with a directed graph–Detection of clique–Terms of signed graph.

Teaching Methods:

Chalk and Talk/ Power Point presentation/ Seminar/ Quiz/ Discussion/ Assignments

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)
TEXT BOOK:

S.	Title of the	Author	uthor Publisher	
No	Book			Publication
	Mathematical	J.N.Kapur	Wiley Eastern Limited,	
1.	Modeling		New Age International	2013
			Pvt. Ltd.,	

UNIT 1	Chapter	2: 2.1–2.3, 2.4.2
UNIT 2	Chapter	3: 3.1.1–3.1.3, 3.2.1 & 3.5.1
UNIT 3	Chapter	4: 4.1.1–4.3.1
UNIT 4	Chapter	5: 5.2.1 - 5.2.6, 5.3.1, 5.3.2 & 5.3.4
UNIT 5	Chapter	7:7.1.2–7.3.1

REFERENCE BOOK:

S.	Title of the	Autho r	Publisher	Yearof Publication
110	Book			1 ubileation
1.	Mathematical	J.N.Kapur	Wiley	1985
	Models	Eastern Limited, New		
	In Biology		Age International Pvt.	
	And Medicine		Ltd.,	

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	S	Μ	S	S
CO2	Μ	Μ	S	S	Μ
CO3	S	S	S	Μ	S
CO4	Μ	S	Μ	Μ	S
CO5	S	S	Μ	Μ	S

SEMESTER-V

DISCIPLINE ELECTIVE COURSE

Programme	B.Sc	Programme	Mathematics
Code		Title	
2023–2024 onwards		Semester	V
Course Code		ELECTIVE-V	OPTIMIZATION TECHNIQUES
Hours/week	4	Credits:	3

OBJECTIVES:

The prime objective of this paper is to introduce certain OR techniques such as LPP, Transportation problems, Assignment problems, to help the students to develop logical reasoning for applying mathematical tools to managerial and real life oriented problems. **COURSE OUTCOMES**

On successful completion of the course, the students will able to

K1	CO1	acquire the knowledge of Transportation and Assignment
		problems.
K2	CO2	understand duality theorems and dual simplex method.
K3	CO3	use the Simplex Method or the Big M Method to solve linear programming problems.
K4	CO4	analyze and interpret results of transportation and problem using appropriate method
K4	CO5	analyze the concept of complementary slackness and its role in solving primal / dual problem.

UNIT I:

(12 Hours)

(12 Hours)

(12 Hours)

 $\label{eq:mathematical} Mathematical formulation of a LPP-Graphical solution to a LPP-extreme points-Convex sets simplex method.$

UNIT II:

Artificial variables – Big M method – Two phase method.

UNIT III:

Duality – Formulation of primal – Dual pairs – Duality and simplex method – Dual simplex method – Fundamental theorem of duality.

UNIT IV:

(12 Hours) Mathematical formulation of transportation problem – Finding initial basic

feasible solution - Degeneracy in LPP - Optimum solution - Modi method -Unbalanced transportation problem.

UNIT V:

(12 Hours)

Mathematical formulation of Assignment problem – Assignment algorithm – Travelling salesman problem.

TEXT BOOK:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
	OPERATIONS	Kanti swaroop,	Sixteenth Edition ,Sultan	
1.	RESEARCH	P.K. Gupta &	Chand & Sons. New	2014
		Manmohan	Delhi	

UNIT 1 Chapter 2 : Sec 2.1 to 2.4, Chapter 3: Sec 3.1 to 3.5,

- Chapter 4 : Sec 4.1 and 4.3
- UNIT 2 Chapter 4 : Sec 4.4 and 4.5
- UNIT 3 Chapter 5 : Sec 5.1 to 5.7, 5.9
- UNIT 4 Chapter 10: Sec 10.1 to 10.13
- UNIT 5 Chapter 11: Sec 11.1 to 11.4 and 11.7

REFERENCE BOOK

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
	OPERATIONS	Taha H. A	Prentice Hall of India	
1.	RESEARCH- AN		Pvt. Ltd, New Delhi	2006
	INTRODUCTION			

Mapping with Programme Specific Outcomes:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S - Strong; M- Medium; L- Low

SEMESTER-V

DISCIPLINE ELECTIVE COURSE-I

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 onwards		Semester	V
Course Code		ELECTIVE-V	ASTRONOMY
Hours/week	4	Credits:	3

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of astronomy. The main objective is to impart the knowledge on fundamental topics such as

- Standard formulae in Spherical Trigonometry
- Diurnalmotion Astronomica lRefraction.
- Geocentric parallax
- Kepler's laws of planetary motion
- Fixing the position of the First point of Aries
- Eclipses
- General description of solar system and Stellar universe

Inaddition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

CO. Number	Statement	Knowledgele vel
CO1	Identify the Standard formulae in Spherical Trigonometry, Astronomical Refraction, Kepler's laws of Planetary motion, Fixing the Ecliptic, Eclipson	K1
CO2	Demonstrate the Celestial sphere, Tangent and Cassini's formulae ,Newton's deductions from Kepler's Laws , the position of the First point of Aries Lunar eclipses.	K2
CO3	Explain the Celestial co-ordinates and their conversions, Geocentric parallax Equation of Time, The Moon, Different phases, Stellar universe.	K3

CO4	Calculate the Zones of Earth-Dip,Twilight, Heliocentric parallax ,Conversion of time, Metoniccycle, Tides,Stellar universe.	K4
CO5	Analyze the Zones of Earth-Dip,Twilight, Heliocentric parallax, Conversion of time, Metoniccycle,Tides,Stellaruniverse.	K4

UNIT I:

Standard formulae in Spherical Trigonometry–Statements only–Celestial sphere-Celestial co-ordinates and their conversions – Diurnal motion - Problems connected with Diurnal Motion - Zones of Earth - Dip –Twilight–Problems.

UNIT II:

Astronomical Refraction – Tangent and Cassini's formulae –Geocentric parallax– Heliocentric parallax–problems.

UNIT III:

Kepler's laws of planetary motion – Newton's deductions from Kepler's Laws-Equation of Time–Seasons–Calender– Conversion of time –problems.

UNIT IV:

Fixing the Ecliptic–Fixing the position of the First point of Aries (Flamsteed'smethod)-The Moon–Different phases-Metonic cycle–Tides problems.

UNIT V:

Eclipses– solar eclipses-Lunar eclipses –General description of solar system and Stellar universe–problems.

Teaching Methods:

Chalk and Talk/PowerPoint presentation /Seminar /Quiz /Discussion/ Assignments

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
	Astronomy	Kumaravelu and	S.Kumaravelu,	1984
1.		Susila	MurugaBhavanam,	
		Kumaravelu	Chidambara Nagar,	
			Nagarkoil-2	

TEXTBOOK:

(12 Hours)

(12 Hours)

(12 Hours)

(12 Hours)

(12 Hours)

Kenler's

REFERENCE BOOK

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	Astronomy	Andrew Fraknoi, David Morrison, Sidney C.Wolff	Samurai Media Limited	2017

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	Μ	Μ	S	Μ
CO2	S	Μ	S	Μ	S
CO3	S	S	S	S	Μ
CO4	М	М	S	М	S
CO5	S	М	S	М	S

SEMESTER-V

DISCIPLINE ELECTIVE COURSE

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 onwards		Semester	V
Course Code		ELECTIVE-VI	NUMERICALMETHODS
Hours/week	4	Credits:	3

OBJECTIVES:

This course introduces fundamental concepts of Numerical methods. It covers concepts such as

- Bisection method, Iteration method, Regular Falsi method, Newton-Raphson method, Direct methods,
- Gausse limination method,Gauss-Jordan method,Iterative methods, Jacobi method,Gauss-Seidal method,Gregory-Newton interpolation formulae, Interpolation with unequal intervals,
- Lagrange's interpolation formula, Inverse interpolation, Trapezoidal rule, Simpson's one third rule, Simpson's three-eighth rule,
- Taylor series method, Euler's method,
- Runge-Kuttamethods-2nd Order, Runge- Kuttamethods-3rdOrder, Runge-Kuttamethods-4thOrder.

It provides technical skills to understand and study various concepts in Numerical analysis.

COURSE OUTCOMES:

СО	Statement	Knowledge
	Statement	Level
CO1	Acquiring knowledge of basic idea of the solution of algebraic and transcendental equations.	K1
CO2	Understand the Solution of simultaneous linear algebraic equations.	K2

CO3	Demonstrate understanding of the	V)	
	Importace of interpolation	KZ	
CO4	Develop the idea about the Numerical	V 2	
CO4	Differentiation and integration.	K3	
COS	Understanding the Numerical solution of	V2	
COS	Ordinary differential equation	КJ	

UNIT I:

Introduction to numerical analysis- The solution of algebraic and transcendental equations – Bisection method–Iteration method – Regular Falsi method,Newton-Raphson method.

UNIT II:

Solution of simultaneous linear algebraic equations–Direct methods - Gausse limination method–Gauss-Jordan method–Iterative methods–Jacobi method–Gauss-Seidal method.

UNIT III:

Finite differences - Interpolation for equal intervals – Gregory Newton interpolation formulae– Interpolation with unequal intervals–Lagrange's interpolation formula–Inverse interpolation.

UNIT IV:

Numerical differentiation and integration– Newton's formulae to compute the derivative– Numerical integration– A general quadrature formula–Trapezoidal rule-Simpson's one third rule – Simpson's three-eighth rule.

UNIT V:

Numerical solution of ordinary differential equation–Taylor series method – Euler's method – Runge- Kutta methods-2nd Order - Runge-Kuttamethods-3rd Order– Runge- Kuttamethods -4th Order- Predictor corrector methods.

TEXT BOOK:

S.No	Title of the	Author	Publisher	Year of
	Book			Publication
1.	Numerical	P.Kandasamy,	Chand &	2009
	Methods	K.Thilagavath,	Company	
		K.Gunavathy	limited,	
			NewDelhi	

(**12 Hours**) ebraic and

(12 Hours)

(12 Hours)

(12 Hours)

(12 Hours)

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- Unit I Chapter 3 :3.1,3.1.1,3.2,3.2.1,3.2.2,3.3,3.3.1,3.4,3.4.1,3.4.3,3.4.4.
- Unit II Chapter 4 :4.1,4.2,4.2.1,4.7,4.8,4.9.
- Unit III Chapter 5 :5.1,5.2,Chapter6:6.1,6.2,6.3,Chapter8:8.7,8.8.
- Unit IV Chapter 9 :9.1,9.2,9.3,9.7,9.8,9.9,9.10,9.13,9.14.
- Unit V Chapter 11:11.5,11.9,11.12,11.13,11.16,11.17.

REFERENCE BOOK:

C No	Title of the	Anthor	Dublickon	Year of
5.INO	Book	Author	Publisher	Publication
1.	Introducing	S.S.Sastry	Prentice Hall	3rdEdition
	methods of		of India	2002
	Numerical		private	
	analysis		limited,	
			New Delhi	

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	М	S	М
CO2	Μ	М	S	S	М
CO3	S	S	S	М	S
CO4	M	S	S	М	М
CO5	Μ	S	М	S	S

SEMESTER-V

DISCIPLINE ELECTIVE COURSE

Programme Code	B.Sc	Programme Title	Mathematics
2023–2 onward	024 1s	Semester	V
Course Code		ELECTIVE-VI	DIFFERENCE EQUATIONS WITH APPLICATIONS
Hours/week	4	Credits:	3

OBJECTIVES:

This course focuses on difference equations concepts and to develop an application in differential equation. It implements the concepts such as

- Difference Calculus, Linear Difference Equations,
- Initial value problems for linear systems,
- Stability of linear systems,
- Asymptotic analysis of sums.

In addition, it also covers theme thod stoprocess the applications of difference equations.

COURSE OUTCOMES:

СО	Statement	Knowledge Level
CO1	Define the theory of Difference Calculus for building applications.	K1
CO2	Illustrate the theory of Linear Difference Equations and its related results.	K2
CO3	Demonstrate the Linear Difference Equations and properties of difference equation.	K4
CO4	Implement method for Initial value Problems for linear systems, Stability of linear systems.	К3
CO5	Apply Asymptotic analysis of sums and its applications.	К3

UNIT I:

(12 Hours)

Difference Calculus :

Difference operator– Summation– Generating function approximate summation.

UNIT II:

(12 Hours)

Linear Difference Equations:

First order equations–General results for line are equations.

UNIT III:

(12 Hours)

Linear Difference Equations(Contd.): Equations with constant coefficients I: Equations with variable coefficients–z–transform.

UNIT IV:

(12 Hours)

Initial value problems for linear systems–Stability of linear systems.

UNIT V:

(12 Hours)

Asymptotic analysis of sums-Linear equations

- Unit I (Chapter 2 Sections 2.1to 2.3) Unit II (Chapter 3 Sections 3.1to 3.2)
- Unit III (Chapter 3 Sections 3.3,3.5a nd 3.7)
- Unit IV (Chapter 4 Sections 4.1to 4.3)
- Unit V (Chapter 5 Sections 5.1to 5.3)

TEXTBOOK:

S.No	Title of the Book	Author	Publisher	Yearof Publication
1	Difference Equations	W.G.Kelleyand A.C.Peterson	Academic press, NewYork	1991

REFERENCE BOOKS:

S.No	Title of the Book	Author	Publisher	Year of Publication
1	An Introduction to Difference Equations	S.N.Elaydi	Springer– Verleg, NewYork	1990
2	Difference Equations	R.Mickens	Van Nostrand Reinhold,New York	1990
3	Difference Equations And Inequalities	R.P.Agarwal	Marcelm Dekker, NewYork	1992

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	Μ	S	S	S
CO2	M	S	S	M	М
CO3	Μ	S	М	S	S
CO4	S	М	S	M	S
CO5	S	S	М	S	S

SEMESTER-VI

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024onwards		Semester	VI
Course Code		CORE-XIII	LINEAR ALGEBRA
Hours/week	6	Credits:	4

OBJECTIVES :

This course focuses on basic analytical concepts and to develop an idea of modern algebra. The main objective is to impart the knowledge on fundamental topics such as

- Polynomial Rings over U.F.D
- Vector Spaces
- Subspace
- Linear Transformations
- Linear Independent
- Rank and Nullity
- Matrix of a Linear Transformations
- Inner product spaces
- Orthogonal complement
- Algebra of Matrices
- Eigen Values and Eigen Vectors

In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

CO. Number	Statement	Knowledge level
CO1	Define Polynomial Rings over U.F.D, Span of a Set, Matrix of a Linear, Transformation, Algebra of Matrices.	K1
CO2	Give Example Polynomial Over Q, Linear Independent, Inner product spaces, Types of Matrices, Simultaneous Linear Equations.	K2
CO3	Analyze the Vector Spaces, Basis and Dimension, Orthogonality, The Inverse of a Matrix, Characteristic Equations.	К3

CO4	Classify the Subspaces, Rank and Nullity,	К3
	Orthogonal complement, Elementary	
	Transformations, Cayley's Hamilton Theorem.	
CO5	Estimate the Linear Transformations, Orthogonal	K4
	complement, Eigen Values and Eigen Vectors.	

UNIT I:

(18 Hours)

(18 Hours)

Polynomial Rings over U.F.D -Polynomial OverQ–Vector Spaces– Definitions & Examples–Subspaces–Linear Transformations.

UNIT II:

Span of a Set-Linear Independent-Basis and Dimension-Rank and Nullity.

UNIT III:

(18 Hours)

(18 Hours)

Matrix of a Linear Transformations –Inner product spaces–Definition– Examples–Orthogonality -Orthogonal complement.

UNIT IV:

Algebra of Matrices–Types of Matrices–The Inverse of a Matrix-Elementary Transformations.

UNIT V:

(18 Hours)

Rank of a Matrix–Simultaneous Linear Equations–Characteristic Equations and Cayley's Hamilton Theorem– Eigen Values and Eigen Vectors

TEACHING METHODS:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments

TEXTBOOK:

S.	Title of the Book	Author	Publisher	Yearof
No				Publication
	Modern Algebra	Arumugam.S	Scitech	2005
		&Isaac.A.T.	Publications	
1.			PVT LTD	
			Chennai.	

Unit I Chapter4 :Section4.16-4.18&Chapter5:Section5.1-5.3

Unit II Chapter5 :Section5.4-5.7

Unit III Chapter5 :Section5.8.&Chapter6:Section6.1-6.3.

Unit IV Chapter7 :Section7.1-7.4.

Unit V Chapter7 :Section7.5-7.8.

REFERENCE BOOKS:

S.	Title of the Book	Author	Publisher	Year of
No				Publication
			Krishna	
1	A first course in modern		Prakasan	1000
1.	algebra	A.R.Vasistha	Mandhir,9,	1983
			ShivajiRoad,	
			Meerut(UP)	
			Emerald	
2.	Modern Algebra	Viswanatha Naik	Publishers	
			135,Anna	2001
			Salai,Chennai	
3	Topics in Algebra-2nd	I N Herstein	John Wiely,	1975
5.	Edition	1.11.1101810111	New York	1975

Mapping with Programme Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	М	S	М	S
CO2	S	S	Μ	М	S
CO3	S	S	М	S	S
CO4	М	S	М	S	S
CO5	S	М	М	S	S

SEMESTER-VI

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024onwards		Semester	VI
Course Code		CORE-XIV	COMPLEX ANALYSIS
Hours/week	6	Credits:	4

OBJECTIVES :

This course focuses on basic analytical concepts and to develop an ide of complex analysis. The main objective is to impart the knowledge on fundamental topics such as

- Complex Numbers and Analytical Functions
- Bilinear Transformations
- Mapping By Elementary Functions
- Power Series and Series Expansions
- Complex Integration and Calculus Of Residues
- Cauchy's Residue theorem
- Evaluation of definite integrals.
- Contour integral

In addition, it also provides analytical thinking to solve the problems

related to the above concepts.

COURSE OUTCOMES

CO	Statement	Knowledge
.Number		level
CO1	Identify the Functions of a complex variable, Elementary transformations, Sequence & Series, Difinite integral, Residues.	K1
CO2	Classify the Limits, Bilinear transformations, Sequences and series of functions ,Cauchy's theorem, Cauchy's Residue theorem.	К2

CO3	Apply the Differentiability, Fixed points of bilinear transformations, Some special bilinear transformations, Power series, Cauchy's Integral formula,Evaluation of definite integrals.	К3
CO4	Harmonic functions ,Mapping by elementary functions, Taylor's series, Contourintegral, Higher derivatives.	K4
CO5	Calculate the Complex Numbers And Analytical Functions, Power Series And Series Expansions, Complex Integration, Calculus Of Residues.	K4

UNIT I:

(18 Hours)

COMPLEXNUMBERSANDANALYTICALFUNCTIONS

Introduction – Functions of a complex variable – Limits – Theorems on limit–Continuous functions–Differentiability–The Cauchy Riemann equations– Analytic functions–Harmonic functions–Conformal mapping.

UNIT II:

(18 Hours)

BILINEAR TRANSFORMATIONS AND MAPPING BY ELEMENTARY FUNCTIONS: Introduction Elementary transformations–Bilinear transformations – Cross ratio–Fixed points of bilinear transformations–Some special bilinear transformations - Mapping by elementary functions.

UNIT III:

POWER SERIES AND SERIES EXPANSIONS:

Introduction–Sequence & Series–Sequences ands eries of functions - Power series – Elementary functions – Taylor's series-Laurent's series –Zeros of ananalytic function–Singularities.

UNIT IV:

COMPLEXINTEGRATION:

Introduction – Difinite integral – Cauchy's theorem – Cauchy's integral formula–Higher derivatives.

UNIT V:

CALCULUS OF RESIDUES:

Introduction–Residues–Cauchy's Residue theorem–Evaluation of definite integrals–Contour integral.

TEACHING METHODS:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments

(18 Hours)

(18 Hours)

(18 Hours)

NOTE:

Questions are asked for 50% theory and 50% for problems.

TEXTBOOK:

S.	Title of the	Author	Publisher	Year of
No.	Book			Publication
1.	Complex	S.Arumugam,	Scitech	2002
	Analysis	A.Thangapandi	publications(I)	
		Issac &	Pvt.Ltd.T.Nagar,	
		A.Somasundaram	Chennai-600017.	

Unit I	Chapter 2 :Sec :2.0-2.9.
Unit II	Chapter 3 :Sec : 3.0-3.5&Chapter 5:Sec: 5.0-5.7.
Unit III	Chapter 4 : Sec:4.0-4.4 & Chapter 7: Sec: 7.0-7.4.
Unit IV	Chapter 6 :Sec :6.0-6.4.
Unit V	Chapter 8 :Sec :8.0-8.3.

REFERENCE BOOK:

S.	Title of the	Author	Publisher	Year of
No.	Book			Publication
1.	Complex	T.K.Manicavachagompillai	S.Viswanathan	2009
	Analysis	S.P.Rajagopalan,	(Printers and	
		R.Sattanathan	publishers)Pvt	
			Ltd,Chennai-	
			600031.	

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	М	М	S	S
CO2	Μ	S	S	Μ	S
CO3	S	S	Μ	S	М
CO4	Μ	М	S	М	S
CO5	S	М	S	S	S

SEMESTER-VI

Programme Code	Programme B.Sc Code		Mathematics
2023–2024on	wards	Semester	VI
Course Code		CORE-XV	MECHANICS
Hours/week	6	Credits:	4

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of mechanics. The main objective is to impart the knowledge on fundamental topics such as

- Forces
- Lami's theorem
- Parallelf orces
- Varigon'stheorem
- Friction
- Projectile
- Impact

In addition, it also provides analytical thinking to solve the problems related to the

above concepts.

COURSE OUTCOMES

CO. Number	Statement	Knowledge level
CO1	Define the force, law of force and lami theorem.	K1
CO2	Classify the Parallel forces and couples	K2
CO3	Apply theidea of Friction and related problems.	К3
CO4	Analyze the concept of Projectiles and its characterization	K4

UNIT I:

(18 Hours)

(18 Hours)

Forces acting on a particle :Forces, types of forces, triangle law of forces, equilibrium of forces acting on a particle, Lami's theorem, Polygon law o forces.

UNIT II:

Couples and Forces acting on a Rigid body :Parallel forces, Moment of a force about a point and a line, couples Varigon's theorem, Couple – Equilibrium of two couples. Forces acting on a rigid body.

UNIT III:

Friction - Laws of friction – Co-efficient of friction, angle and cone of friction – Equilibrium of a particle on a rough inclined plane under any forces–Problems on friction.

UNIT IV:

(18 Hours)

(**18 Hours**)

(18 Hours)

Projectiles–Path of the projectile is a parabola–Characteristics of the motion of a projectile–Velocity of the projectile in magnitude and direction at the end of time–Range on an inclined Plane– Simple problems.

UNIT V:

Collision of elastic bodies – Newton's experimental law – Impact of a s moothsphereonafixedsmoothplane– Direct impact of two smooth spheres–Loss of Kinetic Energy – Oblique impact of two smooth spheres and loss of Kinetic Energy–Simple problems.

Teaching Methods:

Chalk and Talk/Power Point presentation/Seminar/Quiz/Discussion/Assignments

NOTE:

Questions are asked for 50% theory and 50% for problems.

TEXTBOOK:

S.	Title of the Book	Author	Publiser	Yearof
No				Publication
1.	Statics	M.K.Venkatraman	Agasthiar	1999
			Publication	
2.	Dynamics	M.K.Venkatraman	Agasthiar	1970
	-		Publications	

Unit I	Chapter1of statics book Sections2-4,
	Chapter 2of statics book Sections 3,5–9
Unit II	Chapter 3of statics book Sections 2-4,7,12and
	Chapter 4 of statics book Sections 1,2,6,7,8,9,10
TT. '4 TT	Chapter 5 of statics book Sections 1,3and5
Unit III	Chapter / of statics book Sections 1-8,10-12 and
	Chapter 6 of statics book Sections 1,2,3,5 and 8
Unit IV	Chapter VI of Dynamics book Sections 6.2,6.4,6.5,6.9 and 6.12
Unit V	ChapterVIII of Dynamics book Sections 8.3-8.8

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Statics	Dr.M.K.Venkataraman	Agasthiar PublicationS. Viswanathan	2007
			Printers&	
			Publishers	
			Pvt.Ltd	
2.	Mechanics	P.Duraipandian,Laxmi Duraipandian.Muthamizh	S.Chand&	2010
		Jayapragasam	Company Ltd	

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

COs	PSO1	PS2	PSO3	PSO4	PSO5
CO1	Μ	Μ	S	S	М
CO2	S	S	S	Μ	S
CO3	М	S	М	S	М
CO4	S	М	М	S	S
CO5	М	Μ	S	М	S

SEMESTER-VI

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024 or	nwards	Semester	VI
Course Code		DISCIPLINE ELECTIVE-VII	OBJECT ORIENTED PROGRAMMING WITH C++
Hours/week	L-3,P-2	Credits:	3

OBJECTIVES:

The aim of this course is to know all needed about C++ and object oriented programming

and also to meet the global requirements in software industries.

COURSE OUTCOMES

On successful completion of the course, the students will able to

K1	CO1	identify the concept of classes and objects.		
K2	CO2	understand the practice of object oriented programming in the		
		construction of robust maintainable programs which satisfy the		
		requirements.		
K3	CO3	apply the concepts of object-oriented programming		
K3	CO4	apply C++ programming and program development within an		
		integrated development environment.		
K4	CO5	analyze the use of operator overloading and type conversions.		

UNIT I:

[15 Hours]

Object oriented programming paradigm – Basic concept of Object - oriented programming – Benefits of OOP – Object Oriented Languages – Applications of OOP. Fundamentals of C++ - Structure of C++ program – Creating of source file – Compiling and linking.

UNIT II:

[15 Hours]

The main function – Function prototyping – Inline – Inline functions – Function overloading – Friend and virtual function.

UNIT III:

[15 Hours]

Specifying a class – Defining member functions – Marketing an outside function inline – Nesting of member functions – Private member functions arrays within a class-Memory allocation for objects – Static data members static member functions arrays of objects – Objects as function – Arguments friendly functions – Returning objects constant member functions – Pointers to members. **UNIT IV:** [15 Hours]

Constructors – Parameterized constructors – Multiple – Constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Constructing two dimensional arrays – Destructors - Defining operator overloading – Overloading unary operators – Overloading binary operators – overloading binary operators using friends – Manipulation of strings using operators – rules for overloading operators – Type conversions .

UNIT V:

[15 Hours]

Inheritance: Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance-Virtual base classes-Abstract classes-Constructors in derived classes-Nesting of classes .

TEXT BOOK:

S.	TitleoftheBook	Author	Publiser	Yearof
No				Publication
1.	OBJECT	E. Balagurusamy.	Sixth Edition,	Tenth Reprint
	ORIENTED		Tata Mc Graw	2010
	PROGRAMMING		- Hill	
	WITH C++		Publishing	
			company	
			limited	

UNIT 1 Chapter 1: Section- 1.4 to 1.8 and Chapter 2: Section 2.1 to 2.8

UNIT 2 Chapter 4

UNIT 3 Chapter 5

UNIT 4 Chapter 6 and Chapter 7

UNIT 5 Chapter 8

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	Μ	S
CO2	S	S	S	Μ	S
CO3	S	S	S	S	S
CO4	Μ	S	S	Μ	S
CO2	S	S	S	S	S

S - Strong; M- Medium; L- Low

PRACTICALS IN C++

- 1. Write a program to convert temperature Fahrenheit into Celsius.
- 2. Write a program to print the following output using for loops.
 - 1 2 2
 - 3 3 3
 - 4 4 4 4 and so on.

3. Write a program to calculate variance and standard deviation of n numbers.

- 4. Write a macro that obtains the largest of three numbers.
- 5. Write a program to maintain the stock details using class.

6. Write a program to add complex numbers using operator overloading.

- 7. Write a program to multiply complex numbers using operator overloading.
- 8. Write a program to the unary minus operator is overloaded.
- 9. Write a program to maintain the employees information using inheritance.
- 10.Write a program to find the largest value of two numbers using nesting of member function.
- 11.Write a program for shopping list using classes and objects.

12.Write a program to maintain the library details using constructor and destructor. Write a program to overloading operators using friends

SEMESTER– VI DISCIPLINE ELECTIVE COURSE –VII

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024on	wards	Semester	VI
Course Code		DISCIPLINE ELECTIVE-VII	COMBINOTORIAL MATHEMATICS
Hours/week	5	Credits:	3

OBJECTIVES:

This course focuses on discrete mathematics concepts and to develop an idea of combinatorics. The main objective is to impart the knowledge on fundamental topics such as

- Recurrence relation
- Permutations
- Gala's optimal assignment problem
- Fibonacci type relation
- Rook polynomial

In addition, it also provides analytical thinking to solve problems related to the above concepts.

COURSE OUTCOMES

CO NUMBER	STATEMENT	KNOWLEDGE LEVEL
CO1	Identify the logic behind the Recurrence relation, Permutations, Gala's optimal assignment problem,Fibonacci type relation and Rook polynomial Recurrence relation.	К1
CO2	Demonstrate the idea about Recurrence relation, Permutations, Gala's optimal assignment problem, Fibonacci type relation and Rook polynomial Recurrence relation.	K2

Uni	t I: (15)	Hours)
CO5	Apply the concepts of Recurrence relation, Permutations, Gala's optimal assignment problem, Fibonacci type relation and Rook polynomial Recurrence relation.	К3
CO4	Analyze the idea in Recurrence relation, Permutations, Gala's optimal assignment problem, Fibonacci type relation and Rook polynomial Recurrence relation.	K4
CO3	Develop the concepts of Recurrence relation, Permutations, Gala's optimal assignment problem, Fibonacci type relation and Rook polynomial Recurrence relation.	К3

Introduction to Basic ideas–General formula for f(n,k)– Recurrence Relation - boundary condition - Fibonacci sequence -generating function.

Unit II:

Permutation–Ordered selection–unordered selection– further remarks on Binomial theorem. **Unit III:**

Passing with in a set – Pairing between set and optimal assignment problem-Gala's optimal assignment problem.

Unit IV:

Fibonacci type relation-using generating function-Miscellaneous method-counting simple electrical networks.

Unit V:

(15 Hours)

The inclusion–Exclusion principle-Rook polynomial.

Teaching Methods:

Chalk and Talk / Power Point presentation/ Seminar / Quiz / **Discussion** /Assignments

(15 Hours)

(15 Hours)

(15 Hours)

TEXT BOOKS:

S.No	Title of the Book	Author	Publisher	Year of Publication
1	A First Course in Combinatorial Mathematics	Jan Anderson	Oxford Applied Mathematics and Computing Science Series, UK	1974

REFERENCE BOOKS:

S.No	Title of the Book	Author	Publisher	Year of Publication
1	Combinatorics	V.K. Balakrishnan	Schuam Series	1996

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	Μ	S
CO2	S	Μ	S	Μ	М
CO3	M	М	M	S	S
CO4	S	S	M	S	Μ
CO5	S	Μ	S	М	S

SEMESTER-VI DISCIPLINE ELECTIVE COURSE

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 onwards		Semester	VI
Course Code		DISCIPLINE	GRAPH THEORY
		ELECTIVE-VIII	
Hours/week	5	Credits:	3

OBJECTIVES:

This course focuses on basic analytical concepts and to develop an idea of graph theory. The main objective is to impart the knowledge on fundamental topics such as

- Graphs, Subgraphs
- Operations on graphs
- paths, connection, blocks
- Eulerian, Hamiltonian Graphs
- Characterization of Trees ,Centre of a Tree
- Characterization of Planar Graphs
- Thickness, Crossing and Outer Planarity

In addition, it also provides analytical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

CO. Number	Statement	Knowledge level
C01	Define Degrees, Walks, Trails and Paths, Eulerian Graphs, Characterization of Trees, Characterization of Planar Graphs.	K1
C02	Illustrate the Sub graphs ,Connectedness, Eulerian Graphs ,Characterization of Trees,Thickness.	K2

CO3	Discover the Operations on Graphs, components, Hamiltonian Graphs, Center of a Tree, Crossing and Outer Planarity.	К3
CO4	Classify the Operations on Graphs, Blocks – Connectivity, Hamiltonian Graphs, Center of a Tree, Crossing and Outer Planarity.	K4
CO5	Conclude the Operations on Graphs, Blocks – Connectivity, Hamiltonian Graphs, Center of a Tree, Crossing and Outer Planarity.	K4

UNIT I:

(15 Hours)

Introduction– Definition and Examples– Degrees– Subgraphs– Operations on Graphs– Problems.

UNITII:

(15 Hours)

(15 Hours)

Introduction–Walks, Trails and Paths–Connectedness and components–Blocks–Connectivity.

UNIT III:

Introduction–Eulerian Graphs–Hamiltonian Graphs.

UNIT IV:

(15 Hours)

Introduction–Characterization of Trees–Center of a Tree.

UNIT V:

(15 Hours)

Introduction–Definition and Properties–Characterization of Planar Graphs–Thickness, Crossing and Outer Planarity

Teaching Methods:

Chalk and Talk / PowerPoint presentation/ Seminar / Quiz / Discussion/Assignments

TEXT BOOK:

S. No	Title of the Book	Author	Publisher	Year of Publication
1.	Invitation to	S.Arumugam,	Scitech	2001
	Graph Theory	S.Ramachandran	Publications,	
	Graph Theory		Chennai	

UNIT 1 Chapter 1: Section- 1.4 to 1.8 and Chapter 2: Section 2.1 to 2.8 UNIT 2 Chap–II: Sec–2.0–2.3&2.9 UNIT 3 Chap–V: Sec–5.0–5.2 UNIT 4 Chap–VI: Sec–6.0–6.2 UNIT 5 Chap–VIII: Sec–8.0–8.3

REFERENCE BOOKS:

S.No	Title of the Book	Author	Publisher	Year of Publication
1.	Basics of Graph Theory	K. R. Parthasarathy	TMH Publishing company	2001
2.	Graph theory	S.Kumaravelu and Suseela kumaravelu	SKV Printers	1996
3.	A first course in Graph theory	A. Chandran	Macmillan Publishers, Chennai	1997

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	S	Μ	S	S
CO2	Μ	М	S	S	Μ
CO3	S	S	S	М	S
CO4	М	S	М	М	S
CO5	S	S	М	М	S

SEMESTER – VI DISCIPLINE ELECTIVE COURSE – IV

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024on	wards	Semester	VI
Course Code		DISCIPLINE ELECTIVE- VIII	FUZZY SET AND APPLICATIONS
Hours/week	5	Credits:	3

OBJECTIVES:

This course introduces fundamental concepts in Fuzzy sets and Fuzzy logic. It covers concepts such as

- Form classical sets to fuzzy sets;
- Fuzzy sets versus crisp sets, Operations on fuzzy sets,
- Fuzzy arithmetic, Fuzzy relations and Fuzzy Logic.

It provides technical skills to understand and develop various ideas about analysis.

COURSE OUTCOMES:

СО	Statement	Knowledge Level
CO1	Identify the logic behind the execution of the form classical sets to fuzzy sets; Fuzzy sets versus crisp sets	K1
CO2	Understand the concepts of an operations on fuzzy sets.	K2
CO3	Analyze the concept of fuzzy arithmetic	K3

CO4	D4 Develop the idea about the fuzzy relations.					
CO5	CO5 Apply the concepts to the fuzzy logic and its related theorems.					
UNIT I: (15 Hours)						
Form c	lassical sets to fuzzy sets, Fuzzy sets versus crisp	sets				
In	troduction-Crisp sets - Fuzzy sets - Characteristics	and				
signi	ficance of the paradigm shift- Additional properties	-cuts-				
Representation of fuzzy sets–Extension principal for fuzzy sets.						
UNIT II: (15 Hours)						
Operati	ons on fuzzy sets					
Тур	es of operations-Fuzzy complements-Fuzzy inters	ections: t-				
• 1						

norms– fuzzy unions: t–conorms– Combinations of operations – Aggregation operations.

UNIT III:

Fuzzy arithmetic

Fuzzy numbers–Linguistic variables–Arithmetic operations on intervals– Arithmetic operations on fuzzy numbers–fuzzy equations.

UNIT IV:

Fuzzy relations

Crisp versus Fuzzy relation - projections and cylindric extensions -binary fuzzy relations-Binary Relations on a single set - Fuzzy compatibility relations - Fuzzy ordering Relations - Furry Morphisms -Sup-I compositions of Fuzzy Relations-Info compositions of Fuzzy Relations

UNIT V

Fuzzy Logic

Classical Logic-Multivalued Logic-Fuzzy propositions-Fuzzy propositions-Fuzzy Quantifiers-Linguistic Hedges-Inference form conditional fuzzy propositions-Inference from conditional and qualified propositions-Inference form quantified propositions.

TEACHING METHODS:

Chalk and Talk/ PowerPoint presentation/ Seminar/ Quiz/ Discussion/ Assignments

TEXT BOOK:

S.No	Title of the Book	Author	Publisher	Year of Publication
1	Fuzzy sets and Fuzzy logic Theory and Applications	George J, Klir Bo Yuvan	PHI learning pvt. ltd	2009

(15 Hours)

(15 Hours)

(15 Hours)

REFERENCE BOOKS:-

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Fuzzy sets and	George J.	Pearson	2015
	Fuzzy logic	Klir	Education	
	Theory and Applications		of india	

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	Μ	S	Μ	S
CO2	Μ	S	S	S	Μ
CO3	S	Μ	Μ	S	Μ
CO4	Μ	S	S	Μ	S
CO5	S	Μ	S	S	М

SEMESTER-VI SKILL ENHANCEMENT COURSE–VII

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024or	wards	Semester	VI
Course Code		SEC-VII	PROGRAMMING IN C
Hours/week	2	Credits:	2

OBJECTIVES:

This course introduces fundamental concepts such as arrays, structures. It covers concepts such as arrays, pointers and file handling methods. It provides technical skills to design and develop various applications.

COURSE OUTCOMES:

CO Number	CO Statement	Knowledge Level
CO1	Remember Data Types, Constant and Variables & Functions.	K 1
CO2	Understand the concepts of Conditional and looping Statements.	К2
CO3	Apply the concept of Functions, Storage Classes, and Files in a program.	К3
CO4	Evaluate the working of Arrays, Structures and String.	K5
CO5	Create a file program using Pointers.	K6

(6 Hours)

C fundamentals Character set - Identifier and keywords data types -Constants - Variables - Declarations - Expressions -Statements-Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators- Library functions.

UNIT II

(6 Hours)

Data input output functions-Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures-Switch, break and continue, goto statements- Comma operator.

UNIT III

(6 Hours)

Functions- Definition- proto-types- Passing arguments-Recursions. Storage Classes - Automatic, External, Static, Register Variables – Multi- file programs.

UNIT IV

(6 Hours)

Arrays- Defining and Processing- Passing arrays to functions-Multidimensional arrays-Arrays and String. UNIT V

(6 Hours)

Structures- User defined data types-Passing structures to functions- Self- referential structures-Unions-Bitwise operations.

TEXT BOOK:

S. No`	Author	Title of the book	Publisher	Year of publication
1.	E. Balagurusamy	Programming in ANSI C	Tata Mc Graw Hill	2017

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Byron Gott fried	Programming with C	Tata Mc Graw Hill	2013
2.	Yash want Kanetkar	Letus C	BPB Publications	2014
3.	Martin J. Gentile	An Easy Guide to Programming in C	Create Space Independent Publishing Platform	2012

UNIT I

Mapping with Programme Specific Outcomes

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	S	S	М	S
CO2	S	М	S	S	М
CO3	S	М	М	S	S
CO4	М	S	S	М	S
CO5	S	S	М	S	М
SEMESTER-I

GENERICELECTIVECOURSE-I

(For other Department).

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024 (onwards	Semester	Ι
Course Code		ALLIED I	ALLIED MATHEMATICS-I (B.Sc., Physics & Chemistry) THEORY OF EQUATIONS, MATRICES, FINITE DIFFERENCES, TRIGONOMETRY AND DIFFERENTIAL CALCULUS
Hours/week	5	Credits:	4

OBJECTIVE :

To understand the fundamental concepts of Algebra & Finite Differences.

To introduce the fundamental concepts of Trigonometry & Differential Calculus **COURSE OUTCOMES (COS)**

On successful completion of the course, the students will be able to

K1	CO1	remember numbers, sequences, series, basic summaries from
		partial fraction, equations, matrices
K2	CO2	understand trigonometric values and Interpolations
K3	CO3	solve problems by using theorems
K3	CO4	analyze homogeneous and non-homogeneous linear equations
K4	CO5	analyze and Evaluate inverse functions.

UNIT I

(15 Hours)

Theory of equations : Fundamental theorem of algebra - Symmetric function of the roots – formation of equation – certain standard transformation – To diminish the roots of equation by h - Reciprocal equations –Geometrical meaning of Newton - Raphson Method – Sufficient condition of the convergent of the sequence of approximate roots.

UNIT II

Matrices : Fundamental Concepts – Special types of Matrices -Properties of matrices in addition - Properties of matrices in multiplication -Properties of identity matrix - Inverse of the Matrices - Rank of Matrices -Invariance of the rank of matrix - Linear equations - Homogeneous and Non-Homogeneous linear equations.

UNIT III

Interpolation : Introduction - Extrapolation - Linear interpolation or method of proportional parts – Gregory Newton's forward interpolation – Gregory Newton's backward interpolation(for equal intervals)- Error in polynomial interpolation - Error in Newton forward interpolation formula - Error in Newton forward interpolation formula – Equidistant terms with one or more missing values - Lagrange's interpolation(for unequal intervals)

UNIT IV

Trigonometry : Exponential series - Periodicity - Circular functions interms of exponential functions - Hyperbolic functions - Periods of Hyperbolic functions -Relations connecting Hyperbolic functions and circular function - Inverse hyperbolic Functions.

UNIT V

Differential Calculus : Jacobians - Solved problems - Polar curves - Polar coordinates - Transformation of Cartesian to polar and vice versa -Curvature – Radius of curvature in Cartesians – Parametric Form.

TEXT BOOK:

S. No`	Author	Title of the book	Publisher	Year of publication
1.	P . Kandasamy , K . Thilagavathy	"ALLIED MATHEMATICS" PAPER-I First semester	S.Chand Edition	2013

UNIT 1 Chapter : I, II, III UNIT 2 Chapter : I, II, III UNIT 3 Chapter : II,III UNIT 4 Chapter : II.III UNIT 5 Chapter : II,III,IV

(15 Hours)

(15 Hours)

(15 Hours)

(15 Hours)

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Jain Algebra and Trigonometry	G.C.Sharma and Madhu	1st Edition, Galgotia Publications Pvt.Ltd	2003
2.	Numerical Methods	Dr.S.Arumugam, A.Thangapandi Isaac and A.Somasundaram	2nd reprint, Scitech Publication India Pvt, Ltd	2004

Mapping with Programme Specific Outcomes

PO	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong; M- Medium; L- Low

SEMESTER–II GENERIC ELECTIVE COURSE-II

(For other Department)

Programme	B.Sc	Programme	Mathematics
Code		Title	
2023–2024	onwards	Semester	II
Course Code		ALLIED II	ALLIED MATHEMATICS-II
			(B.Sc., Physics & Chemistry)
			INTEGRAL
			CALCULUS, DIFFERENTIAL
			EQUATIONS, LAPLACE
			TRANSFORMS & VECTOR
			ANALYSIS.
Hours/week	5	Credits:	4

OBJECTIVES:

To acquaint the students become familiar with tools in Mathematics to understand problems.

COURSE OUTCOMES (COS)

On successful completion of the course, the students will be able to

K1	CO1	understand the I and II integrals
K2	CO2	understand properties of integrals, Laplace transform.
K3	CO3	understand first order differential equations.
K3	CO4	analysis Theorems and proves.
K4	CO5	evaluate the importance of shifting properties

UNIT I

(15 Hours)

Integral calculus : Methods of integration-Definite integrals of the form $\int \frac{f'(x)}{f(x)} dx , \int \frac{f'(x)}{\sqrt{f(x)}} dx \int \frac{acosx+bsinx}{acosx+\beta sinx} dx , \int e^x [f(x)+f'(x) dx]$ only - Integration by parts-Properties of Definite Integrals - Reduction formulae Sinⁿx, Cosⁿx only. **UNIT II** (15 Hours) Fourier series – Definition of Fourier Series – Standard results in integrals-Definition- Dirchlet's conditions - Fourier series of periodicity 2π and 2l - Odd and even functions –Root mean square value of a function Half range series: Introduction- Half range series – Cosine series - sine series UNIT III (15 Hours)

Ordinary differential equations: Equations solvable for p, Equations solvable for x, Equations solvable for y, Clairauts equation, Equations of first order and of degree higher than one –Total Differential Equation-Necessary and sufficient condition for inerrability of Pdx+Qdy+Rdz=0 – General method of solving Pdx+Qdy+Rdz=0 by taking one variable as constant - Partial Differential equations-By elimination of arbitrary constants - By elimination of arbitrary function **UNIT IV** (15 Hours)

Laplace Transforms- Definition – Laplace Transform of standard functions (e^{at}, cosat, sinat, coshat, sinhat,tⁿ, na positive integer) – Linearity property – First shifting theorem – piecewise continuity- exponential order - Inverse Laplace Transform of standard functions –Problems using partial fraction - LaplaceTransform of derivatives of integrals.

UNIT V

(15 Hours)

Vector Analysis : Differentiation of Vectors –scalar and vector fields – derivative of vectors - Gradient ,- Definition –Directional derivative – directional derivative of scalar point function along any line – level surface- formulae involving - second order differential operators - Divergence and Curl .

S. No`	Author	Title of the book	Publisher	Year of publication
1.	P . Kandasamy , K . Thilagavathy	"ALLIED MATHEMATICS" PAPER-II First semester	S.Chand Edition	2013

TEXT BOOK:

UNIT 1 [Chapter : 1 Pg.No : 1 to 19 & 46 to 51]; [Chapter : 2 Pg.No : 53 to 60]; [Chapter : 3 Pg.No : 61 to 64]

UNIT 2 [Chapter : 6 Pg.No : 140 to159]

- UNIT 3 [ODE Chapter : 1,2 Pg.No:160 to 179] [PDE- Chapter : 1 (1.1 to 1.4)Pg.No:186 to 195]
- UNIT 4 [Chapter : 1 Pg.No : 234 to 272]
- UNIT 5 [Chapter : 1,2 Pg.No:299 to320]

REFERENCE BOOKS:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	Differential Calculus	Shanti Narayan	Shyamlal	2004
			Charitable Trust,	
			New Delhi.	
2.	Vector Calculus	P.N.Chatterji	1st Edition, Rajhans Prakahan	1998
			Publishers, Chennai	

Mapping with Programme Specific Outcomes

<u>P0</u>	PO1	PO2	PO3	PO4	PO5
CO					
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S - Strong; M- Medium; L- Low

Programme Code	B.Sc	Programme Title	Mathematics
2023–2024on	wards	Semester	IV
Course Code		ENHANCEMENT	ENVIRONMENTAL
		COMPULSORY	STUDIES
		COURSE-I	
Hours/week	2	Credits:	2

OBJECTIVES

This course is to provide basic knowledge on the environment, ecosystem, natural resources, biodiversity and conservation, pollution, environmental policy awareness, and management. This course is also describes the population explosions and disaster management.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

СО	CO	Knowledge
Number	Statement	Level
CO1	State the concepts of the ecosystem, natural resources, biodiversity, pollution and Social Issues in the Environment	K1
CO2	Describe the environment in terms of ecosystem and its structural and functional aspects. Also explore the interconnectedness among all the biotic and abiotic components of the environment and the dynamic nature of the ecological processes for sustainable development	K2
CO3	Demonstrate and apply various concepts in the environmental systems and issues at local, regional, and global levels	К3

	Analyze various types of ecosystem, resources,				
CO4	biodiversity, pollution, and environmental	K4			
	regulations for a healthy				
	environment				

Unit – I: The Environment:

The Atmosphere, Hydrosphere, Lithosphere, Biosphere, Ecology, Ecosystem,Biogeochemical Cycle(Carbon Cycle, Nitrogen Cycle),

Unit – II: Environment Pollution:

Air Pollution, Water Pollution, Soil Pollution, Radiation Pollution.

Unit – III: Population Ecology:

Individuals, Species, Pollution, Community, Control Methods of Population, Urbanization and its effects on Society, Communicable Diseases and its Transmission, Non-Communicable Diseases.

Unit- IV: Environmental Movements in India:

Grassroot Environmental movements in India, Role of women, Environmental Movements in Tamil Nadu, State Pollution Control Board, Central Pollution Control Board.

Unit –V Natural Resources:

Conservation of Natural Resources, Management and Conservation of Wildlife, Soil Erosion and Conservation, Environmental Laws: Water Act, 1974, Air Act, 1981, The Wildlife (Protection) Act, 1972, Environment Protection, 1986, Natural Disasters and their Management.

References:

Dr Bharucha Erach, Text Book of Environmental Studies for UG Course, University Press (India) Pvt. Ltd.

Dr Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd, Ahmedabad – 380 013, India.

Katyal Timi & Satake M., Environmental Pollution, Anmol Publication Pvt. Ltd, New Delhi.G. R. Chhatwal, M. C. Mehra, M. Satake, T. Katyal & Mohan V., Environmental Radiation and Thermal Pollution and their control, Anmol Publications, New Delhi.

R. C. Brunner, Hazardous Waste Incineration, Mc Graw Hill Inc.

K. C. Agarwal, Environmental Biology, Nidi Publishing Ltd, Bikaner.

R. N. Basu (Editor), Environment Calcutta University, Kolkata.

QUESTION PATTERN

Section – A: (10X1=10)

Ten questions are to be given, testing K1. All questions are to be answered. Each question carries one mark. Questions must be taken from all units.

Section – B: (5X7=35)

Five questions are to be given in the internal choice (Either-or) pattern, testing K2 and K3.

Questions must be taken from all units. Each question carries seven marks.

Q.No-11 (A and B) from Unit – I

Q. No -12 (A and B) from Unit – II

Q.No-13 (A and B) from Unit – III

Q.No-14 (A and B) from Unit – IV

Q.No-15 (A and B) from Unit - V

Section - C (3X10=30)

Five questions are to be given, testing K4 and K5. Three questions are to be answered.

Each question carries Ten Marks. Questions must be taken in this order.

Q.No. – 16 from Unit – I

Q.No. - 17 from Unit - II

Q.No. – 18 from Unit - III

Q.No. – 19 from Unit - IV

Q.No. - 20 from Unit - V

Course		Value Education	Hr	Credi	CI	C
Code			S	ts	Α	Ε
Sem-V / Part	t– IV		2	2	25	75

Learning Objectives:

This course aims to

LO1 – build physical and mental strength of the learners

LO2 – strengthen the emotional and spiritual aspects of the learners.

LO1 – make the learners responsible and cooperative citizens

LO3 – develop democratic way of thinking and inculcate spirit of national integration

LO4 – develop the practice of paying respect for dignity of individual and diversity in

society

COURSE CONTENT

Unit I - Yoga and Physical Health

- 1.1 Physical Structure Three bodies Five limitations
- 1.2 Simplified Physical Exercises Hand Exercises -Leg Exercises Breathing Exercises – Eye Exercises – Kapalapathi
- 1.3 Maharasanas 1-2 Massages Acu-puncture Relaxation
- 1.4 Yogasanas Hugga Landshar Padmasana Vajrasanas Chakrasanas (Side) Viruchasanas Yoga muthra Patchimothasanas Ustrasanas Vakkarasanas Salabasanas

Unit II - Art of Nurturing the life force and Mind

2.1 Maintaining the youthfulness – Postponing the ageing process

- 2.2 Sex and Spirituality Significance of sexual vital fluid Married life Chastity
- 2.3 Ten stages of Mind
- 2.4 Mental frequency Methods for concentration

Unit III - Sublimation

- 3.1 Purpose and Philosophy of life
- 3.2 Introspection Analysis of Thought
- 3.3 Moralization of Desires
- 3.4 Neutralization of Anger

Unit IV – Human Resources Development

4.1 Eradication of worries

- 4.2 Benefits of Blessings
- 4.3. Greatness of Friendship
- 4.4 Individual Peace and World Peace
- Unit V Law of Nature
- 5.1 Unified force Cause and Effect system
- 5.2 Purity of Thought and Deed and Genetic Centre
- 5.3 Love and Compassion
- 5.4 Cultural Education Five fold Culture

1) போகமும் உடல்நலமும்	(16 hours)
1.1 உடலமைப்பு — 3 உடல்கள் - ஐந்தில் அளவுமுறை	
1.2 எளியமுறை உடற்பயிற்சி — கைப்பயிற்சி — கால் பயிற்சி -	ഗൂச்சுபயிற்சி — കൽ
பயிற்சி — கபாலபதி	
1.3 மகராசனம் 1-2 – உடல் தேய்த்தல் - அக்குபிரஷா் பயிற்சி	– உடல் தளர்த்தல்
1.4 யோகாசனங்கள்: சுப்பட்டியல்காரம் – பத்மாசனம் – வஜ்ராச	னம் - சக்கராசனம்
(பக்கவாட்டில்) — விருச்சாசனம் - யோக முத்ரா — பச்சி பே	மாத்தாசனம் -
உஸ்ட்ராசனம் - வக்கராசனம் - சலபாசனம்	
	(16 hours)
	ட – கம்பகெறி
	. هامر - ۲- مر
2.3 ഇങ്ങളിൽ ലക്ക് ല്യൂറ്റത്തായത്ത് പ്രവർക്ഷങ്ങ പ്രവിന്നിക്ക്	
3) குணநலப்பேறு	(16 hours)
3.1 வாழ்வின் நோக்கம் - வாழ்க்கைத் தத்துவம்	
3.2 அகத்தாய்வு — எண்ணம் ஆராய்தல்	· · · ·
3.3 ஆசை சீரமைத்தல்	
3.4 சினம் தவிர்த்தல்	
	(16 hours)
4) ഥങ്ങിதഖണ	(10 110 113)
4.1 കഖതാസ ഒழിத்தல	
4.2 வாழ்த்தும் பயனும	
4.4 தனிமனித அமைதி — உலக அமைதி	(16 hours)
5) இயற்கை நியதி	(10 nours)
5.1 ஒருங்கிணைப்பு ஆற்றல் - செயல்விளைவுத் தத்துவம்	
5.2 மனத்தூய்மை, வினைத்தூய்மை — கருமையம்	
5.3 அன்பும் கரணையும்	
5.4 பண்பாட்டுக் கல்வி — ஐந்தொழுக்கப் பண்பாடு	

Reference Book:

Manavalakalai Yoga, Vethathri Publications, Tamil Nadu, 2008.

Evaluation Pattern:

Practical [Performing Yoga & Meditation] – 25 marks

Theory [End-Semester Examination] - 75 marks

Question Pattern:

Section – A:

Ten objective type questions with multiple answers are to be given. (10X1=10)

Section – B:

Five short essay type questions in 'Either – or' pattern are to be given. (5X7=35)

Section – C:

Five long essay type questions are to be given. Three questions are to be answered. (5X10=30)

Course		Summer Internship / Industrial	Hrs	Credits	CI	С
Code		Training			Α	Ε
Sem-V / Part	t– IV		-	2	25	75

Learning Objectives:

LO1 – To offer a hands-on-learning experience, that allows the learners to maximize the outcome and benefits of their theoretical knowledge through practical implementation.

LO2– To provide the learners an experience of the real corporate world and thus help them understand the expectations and requirements of the industry

LO3 – To enable the learners build their network and professional relationships, which turns them into confident future professionals.

Course outcomes:

Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experience and also become responsible citizens

Duration of the Training:

The learners of all the Under-Graduation Programmes are to undergo the Internship / Industrial Training during the summer vacation(after completion of the IV Semester examinations) 30 hours.

Evaluation:

After completion of the training, the evaluation of the performance of the learners will be done in the V semester.

Two credits will be awarded for the best performers.

Viva-voce examination will be conducted and the learners have to appear for the Viva-voce individually.

At the time of Viva-voce, the learners have to submit the given records to the examiner.

Work Diary, endorsed by the trainer

A complete report on the objectives, modules and outcomes.

A certificate, duly signed and issued by the trainer

SEMESTER I EXTRA CREDIT PAPER – I

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024	onwards	Semester	Π
Course Code		EXTRA CREDIT PAPER – I	NON VERBAL REASONING FOR COMPETITIVE EXAMINATIONS
Hours/week	2	Credits:	2

DBJECTIVES

This course focuses on basic technical concepts and to develop an idea of non verbal reasoning. The main objective is to impart the knowledge on fundamental topics such as

- Series
- Classification
- Analytical reasoning
- Mirror Images & Water Images
- Completion of Incomplete Pattern, Figure Matrix

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

On the successful completion of the course , students will be able to

CO. Number	Statement	Knowledge level			
CO1	CO1 Memorize the Series, Analogy, Classification, Analytical, reasoning, Mirror – Images & Water – Images, Completion of Incomplete Pattern, Figure Matrix				
CO2	Classify the Series, Analogy, Classification, Analytical, reasoning, Mirror – Images & Water – Images, Completion of Incomplete Pattern, Figure Matrix	K2			
CO3	Apply the Series, Analogy, Classification, Analytical reasoning, Mirror – Images & Water – Images, Completion of Incomplete Pattern, Figure Matrix	КЗ			
CO4	Calculate the Series, Analogy, Classification, Analytical, reasoning, Mirror – Images & Water – Images, Completion of Incomplete Pattern, Figure Matrix.	K4			
CO5	Simplify the Series, Analogy, Classification, Analytical, reasoning, Mirror – Images & Water – Images, Completion of Incomplete Pattern, Figure Matrix.	K4			
UNIT I	:	(6 Hours)			
Se UNIT I	ries- Completion of Series I:	(6 Hours)			
C	lassification				
UNIT I	II:	(6 Hours)			
A	nalogical non verbal reasoning				
UNIT I	V:	(6 Hours)			
Mi	irror – Images & Water – Images.				

UNIT V:

(6 Hours)

Completion of Incomplete Pattern, Figure Matrix

TEXT BOOK:

S.No	Name of the Book	Author	Publisher	Year Of
				Publications
1.	Test of Reasoning for Competitive Examinations	Edgar Thrope	Tata Mc Graw – Hill Publishing company Limited	2006

REFERENCE BOOK:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	A Modern Approach to non Verbal	R.S.Aggarwal	S.Chand Co Ltd,	2018 Second Edition
	Reasoning			

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	S	М	S	М
CO2	S	М	S	М	S
CO3	М	S	М	S	S
CO4	S	М	S	М	S
CO5	S	М	М	S	S

S- Strong; M-Medium.

SEMESTER III EXTRA CREDIT PAPER – II

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024	onwards	Semester	II
Course Code		EXTRA CREDIT PAPER – II	SOLAR SYSTEM AND STELLAR UNIVERSE
Hours/week	2	Credits:	2

COURSE OUTCOMES

On the successful completion of the course , students will be able to

CO1	Acquire the knowledge of Sun and Planets.	Knowledge (level K1)
CO2	Understand the concepts of comets, Meteors, Zodiacal	Understand (level K2)
CO3	Understand the Stellar universe	Understand (level K2)
CO4	Analyze the different kinds of Eclipses	Analysis (Level K4)
CO5	Analyze the concept of Zodiacal Constellation	Analysis (Level K4)

UNIT I:

(6 Hours)

Sun and Planets.

UNIT II:

(6 Hours)

Comets - Asteroids - Meteors - Zodiacal light.

UNIT III:

(6 Hours)

 $Eclipses-causes-conditions-comparison-different\ kinds\ of\ Eclipses.$

UNIT IV:

The Stellar Universe.

UNIT V:

Constellations – Zodiacal Constellations.

TEXT BOOK:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
	Astronomy	Kumaravelu and	S.Kumaravelu,	1984
1.		Susila	MurugaBhavanam,	
		Kumaravelu	Chidambara Nagar,	
			Nagarkoil-2	

REEFERENCE BOOK:

S.	Title of the	Author	Publisher
No	Book		
1.	Astronomy & Why the sky is blue?	G.V. Ramachandran	Scientific publications.

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	S	М	S	М
CO2	S	М	S	М	S
CO3	М	S	М	S	S
CO4	S	М	S	М	S
CO5	S	М	М	S	S

S- Strong; M-Medium.

(6 Hours)

(6 Hours)

SEMESTER V EXTRA CREDIT PAPER – III

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024 onwards		Semester	III
Course Code		EXTRA CREDIT PAPER – III	SET THEORY AND LOGIC
Hours/week	2	Credits:	2

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1	Acquire the concept of Basic set operations	Knowledge (level K1)
CO2	Understand the concept of Equivalence relation	Understand (level K2)
CO3	Analyse Tautology and Contradiction	Analysis (Level K4)
CO4	Apply the concept of conjunction – disjunction	Application (Level K3)
CO5	Analyze the concept of logically true and logically Equivalent statement	Analysis (Level K4)

UNIT I:

(6 Hours)

Basic set operations – Union – Intersection – Difference – Complement.

UNIT II:

(6 Hours)

Reflexive – Symmetric – Transitive – Equivalence relation.

UNIT III:

(6 Hours)

Logic-statements-conjunction-disjunction-negation-conditional-bi-conditional.

UNIT IV:

Propositions and truth table – Tautology and Contradiction.

(6 Hours)

UNIT V:

(6 Hours)

Logical Equivalence, Algebra of Propositions, logically true and logically Equivalent statement.

TEXT BOOK:

S.	Title of the	Author	Publisher
No	Book		
	DISCRETE	B.S. Vatssa.	Scientific
1.	MATHEMATICS		publications.

REFERENCE BOOK:

S.	Title of the	Author	Publisher
No	Book		
1.	2000 Solved Problems	Shyam series	Scientific publications.

Mapping with Programme Specific Outcomes:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	М	S	М	S	М
CO2	S	М	S	М	S
CO3	М	S	М	S	S
CO4	S	М	S	М	S
CO5	S	М	М	S	S

S- Strong; M-Medium.

NOTE : 5X20=100 marks (Two Questions from each unit) 5 out of 8 questions

SEMESTER I VALUE ADDED COURSE -I

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024	onwards	Semester	II
Course Code		VALUE ADDED PAPER – I	VERBAL REASONING FOR COMPETITIVE EXAMINATIONS
Hours/week	2	Credits:	2

OBJECTIVES

This course focuses on basic technical concepts and to develop an idea of verbal reasoning. The main objective is to impart the knowledge on fundamental topics such as

- Series Completion, Coding –Decoding
- Blood Relations, Direction Sense Test
- Logical Venn Diagrams ,Mathematical Operations
- Verification of Truth of the Statement, Arithmetical Reasoning
- Assertion and Reason, Inserting the Missing Character

In addition, it also provides technical thinking to solve the problems related to the above concepts.

COURSE OUTCOMES

On the successful completion of the course , students will be able to

CO. Number	Statement	Knowledge level			
CO1	Identify the Series Completion, Blood Relations, Logical Venn Diagrams, Assertion and Reason	K1			
CO2	2 Classify the Coding Direction Sense Test, Mathematical Operations, Inserting the Missing Character, Verification of Truth of the Statement.				
CO3	Examine the Decoding ,Blood Relations, Inserting the Missing Character.	К3			
CO4	Estimate the Logical Venn Diagrams, Verification of Truth of the Statement, Arithmetical Reasoning.	K4			
CO5	Calculate the Logical Venn Diagrams, Verification of Truth of the Statement, Arithmetical Reasoning.	K4			
UNIT I:	(6	Hours)			
Seri	es Completion				
UNIT II:	(6	Hours)			
Ver	bal Classification				
UNIT III	: (6	Hours)			
Ver	bal Analogy				
UNIT IV	: (6	Hours)			
Cod UNIT V:	ing and Decoding (6	Hours)			
Blood Re	lations, Direction				

TEXT BOOK:

S.No	Name of the Book	Author	Publisher	Year Of
				Publications
1.	Test of Reasoning for Competitive Examinations	Edgar Thrope	Tata Mc Graw – Hill Publishing company Limited	2006

REFERENCE BOOK:

S.	Title of the	Author	Publisher	Year of
No	Book			Publication
1.	A Modern Approach to non Verbal Reasoning	R.S.Aggarwal	S.Chand Co Ltd,	2018 Second Edition

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES:

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	Μ	S	М	S	М
CO2	S	М	S	М	S
CO3	Μ	S	М	S	Μ
CO4	S	М	S	М	S
CO5	S	Μ	М	S	S

S- Strong; M-Medium.

Question Pattern

Section – A:

Eight questions will be given. Five questions are to be answered. $5 \ge 20 = 100$ marks

SEMESTER II VALUE ADDED COURSE -II

Programme Code	B.Sc	Programme Title	Mathematics
2023-2024 onwards		Semester	II
Course Code		VALUE ADDED PAPER – II	Coding Theory
Hours/week	2	Credits:	2

Course Outcomes:

S.No	Description	Blooms' Taxonomy	
		Level	
1	understand the concept of Error detection, correction and decoding	Knowledge (Level 1)	
2	apply the concept of Linear Codes, Hamming weight and Bases for linear codes	Application (Level 3)	
3	get a clear idea about the concepts of Finite Fields	Analysis (Level 4)	
4	understand the concept of Generator matrix and Check matrix	Knowledge (Level 1)	

COURSE CONTENT

UNIT I:

(6 Hours)

Error detection, correction and decoding: Communication channels – Maximum Likelihood decoding

UNIT II:

Hamming distance – Nearest neighbour / minimum distance decoding – Distance of a code.

UNIT III:

(6 Hours)

Finite Fields: Finite fields – Polynomial rings – Structure of finite fields - Minimal Polynomials.

(6 Hours)

UNIT IV:

(6 Hours)

Linear codes: Vector spaces over finite fields - codes. Linear Codes - Hamming weight - Bases for linear

UNIT V:

(6 Hours)

Bases for linear- Generator matrix and parity - Check matrix – Equivalence of linear codes

TEXT BOOK:

S.No	Name of the Book	Author	Publisher	Year Of
				Publications
1.	Coding Theory - A first course	San Ling and Chaoping Xing	Cambridge University Press	2004

Question Pattern

Section – A:

Eight questions will be given. Five questions are to be answered. $5 \ge 20 = 100$ marks

SEMESTER II VALUE ADDED COURSE -III

Programme Code	B.Sc	Programme Title	Mathematics	
2023-2024 onwards		Semester	II	
Course Code		VALUE ADDED PAPER – III	Mathematics for Environmental Studies	
Hours/week	2	Credits:	2	

S.No	Description	Blooms' Taxonomy Level	
1	Understand the concept of Fibonacci numbers in	Knowledge (Level 1)	
	nature		
2	Study the Different types of Fibonacci and Lucas	Application (Level 3)	
	numbers and its applications.		
	apply the concepts of golden ratio	Application (Level 3)	
4	Analyze the concept of Gattei's discovery of golden ratio	Analysis (Level 4)	

COURSE CONTENT

UNIT I:

(6 Hours)

Fibonacci Numbers in nature The rabbit problem, Fibonacci numbers, recursive definition, Lucas numbers, Different types of Fibonacci and Lucas numbers.

UNIT II:

(6 Hours)

Fibonacci numbers in nature : Fibonacci and the earth, Fibonacci 29 and flowers, Fibonacci and sunflower, Fibonacci, pinecones, artichokes and pineapples, Fibonacci and bees, Fibonacci and subsets, Fibonacci and sewage treatment, Fibonacci and atoms, Fibonacci and reflections

UNIT III:

Fibonacci, paraffins and cycloparaffins, Fibonacci and music, Fibonacci and compositions with 1's and 2's.

UNIT IV:

(6 Hours)

Golden Ratio -The golden ratio, mean proportional, a geometric interpretation, ruler and compass construction, Euler construction, generation by Newton's method.

UNIT V:

(6 Hours)

The golden ratio revisited, the golden ratio and human body, golden ratio by origami, Differential equations, Gattei's discovery of golden ratio, centroids of circle.

TEXT BOOK:

S.No	Name of the Book	Author	Publisher	Year Of
				Publications
1.	Fibonacci and Lucas numbers with applications	Thomas Koshy	John Wiley & Sons, Inc	2001

Question Pattern

Section – A:

Eight questions will be given. Five questions are to be answered. $5 \ge 20 = 100$ marks

(6 Hours)