B.SC. MATHEMATICS (With effect from 2021 – 2022)
CBCS PATTERN WITH OUTCOME BASED EDUCATION
THE COURSE OF STUDY AND THE SCHEME OF EXAMINATIONS

S.No	Part	Study Components / Course title		Ins. Hrs./Week	Credit	Title Of The Paper	Cia	Univ Exam	Total
SEMESTER – I									
1	I	Language	Paper I	6	4	Tamil –I /other language	25	75	100
2	II	English	Paper I	6	4	English –I	25	75	100
3	III	Core	Paper I	5	4	Algebra	25	75	100
4	III	Core	Paper II	4	4	Trigonometry	25	75	100
5	III	Allied Theory	Paper I	4	4	Allied Physics-I/ Allied Mathematical Statistics- I	25	75	100
6	III	Allied Practical	Practical I	3	0	Allied Practical: Physics/ Mathematical Statistics	0	0	0
7	IV	EVS		2	2	EVS	25	75	100
				30	22		150	450	600
SEMESTER –II									
1	I	Language	Paper II	6	4	Tamil –II /other language	25	75	100
2	II	English	Paper II	4	4	English –II	25	75	100
3	III	Core	Paper III	5	4	Calculus	25	75	100
4	III	Core	Paper IV	4	4	Solid Geometry	25	75	100
5	III	Allied Theory	Paper II	4	4	Allied Physics-II/ Allied Mathematical Statistics- II	25	75	100
6	III	Allied Practical	Practical I	3	2	Allied Practical: Physics/ Mathematical Statistics	40	60	100

7	IV	Value Education		2	2	Value Education	-	50	50
8	IV	Soft Skill		2	1	Soft Skill	-	50	50
				30	**25**		**165**	**535**	**700**

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1	I	Language	Paper III	6	4	Tamil –III /other language	25	75	100
2	II	English	Paper III	6	4	English –III	25	75	100
3	III	Core	Paper V	4	4	Differential Equations and Laplace Transforms	25	75	100
4	III	Elective	Paper I	4	3	Fourier Analysis	25	75	100
5	III	Allied	Paper III	6	5	Financial Accounting I	25	75	100
6	IV	Skill Based	Subject I	2	2	Mathematics for competitive Examinations	-	50	50
7	IV	Non Major	Elective I	2	2	Functional Mathematics	-	50	50
				30	**24**		**125**	**475**	**600**

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1	I	Language	Paper IV	6	4	Tamil –IV /other language	25	75	100
2	II	English	Paper IV	6	4	English –IV	25	75	100
3	III	Core	Paper VI	4	4	Abstract Algebra	25	75	100
4	III	Elective	Paper II	4	3	Vector Analysis	25	75	100
5	III	Allied	Paper IV	6	5	Financial Accounting-II	25	75	100
6	IV	Skill Based	Subject II	2	2	Business Statistics with R Programming	-	50	50
7	IV	Non Major	Elective II	2	2	Functional Statistics	-	50	50
				30	**24**		**125**	**475**	**600**

* Summer internship programme at the end of IV semester (Optional) – Extra credit-1 to 3

SEMESTER – V									
1	III	Core	Paper VII	6	4	Linear Algebra	25	75	100
2	III	Core	Paper VIII	6	4	Real Analysis- I	25	75	100
3	III	Core	Paper IX	6	4	Statics	25	75	100
4	III	Core	Paper X	5	3	Operations Research-I	25	75	100
5	III	Elective	Paper III	5	3	Graph Theory	25	75	100
6	IV	Skill Based	Subject III	2	2	Numerical Methods	-	50	50
				30	**20**		**125**	**425**	**550**
SEMESTER – VI									
1	III	Core	Paper XI	5	4	Real Analysis- II	25	75	100
2	III	Core	Paper XII	5	4	Dynamics	25	75	100
3	III	Core	Paper XIII	5	4	Complex Analysis	25	75	100
4	III	Core	Paper XIV	5	3	Programming in C Language-Theory	25	75	100
5	III	Core Practical	Practical I	3	2	Computer Practical in C language	40	60	100
6	III	Elective	Paper IV	5	3	Operations Research-II	25	75	100
7	IV	Skill Based	Subject IV	2	2	Mathematical Modelling with Spreadsheet	-	50	50
8	V	Extension Activities	-	3			100	0	100
				30	**25**		**265**	**485**	**750**
	Total			**180**	**140**				**3800**
* Mini project in the VI-Semester (optional) – Extra Credit 1 to 3									

CONSOLIDATED STATEMENT

PART	SUBJECT	PAPERS	HOURS	CREDIT	TOTAL CREDITS	MARKS	TOTAL MARKS
Part – I	Language	4	24	4	16	100	400
Part – II	English	4	22	4	16	100	400
Part – III	Allied Theory (Odd Sem.)	2	10	4-5	9	100	200
	Allied Theory (Even Sem.)	2	10	4-5	9	100	200
	Allied Practical (Odd & Even Sem.)	1	3+3	2	2	100	100
	Electives	4	18	3	12	100	400
	Core – Theory	14	69	3-4	54	100	1400
	Core– Practical	1	3	2	2	100	100
Part – IV	Environmental Science	1	2	2	2	100	100
	Soft Skills	1	2	1	1	50	50
	Value Education	1	2	2	2	50	50
	Language and others/ NME	2	4	2	4	50	100
	Skill Based	4	8	2	8	50	200
Part – V	Extension Activities	1	-	3	3	100	100
	Total		**180**		**140**		**3800**

B.Sc. MATHEMATICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEO):

PEO 1: To develop problem-solving skills and apply them independently to problems in pure and applied mathematics.

PEO 2: To develop abstract mathematical thinking.

PROGRAMME OUTCOMES (PO):

PO 1: Students majoring in Mathematics attain proficiency in Critical thinking, Problem solving and perform computations in higher mathematics and logical reasoning.

PO 2: Demonstrate proficiency in writing proofs.

PO 3: Formulate and analyze mathematical problems, precisely define the key terms, and draw

clear and reasonable conclusions.

PO 4: Use mathematical ideas to solve real-world problems

PO 5: Students will be able to enhance analytical thinking to solve problems.

PO 6: Access and apply knowledge of computing and mathematics appropriate to the connected areas.

ALGEBRA

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem		
I	21CMA1A	Core I	5	75	5	75	0	4

COURSE OBJECTIVES:

The students will be able to

- Develop their knowledge in Theory of Equations, Summation of Series, Matrices, Continued Fraction and Elementary Number Theory.

- Improve the problem-solving skills in Algebra.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Perceive the concepts of Polynomial Equation and to solve it	K3
CO2	Solve the problems using Horner's method and Newton's method	K3
CO3	Gain expertise in the concept of Summation of Series	K2
CO4	Study the types of matrices, Cayley Hamilton theorem and Diagonalisation of a Matrix	K2
CO5	Acquire practical knowledge in the field of elementary number theory	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	M	S	M
CO2	S	S	M	M	S	M
CO3	S	S	M	S	M	S
CO4	M	M	S	S	M	S
CO5	M	S	S	M	S	S

S- Strong; M-Medium; L-Low

UNIT- I: THEORY OF EQUATIONS   **15 Hours**

Polynomial Equation – Imaginary and Irrational roots – Symmetric Function of roots in terms of Coefficient – Sum of rth powers of roots – Reciprocal Equation – Transformation of Equation.

UNIT- II: THEORY OF EQUATIONS [Contd.]   **15 Hours**

Descartes Rule of Signs – Approximate Solutions of Polynomials by Horner's method-Newton's method.

UNIT– III: SUMMATION OF SERIES   **15Hours**

Binomial, Exponential and Logarithmic series (Theorems without proofs) – Simple Problems.

UNIT- IV: MATRICES   **15 Hours**

Symmetric, Skew Symmetric, Hermitianand Skew Hermitian Matrices- Orthogonal and Unitary Matrices - Rank of Matrix- Consistency and Solutions of Linear Systems- Cayley Hamilton Theorem (without proof)- Eigen Values-Eigen Vectors-Similar Matrices-Diagonalisation of a Matrix.

UNIT – V: ELEMENTARY NUMBER THEORY   **15 Hours**

Prime Number-Composite Number-Decomposition of a Composite Number as a Product of Primes Uniquely (without proof)-Divisors of a positive integer-Congruence Modulo n-Euler Function(without proof)- Highest power of a Prime Number p contained in n!-Fermat's and Wilson's Theorems

DISTRIBUTION OF MARKS: THEORY10% AND PROBLEMS: 90%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	T.K.ManickavachagomPillay, T.N.Natarajan and K.S.Ganapathy Volume I &II.	Algebra	S.Viswanathan Printers & Publishes Pvt. Ltd.	2004

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.Arumugam	Algebra	New Gamma Publishing House	2003
2.	A.Singaravelu	Algebra and Trignometry	Meenakshi Agency	2003

WEB RESOURCES

1. http://lib1.org/_ads/390EDD85BC279835BA7847DA4724CB9C

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

1. Dr. Nithyapriya, Assistant Professor of Mathematics.
2. Mrs. C. Revathi, Assistant Professor of Mathematics.

TRIGONOMETRY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/Week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
I	21CMA1B	Core II	4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Apply and establish the concept of trigonometric identities in proving the given statement
- Improve problem solving skills in Trigonometry

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Develop the knowledge about Expansions	K1
CO2	Expand inverse circular functions	K2
CO3	Evaluate circular and hyperbolic functions	K3
CO4	Study the concepts of logarithms of quantities	K3
CO5	Find the expansion of various types of series	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	M	S	S
CO2	S	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	M	M	S	S	M	S
CO5	S	S	M	S	M	S

S- Strong: M- Medium: L- Low

UNIT I: EXPANSIONS 　　　　　　　　　　　　　　　　　　　　　　　　**12 Hours**

Expansions of Cosnθ, Sin nθ- Expansion of tan nθ - Expansion of tan [A+B+C+…] – Formation of Equations - Solution of Trigonometric equations**.**

UNIT II: EXPANSIONS (Contd.) 　　　　　　　　　　　　　　　　　**12 Hours**

$Sin^n\theta$, $Cos^n\theta$ in terms of Functions of multiples of θ - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of ascending powers of θ – Expansion of Inverse circular Functions.

UNIT III: HYPERBOLIC FUNCTIONS 　　　　　　　　　　　　　　**12 Hours**

Definition – Relation between circular and Hyperbolic Functions – Inverse Hyperbolic Functions.

UNIT IV: LOGARITHM AND SUMMATION OF SERIES 　　　　**12 Hours**

Logarithm of complex quantities. Summation of Series using Differences.

UNIT V : SUMMATION OF TRIGONOMETRIC SERIES 　　**12 Hours**

Gregory Series- Euler Series – C+ iS method.

DISTRIBUTION OF MARKS: THEORY20% AND PROBLEMS: 80%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.Narayanan and T. K. MancikavachagomPillay	Trigonometry	S.Viswanathan printers &Publishers Pvt. Ltd. Chennai	2004

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P. Kandasamy. K.Thilagavathy	Mathematics for B.Sc. Vol- I,II,II & IV	S.Chand&Company Ltd. New Delhi-55.	2004

2.	Duraipandian and Laxmi Duraipandian	Trigonometry	Emerald Publishers, Chennai	1984
3.	B.S. Grewal	Higer Engineering Mathematics	Khanna Publishers, New Delhi.	2002
4.	S.L.Loney	Plane Trigonometry, Part II	Cambridge Universitry Press, London.	1982
5.	A. Singaravelu	Algebra and Trigonmetry, Vol- I and II	Meenakshi Agency, Chennai	2003
6.	P.R.Vittal	Trigonometry	MargamPublications, Chennai.	2004

WEB RESOURCES

1. https://open.umn.edu/opentextbooks/textbooks/algebra-and-trigonometry

2. *https://www.emathinstruction.com/algebra-2-trigonometry/*

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5.PPT Presentations

SYLLABUS DESIGNERS

1. Dr. M. Devi, Assistant Professor of Mathematics.

2. Dr. B. Vijayalakshmi, Assistant Professor of Mathematics.

ALLIED MATHEMATICAL STATISTICS-I

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
I	21CAST1A	Allied	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			4	60	4	60		

COURSE OBJECTIVE:

The students will be able to

- Comprehend the fundamental concepts in Statistics.

- Recognize the fundamental meanings of correlation and regression.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand Addition and Multiplication laws of Probability, Independence of Events, Conditional Probability and Baye's theorem	K3
CO2	Acquire knowledge about Random Variables, Expectation, Moments and to solve problems	K2
CO3	Learn about Moment Generating Function,Characteristic Function, Properties, Inversion and Uniqueness Theorem	K3
CO4	Gain knowledge aboutCorrelation, Karl Pearson's Coefficient of Correlation and Rank Correlation.	K3
CO5	Apply Regression for the investigation of relationship between the variables	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF PROGRAM OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	S	M	S
CO2	S	S	S	S	S	S
CO3	M	S	M	M	S	S
CO4	S	S	M	S	M	S
CO5	S	S	M	S	S	S

S- Strong; M-Medium; L-Low

UNIT- I : THEORY OF PROBABILITY   12 Hours

Basic Terminology- Mathematical Probability- Statistical Probability – Axiomatic Probability - Some Theorems on Probability – Addition Theorem of Probability – Extension of Addition Theorem of Probability to n Events – Boole's Inequality - Conditional Probability - Multiplication Theorem of Probability – Independent Events – Bayes' Theorem- Simple Problems.

UNIT- II : RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS   12 Hours

Introduction – Distribution Function-Discrete Random Variable- Continuous Random Variable–Two Dimensional Random Variables – Joint Probability Mass Function – Two Dimensional Distribution Function – Marginal Distribution Functions – Joint Density Function, Marginal Density Function - Conditional Distribution Function and Conditional Probability Density Function –Mathematical Expectation – Expected Value of function of a Random Variable – Properties of Expectation – Properties of Variance – Covariance - Simple Problems.

UNIT– III: MOMENT GENERATING AND CHARACTERISTIC FUNCTIONS
12 Hours

Moment Generating Function -Characteristic Function – Properties of Characteristic Function – Some Important Theorems- Inversion Theorem (Levy Theorem - Statement only)- Uniqueness Theorem of characteristic Function (Statement only) – Simple problems.

UNIT- IV: CORRELATION   12 Hours

Introduction – Meaning of Correlation - Scatter Diagram - Karl Pearson's Coefficient of Correlation - Calculation of the Correlation Coefficient for a Bivariate Frequency Distribution - Rank Correlation- Simple Problems.

UNIT – V- LINEAR AND CURVILINEAR REGRESSION   12 Hours

Introduction**-**Linear Regression – Curvilinear Regression-Regression Curves-Simple Problems.

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS 80%

TEXT BOOK

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	S. C. Gupta & V.K Kapoor	Fundamentals of Mathematical Statistics	Sultan & Sons.	1974

REFERENCE BOOKS

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Hogg, R.V. &Craig.A	Introduction to Mathematical Statistics	Macmillan	1998
2	Mood.A.MGraybill.F.A. &Boes.D.G	Introduction to Theory of Statistics	McGraw Hill	1974
3	Wilks S.S	Elementary Statistics Analysis.	Oxford and IBH	-
4	Snedecor. G. W &Cochran.W.G	Statistical Methods	Oxford and IBH	1967
5	Hoel,P.G(1971)	Introduction to Mathematical Statistics	Wiley.	1971

WEB RESOURCES

1. *www.statisticssolutions.com/correlation-pearson-kendall-spearman/*

2. *http://www.srmuniv.ac.in/sites/default/files/downloads/CORRELATION.pdf*

3. *https://towardsdatascience.com/linear-regression-detailed-view-ea73175f6e86*

TEACHING METHODOLOGY

1. Black Board Teaching

2. Smart Board Class Teaching

3. Giving Assignments for each units

4. Class room Discussions and seminars.

5. PPT Presentations.

SYLLABUS DESIGNERS

1. Dr. M. Devi, Assistant Professor of Mathematics.

2. Mrs.R. Ramya, Assistant Professor of Mathematics.

ALLIED PRACTICAL - MATHEMATICAL STATISTICS

Semester	Subject Code	Category	Lecture		Theory	Practical		Credits
I &II	21CAST21	Allied Practical	Hrs/week	Hrs/Sem	0	Hrs/week	Hrs/Sem	2
			3	45		3	45	

COURSE OBJECTIVES:

The students will be able to

- Apply statistical methods to solve mathematical problems
- Use statistical test in testing hypothesis on data.

SYLLABUS

1. Measures of location and Dispersion (absolute and relative).
2. Computation of Correlation Coefficient for Raw and Grouped data, Rank correlation coefficient.
3. Computation of Regression Equations for Raw and Grouped data.
4. Curve Fitting by the method of Least Square
   a. $y = ax + b$
   b. $y = ax^2 + bx + c$
   c. $y = ae^{bx}$
   d. $y = ax^b$
5. Fitting of Binomial, Poisson, Normal Distributions and Test of Goodness of fit.
6. Large Sample tests with regard to population, mean, proportion, standard deviation.
7. Exact test with respect to mean, variance and coefficient of correlation.
8. Test of Independence of attributes based on chi – square distribution.
9. Confidence Interval based on Normal, t and chi – square and F distribution.
10. Problems based on ANOVA – One way and Two way classification.
11. Completely Randomized Design.
12. Randomized Block Design.

DISTRIBUTION OF MARKS: PROBLEMS 100%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.P.Gupta	Statistical Methods	S Chand & Company	2013
2.	R.S.N. Pillai Bagavathi	Practical Statistics	S Chand & Company	2010

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Hogg, R.V. &Craig.A.T	Introduction to Mathematical Statistics	Macmillan	1998
2.	Mood.A.MGraybill.F.A. &Boes.D.G	Introduction to Theory of Statistics	McGraw Hill	1974
3.	Snedecor. G. W &Cochran.W.G	Statistical Methods	Oxford and IBH	1967
4.	Hoel,P.G	Introduction to Mathematical Statistics	Wiley Eastern	1971
5.	S. C. Gupta & V.K Kapoor	Fundamentals of Mathematical Statistics	Sultan & Chand Sons	2011
6.	Wilks S.S	Elementary Statistics Analysis	Princeton University Press	2016

WEB RESOURCES

1. *http://enwikipedia.org/wiki/statistics.*

2.*http://en.wikipedia./org/wiki/mathematics*

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

1. Mrs. G. VinuPriya, Head and Assistant Professor of Mathematics

2. Mrs. R. Ramya , Assistant Professor of Mathematics

ALLIED PRACTICAL - MATHEMATICAL STATISTICS
SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

Internal assessment: 40 Marks

External assessment: 60 marks

Total: 100 marks

External assessment: 60 marks

Record   : 10 Marks

Practical : 50 Marks

CALCULUS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
I	21CMA2A	Core III	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Gain knowledge about the fundamental principles, concepts in the areas of Differential and Integral Calculus.
- Apply the acquired knowledge and improve the analytical skills.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level(K1-K4)
CO1	Calculate the maxima and minima ofdifferential equations	K1
CO2	Develop the knowledge about radius of curvature in Cartesian and Polar coordinates	K2
CO3	Understand the concept of Involutes,EvolutesandAsymptotes	K2
CO4	Improve the knowledge of Beta and Gamma functions	K3
CO5	Evaluate the area, volume and surface area using double and triple integrals	K4

Knowledge Level: K1-Remember,K2-Understand,k3-Apply,K4-Analyze

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	S	S	S
CO2	M	M	S	S	S	S
CO3	S	M	M	S	S	S
CO4	S	S	S	S	S	S
CO5	S	S	M	S	M	S

S- Strong; M-Medium; L-Low

UNIT-I: DIFFERENTIAL CALCULUS 15 Hours

n^{th} Derivative- Leibnitz's theorem (without Proof) and its application- Total Differential - Maxima and Minima functions of two and three independent variables, Lagrange's method (Without proof), problems on this concepts.

UNIT-II: DIFFERENTIAL CALCULUS (Contd.) 15 Hours

Curvature, Radius of Curvature in Cartesian and Polar coordinates, p-r equation, Centre of Curvature.

UNIT-III: DIFFERENTIAL CALCULUS (Contd.) 15 Hours

Evolutes and Involutes - Asymptotes: Methods (without proof) of finding Asymptotes of rational algebraic curves with special cases.

UNIT- IV: INTEGRAL CALCULUS 15 Hours

Reduction Formulae: $\sin^n \theta, \cos^n \theta, \tan^n \theta, \text{cosec}^n \theta, \sec^n \theta, \cot^n \theta$ -Jacobians -Beta and Gamma functions - properties and problems.

UNIT- V: INTEGRAL CALCULUS (Contd.) 15 Hours

Double Integrals- Triple Integrals- Application to Area, Surface Area and Volume.

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS 90%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	S.Narayanan and T.K.Manickavachagompillay	Calculus Volume I,II	S.Viswanathan printers and publishers pvt.ltd–Chennai	Volume I(2007) Volume II(2010)

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Shanthi Narayan	Differential Calculus	Shymlal charitable trust,Newdelhi	2001
2	S.Sudha	Calculus	Emerald publishers,chennai	1998
3	P.Kandasamy, K.Thilagavathy	Mathematics for B.Sc Volume I,II,III,IV	S,Chand& company ltd ,Newdelhi-55	2004

WEB RESOURCES

1. https://www.khanacademy.org/math/calculus-1

2. https://www.britannica.com/science/calculus-mayhematics

TEACHING METHODOLOGY

1.Class room teaching

2.Assignments

3. Discussions

4. Home Test

5. PPT presentation

SYLLABUS DESIGNERS

1. Dr.M. Kasthuri, Assistant professor of Mathematics.
2. Mrs.B. Babyshalini, Assistant professor of Mathematics.

SOLID GEOMETRY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
II	21CMA 2B	Core	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Understand the knowledge in various concept of Analytical Solid Geometry.
- Learn aboutPlane, Straight Line, Sphere, Cone and Cylinder

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Study the concept of plane and apply the knowledge in solving problems	K1
CO2	Learn the concept of straight line	K3
CO3	Find the equation of sphere	K3
CO4	Discuss the importance of cone	K2
CO5	Apply the concept of cylinder in various problems	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF COURSE OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	S	S	S
CO2	S	M	S	S	S	S
CO3	S	S	M	M	M	M
CO4	S	M	M	M	M	M
CO5	S	S	S	M	S	M

S- Strong   M – Medium   L – Low

UNIT I: PLANE   12Hours

General equation of a plane – Equation of a plane in the normal form – Angle between planes – Plane through three given points – Equation of a plane through the line of intersection of two planes.

UNIT II: STRAIGHT LINE   12Hours

Symmetrical form of a straight line – Image of a point with respect to a plane – Image of a line with respect to a plane – Length and equation of the shortest distance between two skew lines - Coplanar lines.

UNIT III: SPHERE   12Hours

Equation of the sphere – Length of the tangent – Tangent plane – Section of a sphere by a plane – Orthogonal spheres – Equation of a sphere through a given circle.

UNIT IV: CONE   12Hours

Equation of a cone with a given vertex and a given guiding curve - Equation of a cone with its vertex at the origin - Condition for the general equation of the second degree to represent a cone - Right circular cone – Enveloping cone - Tangency of a plane to a cone.

UNIT V: CYLINDER   12Hours

Equation of a cylinder with a given generator and a given guiding curve - Right circular cylinder - Enveloping cylinder – Enveloping cylinder as a limiting form of an enveloping cone.

DISTRIBUTION OF MARKS: PROBLEMS 75 % AND THEORY 25%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.G.Venkatachalapathy	Analytical Geometry	Margham Publications	2008.(For Units I,II and III)
2.	P.DuraiPandian	Analytical Geometry of Three Dimensions	Mugil Publishers	Revised Edition, 1983

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R.Vittal	Vector Analysis, Analytical Solid Geometry, Sequence and Series	Margham Publications	3rdEdition, 2003.(For Units IV and V)
2.	S. G. Venkatachalapathy	Analytical Geometry	Margham Publications	1stEdition,

WEB RESOURCES

1. https://www.brainkart.com/article/Three-Dimensional-Analytical-Geometry-6453

2.*https://www.intmath.com/plane-analytic-geometry/intro.php*

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home Test
5. PPT presentation

SYLLABUS DESIGNERS

1. Dr.N. Nithyapriya, Assistant Professor of Mathematics
2. Dr. M. Kasthuri, Assistant Professor of Mathematics

ALLIED - MATHEMATICAL STATISTICS-II

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
II	21CAST2A	Allied	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Impart knowledge in statistical concepts which includes Distribution, Sampling, Estimation and Test of Significance
- Improve practical knowledge in the field of Mathematical Statistics.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level(K1-K4)
CO1	Understand the concepts of Distribution	K2
CO2	Acquire the knowledge about Sampling Distributions	K2
CO3	Discuss about hypothesis , analyze largessamples and draw conclusions	K3
CO4	Analyze small samples and draw conclusions	K4
CO5	Learn about the Estimation Theory	K2

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	M
CO2	M	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT – I : DISTRIBUTIONS   **12 Hours**

Discrete Distributions: Binomial, Poisson – Continuous Distributions: Normal Distributions.

UNIT – II :SAMPLING DISTRIBUTIONS   **12 Hours**

Student's 't' Distribution – Derivation of student's 't' distribution –Fisher's 't' – Distribution of Fisher's 't' – Constants of t-distribution – Limiting form of t-distribution - Chi-Square Distribution - Derivation of the Chi-Square Distribution – Moments Generating Function, Cumulant Generating Function, Limiting form of Chi-Square Distribution – Characteristic Function of Chi-Square Distribution – Mode and Skewness of Chi-Square Distribution - Additive property of Chi-Square Variates - F- distribution(without proof)- Constants, Mode and Points of inflexion of F-Distribution.

UNIT – III - TESTING OF LARGE SAMPLES   **12 Hours**

Test of Significance –Null and Alternative Hypothesis – Error in sampling – Critical Region and Level of Significance- One tailed and Two tailed tests – Critical Values –Procedure for Testing of Hypothesis - Test of significance for large samples - Sampling of Attributes – Test of significance for Single Proportion, Difference of Proportions – Standard Error for Sample Mean – Test of significance for Single Mean, Difference of Means, Difference of Standard Deviation.

UNIT – IV - TESTING OF SMALL SAMPLES   **12 Hours**

Application of t-Distribution – t-test for Single Mean, Difference of Means - Paired t-test for Difference of Means- Applications of Chi - Square Distribution – Inferences about a Population Variance – Goodness of Fit Test- Test of Independence of Attributes - Contingency tables-Yates's Correction (for 2×2 Contingency table) – Application of F- Distribution – F- test for Equally of Two Population Variances- Simple Problems.

UNIT – V –THEORY OF ESTIMATION   **12 Hours**

Characteristics of Estimators - Concept of Unbiasedness – Consistency – Efficient Estimators – Most Efficient Estimators – Sufficiency- Cramer –Rao Inequality –Method of Moments - Power of the test – Neymann Pearson lemma.

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS 80%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S. C. Gupta and V. K. Kapoor	Fundamentals of Mathematical Statistics	Sultan &Sons	1971

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Hogg, R. V. &Craig.A.T	Introduction to Mathematical Statistics	Macmillan	1998
2.	Mood.A.MGraybill.F. A&Boes.B.	Introduction to theory of statistics	McGraw Hill	1974
3.	Snedecor.G.W&Cochran.W.G	Statistical Methods,	Oxford and IBH	1967
4.	Hoel P.G	Introduction to Mathematical Statistics	Wiley	1971
5.	Wilks S.S	Elementary Statistics Analysis	Princeton University Press	2016
6	Dr.S.P.Gupta	Statistical Methods	Sultan Chand & sons	2012

WEB RESOURCES

1. https://www.e-booksdirectory.com/listing.php?category=413

2. https://www.textbooks.com/Catalog/MDL/Intermediate-and-Advanced-Statistics.php

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNERS

1. Mrs.G. VinuPriya, Head and Assistant Professor of Mathematics

2. Mrs. R. Ramya, Assistant Professor of Mathematics

DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
III	21CMA3A	Core Paper V	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Identify the type of a given differential equation and apply the appropriate analytical technique for finding the solution of first order and higher order ordinary differential equations.

- Find the Laplace Transform of specified functions and solve linear ordinary differential equation using Laplace Transforms.

COURSE OUTCOMES:

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

.	CO Statement	Knowledge Level (K1-K4)
CO1	Understand the different types of solvable equations	K2
CO2	Apply the method of undermined coefficients to solve the non-homogenous linear differential equations with constant coefficients	K2
CO3	Solve simultaneous equations	K3
CO4	Use the Laplace transform in finding the solution of linear differential equations	K3
CO5	Find the solution of first order linear partial differential equations using Lagrange's method	K2

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	M
CO2	M	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT – I: ORDINARY LINEAR DIFFERENTIAL EQUATIONS **12 Hours**

Equations of the First Order and Higher Degree: Equations Solvable for p, Equations Solvable for x and Equations Solvable for y – Clairaut's Equations, Equations of second order with Constant Coefficients.

UNIT –II: ORDINARY LINEAR DIFFERENTIAL EQUATIONS (CONTD.) **12 Hours**

Equations of the Second Order: Euler's homogenous Linear Equations with Variable Coefficients – Legendre's Linear Equations (second order only) - Method of Variation of Parameters.

UNIT – III: DIFFERENTIAL EQUATIONS OF OTHER TYPES **12 Hours**

Simultaneous Equations of first order – Total Differential Equations – Solving Pdx + Qdy+ Rdz = 0.

UNIT – IV: LAPLACE TRANSFORMS **12 Hours**

Laplace Transform – Inverse Laplace Transform – Properties – Application of Laplace Transform to solution of first and second order Linear Differential equations (with constant coefficients)

UNIT – V: PARTIAL DIFFERENTIAL EQUATIONS **12 Hours**

Formation of a PDE – Complete Integral - Particular Integral – Singular Integral, Equations, Solvable by direct Integration solving equations of the types: $f(p, q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f(x, p) = f(y, q)$, $z = px + qy + f(p, q)$ (Only standard types) -Lagrange's equations.

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS 80%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Kandasamy. P &Thilagavathy. K	Mathematics for B.Sc Vol. III	S. Chand and Company Ltd., New Delhi -55	2004
2.	Narayanan. S &Manicavachagam Pillay. T K	Calculus	S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai	2004

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Raisinghania, M D	Ordinary and Partial Differential Equations	S. Chand and Company Ltd., New Delhi -55	2001
2.	Spiegel, M R	Advanced Mathematics for Engineers and scientists	Tata McGraw Hill edition, New Delhi	2005
3.	Spiegel, M R	Laplace Transforms	Tata McGraw Hill edition, New Delhi	2005
4.	Sudha, S	Differential Equations and Integral Transforms	Emerald Publishers, Chennai	2003
5.	Venkataraman, M K	Higher Engineering Mathematics	III – B, National Publishing Co., Chennai.	1998
6	Vittal, P R	Differential Equations and Laplace Transform	Margham Publishers, Chennai	2004
7.	Grewal, B S	Higher Engineering Mathematics	Khanna Publishers, New Delhi	2002
8.	Ross, S L	Differential Equations, III Edition	John Wiley and Sons, New York	1984

WEB RESOURCES

1.https://www.schandpublishing.com/books/higher-education/mathematics/ordinary-partial-differential-equations/9789352535866/#.XfnJdmQzYdU
 2.https://www.sapnaonline.com/general-search?searchkey=Differential_Equations_and_Integral_Transforms+by+s+sudha

TEACHING METHODOLOGY

1. Class room Teaching
2. Assignments
3. Seminars
4. Discussions
5 .PPT Presentations

SYLLABUS DESIGNER

Dr. N. Nithyapriya, Assistant Professor of Mathematics

ELECTIVE – I - FOURIER ANALYSIS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
III	21CMA3B	Elective I	Hrs/Week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Understand the basic concepts of Fourier series and Fourier transforms and will solve problems in these fields of study.
- Find solutions to the differential equations. The portion on Fourier Transforms will help the students to do research in pure and applied mathematics.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Derive Fourier series of a given periodic function by evaluating Fourier coefficients	K2
CO2	Understand the nature of Fourier series that represent odd and even functions	K2
CO3	Expand an odd or even function as a half-range cosine or sine Fourier Series	K3
CO4	Compute Fourier Transform of sine and cosine integrals	K2
CO5	Solve the problems using Convolution Theorem and Parseval's Identity	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	M
CO2	S	M	S	M	S	M
CO3	M	S	M	S	M	S
CO4	S	M	S	S	M	S
CO5	M	S	S	M	S	S

S- Strong; M-Medium; L-Low

UNIT I: FOURIER SERIES   12 Hours

Dirichlet's conditions - Euler's formulae - Functions having Discontinuity - Fourier series in the interval $(0,2\pi)$ and $(-\pi,\pi)$.

UNIT II: FOURIER SERIES: (Contd.)   12 Hours

Fourier Expansions of odd and even functions in the interval $(-\pi,\pi)$- Change of interval - Fourier series in the interval $(0,2l)$ and $(-l,l)$.

UNIT III :FOURIER SERIES: (Contd.)   12 Hours

Half- range Sine and Cosine series - Typical wave forms - Parseval's identity.

UNIT IV :FOURIER TRANSFORMS: 12 Hours

Definition – Fourier integrals – Fourier sine and cosine integrals – Fourier sine and cosine Transform – Simple Problems.

UNIT V : FOURIER TRANSFORMS: (Contd.)   12 Hours

Properties of Fourier Transforms – Convolution Theorem for Fourier Transforms (without proof) – Parsaval's Identity – Simple Problems.

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS: 80%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R.Vittal and V.Malini	Vector Calculus, Fourier Series and Fourier Transform	Margham Publications, Chennai	2004
2.	Dr. A. Singaravelu	Transforms and Partial Differential Equations	Meenakshi Agency	2013

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S. Narayanan and T.K.Manicavachagom Pillay	Calculus	S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai	2004
2.	B.S.Grewal	Higher Engineering Mathematics	Khanna Publishers, New Delhi	2002
3.	G.B. Thomas and R.L.Finney	Calculus and Analytic Geometry	Wesley (9th Edn), Mass. (Indian Print)	1998
4.	M.K.Venkataraman	Engineering Mathematics – Part B	National Publishing Company, Chennai.	1992

WEB RESOURCES

1. *https://www.doverpublications.com/Fourier Series*

2. *https://www.springers.com/Fourier Series*

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5.PPT Presentations

SYLLABUS DESIGNER

Mrs.R.Ramya, Assistant Professor of Mathematics.

SKILL BASED SUBJECT -I MATHEMATICS FOR COMPETITIVE EXAMINATIONS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
III	21SMA3A	Skill based subject -I	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	-	2
			2	30	2	30		

COURSE OBJECTIVES:

The students will be able to

- Apply and establish Mathematical concepts in solving the given aptitude problems.
- Improve problem solving skills using basic Mathematical concepts.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Develop the knowledge about problems on numbers and problems on ages	K1
CO2	Apply the concepts of Ratio and Proportion	K3
CO3	Evaluate the problems on Time and work,time and distance	K3
CO4	Apply the concepts of Calendars and Clocksand Pipe and Cistern	K3
CO5	Acquire the knowledge on Permutations and combinations	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	L	M	S	S	S
CO2	S	M	S	S	S	S
CO3	S	M	S	S	S	M
CO4	S	M	S	S	M	S
CO5	S	L	M	S	M	M

S- Strong: M- Medium: L- Low

Unit-I: **6 Hours**

 Problems on numbers - Problems on Ages(Chapter -7, 8)

Unit-II: **6 Hours**

Ratio and proportion (Chapter – 12)

Unit -III: **6 Hours**

Time and work–Time and distance(Chapter – 15,17)

Unit-IV: **6 Hours**

Pipe and Cistern-Problems on Calendars and Clocks(Chapter – 16, 27, 28)

Unit- V: **6 Hours**

Permutations and combinations (Chapter – 30)

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Dr. R.S. Aggarwal	Quantitative Aptitude (for Competitive Examinations), Revised Edition,	S. Chand and Company Ltd., Ram Nagar, New Delhi	Reprint 2012.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	AbhijitGuha	Quantitative Aptitude for all Competitive Examinations	McGraw Hill Education, sixth edition	2016
2.	R.V.Praveen	Quantitative Aptitude and Reasoning	PHI learning private limited, Third edition, Delhi	2016
3.	Dr.N.K.Singh	Quantitative Aptitude Test	UpkarPrakshan	2009

WEB RESOURCES

1.https://www.careerbless.com/aptitude/qa/home.php

2. https://www.toppr.com/guides/quantitative-aptitude

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

SYLLABUS DESIGNER

Dr. N. Nithyapriya, Assistant Professor of Mathematics

NON MAJOR –I: FUNCTIONAL MATHEMATICS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem		
III	21NMA3A	Non Major –I	2	30	2	30	-	2

COURSE OBJECTIVES:

The students will be able to

- Apply and establish Mathematical concepts in solving the given aptitude problems.
- Improve problem solving skills using basic Mathematical concepts.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Develop the knowledge about problems on numbers and problems on ages	K1
CO2	Understand and apply the concepts of percentage	K2
CO3	Evaluate the problems on Profit and Loss	K3
CO4	Apply the concepts of Time and Work	K3
CO5	Acquire the knowledge on Probability and True Discount	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	S	S	S
CO2	S	M	M	S	S	S
CO3	S	S	S	S	S	M
CO4	S	M	S	S	M	S
CO5	S	M	M	S	M	M

S- Strong: M- Medium: L- Low

Unit – I: **6 Hours**

Problems on Numbers – Problems on Ages (Chapter -7, 8)

Unit – II: **6 Hours**

Percentage (Chapter -10)

Unit – III: **6 Hours**

Profit and Loss (Chapter - 11)

Unit – IV: **6 Hours**

Time and Work (Chapter - 15)

Unit – V: **6 Hours**

Probability- True Discount (Chapter – 31,32)

TEXT BOOK

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	R.S. garwal	Quantitative Aptitude (for Competitive Examinations), Revised Edition,	S. Chand and Company Ltd., Ram Nagar, New Delhi	Reprint 2012.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	AbhijitGuha	Quantitative Aptitude for all Competitive Examinations	McGraw Hill Education, sixth edition	2016
2.	R.V.Praveen	Quantitative Aptitude and Reasoning	PHI learning private limited,Third edition ,Delhi	2016
3.	Dr.N.K.Singh	Quantitative Aptitude Test	UpkarPrakshan	2009

WEB RESOURCES

1. https://www.careerbless.com/aptitude/qa/home.php

2. https://www.toppr.com/guides/quantitative-aptitude/

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

SYLLABUS DESIGNER

Dr. N. Nithyapriya, Assistant Professor of Mathematics

CORE PAPER –VI - ABSTRACT ALGEBRA

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
IV	21CM A4A	Core paper – VI	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Understand the theoretical concepts of algebra and to develop abstract thinking in algebra.
- Acquire knowledge on the basic theory of group, Cayley 's theorem, homomorphism, ring and ideal etc.,
- Learn the basic ideas and notions of abstract algebra which includes ring and field theory.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Provide an insight on theoretical knowledge about Group, Sub-group and its examples and prove Lagrange's theorem and its related concepts.	K3
CO2	Understand the notion of Counting Principle, Normal Subgroups, Homomorphism and theorems related to it.	K3
CO3	Acquire the knowledge about Automorphisms, Cayley's theorem and permutation group	K3
CO4	Explore the concepts of theory of Rings, Integral domain and homomorphism.	K3
CO5	Gain knowledge about the Ideal, Prime ideal, Maximal ideal, Euclidean ring and related theorems.	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAM ME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	S
CO2	S	S	M	M	M	S
CO3	M	S	M	M	S	S
CO4	S	M	S	S	M	M
CO5	S	S	S	M	M	S

S- Strong   M – Medium   L – Low

UNIT – I: GROUPS 12 Hours

Definition of a Group – Examples – Subgroups, Lagrange's theorem- Corollary – Simple Theorems.

(Sections: 2.1 to 2.4)

UNIT – II: GROUPS (Contd.) 12 Hours

Counting Principle – Normal Subgroups – Homomorphisms – Theorems – Simple Problems.

Section: 2.5 to 2.7 (Omit applications of 1 and 2 of 2)

UNIT – III: GROUPS (Contd.) 12 Hours

Automorphisms – Cayley's Theorem – Permutation Groups.

(Sections: 2.8 to 2.10)

UNIT – IV: RINGS 12 Hours

Definition and Examples – Integral Domain – Homomorphism of Rings

(Sections: 3.1 to 3.4)

UNIT – V: RINGS (Contd.) 12 Hour

Idea: Prime Ideal and Maximal Ideal – Simple Theorems – Euclidean rings

(Sections: 3.5 to 3.7)

DISTRIBUTION OF MARKS: THEORY 90% AND PROBLEMS 10%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	I.N. Herstein	Topics in Algebra	Wiley Eastern Ltd, New Delhi(2ndEdition)	1989

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S. Arumugam	Modern Algebra.	Scitech Publications, Chennai	2004

2.	J.B.Fraleigh	A First Course in Algebra	Addison Wesley, Mass. (Indian Print) (3rd Edition)	1987
3.	Lloyd R. Jaisingh and Frank Ayres	Abstract Algebra	Tata McGraw Hill Edition, New Delhi (2nd Edition),	2005
4.	M.L. Santiago	Modern Algebra	Tata McGraw Hill, New Delhi.	2002

WEB RESOURCES

1. *http://www.math.clemson.edu/~macaule/math4120-online.html*
2. *http://archives.math.utk.edu/topics/abstractAlgebra*

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation

SYLLABUS DESIGNER

Mrs. B. Vijayalakshmi, Assistant Professor of Mathematics.

ELECTIVE – II - VECTOR ANALYSIS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
IV	21CMA4B	Elective-II	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Deal with the concepts about differentiation and integration of vectors.
- Improve the basic knowledge of applications of Vector analysis

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Acquire the knowledge about dot and cross product of vectors	K2
CO2	Understand the terms directional derivative and conservative force field	K2
CO3	Demonstrate the vector identities	K3
CO4	Apply the concepts of surface and volume integral in real life in a effective manner	K3
CO5	Verify the Stoke's and Green's theorem	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	M
CO2	M	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT – I - DIFFERENTIAL VECTOR CALCULUS   12 Hours

Differentiation of a Vector – Differentiation Formulae – Differentiation of dot and Cross products.

UNIT – II -GRADIENT, DIVERGENCE AND CURL   12 Hours

Definition of gradient, divergent and curl – Directional derivative – Equations of the tangent plane and normal line, solenoidal and irrotational vectors, conservative force field – simple problems.

UNIT – III- VECTOR IDENTITIES   12 Hours

Proof of Vector Identities - Simple problems using vector identities.

UNIT – IV- VECTOR INTEGRATION   12 Hours

The line integral, surface integral and volume integral with their physical meaning – Statement of Gauss theorem and simple problems.(without proof).

UNIT –V- VECTOR INTEGRATION (CONT.)   12 Hours

Statement of Stoke's and Green's theorem (without proof) – Simple problems.

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS 90%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R.Vittal	Vector analysis, Analytical solid geometry &sequences and series	Margham publications, Chennai	2004

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.Balasubramanian and K.G.Subramanian	Ancillary Mathematics vol I&II	McGraw Hill, New Delhi	1997
2.	S.P.Rajagopalan and R.Sattananthan	Allied Mathematics	Vikaspublications,New Delhi	2005
3.	P.Duraipandian and S.Udayabaskaran	Allied Mathematics volume I & II	Muhilpublishers,Chennai	1977

WEB RESOURCES

1. https://www.whitman.edu/mathematics/calculus_online/chapter16.html
2. https://www.brighthubengineering.com/machine-design/74224-understanding-vector-analysis/

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

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4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

Dr. M. Kasthuri, Assistant Professor of Mathematics

SKILL BASED SUBJECT –II–BUSINESS STATISTICS WITH R PROGRAMMING

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
IV	21SMA4A	Skill Based Subject – II	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	-	2
			2	30	2	30		

COURSE OBJECTIVES:

The students will be able to

- Understand the collection, classification, tabulation and diagrammatic representation of data.
- Use statistical tools in business and arrive at possible inferences relating to population under study.
- Expertise the novel applications of R language and give them a hands on experience of working with data.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Acquire basic knowledge of collection, classification, tabulation and diagrammatic representation of data.	K1
CO2	Learn Index numbers and Methods of constructing Index numbers	K2
CO3	Study the behaviour of the variable and predict the behaviour in future	K2
CO4	Compares actual data with the predicted data	K3
CO5	Apply R language to import data and visualize the data	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF PROGRAM OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	M	S	M	S
CO2	S	S	M	S	S	S
CO3	S	S	S	S	S	S
CO4	S	S	S	S	S	S
CO5	S	S	S	S	S	S

S- Strong; M-Medium; L-Low

UNIT – I: COLLECTION, CLASSIFICATION AND DIAGRAMMATIC REPRESENTATION OF DATA 6 Hours

Introduction - Collection of data – Classification and Tabulation - Diagrammatic Representation

(Text Book 1: Chapter 1 to 4)

UNIT – II: INDEX NUMBERS 6 Hours

Index Numbers: Definition – Characteristics – Uses – General Problems in the construction of Index Numbers - Unweighted Averages of Relatives Methods – Weighted Aggregatives Methods – Weighted Averages of Relatives Methods – Calculations – Tests of Consistency and Adequacy - Circular Test - Fixed Base – Chain Base

(Text Book 2: Chapter 10 (Page No. 444 to 466))

UNIT – III: INDEX NUMBERS AND ANALYSIS OF TIME SERIES 6 Hours

Index Numbers: Cost of Living Index Number – Deflating – Base Shifting – Splicing – Wholesale Price Index.

Analysis of Time Series: Components — Secular Trend - Seasonal variation – Cyclical variation – Measures of trend

(Text Book 2: Chapter 10, 14 (Page No. 467 to 488, Page No. 579 to 583))

UNIT – IV: ANALYSIS OF TIME SERIES 6 Hours

Secular Trend– Graphic Method – Method of Semi-average – Method of Moving Averages, - Method of least squares – Problems, Merits and Demerits

(Text Book 2: Chapter 14 (Page No. 583 to 601))

UNIT – V: BASIC CONCEPTS IN R 6 Hours

Assignment of values, Character, Vector arithmetic, Understanding Data types, importing/exporting data - Computation of tables and graphical representation in R: plot, pie chart, box plot, generating graphs from imported data.

DISTRIBUTION OF MARKS: THEORY 30% AND PROBLEMS 70%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R. Vittal (Unit I)	Business Mathematics and Statistics	Margham Publishers	2011
2.	P.A. Navnitham (Unit II to IV)	Business Mathematics and Statistics	Jai Publishers, Trichi	2011
3.	Joseph Adler (Unit V)	R in a Nutshell A Desktop Quick Reference	O'Reilly	2010
4.	Mark Gardener (Unit V)	Beginning R The Statistical Programming Language	John Wiley & Sons, Inc	2012

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.S.Chadha, R.N.Agarwal	Business Mathematics	S.Chand& Company Ltd, Ram Nagar, New Delhi	1996
2.	Sundaresan and Jayseelan	An introduction to Business Mathematics	Sultan Chand & Company, New Delhi	1988
3.	S.P.Gupta	Elementary Statistical Methods	Sultan Chand &Sons, New Delhi	2005
4.	S.C.Gupta and V.K.Kapoor	Fundamentals of Statistics	Sultan Chand & Sons, New Delhi	2007
5.	Joseph Adler	R in a Nutshell A Desktop Quick Reference	O'reilly	2010

WEB RESOURCES

1. *https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-mg23/*

2. *http://www.r-tutor.com/elementary-statistics*

3. *https://www.r-project.org/*

4. *https://www.r-statistics.com/*

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

6. Hands on training in Computer Lab

SYLLABUS DESIGNER

Mrs. G. VinuPriya, Head and Assistant Professor of Mathematics

NON MAJOR –II - FUNCTIONAL STATISTICS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
IV	21NMA4A	Non Major –II	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	-	2
			2	30	2	30		

COURSE OBJECTIVES:

The students will be able to

- Understand the fundamental concepts in Statistics and develop the skills in computing the statistical measures for the undergraduate students of other departments.
- Concentrate on pertinent and concrete examples.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Learn about types of sets and the operations	K1
CO2	Understand permutation and combination	K2
CO3	Acquire basic knowledge of probability	K2
CO4	Calculate various statistical measures	K3
CO5	Apply statistical tools in various fields	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF PROGRAM OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	S	S	M	S	S
CO2	S	M	S	S	S	S
CO3	S	S	S	S	S	S
CO4	S	M	S	S	S	S
CO5	S	M	S	S	S	S

S- Strong; M-Medium; L-Low

UNIT -I: SET THEORY   6 Hours

Definition - Subsets - Power sets - Equality of sets - Finite and Infinite sets - Set operations - De-Morgan's laws(without proof) - Distributive tables - Cartesian products – Simple problems.

(Text Book 1: Chapter 1)

UNIT –II PERMUTATION AND COMBINATION   6 Hours

Properties of nPr and nCr (no derivation), Cyclic permutation – problems based on these types.

UNIT –III: PROBABILITY THEORY   6 Hours

Definition of Mutually Exclusive events, Exhaustive events, Equally likely events, Independent events, Sample Space, Probability, Axioms of Probability – Addition theorem(without proof) – Multiplication theorem on probability(without proof), Conditional probability (No derivation) – Simple Problems.

UNIT – IV: MEASURES OF AVERAGES   6 Hours

Arithmetic Mean - Median – Mode – Simple problems.

Unit – V: MEASURES OF DISPERSION   6 Hours

Range, Quartile Deviation, Variance, Standard Deviation – problems.

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS: 90%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R. Vittal (Unit I to V)	Business Mathematics and Statistics	Margham Publishers	2011
2.	P.A. Navnitham (Unit II to V)	Business Mathematics and Statistics	Jai Publishers, Trichy	2003

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.P.Gupta&P.K.Gupta	Business Mathematics and Statistics	Sultan Chand & Sons	2013
2.	S.S.Chadha, R.N.Agarwal	Business Mathematics	S.Chand&Company Ltd, Ram Nagar, New Delhi	1996
3.	Sundaresan and Jayseelan	An introduction to Business Mathematics	Sultan Chand & Company, New Delhi	1988
4.	S.P.Gupta	Elementary Statistical Methods	Sultan Chand &Sons, New Delhi	2005
5.	S.C.Gupta and V.K.Kapoor	Fundamentals of Statistics	Sultan Chand & Sons, New Delhi	2007

WEB RESOURCES

1.*https://nptel.ac.in/courses/111/107/111107058/*

2. https://nptel.ac.in/courses/111/105/111105041/

3. https://www.khanacademy.org/math/statistics-probability

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

SYLLABUS DESIGNER

Mrs. G. VinuPriya, Head and Assistant Professor of Mathematics

CORE PAPER – VII - LINEAR ALGEBRA

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
V	21CMA5A	Core paper – VII	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			6	90	6	90		

COURSE OBJECTIVES:

The students will be able to

- Demonstrate competence with the basic ideas of linear algebra including concepts of linear systems, independence, theory of matrices, trace and transpose.
- Study the Algebraic structures of Vector Spaces and Linear Transformation

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand the concepts of Vector space	K2
CO2	Compute inner products and determine orthogonality on Vector spaces	K2
CO3	Prove theorems on linear transformations and find the characteristic root	K3
CO4	Understand Triangular form and solve related problems	K3
CO5	Apply the trace and transpose on linear systems	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	M
CO2	M	S	M	M	S	S
CO3	S	M	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT – I: VECTOR SPACES   **18 Hours**

Definition and examples – Linear dependent and independence.Related Theorems – Simple Problems.

(Chapter – 4: Sections 4.1, 4.2)

UNIT – II: VECTOR SPACES (CONTD.)   **18 Hours**

Dual space – Inner Product spaces – Definitions – Examples - Theorems – Simple Problems.

(Chapter – 4: Sections 4.3, 4.4)

UNIT – III: LINEAR TRANSFORMATION   **18 Hours**

Algebra of linear transformations – Characteristic roots - Definitions – Examples-Related Theorems – Simple Problems.

(Chapter – 6: Sections 6.1, 6.2)

UNIT – IV: LINEAR TRANSFORMATION (CONTD.)   **18 Hours**

Matrices, Canonical forms: Triangular forms - Definitions – Examples - Theorems – Simple Problems.

(Chapter – 6: Sections 6.3, 6.4)

UNIT – V: LINEAR TRANSFORMATION (CONTD.)   **18 Hours**

Trace and Transpose, Determinants - Theorems – Simple Problems.

(Chapter – 6: Sections 6.8, 6.9)

DISTRIBUTION OF MARKS: THEORY 80% AND PROBLEMS 20%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	I.N.Herstein.	Topics in Algebra	Wiley Eastern Ltd. New Delhi	1989

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Surjeet Singh and QaziZameeruddin	Modern algebra	Vikas Publishing House Pvt. Ltd. New Delhi	1982
2	J.B.Fraleigh	A First Course in Algebra (3rd Edition)	Addison Wesley, Mass. (Indian Print)	1987
3	M.L. Santiago	Modern Algebra	Tata McGraw Hill, New Delhi	2002
4	S. Arumugam	Modern Algebra	Scitech Publications, Chennai.	2004
5	S. Lipschutz	Beginning Linear Algebra	Tata McGraw Hill Edition, New Delhi.	2005

WEB RESOURCES

1.*https://marinazahara22.files.wordpress.com/2013/10/i-n-herstein-topics-in-algebra-2nd-edition-1975-wiley-international-editions-john-wiley-and-sons-wie-1975.pdf*

2. https://www.khanacademy.org/math/linear-algebra

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

Mrs. G. Vinu Priya, Head and Assistant Professor of Mathematics

CORE PAPER – VIII - REAL ANALYSIS-I

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
V	21CM A5B	Core paper – VIII	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			6	90	6	90		

COURSE OBJECTIVES:

The students will be able to

- Focus on the proofs of basic theorems in Real analysis.

- Establish the proofs, understand new concepts related to real valued functions.

- Learn the concepts of limits and Continuity

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Recognize the terminology Functions, Real valued functions, Equivalence, countability and Real numbers, least upper bound.	K2
CO2	Prove standard theorems on Sequences	K2
CO3	Learn the elementary concepts and basic ideas involved in operations on convergent sequence, divergent sequence and Cauchy sequence and also to distinguish conditional and absolute convergent.	K3
CO4	Demonstrate limit of a function on the real line, Metric space and limits in Metric space.	K3
CO5	Explain Continuous functions, functions continuous at a point on a real line, reformulation and continuous on a metric space.	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAM ME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	S
CO2	S	S	M	M	M	S
CO3	S	S	M	M	S	S
CO4	S	M	S	S	M	S
CO5	S	S	S	M	M	S

S- Strong   M – Medium   L – Low

UNIT – I: REAL VALUED FUNCTIONS   **18 Hours**

Functions, Real valued functions, Equivalence, countability and Real numbers, least upper bound.

(Chapter**:** 1.4 to 1.7)

UNIT – II: SEQUENCE   **18 Hours**

Sequence – definition – subsequence – limit of a sequence – convergent – divergent sequence, bounded sequence monotone – sequence – series with non-negative terms.

(Chapter: 2.1 to 2.6)

UNIT – III: SEQUENCE(Contd.) AND SERIES   **18 Hours**

Operations on convergent sequence – operations on divergent sequence – Cauchy sequence.

Series: Convergence and divergence – Series with non-negative terms – conditional and absolute convergence.

(Chapter: 2.7, 2.8, 2.10 and Chapter: 3.1, 3.2,3.4)

UNIT – IV: LIMITS AND METRIC SPACE   **18 Hours**

Limit of a function on the real line – Metric space – Limits in Metric space.

(Chapter: 4.1 to 4.3)

UNIT – V: CONTINUOUS FUNCTIONS   **18 Hours**

Functions continuous at a point on a real line – Reformulation – continuous on a metric space - Open sets, closed sets.

(Chapter: 5.1 to 5.5)

DISTRIBUTION OF MARKS: THEORY 90% AND PROBLEMS 10%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	R.Goldberg	Methods of Real Analysis	Oxford and IBH Publishing co., New Delhi	1970

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Tom M. Apostol	Mathematical Analysis	Addison-Wesley, New York	1974
2.	Bartie, R.GandShebert	Real Analysis	John Willey &sons Inc., New York	1976
3.	S.C. Malik and SavitaArora,	Mathematical Analysis	Willey Eastern Limited,New Delhi.	1991
4.	Sanjay Arora and BansiLal,	Introduction to Real Analysis,	SatyaPrakashan, New Delhi.	1991

WEB RESOURCES

1. *https://www.scribd.com/document/422568997/Goldberg-Method-of-Real-Analysis*
2. *https://www.goodreads.com/book/show/28381581-methods-of-real-analysis*

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation

SYLLABUS DESIGNER

Mrs. B. Vijayalakshmi, Assistant Professor of Mathematics.

CORE PAPER –IX -STATICS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
V	21CMA5C	Core paper – IX	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			6	90	6	90		

COURSE OBJECTIVES:

The students will be able to

- Understand the basic concepts of forces, moments, couple and friction, laws of friction, catenary and centre of gravity.
- Focus on the development of skills in formation of suitable mathematical models and problems solving techniques.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Obtain adequate information on forces and moments and generalize the concepts of moments	K2
CO2	Get a basic coverage of coplanar forces, equilibrium of a rigid body, develop the skills in solving many practical problems	K3
CO3	Understand the basic concepts of friction and its laws and to solve many simple problems	K2
CO4	Acquire knowledge on intrinsic equation and Cartesian equation on Catenary & its properties	K3
CO5	Get a wide knowledge about centre of gravity, find the mass centre of certain simple systems which can be found by using integration or without using integration	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF COURSE OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	S	S
CO2	S	M	S	S	M	M
CO3	S	M	S	M	M	S
CO4	S	S	M	M	S	M
CO5	S	M	S	S	S	S

S- Strong   M – Medium   L – Low

UNIT – I: FORCES AND MOMENTS   **18 Hours**

Parallelogram Law of forces – Triangle Law of forces and its converse – Polygon Law of forces – Lami's theorem and its converse – Parallel forces and moment – Varignon's theorem on moments – Generalized theorem on moments.

(Sections: 2.1 – 2.2, 3.1, 4.1 – 4.4)

UNIT – II: COUPLES   **18 Hours**

Arm and Axis of couple – Moment of a couple – Equilibrium of two couples – Couples in parallel planes – coplanar forces – Equilibrium of a rigid body: Three forces acting on a rigid body – Conditions of Equilibrium – Problems.

(Section: 4.6 – 4.7)

UNIT – III: FRICTION   **18 Hours**

Basic concepts – Laws of friction – Equilibrium of a particle on a rough inclined plane under any force – Simple Problems.

(Section: 5.2)

UNIT – IV: CATENARY   **18 Hours**

Intrinsic equation and Cartesian equation of the common catenary – properties of catenary – Sag of telegraph wireless (tightly stretched wires) - Simple Problems.

(Section: 9.1)

UNIT – V: CENTRE OF GRAVITY (C.G)   **18 Hours**

CG of particles lying in one plane – CG of plane area – CG of an arc – CG of solid of revolution – CG of surface of revolution – CG when density varies.

(Section: 6.1 – 6.2)

DISTRIBUTION OF MARKS: THEORY 40% AND PROBLEMS 60%

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	P. Duraipandian, LaxmiDuraipandian and MuthamizhJayapragasam	Mechanics	S. Chand & Co. New Delhi.	2006

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	A.V. Dharmapadam	Mechanics	S. Viswanathan Printers & Publishers Chennai	1991
2	S.L. Loney	Elements of Statics	Macmillian India, Delhi	1982
3	M.K. Venkataraman	Statics	Agasthier Book Depot, Trichy	1990

WEB RESOURCES

1. *https://web.itu.edu.tr/~ustunda1/course/restlectures.pdf*
2. *https://www.brown.edu/Departments/Engineering/Courses/En4/Notes/Forces.pdf*
3. *https://engineering.purdue.edu/~aprakas/CE297/CE297-Ch3.pdf*
4. *http://isdl.cau.ac.kr/education.data/statics/ch8.pdf*

SYLLABUS DESIGNER

Mrs. C. Revathi, Assistant Professor of Mathematics

CORE PAPER –X -OPERATIONS RESEARCH - I

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
V	21CMA5D	Core paper –X	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Develop computational skills and logical thinking in formulating Industry oriented problems as a mathematical problem and finding solutions to these problems.

- Solve the formulation techniques and optimization techniques of socially relevant problems.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand about operations research and the formation of Linear Programming Problem	K2
CO2	Solve Linear Programming problem using Big – M method and Duality	K3
CO3	Find optimum solutions for transportation problems	K3
CO4	Assign each source to each destination using assignment problems	K3
CO5	Analyze the results for various real life mathematical problems using inventory models	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	M
CO2	M	S	S	M	M	S
CO3	S	S	M	S	M	M
CO4	S	M	S	M	M	S
CO5	S	S	M	M	S	M

S- Strong   M – Medium   L – Low

UNIT I: LINEAR PROGRAMMING PROBLEM   15 Hours

Introduction to Operations Research – General Linear Programming Problem – Mathematical formulation of LPP – Graphical solution – Simplex Algorithm – Simple Problems.

(Chapter 1: Sections 1.1 to 1.23

Chapter 2: Sections 2.6 to 2.16)

UNIT II: ARTIFICIAL VARIABLE TECHNIQUE AND DUALITY   15 Hours

Artificial Variable Technique – Big – M method – Duality – Primal and Dual relation – Simple Problems.

(Chapter 2: Sections 2.17 (2.17-1) and 2.18)

UNIT III: TRANSPORTATION PROBLEM   15 Hours

Transportation problem – Mathematical formulation – Initial Basic Feasible Solution – The Transportation Algorithm (MODI Method) – Unbalanced transportation problem.

(Chapter 3: Sections 3.1 to 3.7)

UNIT IV: ASSIGNMENT PROBLEM   15 Hours

Assignment problem – The assignment algorithm (The Hungarian Assignment Method) – Unbalanced Assignmentproblems –Profit Maximization Problems.

(Chapter 4: Sections 4.1 to 4.7)

UNIT V: INVENTORY MODELS   15 Hours

Inventory models – EOQ model – (a) Uniform demand rate, Infinite production rate with no shortages, (b) Uniform demand rate, Finite production rate with no shortages – Simple Problems.

(Chapter 12: Sections 12.1 to 12.5)

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS 90%
TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Gupta P.K. and Hira D.S.	Problems in Operations Research	Sultan Chand & Sons, New Delhi	2000

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	KantiSwaroop and Gupta P.K. Manmohan	Problems in Operations Research	Sultan Chand & Sons, New Delhi	2002
2.	H. A. Taha	Operations Research	Macmillan Publishing Company, New York	2003
3.	P. R. Vittal	Operations Research	Margham Publications, Chennai	2003
4.	J. K. Sharma	Operations Research : Theory and Applications	Macmillan, Delhi	2001

WEB RESOURCES

1. *https://www.maths.unp.ac.za/coursework/MATH331/2012/linearprogramming.pdf*
2. *https://towardsdatascience.com/operations-research-in-r-transportation-problem-1df59961b2ad*

SYLLABUS DESIGNER

Dr. M. Kasthuri, Assistant Professor of Mathematics

ELECTIVE –III -GRAPH THEORY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
V	21CMA5E	Elective –III	Hrs/Week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Understand the fundamental concepts of graph theory such as paths, trees in a graph, Euler graphs and Hamiltonian graphs

- Apply the concepts of graph theory in relevant fields and to improve the proof writing skills.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand the basic definitions and properties of graphs	K2
CO2	Find adjacency and incidence matrices	K3
CO3	Prove connectivity theorems	K3
CO4	Describe some basic algorithms for Eulerian graphs, Hamiltonian graphs and Planar graph.	K3
CO5	Develop mathematical models using graph theory	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	S
CO2	M	S	S	S	M	S
CO3	S	M	S	M	S	M
CO4	M	S	S	S	S	S
CO5	S	S	M	S	M	S

S- Strong: M- Medium: L- Low

Unit I :GRAPHS AND SUBGRAPHS   15 Hours

Graphs, Subgraphs, degree of a Vertex, isomorphism of graphs, walks, trails, paths.

(Chapter 2: Sections: 2.0 to 2.7

Chapter 4: Sections: 4.1)

Unit II:OPERATIONS ON GRAPHS   15 Hours

Adjacency and incidence matrices, Operations on graphs, Simple problems.

(Chapter 2: Sections: 2.8 to 2.9)

Unit III: CONNECTIVITY   15 Hours

Connectedness and components, cut vertex, bridge, block, connectivity theorems and simple

problems.

(Chapter 4: Sections: 4.2 to 4.4)

Unit IV: EULERIAN GRAPHS, HAMILTONIAN GRAPHSAND TREES   15 Hours

Eulerian graphs and Hamiltonian graphs, trees, theorems and simple problems.

(Chapter 5: Sections: 5.0 to 5.2

Chapter 6: Sections: 6.0 to 6.2)

Unit V: PLANAR GRAPHS   15 Hours

 Planar graphs – Definition and properties, colourability, chromatic number and chromatic

index.

(Chapter 8: Sections: 8.0 to 8.3)

DISTRIBUTION OF MARKS: THEORY 80% AND PROBLEMS: 20%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S. Arumugam and S. Ramachandran	Invitation to Graph Theory	Publications India Pvt Ltd, 7/3C, Madley Road, T - Nagar, Chennai – 17	2015

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	J.A Bondy and USR Murthy	Graph theory and applications	McMillan	1976
2.	J.Clark and D.A Holton	A first look at Graph theory	Allied publishers	1995
3.	R.Gould	Graph theory	Benjamin / Cummings	1989
4.	A.Gibbons	Algorithmic Graph Theory	Cambridge University Press	1989
5.	R.J. Wilson	Introduction to Graph Theory	Pearson Education	2004
6.	S.A. Choudum	A First Course in Graph Theory	MacMillan India Ltd	1987

WEB RESOURCES

1.*https://iversity.org/blog/introduction-graph-theory/*

2.*http://www.hamilton.ie/ollie/Downloads/Graph.pdf*

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5.PPT Presentations

SYLLABUS DESIGNER

Ms.R.Ramya, Assistant Professor of Mathematics.

SKILL BASED SUBJECT –III NUMERICAL METHODS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
V	21SMA5A	Skill based subject-III	Hrs/Week	Hrs/Sem	Hrs/week	Hrs/Sem	0	2
			2	30	2	30		

COURSE OBJECTIVES:

The students will be able to

- Understand the basic methods for forming difference table and learn the essence of interpolation techniques

- Solve algebraic equations, system of linear equations and to find numerical differentiation, numerical integration and numerical solution of ordinary differential equations.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Find the solution of algebraic and transcendental equation using different methods	K2
CO2	Understand and apply the concepts of finite differences	K3
CO3	Calculate numerical differentiation and integration	K3
CO4	Evaluate the problems on linear systems	K3
CO5	Acquire the knowledge of numerical Solution of ordinary differential equations	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	M	S	S	M
CO2	S	M	S	S	S	S
CO3	S	M	M	M	S	M
CO4	S	M	S	S	M	S
CO5	S	M	S	S	M	M

S- Strong: M- Medium: L- Low

UNIT I: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATION

6 Hours

Solution of Algebraic and Transcendental equation - Iteration Method, Method of False position, Newton Raphson Method – Simple Problems.

(Section SE.4 – SE.36)

UNIT II: FINITE DIFFERENCES

6 Hours

Finite differences-Forward differences, Backward difference, Newton's formula for interpolation. Lagrange's interpolation formula - Simple Problems.

(Section IA – IA.4, IA.31 to IA.34)

UNIT III- NUMERICAL DIFFERENTIATION AND INTEGRATION

6 Hours

Numerical differentiation and integration – Numerical differentiation- Errors in Numerical Differentiation-Differentiation Formulae with function values, Numerical integration - Trapezoidal Rule and Simpson's Rule - Simple Problems.

(Section D1.1- D1.6, D1.20-D1.24)

UNIT IV - SOLUTION OF LINEAR SYSTEMS

6 Hour

Solution of linear Systems – Direct Methods –Gaussian Elimination method, Gauss Jordan method - Simple Problems.

(Section SE. 42-SE.44)

UNIT V- NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

6 Hours

Numerical Solution of ordinary differential equations – Solution by Taylor Series, Picard's method of Successive approximations, Euler method, Runge- Kutta method (Only D.E. of II Order) - Simple Problems.

(Section OD.1- OD.22, OD.31, OD:45-61)

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.Kalavathy and M.Joice Punitha	Numerical Methods	Vijay Nicole Imprints Private Limited, Chennai	2010

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	M.K Jain, S.R.K Iyengar, and R.K Jain	Numerical Methods for Scientific and Engineering Computation	New age International Publisher, India	2012
2.	E. Balagurusamy	Numerical Methods	Tata McGraw Hill Publishing Company, New Delhi	2004
3.	P.Kandasamy, K.Thilagavathi, K.Gunavathi	Numerical Methods	S.Chand& Company Ltd, New Delhi	1997
4.	A.Singaravelu	Numerical Methods	Meenakshi Publications, Chennai	2002

WEB RESOURCES

1. http://nptel.ac.in/courses/122102009/,
2. http://www.math.ust.hk/~machas/numerical-methods.pdf

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

SYLLABUS DESIGNER

Dr. N. Nithyapriya, Assistant Professor of Mathematics

CORE PAPER – XI - REAL ANALYSIS II

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
VI	21CM A6A	Core Paper – XI	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Develop the understanding of point wise and uniform convergence of sequence and series of functions.

- Enhance the mathematical maturity and to work comfortably with concepts.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Acquire the comprehensive knowledge about Connected and Bounded sets	K2
CO2	Understand the terms Complete metric space and Compactness	K2
CO3	Prove standard theorems in Riemann integral	K3
CO4	Apply the concept of Rolle's theorem in real life	K3
CO5	Analyze the Taylor's formula with different forms of remainder	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITHPROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	S	S	M
CO2	M	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT- I - CONNECTEDNESS   **15 Hours**

Connected sets – Bounded sets and Totally Bounded sets.

(Chapter 6 : Section 6.1 – 6.3)

UNIT- II - COMPLETE METRIC SPACESAND COMPACTNESS   **15 Hours**

Complete metric spaces - Compact metric spaces – Continuous functions on compact metric spaces – Continuity of Inverse Functions – Uniform Continuity.

(Chapter 6 : Section 6.4 – 6.8)

UNIT- III- RIEMANN INTEGRATION   **15 Hours**

The Sets of measure zero - Definition of the Riemann Integral - Properties of the Riemann integral – Derivatives.

(Chapter 7 : Section 7.1 – 7.5 [omit section 7.3])

UNIT - IV– RIEMANN INTEGRATION (contd.)   **15 Hours**

Rolle's Theorem and the law of the Mean – Fundamental theorem of calculus – Improper Integrals

(Chapter 7 : Section 7.6 – 7.9)

UNIT- V- SEQUENCES AND SERIES OF FUNCTIONS   **15 Hours**

Taylor's Theorem: Taylor's Formula with Different Forms of Remainder – The Binomial Theorem – L'Hospital Rule.

(Chapter 8: Section 8.5 – 8.7 [omit section 8.1 – 8.4])

DISTRIBUTION OF MARKS: THEORY 80% AND PROBLEMS 20%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	R .Goldberg	Methods of Real Analysis	Oxford and IBH Publishing Co, New Delhi	1970

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Tom M. Apostol	Mathematical Analysis	Addison-Wesley, New York	1974
2.	Bartle, R.G. and Shebert	Real Analysis	John Willey &sons Inc., New York	1976
3.	S.C.Malik and Savita Arora.	Mathematical analysis	WilleyEasternLimited,NewDelhi	1991
4.	Sanjay Arora and BansiLal	Introduction to Real Analysis	SatyaPrakasam,New Delhi	1991

WEB RESOURCES

1. https://blogs.scientificamerican.com/roots-of-unity/what-does-compactness-really-mean/

2. https://mathworld.wolfram.com/Analysis.html

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

Dr. M. Devi, Assistant Professor of Mathematics

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
VI	21CM A6B	Core paper – XII	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Understand the concepts of Kinematics, Simple Harmonic Motion, Projectiles, Central orbits and Moment of inertia.

- Enhance the mathematical maturity and provide model for some real life problems

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Acquire the knowledge about resultant and relative velocity	K2
CO2	Understand the terms projectile, trajectory and range	K2
CO3	Construct the mathematical equations for Simple Harmonic Motion	K3
CO4	Apply the concept of central orbit and Kepler's Laws of planetary motion problems in real life	K3
CO5	Determine the moment of inertia of simple geometric shapes	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	S	M	M
CO2	S	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT –I- KINEMATICS   15 Hours

Velocity–Resultant velocity – Relative velocity – Acceleration – Rectilinear motion –
Rectilinear Motion with a Constant Acceleration – Velocity and Acceleration in a coplanar
motion – Angular Velocity – Relative Angular Velocity – Problems.
(Chapter 1: Sections 1.1 – 1.4)

UNIT –II- PROJECTILE   15 Hours

Force on a Projectile – Nature of trajectory – Results pertaining to the Motion of Projectile –
maximum Horizontal range for a given Speed and Range – Projectile projected horizontally -
Projectile projected on an inclined plane - Maximum range on an inclined Plane - Problems.
(Chapter 13: Sections 13.1 – 13.2)

UNIT- III- RECTILINEAR MOTION UNDER VARYING FORCE   15 Hours

Simple Harmonic motion along a Horizontal line –Simple Harmonic motion along a vertical
line. Impact-Direct oblique of two smooth spheres- Impulse of kinetic energy due to impact –
Simple Problems.
(Chapter 12: Sections 12.1 – 12.3, Chapter 14: Sections 14.1 – 14.5)

UNIT-IV-CENTRAL ORBIT   15 Hours

Central Force and Central Orbit-Equation of a central orbit - Law of force and speed for a
given orbit-Method to find central orbit-conic as a central orbit-Kepler's Laws of planetary
motion, Problems.
(Chapter 16: Sections 16.1 – 16.3)

UNIT-V-MOMENT OF INERTIA   15 Hours

Theorems of parallel and perpendicular axis-Moment of Inertia of rod, triangular lamina,
circular lamina, elliptic lamina, circular ring, right circular cone and sphere (hollow and
solid), Problems.
(Chapter 17: Section 17.1)

DISTRIBUTION OF MARKS: THEORY 30% AND PROBLEMS 70%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P. Duraipandian, LaxmiDuraipandian and MuthamizhJayapragasam	Mechanics	S. Chand & Co. New Delhi	2006

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	A.V.Dharmapadam	Mechanics	S. Viswanathan and Co,Chennai	1991
2.	S.L. Loney	Elements of Dynamics	Macmillian India, Delhi	1982
3.	M.K. Venkataraman	Dynamics	Agasthier Book Depot, Trichy	1990

WEB RESOURCES

1. https://revisionmaths.com/advanced-level-maths-revision/mechanics/projectiles

2. https://dynref.engr.illinois.edu/rem.html

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

Dr. M. Devi, Assistant Professor of Mathematics

CORE PAPER – XIII-COMPLEX ANALYSIS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
VI	21CMA6C	Core paper – XIII	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Learn Complex number System, Complex function and Complex integration.
- Gain knowledge about the Origin, properties and application of Complex numbers and Complex functions.

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Compute sums, products, quotients, conjugate, modulus and argument of complex numbers.	K2
CO2	Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties.	K3
CO3	Evaluate complex contour integrals by the fundamental theorems and apply the Cauchy integral formula.	K3
CO4	Apply the theory into application of the power series expansion of analytic functions.	K3
CO5	Evaluate and analyze complex integrals using the residue theorem.	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	S
CO2	S	M	S	S	M	S
CO3	S	S	M	M	S	S
CO4	S	S	S	S	S	S
CO5	S	M	M	M	M	S

S- Strong   M – Medium   L – Low

UNIT – I COMPLEX NUMBERS ANDANALYTIC FUNCTIONS 15 Hours

Definition of Function of a Complex Variable – Mappings – Limits, Continuity – Derivatives and Differentiation Formula – Cauchy – Riemann Equations – Properties of Analytic Functions – Necessary and Sufficient Conditions for Analytic Functions – Harmonic Functions – Determination of Harmonic Conjugate and Analytic Function.

(Text Book 1: Chapter 1: Sections :1.0- 1.5 ,1.8 and 1.9

Chapter 2: Sections: 2.0 -2.9)

UNIT – II MAPPING 15 Hours

Bilinear Transformation and Some Special Bilinear Transformation -Conformal Mapping – The transformations $w = az+b$, $w=1/z$, $w=z^2$, $w=\sqrt{z}$, $w=e^z$.

(Text Book 1: Chapter 3: Sections: 3.0 - 3.5

Chapter 5: Sections: 5.0 - 5.3)

UNIT – III INTEGRALS 15 Hours

Contours – Line Integrals – Cauchy – Goursat's Theorem (without proof) Cauchy's Integral Formula – Derivatives of Analytic Functions – Maximum Modulus Theorem.

(Text Book 1: Chapter 6: Sections :6.0 - 6.4)

UNIT – IV POWER SERIES 15 Hours

Taylor's and Laurent's Theorem – Singularities and Classification – Problems.

(Text Book 2: Complex Variables and Applications

Chapter 5: Sections : 51 – 56)

UNIT – V RESIDUES AND POLES 15 Hours

Residues – Cauchy's residue theorem – Simple problems. Evaluation of real integrals, Improper integrals involving sine & cosine functions.

(Text Book 1: Chapter 8: Sections: 8.0 - 8.3)

DISTRIBUTION OF MARKS - THEORY 40% AND PROBLEMS 60%

TEXT BOOKS S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S.Arumugam, A. Thangapandi Isaac, A. Somasundaram	Complex Analysis	Scitech Publications	2015
2.	R.V. Churchill and J.W. Brown	Complex Variables and Applications	McGraw Hill International Book Co., Singapore.	1984

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.Duraipandian and LaxmiDuraipandian	Complex Analysis.	Emerald Publishers,Chennai.	1976
2.	S.Ponnusamy	Foundations of Complex Analysis	Narosha Publishing House, New Delhi.	2000
3.	Murray R.Spiegel	Theory and Problems of Complex Variable	Tata McGraw Hill Edition, New Delhi.	2005

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all the units
3. Discussions
4. Home test

WEB SOURCES

1. http://www.freebookcentre.net/Mathematics/Complex-Analysis-Books.html
2. http://www.math.ku.dk/noter/filer/koman-12.pdf

SYLLABUS DESIGNER

Dr.T.Ranjani, Assistant Professor of Mathematics.

CORE PAPER – XIV - THEORY: PROGRAMMING IN C LANGUAGE

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
VI	21CMA6D	Core paper – XIV	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	-	3
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Learn about C Constants, Variables, Statements, Arrays, functions and various concepts of C Language.
- Develop programming skill in the Computer Language C.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Learn about C constants and Variables	K1
CO2	Explain about various operators in C Language, formatted input and output	K2
CO3	Learn about decision making statements and understand the reason why different constructs are available for iteration	K3
CO4	Develop C programs for arrays and user defined functions	K3
CO5	Understand structure, Unions and Pointers and to develop programs based on it.	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF PROGRAM OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	M	M
CO2	S	S	M	S	M	M
CO3	S	S	M	S	S	S
CO4	S	M	S	S	S	S
CO5	S	M	M	S	S	S

S- Strong; M-Medium; L-Low

UNIT – I : C CONSTANTS AND VARIABLES   **15 Hours**

C Constants, variables, Data-type, Declaration of variables, assigning values to variables.

(Chapter 2: Sections 2.5 to 2.8, 2.10)

UNIT – II : OPERATORS   **15 Hours**

Arithmetic, Relational, Logical, Assignment, Increment and decrement, Conditional,

Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic operators,

Formatted input and output.

(Chapter 3: Sections 3.1 to 3.7, 3.10 to 3.12

Chapter 4: Sections 4.4 & 4.5)

UNIT – III: DECISION MAKING AND BRANCHING   **15 Hours**

Decision making with **if**, simple **if, if else**, Nesting of **if – else, else – if** ladder, **switch**

statement, the **? :** Operator, go to statement. Decision making and looping: **while, do, for**

statement, Jumps in loops.

(Chapter 5: Section 5.1 to 5.9

Chapter 6: Section 6.1 to 6.5)

UNIT – IV: ARRAYS AND USER-DEFINED FUNCTION   **15 Hours**

one– dimensional array, two – dimensional array, Initializing two – dimensional array, Multi

– dimensional arrays. User – Defined Function: Need for User-defined function, Multi-

function program, the form of C-Function, Return Value and their types.

(Chapter 7: Sections 7.1 to 7.6

Chapter 9: Sections 9.1 to 9.6)

UNIT – V: STRUCTURES, UNIONS AND POINTERS   **15 Hours**

Structure definition, Declaring Structure Variables, Accessing Structure Members, Structure

initialization, Comparison of structure variables, Arrays of structures, Arrays within

structures, structure within structures, Unions

POINTERS: Understanding Pointers, Accessing the address of a variable, Declaring and

initializing of pointers, accessing a variable through its pointer, Pointer expression.

(Chapter 10: Sections 10.1 to 10.10, 10.12

Chapter 11: Sections 11.1 to 11.6, 11.8)

DISTRIBUTION OF MARKS: THEORY 80% AND PROBLEMS: 20%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	E.Balagurusamy	Programming in ANSI C	Tata McGraw Hill Education	2010

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	V. Rajaraman	Computer Programming in C	PHI learning Private	2019
2.	Herbert Schildt	Teach yourself C	McGraw-Hill Education	1997
3.	Mullish Cooper	The spirit of C	Jaico Publishers	1998
4.	YashavantKanetkar	Let us C	BPB Publications	2016
5.	Dr.P.Rizwan Ahmed	Programming in C	Margham Publications	2016

WEB RESOURCES

*1.*https://nptel.ac.in/courses/106/104/106104128/

2. https://nptel.ac.in/courses/106/105/106105171/

3. https://beginnersbook.com/2015/02/simple-c-programs/

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

SYLLABUS DESIGNER

Mrs. G. VinuPriya, Head and Assistant Professor of Mathematics.

CORE PRACTICAL: COMPUTER PRACTICAL IN C LANGUAGE

Semester	Subject Code	Category	Lecture		Theory	Practical		Credits
VI	21CMA61	Core Practical	Hrs/week	Hrs/Sem	0	Hrs/week	Hrs/Sem	2
			3	45		3	45	

COURSE OBJECTIVES:

The students will be able to

- Develop strong logical thinking, to write error-free syntax codes, to master the debugging

  techniques and to present the results in neat form in C Language for numerical methods.

- Solve problem numerically using C language

SYLLABUS

1. Assigning the ASCII value.
2. Square of numbers: Using for loop, while loop.
3. Square of numbers: do-while loop, goto statement
4. Characters between two given characters.
5. Number of vowels and consonants.
6. Three- dimensional matrix.
7. Addition of Matrices.
8. Multiplication of Matrices.
9. Prime number between two given numbers.
10. Fibonacci series
11. Factorial numbers
12. Power of a value.
13. Interchange sort.
14. Arithmetic Mean for raw data
15. Standard deviation for raw data
16. Student record.

DISTRIBUTION OF MARKS: PROBLEMS 100%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Mullish Cooper	The spirit of C	Jaico Publishers	1998
2.	Herbert Schildt	Teach yourself C	McGraw-Hill Education	1997

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	YashavantKanetkar	Let us C	BPB Publications	2016
2.	Byron Gottfried	Programming with C, Schaum's Outlines	McGraw-Hill Education	2006
3.	Ashok N. Kamthane, Amit Ashok Kamthane	Programming in C	Pearson Education India	2015

WEB RESOURCES

1. *https://www.javatpoint.com/c-programming-language-tutorial*
2. *https://www.guru99.com/c-programming-tutorial.html*

TEACHING METHODOLOGY

1. Class room Teaching

2. Practical class in Computer Laboratory

3. PPT Presentations

SYLLABUS DESIGNER

Mrs. G. VinuPriya, Head and Assistant Professor of Mathematics

CORE PRACTICAL: COMPUTER PRACTICAL IN C LANGUAGE
SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

Internal assessment: 40 Marks

External assessment: 60 marks

Total: 100 marks

External assessment: 60 marks

Record   : 10 Marks

Practical : 45 Marks

Viva   :   5 Marks

ELECTIVE –IV - OPERATIONS RESEARCH - II

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
VI	21CMA6E	Elective – IV	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			5	75	5	75		

COURSE OBJECTIVES:

The students will be able to

- Develop computational skill and logical thinking in formulating industry oriented problems as a mathematical problem and finding solution to these problems.

- Understand the mathematics of Information Theory at the basic level.

- Inculcate knowledge on maximize the profit and minimize the cost in every place.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Provide basic knowledge on game theory and able to solve practical problems related to it.	K2
CO2	Find the optimum integer solution using Integer programming problem	K3
CO3	Expose the fundamentals of Queueing theory and steady state analysis	K3
CO4	Determine the sequences that minimizes the total elapsed time by sequencing problem	K3
CO5	Discuss the constructing a project network and its importance	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	S	S	S
CO2	S	M	S	S	S	M
CO3	S	S	M	S	M	S
CO4	S	M	S	S	S	S
CO5	S	M	S	M	S	S

S- Strong   M – Medium   L – Low

UNIT I: GAME THEORY   **15 Hours**

Game theory – Two persons zero sum game – The Maximin and Minimax principle – Saddle points– Games without saddle points, mixed strategies – Dominance property.
(Sections: 9.1 – 9.20)

UNIT II: INTEGER PROGRAMMING   **15 Hours**

Integer programming – Gomory's all I.P.P method.
(Sections: 6.10.1 – 6.10.6)

UNIT III: QUEUING THEORY   **15 Hours**

Queuing Theory – Basic concepts – Steady state analysis of M/M/1 system with finite and infinite capacities.
(Sections: 10.1 – 10.9, Models I and IV)

UNIT IV: SEQUENCING PROBLEM   **15 Hours**

Sequencing problem – n jobs through two machines, n jobs through three machines – Graphical Method.
(Sections: 5.1 – 5.4)

UNIT V: NETWORK SCHEDULING BY CPM/PERT   **15 Hours**

Network Scheduling by CPM/PERT – Project Network Diagram – Critical Path Method (CPM) – PERT computations.
(Sections: 14.3, 14.8 – 14.9, 14.12 – 14.13, 15)

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS 90%

TEACHING METHODOLOGY:

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Gupta P.K. and Hira D.S	Problems in Operations Research	S.Chand& Co.,Delhi	2000

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	J.K.Sharma	Operations Research : Theory and Applications	Macmillan, Delhi	2001
2.	KantiSwaroop, Gupta P.K. Manmohan,	Problems in Operations Research	Sultan Chand & Sons	2002
3.	Ravindran A., Philips D.T. and Solberg J.J.	Operations Research	John Wiley & Sons, New York.	1987
4.	Taha H.A	Operations Research	Macmillan Publishing Company, New York	2003
5.	Vittal P.R	Operations Research	MarghamPublications, Chennai	2003
6.	Venkatesan S.J	Operations Research	J.S Publishers, Cheyyar	-

WEB RESOURCES

1. *https://notendur.hi.is/kth93/3.20.pdf*
2. *https://shodhganga.inflibnet.ac.in/bitstream/10603/30974/4/06_chapter%204.pdf*
3. *https://ocw.ehu.eus/pluginfile.php/8171/mod_resource/content/1/6_Integer_Slides.pdf*
4. *https://thalis.math.upatras.gr/~tsantas/DownLoadFiles/Hillier&Lieberman_7th-edition_Chapter10.pdf*

SYLLABUS DESIGNER

Mrs. C. Revathi, Assistant Professor of Mathematics

SKILL BASED SUBJECT-IV -MATHEMATICAL MODELLING WITH SPREADSHEET

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
VI	21SMA6A	Skill Based Subject – IV	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	-	2
			2	30	2	30		

COURSE OBJECTIVES:

The students will be able to

- Develop deep understanding of the mathematical modelling through differential equations, systems of ordinary differential equations and difference equations.
- Analyze the long-term behaviour of discrete and continuous dynamical systems numerically and graphically using Spreadsheet.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Develop the knowledge about Mathematical Modelling	K2
CO2	Understand and apply the concepts of Mathematical Modelling through ordinary differential equations	K3
CO3	Apply the methods of Mathematical Modelling through systems of ordinary differential equations	K3
CO4	Evaluate the problems on Difference equation	K3
CO5	Acquire the knowledge on applications of Partial Differential Equation	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

C	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	M	S	M	M
CO2	S	M	S	S	S	S
CO3	S	M	S	S	S	M
CO4	S	M	S	S	S	S
CO5	S	M	S	S	S	S

S- Strong: M- Medium: L- Low

UNIT - I: MATHEMATICAL MODELLING: NEED, TECHNIQUES, CLASSIFICATIONS AND SIMPLE ILLUSTRATIONS   6 Hours

Simple Techniques requiring Mathematical Modelling – The Technique of Mathematical Modelling – Classification of Mathematical Models – Some Characteristics of Mathematical Models.

(Chapter 1- Sections 1.1-1.4)

UNIT - II: MATHEMATICAL MODELLING THROUGH ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER   6 Hours

Mathematical Modelling through Differential Equations – Linear Growth and Decay Models – Non-Linear Growth and Decay Models.

(Chapter 2- Sections 2.1-2.3)

UNIT - III: MATHEMATICAL MODELLING THROUGH SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER   6 Hours

Mathematical Modelling in Population Dynamics – Mathematical Modelling of Epidemics through Systems of Ordinary Differential Equations of First Order.

(Chapter 3- Sections 3.1-3.2)

UNIT - IV: MATHEMATICAL MODELLING THROUGH DIFFERENCE EQUATIONS   6 Hours

The Need for Mathematical Modelling through Difference equations; some simple models- Basic Theory of linear difference equation with constant coefficients-Mathematical Modelling through Difference equation in finance.

(Chapter 5- Sections 5.1-5.3)

UNIT - V: MATHEMATICAL MODELLING THROUGH PARTIAL DIFFERENTIAL EQUATIONS   6 Hours

Situations giving rise to partial Differential equations Models-Mass Balance Equations: First Method of getting PDE models-Momentum-Balance equations.

(Chapter 6- Sections 6.1-6.3)

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	J.N. Kapur	Mathematical Modelling	New Age International (P) Ltd., Publishers,	2000

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Brian Albright	Mathematical Modelling with Excel	Jones & Bartlett, Student Edition,	2012
2.	Belinda Barnes, Glenn Robert Fulford	Glenn Robert Fulford, Mathematical Modelling with case studies	Chapman & Hall/CRC	2009
3.	Dilwyn Edwards, Mike Hamson	Guide Mathematical Modelling	Palgrave, St.Martin's Press, LLC	2007
4.	Glenn Fulford , Peter Forrester , Arthur Jones	Modelling with Differential and Difference Equations	Cambridge University Press	1997
5.	R.RobertHuckfeldt , C.W.kohfeld, Thomas W.Likens	Dynamic modelling An Introduction	SAGE Publications	1982
6.	Allman, E.S, and J.A.RhodesJ.A.Rhodes	Mathematical models in Biology	Cambridge University Press	2004
7.	M.M.Meerschaert	Mathematical Modeling, 2nd edition	San Diego, CA Academic press	1999

WEB RESOURCE

https://people.maths.bris.ac.uk/~madjl/course_text.pdf

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5. PPT Presentations

6. Computer programming

SYLLABUS DESIGNER

Dr. N. Nithyapriya, Assistant Professor of Mathematics.