

GOVERNMENT COLLEGE FOR WOMEN (AUTONOMOUS)

KUMBAKONAM

(Common course structure – B.Sc., – 2024 - 2025)

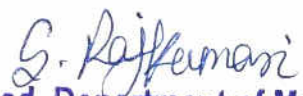
Department : Mathematics Programme Code: USMA

SEMESTER – I

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits
I	LC – I	U231T1	Tamil	6	3
II	ELC - I	U231E1	General English – I	6	3
III	CC – I	U23MC101	Algebra and Trigonometry	4	4
	CC – II	U23MC102	Differential Calculus	4	3
	GEC – I	UCHGEE4	Chemistry for Physical Sciences -I	4	4
	GEC – II	UCHGE3P	Volumetric Analysis - Practical	2	1
IV	VE	U231VE	Value Education	2	2
IV	FC	U23M1FC	Fundamentals of Mathematics	2	2
			Total	30	22

SEMESTER – II

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits
I	LC – II	U232T2	Tamil	6	3
II	ELC – II	U232E2	General English – II	6	3
III	CC – III	U23MC203	Integral Calculus	4	4
	CC - IV	U23MC204	Analytical Geometry (Two & Three Dimensions)	4	3
	GEC -III	UCHGEE5	Chemistry for Physical Sciences - II	4	4
	GEC- IV	UCHGE6P	Chemistry Practical for Physical and Biological Science	2	1
IV	SEC - I	U23M2SE1	Basics and Techniques in Spread Sheet - Practical	2	2
IV	EVS	U232ES	Environmental Studies	2	2
			Total	30	22


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B.Sc., Mathematics – 2023 – 2024 (batch) onwards

SEMESTER – III

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits
I	LC – III	U233T3	Tamil	6	3
II	ELC - III	U233E3	English	6	3
III	CC – V	U23MC305	Sequences and Series	5	4
III	CC – VI	U23MC306	Mathematical Statistics	4	4
III	GEC – IV	U23PGE1	Basic Allied Physics	4	4
III	GEC – V	U23PGE2P	Allied Physics – Practical I	2	1
IV	SEC - II	U23M3PD	Personality Development- Theory	1	1
IV	SEC - III	U23M3QA	Quantitative Aptitude	2	2
			Total	30	22

Heating weather

23

SEMESTER – IV

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits
I	LC – IV	U234T4	Tamil	6	3
II	ELC - IV	U234E4	English	6	3
III	CC – VII	U23MC307	Differential Equations and Applications	5	5
III	CC – VIII	U23MC308	Mathematical Statistics using SPSS - Practical	3	2
III	GEC – VI	U23PGE4	Advanced Allied Physics	4	4
III	G EC -VII	U23PGE4P	Allied Physics – Practical II	2	1
IV	IDSEC	U23M4	Commercial Mathematics	2	2
IV	SEC - IV	U23M4	Computing Skills (Office Automation) - Practical	2	2
			Total	30	22
			<i>Extension</i> Internship/Industrial training*	-	-

*Internship/industrial training during summer vacation. The credits shall be awarded in Semester V statement of marks.

23

SEMESTER – V

Part	Course Type	Title of the Course	Hrs/ Week	Credits
III	CC – IX	Abstract Algebra	6	5
III	CC – X	Real Analysis	6	4
III	CC – XI	~~Statics~~ Mechanics	5	4
III	CC – XII	~~Core/Project Viva-Voce~~ Operation Research	3	4
III	DSE – I	Discrete Mathematics	4	4
III	DSE – II	Programming in C – Practical	4	2
IV	SEC – VI	Introduction to Scientific Computing (MATLAB) – Practical	2	2
IV	AEC - I	Internship/Industrial training	-	2
		Total	30	27

SEMESTER – VI

Part	Course Type	Title of the Course	Hrs/ Week	Credits
III	CC – XIII	Linear Algebra	6	5
III	CC – XIV	Complex Analysis	5	5
III	CC - XV	~~Dynamics~~ Vector Calculus, Laplace Transforms and Fourier Series	5	4
III	DSE – III	Numerical Methods	5	3
III	DSE - IV	Graph Theory	4	3
IV	SEC – VII	Statistics with R Programming (Practical)	2	2
IV	AEC - II	Professional competency skill – General awareness for Recruitment Board of Examinations	2	2
IV	GS	Gender studies	1	1
	EA	Extension Activity	-	1
		Total	30	25


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DEPARTMENT OF MATHEMATICS
List of Generic Elective Course

No	Subject Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
1.	UMGE1	Calculus and Fourier Series	6	5	3	25	75	100
2.	UMGE2	Algebra, ODE and Trigonometry	6	5	3	25	75	100
3.	UMGE3	Probability and Statistics	6	5	3	25	75	100
4.	UMGE4	Laplace Transforms and Vector Calculus	6	5	3	25	75	100
5.	UMGE5	Numerical Methods	6	5	3	25	75	100
6.	UMGE6	Operations Research	6	5	3	25	75	100
7.	UMGE7	Discrete Mathematics	6	5	3	25	75	100

List of Discipline Specific Elective Course

S.No	Subject Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
1.	U23MDE1	Programming in C – Practical	3	2	3	40	60	100
2.	U23MDE2	Object Oriented Programming in C++- Practical	3	2	3	40	60	100
3.	U23MDE3	Numerical Analysis	5	4	3	25	75	100
4.	U23MDE4	Fuzzy Mathematics	5	3	3	25	75	100
5.	U23MDE5	Graph Theory	5	4	3	25	75	100
6.	U23MDE6	Formal Languages and Automata Theory	4	3	3	25	75	100
7.	U23MDE7	Operations Research	5	4	3	25	75	100
8.	U23MDE8	Discrete Mathematics	5	3	3	25	75	100


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Category	Hours			Credits	Marks		
	Lecturer	Tutorial	Practical		CIA	External	Total
Theory	4	-	-	4	25	75	100

Course Contents

Objectives:

- Basic ideas on the Theory of Equations, Matrices and Number Theory.
- Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.

Unit I: Theory of equations - Relations between roots and coefficients – Sum of the powers of the roots – Newton's theorem on the sum of the powers of the roots.

Unit II: Transformation of Equations – Reciprocal Equations - Multiple roots- Horner's method - Biquadratic Equations.

Unit III: Cubic Equations solution by Cardon's method(only) – solution by Ferrari's method.

Unit IV: Expression for $\sin n\theta$, $\cos n\theta$ and $\tan n\theta$ – Expression for $\cos^n\theta$, $\sin^n\theta$ – Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ - related problems.

Unit V: Hyperbolic functions –Inverse hyperbolic functions - related problems - Logarithm of complex Number.

TEXT BOOKS:

- T K Manicavachagom Pillay and others, Algebra Volume I, S.V. Publications- Reprint -2013.
- S. Arumugam and Issac Somasundaram, Trigonometry ,New Gamma Publishing House, 2012.

REFERENCE(S):

- Kandasamy P and K. Thilagavathi – Mathematics for B.Sc., - 2004, Vol I and Vol IV., S.Chand and Co., New Delhi.
- T K Manicavachagom Pillay and S. Narayanan – Algebra – Viswanathan Publishers and Printers Pvt. Ltd., - 2004.
- S. Arumugam and Thangapandi Issac, - Classical Algebra, New Gamma Publishing House, Palayamkottai.
- J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.

SECTIONS:

- UNIT I :** Chapter 6 (sections 11, 13, 14) of [1]
UNIT II : Chapter 6 (sections 15, 16, 26, 30, 33) of [1]
UNIT III : Chapter 6 (sections 34,34.1,35) of [1]
UNIT IV : Chapter 1 (sections 1.1 - 1.3) of [2]
UNIT V : Chapter 2 and Chapter 3 of [2]

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Recall Sum of the powers of the roots	K1
CO2	Explain Multiple roots and Horner's method.	K2
CO3	Solve the solution by Ferrari's method.	K3
CO4	Examine the powers and multiples of trigonometric functions in terms of sine and cosine.	K4
CO5	Determine relationship between hyperbolic functions and Elaborate the summation of trigonometric series.	K5 & K6

K1 - Remember, K2 - Understand, K3 - Apply, K4 - Analyze, K5-Evaluate, K6- Create

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	2	-	2	-
CO2	2	3	2	2	-	-	2
CO3	2	2	4	2	2	-	3
CO4	3	2	2	2	-	2	2
CO5	3	2	2	-	2	-	3

Very Strong -4 Strong -3 Medium -2 Low -1

Question pattern:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

U. S. Sudarshan
Staff Incharge

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Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	4	-	-	3	25	75	100

Objectives:

1. The basic skills of differentiation, successive differentiation, and their applications.
2. Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.

Course Contents

Unit I: Successive Differentiation: Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product.

Unit II: Envelope: Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.

Unit III: Curvature: Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involute – Radius of Curvature in Polar Co-ordinates – Pedal equations of a curve.

Unit IV: Linear Asymptotes and singular points (node, cusp and conjugate points).

Unit V: Tracing of curves – Polar Equation- Cycloid – Epi – and Hypocycloids.

TEXT BOOKS:

1. T K Manicavachagom Pillay and others Differential Calculus, Volume I, S.V.Publications, Chennai- Reprint 2000.

REFERENCE(S):

1. Arumugam S and Thangapandi Issac A, Calculus, New Gamma Publishing House, June 2014.
2. Kandasamy, P and K. Thilagavathi, Mathematics for B.Sc., - Volume II – 2004, S. Chand & Co., New Delhi.

SECTIONS:

- UNIT I:** Chapter III - (1.1 to 1.6 & 2.1,2.2)
UNIT II: Chapter X - (1.1 to 1.4)
UNIT III: Chapter X - (2.1 to 2.8)
UNIT IV: Chapter XI - (1 to 3), Chapter XII - (1 to 7)
UNIT V: Chapter XIII - (1 to 2)

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Find the n^{th} derivative, form equations involving derivatives and apply Leibnitz formula.	K1
CO2	Explain the envelope of a given family of curves.	K2
CO3	Solve evolutes and involutes and to find the radius of curvature using polar co- ordinates.	K3
CO4	Discover the Liner Asymptotes and singular points.	K4
CO5	Determine Tracing of curves, Polar Equation and discuss the Cycloid and Epi –Hypocycloid.	K5 & K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	2	2	-	2	-
CO2	4	2	2	2	2	3	1
CO3	2	2	3	2	-	2	-
CO4	3	3	1	2	-	2	1
CO5	3	3	1	2	-	3	1

Very Strong -4 Strong - 3 Medium - 2 Low - 1

Question pattern:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

Atul Arunak
Staff Incharge
[Dr. AR. RAJAYAL]

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SEMESTER – I FC - FUNDAMENTALS OF MATHEMATICS

Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	2	-	-	2	25	75	100

Course Contents

Objectives:

- Basic ideas on the Properties of union, intersection and Complement of Operations..
- Knowledge to find Elementary Operation of rank of matrix

Unit I: Sets: Introduction-Notation and Description of sets-Subsets - Venn Euler's diagram - Operations of sets.

Unit II: Properties of sets operation: Properties of union, intersection and Complement.

Unit III: Matrix Algebra: Basic definition, Matrix Operations Addition-Multiplication, Transpose of Matrix-Inverse of Square Matrix.

Unit IV: Determinants: Properties of determinant-Elementary Operation of rank of matrix.

Unit V: Logic: Introduction- T-F statement-Connectivity-Conjunction-disjunction-Negation-Conditional -Bi-conditional.

TEXT BOOK:

1. Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2001.

REFERENCE(S):

1. P. Tremblay and R.Manohar, Discrete Mathematical Structures with Applications to Computer Science ,TMH Edition 1997

SECTIONS:

UNIT I : Chapter 1 (section 1 to section 6)

UNIT II : Chapter 1 (section 7 (1 –3))

UNIT III : Chapter 6 (section 1 to 3)

UNIT IV : Chapter 6 (section 3 to 4)

UNIT V : Chapter 9 (section 1 to 3)

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Recall the Notation and Description of sets, Subsets, Venn Euler's diagram.	K1
CO2	Explain the Crack challenging problems of simplifications based on Properties of union, intersection and Complement.	K2
CO3	Solve the Matrix Operations Addition-Multiplication, Transpose of Matrix- Inverse of Square Matrix.	K3
CO4	Classify the Elementary Operation of rank of matrix.	K4
CO5	Evaluate T-F statement and compose the Connectivity, Conjunction.	K5 & K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	1	2	2	-	2	-
CO2	3	2	2	2	-	3	1
CO3	2	2	3	2	-	2	-
CO4	3	2	1	2	-	2	1
CO5	3	3	1	2	-	3	1

Very Strong -4 Strong - 3 Medium - 2 Low - 1

Question pattern:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

Staff Incharge
G. Sahithyabharathi

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Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	4	-	-	4	25	75	100

Course Contents

Objectives:

- Knowledge on integration and double, triple integrals and improper integrals.
- Knowledge about Beta and Gamma functions and their applications.
- Skills to Determine Fourier series expansions.

UNIT-I: Properties of definite integrals - Reduction formulae - Types and examples.

UNIT-II: Integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula.

UNIT-III: Double Integrals - definition of double integrals - evaluation of double integrals - Change of order of integration - double integrals in polar coordinates.

UNIT-IV: Triple integrals - Applications of multiple integrals - volumes of solids of revolution.

UNIT-V: Beta and Gamma functions - definitions - recurrence formula of Gamma functions - properties of Beta functions - Relation between Beta and Gamma functions.

TEXT BOOK:

- S. Narayanan and T. K Manicavachagom Pillay, Calculus, Volume – II, S.Viswanathan (Printers) PVT.LTD., 2012

REFERENCE(S):

- A.Singaravelu, Allied Mathematics-I-Aug 2007(1st Edition)
- A.Singaravelu, Allied Mathematics-II-June 2010(2nd Edition)
- H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
- Arumugam S and Thangapandi Issac A, Calculus, New Gamma Publishing House, June 2014.
- Apostol, T.M. Calculus. Vol. I (4th Edn.) John Wiley and Sons, Inc., New York 1991.
- Apostol, T.M. Calculus. Vol. II (2nd Edn.) John Wiley and Sons, Inc., New York. 1969.

SECTIONS:

- Unit I : Chapter 1 (sections 11,13 – 13.7)
 Unit II : Chapter 1 (sections 13.10 ,15.1)
 Unit III : Chapter 5 (sections – 1 to 3, 3.1, 3.2)
 Unit IV : Chapter 5(section- 4 to 6, 6.1)
 Unit V : Chapter 7 (sections 2.1 to 5)

P. Latha
 Staff incharge
 30/09/24
 (P. LATHA)

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Find the Properties of definite integrals.	K1
CO2	Explain the Integration of product of powers of algebraic and logarithmic functions.	K2
CO3	Compute the double integrals and problems using change of order of integration	K3
CO4	Examine the Applications of multiple integrals and volumes of solids of revolution.	K4
CO5	Determine the beta and gamma functions and to formulate them in solving problems of integration	K5 & K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	-	2	-
CO2	3	4	2	2	2	3	1
CO3	3	2	3	3	-	2	-
CO4	3	2	1	2	-	2	2
CO5	3	3	1	2	-	3	1
Very Strong -4 Strong - 3 Medium - 2 Low - 1							

Question pattern:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

CC- IV ANALYTICAL GEOMETRY (TWO&THREE DIMENSIONS)

Theory Hours : 4
Practical Hours : -
Exam Hours : 3

Course Code : U23MC204
Credits : 4
Internal : 25
External : 75

Objectives:

- Necessary skills to analyze characteristics and properties of two- and three-dimensional geometric shapes.
- To present mathematical arguments about geometric relationships.
- To solve real world problems on geometry and its applications.

UNIT - I

System of Planes-Length of the perpendicular-Equation of the planes bisecting the angle between the plane.

UNIT - II:

Polar coordinates: General polar equation of straight line – Equation of a circle -Equation Chord of circle.

UNIT - III

Representation of line–angle between a line and a plane – co-planar lines–shortest distance between two skew lines –length of the perpendicular.

UNIT - IV

Equation of a sphere – general equation - section of a sphere by a plane - Equation of the circle - Tangent plane – orthogonal spheres.

UNIT - V

Equation of a cone – Right circular cone – Intersection of a straight line and Quadric cone – Equation of cylinder – Enveloping cylinder.

TEXT BOOKS:

- P Duraipandian, Laxmi Duraipandian and D Muhilan, Analytical Geometry 2D, Emerald Publishers, 1997.
- T K Manicavachagom Pillay and T Natarajan, Analytical geometry part-II 3D, S Viswanathan(Printers) PVT.LTD., 2013
- A. Singaravelu and R. Ramaa, Analytical Geometry of 3Dimensions & Integral calculus (Paper II) A.R. Publications, June 2003.

REFERENCE(S):

- S.Arumugam and Isacc , Calculus, volume I, New Gamma Publishing House, 1991
- S.Narayanan T K Manicavachagom Pillay, Trigonometry, S. Viswanathan, Pvt Limite and Vijay Nicole Imprints Pvt Ltd, 2004.
- Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions.
- Robert C. Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York, 1961.

- Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
- William H. McCrea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, New York, 2006.
- John F. Randelph, Calculus and Analytic Geometry, Wadsworth Publishing Company, CA, USA, 1969.
- William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, NewYork, 2016.

Unit I : Chapter 1&2 (section- 2.18-2.38) Text book-3

Unit II : Chapter 9 (section-9.1,9.2,9.3-9.5) Text book-1

Unit III : Chapter 1&2 (section- 2.39-2.75) Text book-3

Unit IV : Chapter 1&2 (section-2.75-2.110) Text book-3

Unit V : Chapter-5 (section – 2 , 3 & 8) Text book-2

COURSE OUTCOMES (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Explain in detail the system of Planes

CLO 2: Find the polar equations of straight line and circle, equations of chord.

CLO 3: Explain in detail the system of Straight lines

CLO 4: Explain in detail the system of Spheres

CLO 5: Find the equation of cone and cylinder.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	-	-	√	√	√
CLO4	√	√	√	√	√	√	√	√	√
CLO5	√	√	√	√	√	√	√	√	√

Question Paper Pattern

SECTION A : $10 \times 1 = 10$ (Each Unit Carries Two Questions)

$5 \times 2 = 10$ (Each Unit Carries one Questions)

SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C : $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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SEC- I MATHEMATICS FOR COMPETITIVE EXAMINATIONS – I

Theory Hours : 2
 Practical Hours : -
 Exam Hours : 3

Course Code : U23M2SE1
 Credits : 2
 Internal : 25
 External : 75

Objectives:

1. Develop Mathematical Aptitude Skills.
2. The formulae given are useful over many problems.
3. To provide a confidence to appear in competitive examinations.

UNIT – I:

Numbers – HCF and LCM – Decimal Fractions.

UNIT – II:

Square Roots and Cube Roots – Percentage – Average – Ratio and Proportion – Partnership – Profit and Loss.

UNIT – III:

Time and Work – Time and Distance.

UNIT – IV:

Problems on Trains – Problems on Numbers – Problems on Ages.

UNIT – V:

Area – Volume and Surface Areas.

TEXT BOOK:

[1].R.S Aggarwal, Quantitative Aptitude , S.Chand and company Ltd., New Delhi,2008.

REFERENCE(S) :

- [1].B.S.Sijwali, quantitative aptitude Arihant Publications(india) Pvt Ltd 2007.
- [2].Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Mc Graw Hill Companies, 2006.
- [3].Arora .P.N. and Arora.s. 2009,Quantitative Aptitude Mathematics:Volume 1,S.Chand and company Ltd.
- [4].Kothari. C.R.1989. Quantitative techniques,Vikas Publishing House Pvt Ltd.
- [5].Srinivasan.T.M., Perumalswami.S. and gopala Krishnan.M.D., 1985 , Elements of Quantitative Techniques, Emerald Publishers.

COURSE OUTCOMES (for Mapping with POs and PSOs)

The students will be able to

CLO 1: Expose various types of Numbers. Use least common multiple method.

CLO 2: Crack challenging problems of simplifications based on complex function, square roots, cubic roots, unit digits, Exponents and percentages within a few seconds with the help of short tricks without knowledge.

CLO 3: Learn and apply tips and logical method on difficult problems of topics like time and work, pipes and cistern, speed and distance, average speed etc.

CLO 4: Study Problems on Trains, Numbers, Ages.

CLO 5: Apply easiest technique to solve Volume and Surface area.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	√	√	√	√	√
CLO4	√	√	√	√	√	√	√	√	√
CLO5	√	√	√	√	-	√	√	√	√

Question Paper Pattern

Each unit fifteen multiple choice questions for all topics: 75 x 1 = 75

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List of Generic Elective Course

S.No	Subject Code	Title of the Course	Credits
1.	U23MGE1	Calculus and Fourier Series	5
2.	U23MGE2	Algebra, ODE and Trigonometry	5
3.	U23MGE3	Probability and Statistics	5
4.	U23MGE4	Laplace Transforms and Vector Calculus	5
5.	U23MGE5	Numerical Methods	5
6.	U23MGE6	Operations Research	5
7.	U23MGE7	Discrete Mathematics	5

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CALCULUS AND FOURIER SERIES

Theory Hours : 6
Practical Hours : -
Exam Hours : 3

Course Code : U23MGE1
Credits : 5
Internal : 25
External : 75

Objectives:

- To provide the knowledge about the differentiation and various methods for evaluation of integrals.
- To study the properties of definite integrals and methods for solving the double integrals and simple integrals.
- To study methods for solving Fourier series.

UNIT - I:

Successive Differentiation – n^{th} derivative of standard functions (Derivation not needed) – simple problems only – Leibnitz theorem (proof not needed) and its applications.

UNIT - II:

Evaluation of integrals of types

$$[1] \int \frac{px+q}{ax^2+bx+c} dx \quad [2] \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad [3] \int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$$

$$[4] \int \frac{dx}{a+b\cos x} \quad [5] \int \frac{dx}{a+b\sin x} \quad [6] \int \frac{a\cos x + b\sin x + c}{p\cos x + q\sin x + r} dx$$

UNIT - III :

General properties of definite integrals – Evaluation of definite integrals of types – Reduction formula (when n is a positive integer)

$$[1] \int e^{ax} x^n dx \quad [2] \int \sin^n x dx \quad [3] \int \cos^n x dx \quad [4] \int_0^x e^{ax} x^n dx$$

$$[5] \int_0^{\frac{\pi}{2}} \sin^n x dx \quad [6] \text{ without proof } \int_0^{\frac{\pi}{2}} \sin^n x \cos^n x dx \text{ –and illustrations}$$

UNIT - IV:

Evaluation of Double and Triple integrals in simple cases.

UNIT - V:

Definition of Fourier series – Finding Fourier coefficients for a given periodic function with period 2π . Odd & Even functions - Half range Fourier coefficients.

TEXT BOOK(S):

- A. Singaravelu, Allied Mathematics – I– Aug 2007(1st Edition).
- A. Singaravelu, Allied Mathematics – II – June – 2010(2nd Edition).

COURSE OUT COMES:

The students will be able to

CLO1: Find higher derivatives of given function by using Leibnitz's theorem.

CLO2: Evaluate indefinite integrals and reduction formula.

CLO3: Develop the concept of definite integrals and reduction formula.

CLO4: Solve first order differential equation utilizing the standard techniques for separable, exact, linear homogeneous equation.

CLO5: Derive a Fourier series of a given periodic function by evaluating Fourier coefficients.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	✓	✓	✓	✓	-	-	✓	✓	✓
CLO2	✓	✓	✓	✓	-	-	✓	✓	✓
CLO3	✓	✓	✓	✓	-	-	✓	✓	✓
CLO4	✓	✓	✓	✓	-	-	✓	✓	✓
CLO5	✓	✓	✓	✓	-	-	✓	✓	✓

Question Paper Pattern

SECTION A : $10 \times 1 = 10$ (Each Unit Carries Two Questions)

$5 \times 2 = 10$ (Each Unit Carries one Questions)

SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C : $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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ALGEBRA, ODE AND TRIGONOMETRY

Theory Hours : 6	Course Code : U23MGE2
Practical Hours : -	Credits : 5
Exam Hours : 3	Internal : 25
	External : 75

Objectives:

1. To study the various methods for solving Ordinary Differential Equations.
2. To understand the linear system of Ordinary Differential Equations.

UNIT - I:

Exponential and Logarithmic Series (Formulae only) – Problems in Summation only.

UNIT – II:

Differential Equation of first order and higher degree – Equations solvable for p, solvable for x, Solvable for y, Clairaut's equation (simple cases only)

UNIT - III:

Linear Differential equations with constant coefficients – Finding particular integrals in the cases of e^{ax} , $\sin(ax)$, $\cos(ax)$ (where a is a constant), x^a where a is a positive integer and $e^{ax} f(x)$ where f(x) is any function of x – (only problems in all the above – No proof needed for any formula).

UNIT - IV:

Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer) – Expansion of $\sin^n \theta$, $\cos^n \theta$, $\sin^n \theta \cos^m \theta$, in a series of sines & cosines of multiples of θ (θ – given in radians) – Expansion of $\sin \theta$, $\cos \theta$ and $\tan \theta$ in terms of powers of θ (only problems).

UNIT - V:

Exponential formula for $e^{i\theta}$ – Definition of Hyperbolic functions – Formulae of Hyperbolic functions – Relation between Hyperbolic and circular functions – Expansion of $\sin hx$, $\cos hx$, $\tan hx$, in powers of x – Expansion of Inverse hyperbolic functions $\sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$ – Separation of real & imaginary parts of $\sin(x+iy)$, $\cos(x+iy)$, $\tan(x+iy)$, $\sinh(x+iy)$, $\cosh(x+iy)$, $\tanh(x+iy)$.

TEXT BOOK:

1. Dr. A.Singaravelu. Allied Mathematics. Fourth Revised Edition. Aug – 2013.

REFERENCE(S):

- [1]. PR.Vital. Trigonometry. Margham Publications Chennai IT. 3rd Edition-2004.
- [2].S.Narayanan. T.K.Manickavasagam Pillai. Trigonometry S.Viswanathan. Pvt Ltd 2004.
- [3].S.Narayanan. T.K.Manickavasagam Pillai. Differential equations and it's applications Viswanatham Printers. 2007.
- [4]. Arumugam Issac. Allied Mathematics. New Gamma Publishing House. 2007.

COURSE OUTCOMES:

The students will be able to

CLO1: Study basic problems involving the Exponential and Logarithmic Series.

CLO2: Learn about Differential Equation of first order and higher degrees.

CLO3: Learn about Linear equations with constant coefficients.

CLO4: Learn about the expansion of trigonometry functions. Expose various concept of trigonometry, inverse trigonometry functions.

CLO5: Provide Hyperbolic functions and the Relation between hyperbolic function.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	✓	✓	✓	✓	-	-	✓	✓	✓
CLO2	✓	✓	✓	✓	-	-	✓	✓	✓
CLO3	✓	✓	✓	✓	-	-	✓	✓	✓
CLO4	✓	✓	✓	✓	-	-	✓	✓	✓
CLO5	✓	✓	✓	✓	-	-	✓	✓	✓

Question Paper Pattern

SECTION A : $10 \times 1 = 10$ (Each Unit Carries Two Questions)

$5 \times 2 = 10$ (Each Unit Carries one Questions)

SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C : $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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PROBABILITY AND STATISTICS

Theory Hours : 6
Practical Hours : -
Exam Hours : 3

Course Code : U23MGE3
Credits : 5
Internal : 2
External : 75

Objectives:

- To make the students gain wide knowledge in probability which plays a main role in solving real life problems.
- To study the applications of Binomial and Poisson distributions.

UNIT - I:

Theory of Probability: Basic Terminology – Axiomatic approach to probability – Some theorems on probability – Conditional probability – Multiplication theorem of Probability – Independent events.

UNIT - II:

Random variables – Distribution function – Discrete and Continuous random variable – Two-dimensional random variables.

UNIT - III:

Mathematical Expectation: Expected value of a Random variable – Properties of Expectation and properties of variance – Covariance – Moment generating function.

UNIT - IV:

Correlation – Definition – Scatter diagram – Karl Pearson's coefficient of correlation – Rank correlation – Simple problems. Linear Regression – Regression lines x on y and y on x – Simple problems.

UNIT - V:

Special discrete distribution: Binomial and Poisson distribution – Moment generating functions of these distributions – Additive Property of Binomial and Poisson distributions – Continuous probability distribution – Normal distribution – Chief characteristics of normal distributions.

TEXT BOOK:

[1]. S.C. GUPTA and V.K. KAPOOR, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, Educational publishers New Delhi, Reprint 2003.

UNIT I :Chapter 3 (Sections 3.3, 3.8, 3.8.5, 3.9, 3.9.1, 3.9.3, 3.10, 3.11.3.12)

UNIT II :Chapter 5 (Sections 5.2, 5.2.1, 5.3, 5.3.1, 5.4, 5.4.1, 5.5, 5.5.1)

UNIT III :Chapter 6 (Sections 6.2, 6.4, 6.5, 6.6) and 7 (Sections 7.1, 7.1.2)

UNIT IV :Chapter 10 (Sections 10.2, 10.3, 10.4 to 10.4.2, 10.7 to 10.7.3) and Chapter 11 (Sections 11.2, 11.2.1)

UNIT V :Chapter 8 (Sections 8.4, 8.4.6, 8.4.7, 8.5, 8.5.1, 8.5.5, 8.5.8) and Chapter 9 (Sections 9.2, 9.2.2).

REFERENCE(S):

- A.Singaravelu, Probability and statistics (paper - III), March 2002.
- P.Thambidurai, Practical Statistics, Rainbow Publishers – CBI(1991).

COURSE OUT COMES:

The students will be able to

CLO1 :Understand the basic concept of probability.

CLO2:Appreciate the importance of probability distribution of random variables and to know the notion of central tendency.

CLO3: Establish the Mathematical Expectation.

CLO4:Understand the correlation and regression coefficient.

CLO5:Important probability distributions of binomial, poisson and normal.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	-	-	√	√	√
CLO4	√	√	√	√	-	-	√	√	√
CLO5	√	√	√	√	-	-	√	√	√

Question Paper Pattern

SECTION A : $10 \times 1 = 10$ (Each Unit Carries Two Questions)

$5 \times 2 = 10$ (Each Unit Carries one Questions)

SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C : $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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LAPLACE TRANSFORMS AND VECTOR CALCULUS

Theory Hours	: 6	Course Code	: U23MGE4
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Internal	: 25
		External	: 75

Objectives:

- To study the techniques of finding Laplace transforms and Inverse Laplace transforms and their application in solving differential equations.
- To study the Derivation of vectors and line integral, surface integral and volume integral and their applications.

UNIT - I:

Laplace Transforms – Definition – $L(e^{at})$, $L(e^{-at})$, $L(\cos(at))$, $L(\sin(at))$, $L(t^n)$, where n is a positive integer - Basic theorems in Laplace Transforms (formula only) – $L[e^{-at}\cos bt]$, $L[e^{-at}\sin bt]$, $L[e^{-at}f(t)]$.

UNIT - II:

Inverse Laplace Transforms related to the above standard forms – Solving of differential equations using Laplace Transforms.

UNIT - III:

Vector differentiation – Velocity and Acceleration Vectors – Gradient of a vector – Directional Derivative – Unit Normal Vector – Divergence – Curl – Solenoidal and Irrotational vectors – Properties connecting grad, div and curl of a vector.

UNIT - IV:

Vector Integration – Line integrals – Surface integrals – Volume integrals.

UNIT - V:

Gauss Divergence Theorem (Statement only), Verification and application – Stoke's Theorem (statement only), Verification and application.

TEXT BOOK:

I. Dr. A. Singaravelu, Allied Mathematics, Fourth Revised Edition, Aug – 2013.

REFERENCE(S):

- [1]. G. B. Thomas and R. L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson, 2002.
- [2]. Jain and Iyengar, Advance Engineering Mathematics, Narosa Publishing House.
- [3]. M. K. Venkataraman, Engineering Mathematics, S. V. Publications, 1985, Revised Edition.
- [4]. J. N. Sharma, A. R. Vasishtha, Vector calculus, Krishna Prakashan Media (P) Ltd., 2004.

COURSE OUTCOMES:

The students will be able to

CLO1: Learns that serves as a platform for advanced mathematics and for solving many real life problems.

CLO2: Use the methods of Laplace transforms and Inverse Laplace transforms to solve differential equations with constant coefficients.

CLO3: Determine gradient vector fields and find potential functions, derivatives of vector functions.

CLO4: Evaluate line, surface and volume integrals. Compute length, area and volume of surface using vector integration.

CLO5: Apply the Gauss Divergence Theorem and Stoke's Theorem.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	-	-	√	√	√
CLO4	√	√	√	√	-	-	√	√	√
CLO5	√	√	√	√	-	-	√	√	√

Question Paper Pattern

SECTION A : $10 \times 1 = 10$ (Each Unit Carries Two Questions)

$5 \times 2 = 10$ (Each Unit Carries one Questions)

SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C : $3 \times 10 = 30$ (Each Unit Carries One Questions)

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NUMERICAL METHODS

Theory Hours	: 6	Course Code	: U23MGE5
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Internal	: 25
		External	: 75

Objectives :

1. To introduce different numerical techniques to solve Algebraic and differential equations.
2. To develop skills in solving problems using numerical techniques.

UNIT - I:

Algebraic and Transcendental Equations – Finding the roots of the given equation using Bisection Method – Newton Raphson Method, Iteration Method.

UNIT - II:

Finite differences – Forward, Central and Backward differences – Newton's forward & backward interpolation formulae – Lagrange's interpolation polynomial.

UNIT - III:

Numerical Integration – Trapezoidal and Simpson's 1/3 and 3/8 rules.

UNIT - IV:

Solutions to linear systems – Gaussian Elimination Method – Jacobi and Gauss seidel Iterative methods.

UNIT - V:

Numerical solution of ordinary differential Equations : Solution by Taylor series method – Euler's Method – Runge - Kutta second and fourth order methods.(Proof need not necessary, simple problems only for all units).

UNIT I : Chapter 2 (sections 2.1,2.2, 2.3, 2.5)

UNIT II : Chapter 3 (sections 3.3, 3.3.1, 3.3.2, 3.3.3, 3.6, 3.9.1)

UNIT III : Chapter 5 (sections 5.4.1, 5.4.2, 5.4.3)

UNIT IV: Chapter 6 (sections 6.3, 6.3.2)
Chapter 8 (sections 8.3.1, 8.3.2)

UNIT V: Chapter 7 (sections 7.1, 7.2, 7.4, 7.5).

TEXT BOOK:

1. S.S. Sasry, Introductory Methods of Numerical Analysis, prentice Hall of India, private limited Third edition – 2000.

REFERENCE(S):

- [1].A. Singaravelu Numerical Methods . 2002.
- [2]. Dr. M.K.Venketaraman, M.A., M.Tech., Ph.D. Numerical Methods in Science and Engineering , National publishing Co., Chennai. 2000.

COURSE OUTCOMES:

The students will be able to

- CLO1 : Obtain numerical solutions of algebraic and transcendental equations.
CLO2 : Learn about various interpolating and extrapolating methods to find numerical solutions
CLO3 : Understand the Trapezoidal and Simpson's 1/3 and 3/8 rules.
CLO4 : Solve initial and boundary value problems in differential equations using numerical methods.
CLO5 : Apply Taylor's series and Runge - Kutta methods to find the solution of the equations.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	-	-	√	√	√
CLO4	√	√	√	√	-	-	√	√	√
CLO5	√	√	√	√	-	-	√	√	√

Question Paper Pattern

- SECTION A : $10 \times 1 = 10$ (Each Unit Carries Two Questions)
 $5 \times 2 = 10$ (Each Unit Carries one Questions)
 SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))
 SECTION C : $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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OPERATIONS RESEARCH

Theory Hours : 6
Practical Hours : -
Exam Hours : 3

Course Code : U23MGE6
Credits : 5
Internal : 25
External : 75

Objectives:

1. To introduce the various techniques of Operations Research.
2. To make students solve real life problems in Business and Management.

UNIT – I:

Introduction to operations Research – Linear programming problem – Mathematical formulation of LPP – Graphical Solution methods – Simplex methods with $\leq$, $\geq$, $=$ constraints.

UNIT - II:

Transportation problems: Definition – Matrix form of T.P – Initial Basic feasible solution – The North West corner Rule – The Row minima method – The column minima Method – The matrix minima Method – Vogel's Approximation method – Unbalanced T.P.

UNIT – III:

Assignment problem – Hungarian Algorithm – Maximization method – Minimization method– Special cases in Assignment problems.

UNIT - IV:

Net work scheduling by PERT/CPM – Introduction – Network and basic components – Rules of Network construction – critical path analysis.

UNIT – V:

Probability considerations in PERT– Distinction between PERT and CPM (Simple problem only).

TEXT BOOK :

1. Kanti swarup, P.K. Gupta and Manmohan, Operations Research –9th Edition 2001, published by sultan Chand & Sons, New Delhi.

UNIT I : Chapter 2 (sections 2.1, 2.2)
Chapter 3 (sections 3.2, 3.3)
Chapter 4 (sections 4.3, 4.4)

UNIT II : Chapter 10 (sections 10.1, 10.5, 10.8, 10.9)
UNIT III : Chapter 11 (sections 11.1, 11.2, 11.3, 11.4)
UNIT IV : Chapter 21 (sections 21.1, 21.2, 21.4, 21.5)
UNIT V : Chapter 21 (sections 21.6, 21.7).

REFERENCE(S):

- [1]. Hamdy A. Taha, Operations Research (7th Edn.), Prentice Hall of India, 2002.
- [2]. Richard Bronson, Theory and Problems of Operations Research, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1982.

COURSE OUT COMES:

The students will be able to

CLO1: Learn mathematical techniques that will help them to understand and Analyze managerial problems in industry so that resources (Capitals, Materials, staffing and machines) may be utilized more effectively.

CLO2: Use mathematical software to solve the Transportation Problems.

CLO3: Apply the Special cases in Assignment problems.

CLO4: Solve the Network scheduling of CPM method problem.

CLO5: Understand the Network scheduling of PERT method.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	-	-	√	√	√
CLO4	√	√	√	√	-	-	√	√	√
CLO5	√	√	√	√	-	-	√	√	√

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Total = 75

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DISCRETE MATHEMATICS

Theory Hours	: 6	Course Code	: U23MGE7
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Internal	: 25
		External	: 75

Objectives :

1. To study various finite(discrete) structures of Mathematics.
2. To study recurrence relations and generating functions. analyses recurrence relations and provides methods for solving recurrence relations
3. To introduce group codes, procedure for generating group codes and Inference theory of predicate calculus

UNIT - I

Recurrence relations: Solution of finite order homogeneous Linear relations – Solution of Non-Homogeneous relations – Generating functions- Some common recurrence relations – Primitive recursive functions – Recursive and Partial Recursive Functions.

UNIT - II

Coding Theory: Introduction – Hamming Distance – Encoding a message – group codes – Procedure for Generating Group codes – Decoding and Error correction – An example of single Error correcting code

UNIT - III

Connectives –Atomic and Compound statements – Well formed formulae – Truth table of a Formula – Tautology - Tautological Implications and Equivalence of Formulae - Normal Forms – Principal Normal Forms

UNIT - IV

Theory of inference - Open Statements - Quantifiers – Inference theory of Predicate Calculus - statements involving more than one quantifier.

UNIT - V

Types of matrices - Rank of a matrix– Simultaneous linear equations – Characteristic equation and Cayley Hamilton Theorem - simple problems only.

TEXT BOOK[S]:

- [1] Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2001.
- [2] S.Arumugam and A. Thangapandi Isaac, Modern Algebra, New Gamma publishing House, Aug - 2003.

- UNIT I : Chapter 5 (sections 5.5 to 5.33) of [1]
 UNIT II : Chapter 8 (section 8.1 to 8.11) of [1]
 UNIT III : Chapter 9 (sections 9.4 to 9.93) of [1]
 UNIT IV : Chapter 9 (sections 9.56 to 9.86) of [1]
 UNIT V : Chapter 7 (sections 7.2 , 7.5 , 7.6 , 7.7) of [2].

REFERENCE(S):

- [1] J.P. Trembly and R.Manohar; Discrete Mathematical Structures with Applications to Computer Science, TMH Edition 1997.

- [2]. A.R. Vasistha, A.K. Vasistha, M.A> Krishna prakasam media (P) Ltd., 2008.
- [3]. Kenneth H. Rosen, Discrete mathematics and its applications, 7th edition, Tata McGrow Hill Publication co.Ltd , New Delhi, Special Indian edition 2011.

COURSE OUTCOMES:

The students will be able to

CLO1: Solve recurrence relation, linear equations and generating functions.

CLO2: Understand the techniques of coding and decoding systems.

CLO3: Gain the knowledge of logic and normal forms.

CLO4: Have exposure to the inference theory and predicate calculus.

CLO5: Have an efficiency in solving problems in matrix theory.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	√	√	√	√	-	-	√	√	√
CLO2	√	√	√	√	-	-	√	√	√
CLO3	√	√	√	√	-	-	√	√	√
CLO4	√	√	√	√	-	-	√	√	√
CLO5	√	√	√	√	-	-	√	√	√

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 $5 \times 2 = 10$ (Each Unit Carries one Questions)
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SEMESTER – III CC V – SEQUENCES AND SERIES

Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	5	-	-	4	25	75	100

Course Contents

Objective:

- To study the algebra of sequences.
- To study the convergence and divergence of series and the methods of testing the convergence.
- To study the binomial, exponential and logarithmic series

UNIT – I:

Sequence, limit, convergence of a sequence – Cauchy's general principle of convergence – Cauchy's first theorem on Limits – Bounded sequence – Monotonic sequence always tends to a limit, finite or infinite.

UNIT – II:

Infinite series Definitions of Convergence, Divergence and Oscillation– Necessary condition for Convergence – Convergence of $\sum \frac{1}{n^p}$ and Geometric series.

UNIT – III:

Comparison test - D' Alembert's Ratio test and Raabe's test, Simple problems based on above tests.

UNIT – IV:

Cauchy's condensation test - Cauchy's Root test and their simple problems - Alternative series with simple problems.

UNIT – V:

Binomial theorem for rational index – Exponential and Logarithmic series - Summation of series and approximations using these theorems.

TEXT BOOK :

- T.K. Manicavachagampillai, T. Natarajan, K.S. Ganapathy, Algebra, Volume – I, S.Viswanathan Pvt Limited, Chennai,2013.

REFERENCE (S) :

- M.K Singal and Asha Rani Singal, A first course in Real Analysis, R. Chand and Co., 1999.
- Dr. S.Arumugam, Sequences and Series, New Gamma Publishers, 1999.
- Richard, R. Goldbeg, Methods of Real Analysis [Oxford and IBH Publishing Co. Pvt. LTD].

SECTIONS:

- UNIT -I : Chapter 2 (sections 1 to 7)
 UNIT -II : Chapter 2 (sections 8, 9, 10, 11, 12 and 14)
 UNIT -III : Chapter 2 (Sections 13, 16, 18 and 19)
 UNIT -IV : Chapter 2 (sections 15, 17, 21 to 24)
 UNIT -V : Chapter 3 (sections 5 to 11, 14) and Chapter 4 (Sections 2, 3, 5 to 9).

VMC305

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Find the ability to work within an axiomatic framework sequence and limit.	K1
CO2	Explain the Cauchy's criterion for the convergence of real and complex sequences and series follows from the completeness axiom and the ability to explain the steps in standard mathematical notation.	K2
CO3	Apply the simple techniques for testing the convergence of sequences and series and confidence in applying them.	K3
CO4	Classify the sequences and series, with a developing intuition about the behavior of new ones.	K4
CO5	Determine the elementary functions can be defined by power series and develop the ability to deduce some of their easier properties.	K5&K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	2	3	1	2	1
CO2	4	3	2	3	2	3	1
CO3	3	2	2	2	-	2	-
CO4	2	3	2	2	2	2	-
CO5	3	3	2	3	1	2	1

Very Strong-4 Strong - 3 Medium – 2 Low – 1

Question pattern:

Section A	Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10) 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

[M DEVI]
Staff Incharge

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Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	4	-	-	4	25	75	100

Objective:

1. To make the students gain wide knowledge in probability which plays a main role in solving real life problems.
2. To frame distribution functions and its types.
3. To study the applications of Binomial and Poisson distributions.

UNIT - I

Diagrammatic representation: Types of Diagram – Bar and Pie diagram- Pictographs- graphs- Rang charts and ratio charts- Histogram – Frequency Polygon- Problems.

UNIT - II

Measures of general value: Arithmetic mean - Median-Mode - Geometric mean - Harmonic mean - Quartile deviations (Simple problems only).

UNIT - III

Correlation (two variables only) – Karl Pearson's Correlation Coefficient - Rank Correlation - Spearman's rank correlation coefficient (repeated and non-repeated). Linear regression – Simple problems

UNIT - IV

Binomial and Poisson distribution – Recurrence relations for Binomial and poisson distribution - Continuous distribution: Normal distribution – Chief characteristics of normal distributions.

UNIT - V

Sampling distribution: Chi square Variates – Definition – Derivation – Student's t - Distributions – Definition – Derivation – Constant (mean and variance only). Small sample tests – paired t-test, Chi-square test of goodness of fit - Simple problems.

TEXT BOOK :

- [1]. P.R.Vittal, Mathematical Statistics, Margham Publications, Chennai, Reprint-2013.
- [2]. S.C. Gupta and V.K.Kapoor . Fundamentals of Mathematical Statistics–Sultan chand and sons, Educational Publishers, New Delhi, Reprint – 2003.

REFERENCE (S) :

- Kapur and H.C. Saxena, Mathematical Statistics, S. Chand and company Pvt. Ltd., New Delhi, Reprint – 2015.
- J. Pillai and Bahavathi, Statistics Theory and Pratical, S. Chand and company Pvt. Ltd., New Delhi, Reprint – 2015.
- Javinithan, Business mathematics and Statistics, Jai publications Trichy, April – 2013.

SECTIONS:

- UNIT I** : Chapter 4 of [1]
- UNIT II** : Chapter 5 of [1]
- UNIT III:** Chapter 10 (sections 10.2, 10.4, 10.4.2, 10.7, 10.7.1 to 10.7.3), Chapter 11 (sections 11.2, 11.2.1) of [2].
- UNIT IV** : Chapter 8 (Sections 8.4, 8.4.2, 8.5, 8.5.4) and Chapter 9 (Sections 9.2, 9.2.2) of [2].
- UNIT V** : Chapter 15 (sections 15.1, 15.2, 15.6.2), Chapter 16 (sections 16.2, 16.2.1, 16.2.4, 16.3.1 to 16.3.3) of [2].

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Find the tabulate a given data and study graphical and diagrammatic representation through, Bar diagram, Pie diagrams, Histograms, Frequency polygon.	K1
CO2	Explain the Mean, Median, Mode and Geometric mean, Harmonic mean. Workout the simple problems in discrete and continuous series.	K2
CO3	Apply the Karl Pearson, Rank correlation and lines of regression	K3
CO4	Classify the Binomial, Poisson and Normal Distributio	K4
CO5	Estimate the chi-square distribution and discuss the small sample test.	K5&K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	2	2	3
CO2	4	2	3	3	2	3	3
CO3	3	2	3	2	2	2	2
CO4	4	3	2	2	1	3	1
CO5	3	3	2	3	1	2	2

Very Strong-4 Strong - 3 Medium – 2 Low – 1

Question pattern:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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Staff Incharge

U23M3PD

UM3PD

SEMESTER - III SEC - II PERSONALITY DEVELOPMENT - THEORY

Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	1	-	-	1	25	75	100

Course Contents

Question Paper Pattern

Each unit Fifteen marks question for all topics: 5 x 15 = 75

அலகு:1

வேக வாசிப்புத் திறன் - விரைவான வாசிப்புத் திறன் தேவை - எதை வாசிக்க வேண்டும் - எப்படி வாசிக்க வேண்டும் - வளர்ச்சிக் கட்டம் - பயன் - குதியாட்ட வாசிப்பு - தகர்க்க வேண்டிய மனத் தடைகள் - எழுத்துத் திறன்.

அலகு:2

படைப்புத் திறன் - கவனிக்கும் திறன் - செவிமடுக்கும் செயல்பாடு ஒரு கலைத் திறன் - கூர்ந்து கவனிப்பது - கவனித்தலில் 4 படிக்கட்டுகள் - சரியாக கவனிக்க முடியாமை.

அலகு:3

பேச்சுத் திறன் - எவற்றில் தெளிவு வேண்டும் - செந்தமிழும் நாப்பழக்கம் - மேடைத் தோற்றம் - கேளாறும் வேட்ப மொழிவது எப்படி - தரமான நல்ல பேச்சு - வளரும் பேச்சாளர். நேர்காணல் திறன் - வேலை தேடுவோர் அறிந்திருக்க வேண்டிய அடிப்படைகள் - தன்விவரத் தயாரிப்பு - மாதிரி நேர்காணல் வினாக்கள் - ஒரு வேலையில் எதிர்பார்ப்பு - வேலைக்கு தகுதியாக்கிக் கொள்ளும் பண்பு நலன்கள் - உங்களுக்கு எதிரான குணங்கள் - நேர்காணல்.

அலகு:4

தலைமைத் திறன் - யானை குருவி நண்பர்கள் சதை - வெற்றிகரமான தலைவர் - உன்னத தலைவர்களது தலைமையின் இரகசியங்கள் - போலித் தலைவர்கள் - மேலாண்மைத் திறன் - மேலாளர் இலட்சிய மனக்காட்சியை உருவாக்குதல் - குழு மேலாண்மை செயல்பாடு - குழுவைச் சிறப்பாகச் செயல்படச் செய்யும் கலை - தரமான குழுவின் தலைமைகள் - தடைகள் - தளங்கள் - மனித வளர்ச்சியில் மேலாளர் திறன் - எச்சரிக்கைகள்.

அலகு:5

மன அழுத்தம் எதிர்கொள் திறன் - அதன் அடையாளம் - எதிர்கொள்வது - நுனி முதல் அடிவரை அலசி ஆராய்தல் - உத்திகள் - மக்களை எதிர்கொள்ளும் திறன் - மன இறுக்கத்தை தளர்த்தும் முறை - உத்திகள் - மனக்காட்சியால் களிப்பற்று அமைதியுறல். மனப்படம் பதிவுத் திறன் - தேவை - பயன்படுத்துதல் - மனப்படம் பதிவு - உருவாக்கும் 10 விதிகள் - மறதி.

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UM3QA

SEMESTER III		SEC- III - QUANTITATIVE APTITUDE					
Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	2	-	-	2	25	75	100

Course Contents

Objectives:

1. Develop Mathematical Aptitude Skills.
2. The formulae given are useful over many problems.
3. To provide a confidence to appear in competitive examinations.

UNIT - I:
Permutation and Combination – Probability.

UNIT - II:
Tabulation .

UNIT - III:
Bar Graphs.

UNIT - IV:
Pie Charts.

UNIT - V:
Line Graphs.

TEXT BOOK:

[1].R.S Aggarwal, Quantitative Aptitude , S.Chand and company Ltd., New Delhi,2008.

REFERENCE(S):

- [1].B.S.Sijwali, quantitative aptitude Arihant Publications(india) Pvt Ltd 2007.
- [2].Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Mc Graw Hill Companies, 2006.
- [3].Arora P.N. and Arora.s. 2009,Quantitative Aptitude Mathematics:Volume 1,S.Chand and company Ltd.
- [4].Kothari. C.R.1989, Quantitative techniques,Vikas Publishing House Pvt Ltd.
- [5].Srinivasan.T.M., Perumalswami.S. and gopala Krishnan.M.D., 1985 , Elements of Quantitative Techniques, Emerald Publishers.

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Define the Permutation and Combination.	K1
CO2	Explain the Tabulation	K2
CO3	Apply the Bar Graphs.	K3
CO4	Classify the Pie Charts.	K4
CO5	Evaluate the Line Graph and discuss the problems.	K5 & K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	2	2	3
CO2	4	2	2	3	2	3	2
CO3	3	2	3	2	1	2	4
CO4	3	3	2	2	2	3	3
CO5	4	3	2	3	3	2	3
	Very Strong-4	Strong - 3	Medium - 2	Low - 1			

Question pattern:

Section A	Section B
5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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SEMESTER – IV CC- VII DIFFERENTIAL EQUATIONS AND APPLICATIONS

Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	5	-	-	5	25	75	100

Objectives:

- 1.To expose the students to various techniques of integration.
- 2.To study differential equations and partial differential equations of first and second order.
- 3.To study the techniques of finding Laplace transforms and inverse Laplace transforms and real functions and their application in solving ordinary differential equations.

Course Contents

UNIT - I

Differential Equations of the first order: Definitions – Solutions of Differential Equations – Equations of the first order and the first degree – Variables Separable – Homogeneous Equations – Non-Homogeneous Equations of the first degree in X and Y – Linear Equations – Bernoulli's Equations – Exact Differential Equations – Sufficient Conditions – Rule for Solving an Exact Differential Equations – Rules for Integrating Factors - Equations Solvable of p – Equations Solvable for y – Equations solvable for x – Clairaut's Form.

UNIT - II

Linear Differential equations with constant coefficients: The operators D and D^{-1} – Particular integral – Special methods of finding particular integral – Linear equations with variable coefficients – Find the particular integral – Equations reducible to the linear homogeneous equation.

UNIT - III

Simultaneous Differential equations: Simultaneous of the first order and first degree – Solution of $dx/P = dy/Q = dz/R$ – Methods for solving $dx/P = dy/Q = dz/R$ – Geometrical interpretation of $dx/P = dy/Q = dz/R$ – Total Differential equations rules for Integrating $Pdx + Qdy + Rdz = 0$.

UNIT - IV

Partial Differential Equations: Derivation of Partial Differential Equations – Elimination of arbitrary Constants – Elimination of arbitrary Functions – Different integrals of partial differential Equations – Solutions of PDE in some simple cases.

UNIT - V

Standard types of first order Equations – Types I, II, III, IV – Lagrange's Equation – Charpit's Method – Standard I, II, III, IV.

TEXT BOOKS:

S. Narayanan and T.K. Manickavasagam Pillai, Calculus volume- III
S.Viswanathan (Printers and Publishers), Pvt. Ltd. 2011.

REFERENCE (S):

- [1] P.R. Vittal, V. Malini, Calculus, Margham, Publications, 2004.
- [2] Dr. M.K. Venkataraman, Mrs. Manorama Sridhar, Differential equations and Laplace Transforms, National publishing company, 2004.
- [3] S. Narayanan, T.K. Manikavachagom pillai, Differential Equations and its Applications viswanathan printers, 2007.
- [4] Arumugam Issac, Allied Mathematics, New Gamma Publishing house, 2007.

SECTIONS:

- UNIT I : Chapter 1 (sections 1.1, 1.2, 2(2.1-2.5), 3.1-3.3,4,5(5.1-5.5),6.1)
UNIT II : Chapter 2 (sections 1.1, 2,3,4,8,9)
UNIT III: Chapter 3 (sections 1-5,7(7.2,7.3))
UNIT IV : Chapter 4 (sections 1,2(2.1,2.2),3,4)
UNIT V : Chapter 4 (sections 5(5.1-5.5)6,7(7.1))

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Define the first order differential equations including separable, homogeneous, exact and linear.	K1
CO2	Explain the Special methods of finding particular integral	K2
CO3	Compute the Simultaneous Differential equations	K3
CO4	Examine the Partial Differential Equations.	K4
CO5	Evaluate the Standard types of first order Equations and Compose the Lagrange's Equation.	K5&K6

K1 - Remember, K2 - Understand, K3 - Apply, K4 - Analyze, K5-Evaluate, K6- Create

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	1	2
CO2	3	3	2	3	2	3
CO3	3	2	3	2	2	2
CO4	3	3	2	2	-	2
CO5	4	2	3	3	-	2

Very Strong-4

Strong - 3

Medium - 2

Low - 1

Question pattern:

Section A		Section B		Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 Unit Carries Questions)	

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Staff Incharge
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**SEMESTER - IV CC-VIII MATHEMATICAL STATISTICS USING SPSS -
PRACTICAL**

Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	3	-	3	2	40	60	100

Course Contents

Objective:

To give practice on different statistical techniques using SPSS.

List of Experiments:

1. Graphical display of data
2. Calculation of measure of central tendency.
3. Correlation.
4. Regression.
5. Fitting of Binomial and Poisson distribution.
6. Fitting of Normal distribution.
7. Chi-square distribution.
8. Students t-distribution.
9. Paired t- test for Mean.
10. Chi-square test for Goodness of fit.

(Five questions have to be answered out of six questions. At least one question from each unit must be asked. Each question carries ten marks).

TEXT BOOK:

[1] S.C Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics-Sultan Chand and Sons, Educational publishers, New Delhi,2003.

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Find the average, Median, Mode, Standard deviation of the given collection data.	K1
CO2	Explain the correlation between the two variables between -1 and +1.	K2
CO3	Solve and Get conclusion (or) result.	K3
CO4	Analyze the Binomial, Poisson and Normal distribution.	K4
CO5	Determine the Students t-distribution and Construct Chi-square test for Goodness of fit.	K5&K6

K1 - Remember, K2 - Understand; K3 - Apply; K4 - Analyze; K5-Evaluate, K6- Create

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	2	2	3
CO2	4	2	2	3	2	3	3
CO3	4	2	3	3	3	2	2
CO4	3	3	2	2	1	2	4
CO5	4	3	2	3	2	2	3
Very Strong-4 Strong - 3 Medium - 2 Low - 1							

Question pattern: Theory 40%; Problems: 60%

Section A	Section B	Section C
1 X 15 = 15 Marks	2 x 20 = 40 Marks	Record = 5 Marks


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U23M4CSP UM4CSP

SEMESTER – IV SEC IV - COMPUTING SKILLS (OFFICE AUTOMATION) - PRACTICAL

Category	Hours			Credits	Marks		
	Lecture	Tutorial	Practical		CIA	External	Total
Theory	2	-	2	2	40	60	100

Course Contents

Unit I

1. Study the features of MS-Office 2007
2. MS – Word Text formatting and table
3. Mail Merge

Unit II

1. Mathematical Equations
2. Watermarking
3. Create backup file

Unit III

1. MS- Power point Create text and images with effects.
2. Create animation and sound effects

Unit IV

1. MS –Excel Create pay details of employee
2. Calculate students mark details
3. Create four types of chart

Unit V

1. Queries
2. Form design
3. Report generation

TEXT BOOK:

1. Complex information technology course book kit Vikas Gupta, WILEY Dreamtech, 2005.
2. The complete computer upgrade and repair book, 3rd edition Cheryl A Schmit Willy Dreamtech.

COURSE OUTCOMES

Course Out Comes	On completion of this course, students will be able to	Level
CO1	Find the features of MS-Office 2007	K1
CO2	Illustrate the Mathematical Equations	K2
CO3	Apply the basic concept of MS- Power point	K3
CO4	Classify the four types of chart.	K4
CO5	Estimate the Queries and create the Report generation.	K5&K6

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

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	3	2	2	2	4
CO2	4	3	2	3	2	3	1
CO3	3	3	3	2	1	2	3
CO4	4	3	2	3	2	2	3
CO5	3	3	2	3	1	2	3

Very Strong-4 Strong - 3 Medium – 2 Low – 1

Question pattern: Theory 40%; Problems: 60%

Section A	Section B	Section C
1 X 15 = 15 Marks	2 x 20 = 40 Marks	Record = 5 Marks

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Theory Hours : 5
 Practical Hours : -
 Exam Hours : 3

Course Code :
 Credits : 5
 Internal : 25
 External : 75

Objectives:

1. To study the various algebraic structures of Mathematics including sets, groups.
2. To develop the Rings, maximal and prime ideals through the concept of groups.

UNIT I : Groups

Groups – Introduction – Definition and Examples – Elementary Properties of a Group – Equivalent Definitions of group – Permutation Group -Subgroups – Cyclic groups – Order of an element.

UNIT II :

Cosets and Lagrange's theorem - Normal subgroups and Quotient groups – Isomorphisms – Homomorphisms .

UNIT III : Rings

Definition and Examples – Elementary Properties of rings – Isomorphism – Types of rings – Characteristic of a ring – Subrings

UNIT IV :

Ideals – Quotient rings – Maximal and prime ideals – Homomorphism of rings – Field of quotients of an integral domain – Ordered integral domain.

UNIT V :

Unique factorization domain(U.F.D) – Euclidean domain – Every P.I.D. is a U.F.D. – Polynomial Rings – Polynomial Rings over U.F.D. – Polynomials over $\mathbb{Q}$.

TEXT BOOK :

- [1] S. Arumugam and A. Thangapandi Isaac, Modern Algebra , Scitech publications
 (India) PVT, Ltd – 2004 1st print

- UNIT I : Chapter 3 (sections 3.0 to 3.7)
 UNIT II : Chapter 3 (sections 3.8 to 3.11)
 UNIT III : Chapter 4 (sections 4.1 to 4.6)
 UNIT IV : Chapter 4 (sections 4.7 to 4.12)
 UNIT V : Chapter 4 (sections 4.13 to 4.18)

REFERENCE (S):

- [1] M.L.SANTIAGO, Modern Algebra, Tata, McGraw–Hill publishing Company
 Limited, New Delhi.
 [2] Surjeet singh and Qazi Zameeruddin, Modern Algebra, Vikas publishing House
 PVT,Limited.
 [3] S.G. Venkatachalapathy, Modern Algebra, Margham Publications, 2008.
 [4] I.N. Herstein, Topics in Algebra, John wiley and sons, New York, 2003.

Course Outcomes : On completion of the course, students will be able to:		
CO1	Classify and apply the Groups, Permutation groups and their properties.	Level K1
CO2	Identify different algebraic structures, isomorphic and Homomorphism structure	K2
CO3	Understands the fundamental concepts of the algebraic structures such as Rings and subrings.	K3
CO4	Understand Ideals, quotient rings and Homomorphism of rings	K4
CO5	Learn about various concepts of Unique factorization domain and Polynomial rings.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of course							
Contribution to							
s							

Strong - 4 Very Strong - 3 Medium - 2 Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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Theory Hours : 5
 Practical Hours : -
 Exam Hours : 3

Course Cod :
 Credits : 5
 Internal : 25
 External : 75

Objectives:

1. To study the real number system & properties of various functions defined on the real line.
2. To give application of Real analysis.

UNIT - I :

Sets and functions : sets and elements – Operations on sets – Functions – Real valued functions – Equivalence, countability – Real numbers – Least upper bounds.

UNIT - II :

Limits and metric spaces : Limit of a function on the real line – Metric spaces – Limits in metric spaces.

UNIT - III :

Continuous functions on metric spaces : Functions continuous at a point on the real line – Reformulation – Functions continuous on metric space – Open sets – Closed sets.

UNIT - IV :

Calculus: sets of measure zero – Definition of the Riemann integral – Existence of the Riemann integral – Properties of the Riemann integral – Derivatives – Rolle's theorem – The law of the mean – Fundamental theorem of calculus.

UNIT - V :

Taylor series : Taylor's theorem – The binomial theorem – L'Hospital's rule

TEXT BOOK :

- [1] RICHARD R.GOLDBERG, Methods of Real Analysis,
 Oxford and IBHP Publishing co,Pvt., Ltd.,New Delhi,1970.

- UNIT - I : Chapter 1 (sections 1.1 to 1.7)
 UNIT - II : Chapter 4 (sections 4.1 to 4.3)
 UNIT - III : Chapter 5 (sections 5.1 to 5.5)
 UNIT - IV : Chapter 7 (sections 7.1 to 7.8)
 UNIT - V : Chapter 8 (sections 8.5 to 8.7)

REFERENCE(S) :

- [1] M.K. Singal and Asha Rani Singal , A First course in Real Analysis, R. Chand and Co, publishers, New Delhi,2003.
 [2] Shanthi Narayanan, A Couse of Mathematical Analysis, S.Chand and Co,1995.

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Apply mathematical concepts and principles to perform numerical and symbol computations	K1
CO2	Use technology appropriately to investigate and solve mathematical problems.	K2
CO3	To recognize mathematics related problems, asses their solvability and solve them with in a specified time frame	K3
CO4	Analysis Riemann integral derivates and fundamental theorem of calculus	K4
CO5	Understand Taylor's theorem and Binomial theorem concept. Question Paper Pattern	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
1							
2							
3							
4							
5							
Weightage							
Weighted % of Contribution to POs							

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Question pattern:

Section A		Section B	Section C
Multiple choice question each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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Theory Hours : -5

Course Code :

Exam Hours : 3

Credits : 4

Internal : 25

External : 75

Objectives:

1. To determine the resultant of system of forces.
2. To develop the knowledge and understanding of the fundamental concepts in statics of a Specific Reduction of Coplanar forces into a force
3. To give enough working knowledge to handle practical problems.

UNIT I

Force: Newton's laws of motion –Resultant of two forces on a particle- Equilibrium of a particle: Equilibrium of a particle – Limiting equilibrium of a particle on an inclined plane.

UNIT II

Forces on a rigid body: Moment of a forces –General motion of a rigid body - Equivalent systems of forces - Parallel forces - Varignon's theorem - Couples - A Specific Reduction of forces: Reduction of Coplanar forces into a force and a couple- Problems involving frictional forces.

UNIT III

Work , Energy and power : Work – Conservative field of force - Power- Rectilinear motion under varying force: Simple harmonic motion – S.H.M along a horizontal line - S.H.M along a vertical line.

UNIT IV

Projectiles: Forces on a Projectile – Projectile projected on an inclined plane .

UNIT V

Central Orbits : General Orbits - Central Orbit - Conic as a Centered orbit.

TEXT BOOK :

[1] Mechanics - P. Duraipandiyan, Laxmi Duraipandiyan, Muthamizh Jayapragasam, S.Chand and Company Pvt. Ltd. Reprint - 2015.

UNIT I : Chapter 2 (2.1, 2.2) and Chapter 3(3.1, 3.2)

UNIT II : Chapter 4 (4.1 to 4.4, 4.6) and Chapter 5 (5.1, 5.2)

UNIT III : Chapter 11 (11.1 to 11.3) and Chapter12 (12.1 to 12.3)

UNIT IV : Chapter 13 (13.1, 13.2)

UNIT V : Chapter 16 (16.1 to 16.3)

REFERENCE (S):

[1] .M .K Venkataraman, Statics, Agasthiyar Publications, 2002.

[2] .A.V .Dharmapadham, Statics, S.Viswanathan Publishers Pvt., Ltd.,

[3] .S.L .Lony ,Elements of Statics and Dynamics, Part – I,. A.I.T. Publishers, 1991.

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Define Resultant, Component of a Force, Coplanar forces like and unlike and Limiting equilibrium of a particle in an inclined plane.	K1
CO2	Understand the concepts of force with moment of a force, Reduction of coplanar forces into a force and couple.	K2
CO3	Deep analyzing the Work , Energy and power and define Simple Harmonic motion of horizontal line and vertical line.	K3
CO4	Find out the nature of trajectory and the motion of the projectile.	K4
CO5	Define Central orbit, explain Conic as Centred orbit and solve problems related to central orbits..	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of Course contribution to POs							

Strong - 4 Very Strong - 3 Medium - 2 Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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Theory Hours : 5
 Practical Hours : -
 Exam Hours : 3

Course Code :
 Credits : 4
 Internal : 25
 External : 75

Objectives :

1. To introduce the field of operations research which has many applications in management techniques.
2. To help students to find optimum solutions in business and management problems.
3. To develop scientific ability.

UNIT I :

Linear Programming Problem: Introduction – Mathematical Formulation of the problem – Graphical Solution Method – Simplex method – Big (M) Method.

UNIT II :

Transportation Problem: Introduction – North west corner rule – Least cost method – Vogel's approximation Method – MODI Method – Assignment problems.

UNIT III :

Sequencing Problems: Introduction – Problem of sequencing – Basic term used in sequencing – Processing n Jobs through 2 machines – Processing n Jobs through k machines – Processing 2 Jobs through k machines.

UNIT IV :

Replacement Problems: Introduction – Replacement of Equipment / asset that Deteriorates Gradually – Replacement of Equipment that fails suddenly.

UNIT V :

Network scheduling by PERT/CPM: Introduction – Network and basic components – Rules of network construction – Critical path analysis – Probability consideration in PERT – Distinction between PERT and CPM.

TEXT BOOK :

- [1]. Operations Research – Kanti Swarub, P.K.Gupta, Man Mohan. Sultan Chan & Sons Educational Publishers New Delhi, Sixteenth thoroughly Revised Edition Reprint – 2014.

- UNIT I** : Chapter 2 (sections 2.1, 2.3)
 Chapter 3 (sections 3.1, 3.2)
 Chapter 4 (sections 4.1, 4.4)
- UNIT II** : Chapter 10 (sections 10.1, 10.2, 10.8, 10.9, 10.13)
 Chapter 11 (sections 11.1, 11.2, 11.3, 11.4)
- UNIT III** : Chapter 12 (sections 12.1 to 12.6)
- UNIT IV** : Chapter 18 (sections 18.1 to 18.3)
- UNIT V** : Chapter 25 (sections 25.1, 25.2 , 25.4, 25.6, 25.7, 25.8).

REFERENCE(S):

- [1] Hamdy A. Taha, Operations Reseach (7th Edn.), Prentice Hall of India, 2002.
- [2] Richard Bronson, Theory and Problems of Operations Research, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1982.
- [3] Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research (Sultan chand and sons).

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Learn mathematical techniques that will help them to understand and analyze managerial problems in industry so that resources (Capitals, Materials, staffing and machines) may be utilized more effectively.	K1
CO2	Use mathematical software to solve the Transportation Problems	K2
CO3	Identify and develop operational research models from the verbal description of the real system	K3
CO4	Solve the replacement problem	K4
CO5	Understand the Network scheduling of PERT/CPM method.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of Course contribution to POs							

Strong - 4 Very Strong - 3 Medium - 2 Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = (Each Carries Questions)

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U23MC613

CC- XIII LINEAR ALGEBRA

Theory Hours :6
Practical Hours :-
Exam Hours :3

Course Code :
Credits : 5
Internal : 25
External : 75

Objectives:

1. Know the various algebraic structures of Mathematics including sets, groups.
2. Learn about vector spaces, span of a set and linear independence.
3. Develop an analytic thinking in the concept of linear equations..

UNIT I : Vector Spaces:

Introduction – Definition and Examples – Subspaces – Linear Transformation.

UNIT II :

Span of a set – Linear Independence – Basis and Dimension – Rank and Nullity – Matrix of a Linear Transformation.

UNIT III : Inner Product Spaces:

Introduction - Definition and Examples – Orthogonality – Orthogonal Complement.

UNIT IV : Theory of Matrices:

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

UNIT V :

Rank of a Matrix – Simultaneous Linear Equations – Characteristic Equation And Cayley Hamilton Theorem – Eigen Values And Eigen Vectors.

TEXT BOOK :

- [1] S. Arumugam and A. Thangapandi Isaac, Modern Algebra , Scitech publications (India) PVT, Ltd – 2004 1st print .

UNIT I : Chapter 5 (sections 5.0 to 5.3)
UNIT II : Chapter 5 (sections 5.4 to 5.8)
UNIT III : Chapter 6 (sections 6.0 to 6.3)
UNIT IV : Chapter 7 (sections 7.0 to 7.4)
UNIT V : Chapter 7 (sections 7.5 to 7.8).

REFERENCE (S):

- [1] M.L.SANTIAGO, Modern Algebra, Tata, McGraw–Hill publishing Company Limited, New Delhi.
- [2] Surjeet singh and Qazi Zameeruddin, Modern Algebra, Vikas publishing House PVT, Limited.
- [3] S.G. Venkatachalapathy, Modern Algebra, Margham Publications, 2008.
- [4] I.N. Herstein, Topics in Algebra, John wiley and sons, New York, 2003.
- [5] A.R. Vasistha, A.K. Vasistha, Modern Algebra, Krishna Prakasam Media(P) Ltd., 2008.

Course Outcomes : On completion of the course, students will be able to:		
CO1	.Identify the concepts of vector spaces in linear transformations and their properties	Level K1
CO2	Learn about the rank and nullity of linear transformations	K2
CO3	Understand the basic concepts of orthogonal complement.	K3
CO4	Apply the basic concepts of types of matrices	K4
CO5	Learn the role on Cayleys Hamilton theorem and solve the problems in eigen values and eigen vectors	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of course contribution to POs							

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = (Each Carries Questions)

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CC - XIV COMPLEX ANALYSIS

U23MC614

Theory Hours :5
Practical Hours : -
Exam Hours :3

Course Code	:	
Credits	:	4
Internal	:	25
External	:	75

Objectives:

1. To introduce the theory of complex variable which is different from analysis of real variable.
2. To learn the properties of complex valued function defined on the set of Complex numbers.
3. To introduce the concept of complex integration and its properties.

UNIT I:

Functions of a complex variable – Limits – Theorems on Limits – Continuous functions – Differentiability
Cauchy - Riemann equations – Analytic functions – Harmonic functions.

UNIT II:

Elementary transformations – Bilinear transformations – Cross ratio – Fixed points of Bilinear transformations – Some special bilinear transformations

UNIT III:

Complex Integration: Definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives.

UNIT IV:

Series Expansions: Taylor's series – Laurent's series – Zeros of analytical functions – Singularities.

UNIT V:

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

TEXT BOOK:

S.Arumugam, A.Thangapandi Isaac and A.Somasundaram, Complex Analysis,
New Scitech publications (India) Pvt.Ltd. November 2003.

- | | | |
|-----|---|---------------------------------|
| I | : | Chapter 2 (sections 2.1 to 2.8) |
| II | : | Chapter 3 (sections 3.1 to 3.5) |
| III | : | Chapter 6 (sections 6.1 to 6.4) |
| IV | : | Chapter 7 (sections 7.1 to 7.4) |
| V | : | Chapter 8 (sections 8.1 to 8.3) |

REFERENCE(S)

P.P.Gupta – Kedarnath and Ramnath, Complex Variables, Meerut-Delhi.

J.N.Sharma, Functions of a Complex Variable, Krishna
Prakasan Media(p) Ltd. 13th Edition, 1996-97.

T.k. Manickavachagam Pillai, Complex Analysis, S.Viswanathan Publishers pvt.
Ltd.1994.

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Understand the significance of differentiability and analytical of complex function leading to the Cauchy-Riemann equations.	K1
CO2	Solve analytic function as a mapping on the plane, Mobius or bilinear transformation.	K2
CO3	Learn the role on Cauchy theorem and Cauchy's integral formulas in evaluation of closed integrals. Apply Cauchy Inequality, Liouville's theorem, Fundamental theorem of algebra and Morera's theorem.	K3
CO4	Learn Taylor's series and Laurent's series expansion of analytic function	K4
CO5	Classify the nature of singularity, poles and Residues and application of Cauchy's Residue theorem.	K5 & K6

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
01							
02							
03							
04							
05							
Weightage							
Weighted % of Course							
Contribution to POs							

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

[Signature]
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CC-XV-VECTOR CALCULUS, LAPLACE TRANSFORM AND FOURIER SERIES

Theory Hours : 5
 Practical Hours : -
 Exam Hours : 3

Course Code :
 Credits : 5
 Internal : 25
 External : 75

- Objectives:
1. To Study the application of derivative of vectors and Study the line integral, surface integral and volume integral and their application.
 2. To study the techniques of finding Laplace transforms and inverse Laplace transforms and real functions and their application in solving ordinary differential equations.
 3. To express periodic functions as a Fourier series.

UNIT-I

Vector differentiation – Velocity and acceleration of vectors – Vector and scalar fields – Gradient of a vector – Unit normal – Differential derivative – Divergence and curl of vector – Solenoidal and irrotational vectors – Laplacian double operators – Simple problems.

UNIT-II

Vector Integration – Tangential line integral – Conservative force field – Scalar potential – Work done by a force – Normal surface integral – volume integral – simple problems.
 Gauss Divergence theorem – stoke's theorem – Green's Theorem – Simple problems and verification of the theorems for simple problems.(statement only)

UNIT-III

Laplace Transform-Piecewise continuity-Laplace Transform of periodic functions some general theorem and related Examples

UNIT-IV

Inverse Laplace transform and obtained in finding the Laplace inverse transform of functions-Solve ordinary differential equations with constant co-efficients.

UNIT-V

Definition-Finding fourier co-efficients for a given periodic function with period 2π and $2l$ – Odd and even function – Half range series.

EXT BOOK(S):

- [1]. K.Viswanathan and S.Selvaraj, Vector Analysis, Emerald Publishers Reprint 1999.
- [2]. S.Narayanan, T.K.Manickavasagam pillai, Calculus Volume-III, S.Viswanathan Pvt.Limited and Vijay Nicole Imprints Pvt Ltd, 2004.

NIT- I : Chapter 1(section 1) and Chapter 2(section 2.1 to 2.2.5, 2.3 to 2.5.1) of [I]
 NIT-II : Chapter 3(sections 3.1 to 3.7) and Chapter 4(section 4.1 to 4.5.1) of [I]
 NIT-III : Chapter 5 (section 1 to 5) of [2]
 NIT-IV : Chapter 5 (section 6 to 8) of [2]
 NIT-V : Chapter 6 (section 1 to 5) of [2]

REFERENCE(S):

- [1]. A. Singaravelu, Allied Mathematics – I – Aug 2007(1st Edition).
- [2]. A. Singaravelu, Allied Mathematics – II – June – 2010(2nd Edition).

Staff incharge

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Learns that serves as a platform for advanced mathematics and for solving many real life problems	K1
CO2	Use the methods of Laplace transforms and Inverse Laplace transforms to solve	K2
CO3	Derive a Fourier series of a given periodic function by evaluating Fourier coefficients	K3
CO4	Know that any periodic function can be expressed as a Fourier series.	K4
CO5	Be able to expand an Odd or even function as a half – rang cosine or sine Fourier series	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of Course contribution to POs							

Strong - 4 Very Strong - 3

Medium – 2

Low – 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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LIST OF ELECTIVE COURSES

1. Discrete Mathematics
2. Programming in C- Practical
3. Numerical Methods
4. Graph Theory
5. Fuzzy Mathematics
6. Astronomy
7. Mathematical Modeling

theory Hours : 4
 practical Hours : -
 exam Hours : 3

Course Code :
 Credits : 4
 Internal : 25
 External : 75

Objectives :

1. To study various finite(discrete) structures of Mathematics.
2. To study recurrence relations and generating functions, analyses recurrence relations and provides methods for solving recurrence relations.
3. To introduce group codes, procedure for generating group codes and Inference theory of predicate calculus.

UNIT I :

Mathematical Logic - Introduction – Propositions – Connectives – Order of precedence for logical Connectives – Conditional and bi - conditional propositions - Tautology and Contradiction - Equivalence of propositions – Duality Law – Duality theorem – Algebra of propositions – Tautological implications - Normal Forms – Disjunctive and Conjunctive Normal forms - Principal Disjunctive Normal and Conjunctive Normal Forms – Worked Examples.

UNIT II :

Theory of Inference – Truth Table Techniques – Rules of inference – Form of Argument – Rule of CP or Rule of conditional proof – Inconsistent premises – Indirect method of proof – Predicate Calculus or Predicate Logic – Quantifiers – Existential Quantifiers – Negation of a Quantified Expression - Nested (More than one) Quantifiers – Free and Bound variables – Valid formulas and Equivalence – Inference theory of Predicate Calculus – Worked Examples.

UNIT III :

Lattices – Principle of Duality – Properties of Lattices – Lattices as Algebraic Systems – Sublattices - Lattice Homomorphism – Some Special Lattices

UNIT IV :

Coding Theory - Introduction – Encoders and Decoders – Group code – Hamming Codes – Error Correction in Group codes - Step by steps procedure for Decoding Group codes – worked Examples.

UNIT V :

Recurrence relations: Solution of finite order homogeneous Linear relations – Solution of Non-Homogeneous relations – Generating functions- Some common recurrence relations – Primitive recursive functions – Recursive and Partial Recursive Functions

TEXT BOOK[S]:

- [1] Mr.T.Veerarajan, Discrete Mathematics with Graph theory and Combinatorics, Tata McGraw – Hill Publishing company limited, New Delhi, 2007.
- [2] Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2001.

UNIT I : Chapter 1 (Page No 1 to 26) of [1]

UNIT II : Chapter 1 (Page No 27 to 50) of [1]

UNIT III : Chapter 2 (Page No 96 to 102) of [1]

UNIT IV : Chapter 5 (Page No 290 to 313) of [1]

UNIT V : Chapter 5 (Page No. 5.5 to 5.36) of [2].

REFERENCE(S):

- [1] J.P. Trembly and R.Manohar; Discrete Mathematical Structures with Applications to Computer Science ,TMH Edition 1997.
- [2] A.R. Vasistha, A.K. Vasistha, M.A.Krishna prakasam media (P) Ltd., 2008.
- [3] Kenneth H. Rosen, Discrete mathematics and its applications, 7th edition, Tata MCGrow Hill Publication.co,Ltd., New Delhi, Special Indian edition 2011.

Course Outcomes : On completion of the course, students will be able to:		
CO1	Gain the knowledge of logic and normal forms.	Level K1
CO2	Have exposure to the inference theory and predicate calculus.	K2
CO3	Study the algebraic concepts, lattice homomorphism and distributive lattices.	K3
CO4	Understand the techniques of coding and decoding systems.	K4
CO5	Solve recurrence relation, linear equations and generating functions.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of course contribution to POs							

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Question)

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Theory Hours :-
 Practical Hours : 3
 Exam Hours : 3

Course Code :
 Credits : 2
 Internal : 40
 External : 60

Objectives :

This course is mainly concentrates on programming of C and its implementation. It makes the students to be familiar with the structure of programming language and it enables them to write programs to solve real world problems using C concepts.

LIST OF PROGRAMMES

1. Programs on formatted input/output.
2. Programs using conditional statements.
3. Programs using looping statements.
4. Programs using one-dimensional array and two-dimensional array.
6. Programs using functions (Nesting of functions).
7. Programs on structures and unions.

TEXT BOOK :

[1] Balagurusamy. E, Programming in ANSI C, Tata McGraw – Hill, Third Edition, 2013.

REFERENCE (S):

- [1] D.M. Ritchie, The C Programming Language, Prentice Hall of India, 1977.
 [2] Y. Kanetkar, Understanding Pointers in C, 4th Edition, BPB publications, New Delhi.
 [3] C. Gottfried, Programming in C, Schaum outline series, 1996.
 [4] P. Pandiyaraja, Programming in C, Vijay Nicole Imprint Private Limited, 2005.

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Execute simple programs using input/output and conditional statements	K1
CO2	Execute simple programs using looping statements.	K2
CO3	Execute simple programs using one-dimensional and two dimensional arrays.	K3
CO4	Execute simple programs using strings.	K4
CO5	Execute simple programs using structures	K5 & K6

DSE III-NUMERICAL METHODS

U23MGE6-1

Theory Hours :4
Practical Hours :-
Exam Hours : 3

Course Code :
Credits : 3
Internal : 25
External : 75

Objectives:

1. To develop the mathematical skills of the students in the areas of numerical methods.
2. To provide the student with numerical methods of solving the Interpolation, differentiation and integration.
3. This course is an introduction to broad range of numerical methods for solving mathematical problems that arise in science and engineering.

UNIT I : Solution of Numerical Algebraic and Transcendental equations:

The bisection method – Iteration Method- Regular falsi Method- Newton's Raphson method.

UNIT II : Solution of simultaneous Linear Algebraic Equations:

Gauss Elimination method – Gauss Jordan Method – Gauss Jacobi Method - Gauss Siedal methods.

UNIT III : Finite differences:

First and Higher order differences - Forward and Backward differences – Properties of Operators. Interpolation with equal Intervals: Newton's Forward - Backward interpolation. Interpolation with unequal Intervals: Lagrange's interpolation formula.

UNIT IV : Numerical Differentiation and Integration :

Trapezoidal rule - Simpson's 1/3 and Simpson's 3/8- rules.

UNIT V : Numerical solution of ODE:

Taylor's series method (Type I) - Picard's method of Successive approximations - Euler's method - Runge-kutta second and fourth order method.

TEXTBOOK :

[1] Dr.P.Kandasamy, Dr.K.Thilagavathy and Dr.K.Gunavathi, Numerical Methods, S.Chand & Company PVT.Ltd, Reprint 2015.

UNIT I : Chapter 3 (sections 3.1- 3.4)

UNIT II : Chapter 4 (sections 4.1,4.2,4.8,4.9)

UNIT III : Chapter 5 (sections 5.1,5.2) Chapter 6 (Sections 6.1, 6.2,6.3 Omit (6.1.a))
Chapter 8 (sections 8.7)

UNIT IV : Chapter 9 (sections 9.7,9.8,9.9, 9.13,9.14)

UNIT V : Chapter 11 (sections 11.5,11.8,11.9,11.12,11.13).

REFERENCE(S):

- [1] S.Narayanan and others, Numerical Analysis, S.Viswanathan Publishers, 1994,
- [2] A.Singaravelu, Numerical methods, Meenachi Agency, June 2000.
- [3] E. Kendall, Atkinson, An Introduction to Numerical Analysis, II Edition, John wiley& Sons, 1989.
- [4] S.S Sastry, Introductory methods of Numerical Analysis, Prentices Hall of India Pvt.Limited,2001,Third Edition.


(Dr. P. Kandasamy)

Course Outcomes : On completion of the course, students will be able to:		
CO1	Learn the numerical methods to find our solution of algebraic equations using different methods.	Level K1
CO2	Discuss the Solution of simultaneous Linear Algebraic Equations.	K2
CO3	Understand the various interpolation methods and finite difference concepts.	K3
CO4	Work the Numerical Differentiation and Integration of Trapezoidal method.	K4
CO5	Apply Taylor series and Runge kutta methods to find the solution of the equations.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of Course contribution to POs							

Strong - 4 Very Strong - 3 Medium - 2 Low - 1

Question pattern:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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DSEIV- GRAPH THEORY

U23MGE6:2

Theory Hours : 4
Practical Hours : -
Exam Hours : 3

Course Code	:
Credits	: 3
Internal	: 25
External	: 75

Objectives:

1. Be familiar with the most fundamental graph theory topics and results.
2. Be exposed to the techniques of proofs and analysis.

UNIT I:

Definition of a graph, application of a graph – Finite and infinite graphs – Incidence and degree – Isolated, pendant vertices and Null graph – Isomorphism – Sub graphs – walks, Paths and circuits – connected and disconnected graphs and components – Euler graphs – Operations on Graphs – More on Euler graphs – Hamiltonian paths and Circuits.

UNIT II:

Trees – Properties of trees – Pendant vertices in a Tree – Distance and centres in a Tree – Rooted and Binary Trees – Spanning Trees – Fundamental Circuits.

UNIT III:

Cut -sets – Properties of a Cut-set – All cut -sets in a graph Fundamental circuits and Cut sets – Connectivity and separability.

UNIT IV:

Vector Spaces of a Graph – Sets with one, two operations – Modular arithmetic –Galois Fields – Vectors and Vectors Spaces – Vector Space Associated with a Graph –Basis vectors of a graph – circuit and cut-set subspaces – Orthogonal vectors and Spaces.

UNIT V:

Matrix representation of graphs – Incidence matrix – Circuit Matrix – Fundamental Circuit Matrix and rank of B – Cut-set matrix - Chromatic Number – Chromatic partitioning – Chromatic polynomial

TEXT BOOK:

- [1] Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India Pvt Ltd., New Delhi, Reprint 200

- UNIT I : Chapter 1 (sections 1.1 to 1.5) and Chapter 2 (sections 2.1, 2.2, 2.4 to 2.9)
UNIT II : Chapter 3 (sections 3.1 to 3.5, 3.7, 3.8)
UNIT III : Chapter 4 (sections 4.1 to 4.5)
UNIT IV : Chapter 6 (sections 6.1 to 6.8)
UNIT V : Chapter 7 (sections 7.1, 7.3, 7.4, 7.6) and Chapter 8 (sections 8.1 to 8.3).

REFERENCE(S):

- [1] Dr.S.Arumugam and Dr.S.Ramachandran, Invitation to Graph Theory , Scitech Publications India Pvt Limited, Chennai 2001.
- [2] K.R Parthasarathy ,Basic Graph Theory , Tata Mcgraw Hill Publishing Company, New Delhi,1994.
- [3] G.T John Clark, Derek Allan Holten, A First Look at Graph Theory ,World Scientific Publishing company,1995.
- [4] G.Chartrand, Linda Lesniak and Ping zhang, Graphs and Digraphs, Fifth Edition, CRC press, 2011.

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In Charge

Course Outcomes : On completion of the course, students will be able to:		
CO1	Define basic notions in graph theory and account for the theory of paths and the degree of connectedness of a graph.	Level
CO2	Account the basic properties of trees and fundamental circuits.	K1
CO3	Explain the Properties of a Cut-set , All cut -sets in a graph	K2
CO4	Fundamental circuits	K3
CO5	Analysis the Galois Fields , Vectors and Vectors Spaces	K4
	Understand the matrix representation of graphs.	K5 & K6
	Question Paper Pattern	

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of course contribution to POs							

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
Multiple choice question m each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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DSE - V FUZZY MATHEMATICS

Theory Hours : 4

Exam Hours : 3

Course Code :
Credits : 3
Internal : 25
External : 75

Objectives

1. To know the fundamentals of fuzzy Algebra.
2. To know the basic definitions of fuzzy theory
3. To know the applications of fuzzy Technology.

UNIT – I Fuzzy Subsets and Fuzzy Mappings

Introduction- Fuzzy subsets- Partially Ordered sets -Lattices and Boolean Algebras- L fuzzy sets- Visual Representation of a fuzzy subset - operations on fuzzy subsets -Disjunctive sum- α –level sets - properties of fuzzy subsets of a set.

UNIT - II

Algebraic product and sum of two fuzzy subsets-properties satisfied by Addition and product- Cartesian product of fuzzy subsets.

UNIT – III Fuzzy Relations and Fuzzy Logic

Introduction- Algebra of fuzzy relations-logic-connectives.

UNIT - IV

Some more connectives. Fuzzy Groups and Fuzzy Rings: Introduction-fuzzy subgroup-homomorphic image and Preimage of subgroupoid.

UNIT - V

Fuzzy invariant subgroups-fuzzy subrings.

TEXT BOOK[S]:

- [1] S.Nanda and N.R.Das "Fuzzy Mathematical concepts, Narosa Publishing House, New Delhi.

UNIT I : Sections 1.1-1.10

UNIT II : Sections 1.11-1.13.

UNIT III : Sections 2.1-2.4

UNIT IV: Sections 2.5,3.1-3.3

UNIT V : Section 3.4 and 3.5.

REFERENCES:

- [i]. A.K.Bhargava;FuzzySetTheory,FuzzyLogicandtheir Applications, published by S. Chand Pvt. Limited(2013).
- [2]. K.Pundir and R.Pundir, Fuzzy sets and their application, Published by A Pragati edition(2012).
- [3]. H.J.Zimmermann, Fuzzy set theory and its applications, Springer (2012).

Course Outcomes : On completion of the course, students will be able to:			Level
CO1	List of fuzzy sets and related theorems.		K1
CO2	Explain Operation on fuzzy sets and α -cuts of fuzzy operations		K2
CO3	Identify the fuzzy and crisp relations.		K3
CO4	Classify the decision making in fuzzy environments.		K4
CO5	Conclude that the application of medicine, economics and genetic algorithms		K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of							
Contribution to POs							

Strong - 4 Very Strong - 3

Question pattern:

Medium - 2

Low - 1

Section A		Section B	Section C
Multiple choice question per unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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DSE-VI ASTRONOMY

Theory Hours : 4
 Practical Hours : -
 Exam Hours : 3

Course Cod :
 Credits : 3
 Internal : 25
 External : 75

Objectives:

1. To introduce the exciting world of astronomy to the students.
2. To help the students to study about the celestial objects.

UNIT I :

Relevant Properties of a sphere and relevant formulae for spherical trigonometry (All without proof) – Diurnal motion.

UNIT II :

Earth – Dip of horizon – Twilight – Refraction – Tangent and Cassini's Formula.

UNIT III :

Kepler's Laws of Planetary motion (statement only) – Newton's deduction from them – Three anomalies of the Earth and relation between them.

UNIT IV :

Equation of time, Calendar – Geocentric Parallax – Aberration of light.

UNIT V :

Moon (except Moon's librations) – Motions of Planet (assuming that orbits are circular) – Eclipses.

TEXT BOOK:

- [1] S.Kumaravelu and Prof. Susheela Kumaravelu, Astronomy, SKV Publications, 2002.

UNIT I : Chapter 1 and Chapter 2

UNIT II : Chapter 3 (sections 1, 2, 5, 6)
 Chapter 4 (sections 117 to 122, 129, 130)

UNIT III : Chapter 6

UNIT IV : Chapter 7 (section 1, 3, 4) and Chapter 9.

UNIT V : Chapter 12.

REFERENCE(S):

- [1] V.Thiruvengkatacharya, A text book of Astronomy, S.Chand and Co., Pvt Ltd., 1972.
- [2] Bonnet, R. & Keen, G. (1992), Space and Astronomy, 49 Science Fair Projects, TAB Books, Blue Ridge summit, PA.
- [3] Sneider, C. (1988), Earth, Moon and Stars, Lawrence Hall of science, Berkeley, CA.
- [4] Vogt, G. (1992), The Hubble Space Telescope, The Millbrook Press, Brook field, CT.

Course Outcomes : On completion of the course, students will be able to:		
CO1	Describe and explain the observed daily and long-term motion of objects like sphere(sun, moon, planets, stars).	Level K1
CO2	Use a earth tangent and Cassini's formula. Explain how astronomical distances are determined using parallax and luminosity techniques.	K2
CO3	Sketch and explain the relationships of three anomalies of the earth.	K3
CO4	Demonstrate a thorough understanding of geocentric parallax.	K4
CO5	Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations in moon	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted % of Course contribution to POs							

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Question pattern: Theory 40%; Problems:

Section A		Section B	Section C
2 Multiple choice question from each unit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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DSE-VII MATHEMATICAL MODELLING

Theory Hours :4
Practical Hours : -
Exam Hours :3

Course Code :
Credits : 3
Internal : 25
External : 75

Objectives:

1. To introduce the basic concepts of modeling.
2. To study the different mathematical models involving differential equations, graph theory etc.

UNIT I:

Mathematical Modelling through Ordinary Differential Equations of First Order: Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamics problems – Geometrical problems.

UNIT II:

Mathematical Modelling through system of Ordinary Differential Equations of First Order: Population Dynamics-Epidemics – Compartment Models – Economics –Medicine, Arms Race, Battles and International Trade – Dynamics.

UNIT III:

Mathematical Modelling through Ordinary Differential Equations of Second Order: Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modelling through Linear Differential Equations of Second order – Miscellaneous Mathematical Models.

UNIT IV:

Mathematical Modelling through Difference Equations: Simple Models – Basic theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics – Probability Theory.

UNIT V:

Mathematical Modelling through Graphs: Solutions that can be Modelled through Graphs – Mathematical Modelling in terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

TEXT BOOK:

[1] J.N. Kapur, Mathematical Modelling , Wiley Eastern Limited , New Delhi,1988.

REFERENCE(S):

- [1]. J.N. Kapur, Mathematical Models in Biology and Medicine, Affiliated East-West Press Limited, New Delhi,1981.
- [2]. Bimal K. Mishra and Dipak satpathi, Mathematical modeling, Ane books Pvt,Ltd.,2007.

Course Outcomes : On completion of the course, students will be able to:	
CO1	Understand the concept of a math

CO	On completion of the course, students will be able to:	Level
CO1	Understand the concept of a mathematical model and explain the series of steps involved in mathematical modeling.	K1
CO2	Classify different classes of mathematical models	K2
CO3	Discuss features of a good model and the benefit of using a mathematical model.	K3
CO4	Identify some simple real – life problems that can be solved using mathematical models.	K4
CO5	Convert the physical problems as differential equations through mathematical modeling.	K5 & K6

Mapping of Course Outcomes with Pos							
O/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
% of							
n to POs							

ng - 4 Very Strong - 3

Question pattern: Theory 40%; Problems:

Medium - 2

Low - 1

Section A		Section B	Section C
choice question nit (10X1=10)	1 question from each unit (5X2=10)	5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type)	3 × 10 = 30 (Each Unit Carries One Questions)

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SEC V - INTRODUCTION TO SCIENTIFIC COMPUTING (MATLAB) PRACTICAL

Theory Hours : -
Practical Hours : 3
Exam Hours : 3

Course Code	:	
Credits	:	
Internal	:	2
External	:	40
	:	60

Objectives :

1. To introduce the Mathematical software MATLAB for high-performance numerical computations and visualization.
2. To learn MATLAB built-in functions provided to solve all type of scientific problems..

LIST OF PROGRAMMES

1. Plotting a function.
2. Polar plot.
3. Arithmetic operations on matrices.
4. Finding the determinant of a matrix.
5. Finding the rank of a matrix
6. Finding transpose of a Matrix
7. Finding Eigen values and Eigen vectors of a matrix.
8. Polynomial curve fitting.
9. 2D plots, 3D plots
10. Sum of all intergers
11. Finding squares of integers
12. Programme using Switch structure, break statement and error statement.

TEXT BOOK :

- 1] Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma MATLAB and its applications in Engineering.

REFERENCE (S):

- 1] RUDRA PRATAP, Getting Started with MATLAB-A Quick Introduction for Scientists and Engineers, Oxford University Press, 2003.
- 2] William John Palm, Introduction to Matlab 7 for Engineers, McGraw-Hill Professional, 2005.
- 3] Dolores M. Etter, David C. Kuncicky, Introduction to MATLAB 7, Prentice Hall, 2004
- 4] Website: www.ann.jussieu.fr/free.htm
- 5] MATLAB – The language of technical computing, The MATH WORKS Inc., Version 5 1996 ([http: www.mathworks.com](http://www.mathworks.com))

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Find importance of this software for lab experimentation.	K1
CO2	Articulate importance of software's in research by simulations work.	K2
CO3	Have in depth knowledge of providing virtual instruments on lab view environment.	K3
CO4	Write basic mathematical problems in MATLAB.	K4
CO5	Use of this software for real time applications.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
01							
02							
03							
04							
05							
Weightage							
Weighted % of							
course							
Contribution to							
Pos							

Strong - 4 Very Strong - 3

Medium - 2

Low - 1

Question pattern:
Question Paper Pattern

ANSWER ALL THE QUESTIONS

2 X 15 = 30Marks

1 x 20 = 20Marks

Record = 5 Marks

Viva voce = 5

Total = ~~60~~ Marks

Theory Hours	: 2
Practical Hours	:
Exam Hours	: 3

Course Code	:
Credits	: 2
Internal	: 25
External	: 75

Objectives:

1. Develop Mathematical Aptitude Skills.
2. The formulae given are useful over many problems.
3. To provide a confidence to appear in competitive examinations

UNIT I :
Simple Interest –Compound Interest.

UNIT II:
Permutation and Combination - Probability.

UNIT III :
Height and Distance –Odd Man Out and Series.

UNIT IV :
Calendar - Clocks.

UNIT V :
Percentage – Partnership.

REFERENCE(S):

- [1].R.S Aggarwal, Quantitative Aptitude , S.Chand and company Ltd., New Delhi,2008
- [2].B.S.Sijwali, quantitative aptitude Arihant Publications(india) Pvt Ltd 2007.
- [3].Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Mc Graw Hill Companies, 2006.
- [4].Arora .P.N. and Arora.s. 2009,Quantitative Aptitude Mathematics:Volume 1,S.Chand and company Ltd.
- [5].Kothari. C.R.1989, Quantitative techniques,Vikas Publishing House Pvt Ltd.
- [6].Srinivasan.T.M., Perumalswami.S. and gopala Krishnan.M.D., 1985 , Elements of Quantitative Techniques, Emerald Publishers.

COURSE OUTCOMES

Course Outcomes	Level
On completion of this course, students will be able to	
CO1 Define Numbers and Decimal fractions	K1
CO2 Explain the Square roots and cube roots	K2
CO3 Find the numbers . ages and trains.	K3

CO4	Classify the volume and Surface Area.	
CO5	Evaluate the Calender and Clocks.	K4
		K5 & K6

Mapping of Course Outcomes with Pos

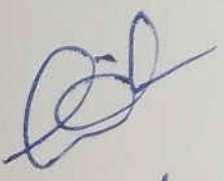
CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							
CO4							
CO5							
Weightage							
Weighted %							
of Course							
contribution							
to POs							

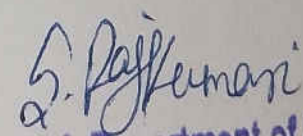
Strong - 4 Very Strong - 3 Medium - 2 Low - 1

Question pattern:

Section A

Each units fifteen multiple choice questions for all topics: 75 x 1 = 75


Staff incharge.


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