DHANALAKSHMI SRINIVASAN COLLEGE OF ARTS & SCIENCE FOR WOMEN

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

Reaccredited with A^{++} Grade by NAAC

Perambalur-621 212

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS-COURSE STRUCTURE UNDER CBCS-LOCF

(CANDIDATES ADMITTED FROM 2024-2025 ONWORDS**)**

Programme Pattern								
Course Details				**Scheme of Exams**				
Sem	**Part**	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
I	1	24U1LT1	**Language - I** Cheyyul (Ekkala Elakkiyam), Sirukadhai, Illakiyavaraluru	6	3	25	75	100
		24U1LH1	Hindi					
		24U1LF1	French					
	2	24U1EL1	English For Communication-I	6	3	25	75	100
	3	24UMM1C1	**CC-I:** Theory of Equations & Differential Calculus	5	5	25	75	100
	3	24UMM1C2	**CC-II:** Analytical Geometry 3D	5	4	25	75	100
	3	24UPH1A1	**Allied-I** General Physics –I	3	3	25	75	100
	3		**Allied- I Practical** General Physics Practical - I	3	-	-	-	-
	4	24U1VED	Value Education	2	2	25	75	100
	Total			**30**	**20**	**-**	**-**	**600**
II	1	24U2LT2	**Language - II** Cheyyul (Edaikala Elakkiyam), Puthinam	6	3	25	75	100
		24U2LH2	Hindi					
		24U2LF2	French					
	2	24U2EL2	English For Communication-II	6	3	25	75	100
	3	24UMM2C3	**CC-III:** Integral Calculus	5	5	25	75	100
	3	24UMM2C4	**CC-IV:** Trigonometry & Vector Calculus	5	4	25	75	100
	3	24UPH2A2	**Allied-II** General Physics - II	3	3	25	75	100
	3	24UPH1A1P	**Allied-I& II Practical** General Physics Practical - I	3	2	40	60	100
	4	24U2EVS	Environmental Studies	2	2	25	75	100
	Total			**30**	**22**	**-**	**-**	**700**
III	1	24U3LT3	**Language-III** Cheyyul(Kappiyangal), Urainadai, Aluval Murai Madalgal, Elakkiya Varalaru	6	3	25	75	100
		24U3LH3	Hindi					
		24U3LF3	French					
	2	24U3EL3	English Through Literature	6	3	25	75	100

	3	24UMM3C5	**CC-V:** Algebra And Fourier Series	5	5	25	75	100
	3	24UMM3C6	**CC-VI:** Theory Of Numbers	5	5	25	75	100
	3	24UMM3A3	**Allied-III** Mathematical Statistics-I	3	3	25	75	100
	3		**Allied-III Practical** Mathematical Statistics Practical	3	-	-	-	-
	4	24UMM3N1A	**NME-I:** Mathematics For Competitive Examination-I	2	2	25	75	100
		24UMM3N1B	**NME-I:** Operations Research					
		24UMM3N1C	**NME-I:** Statistics – I					
	Total			**30**	**21**	**-**	**-**	**600**
IV	1	24U4LT4	**Language-IV** Cheyyul (Sanga Elakiyam, Neethi Elakkiyam), Nadagam, Elakkiya Varalaru, Pothukatturai	6	3	25	75	100
		24U4LH4	Hindi					
		24U4LF4	French					
	2	24U4EL4	English For Competitive Examinations	6	3	25	75	100
	3	24UMM4C7	**CC-VII:** Differential Equations And Laplace Transform	5	5	25	75	100
	3	24UMM4C8	**CC-VIII:** Sequence And Series	5	5	25	75	100
	3	24UMM4A4	**Allied-IV** Mathematical Statistics – II	3	3	25	75	100
	3	24UMM3A2P	**Allied-III & IV Practical** Mathematical Statistics Practical	3	2	40	60	100
	4	24UMM4N2A	**NME-II:** Mathematics For Competitive Examination-II	2	2	25	75	100
		24UMM4N2B	**NME-II:** Numerical Methods					
		24UMM4N2C	**NME-II:** Statistics – II					
	Total			**30**	**23**	**-**	**-**	**700**
V	3	24UMM5C9	**CC-IX:** Numerical Analysis	5	5	25	75	100
	3	24UMM5C10	**CC-X:** Abstract Algebra	5	5	25	75	100
	3	24UMM5C11	**CC-XI:** Real Analysis	5	5	25	75	100
	3	24UMM5C12	**CC-XII:** Statics	5	4	25	75	100
	3	24UMM5MBE1A	**MBE-I:** Operations Research	5	4	25	75	100
		24UMM5MBE1B	**MBE-I:** Stochastic Processes					
		24UMM5MBE1C	**MBE-I:** Fuzzy Mathematics					
	3	24UMM5IS	Internship/Field Study/ Industrial Visit	-	1			100
	4	24UMM5SBE1A	**SBE-I:** Quantitative Aptitude – I	3	2	25	75	100
		24UMM5SBE1B	**SBE-I:** Arithmetic And Mental Ability – I					
		24UMM5SBE1C	**SBE-I:** General Aptitude For Competitive Examinations- I					
	4	24U5SS	Soft Skills	2	2	25	75	100
			Self Paced Learning-I	-	2*			
	Total			**30**	**28**	**-**	**-**	**800**

VI	3	24UMM6C13	**CC-XIII:** Linear Algebra	6	5	25	75	100
	3	24UMM6C14	**CC-XIV:** Complex Analysis	6	5	25	75	100
	3	24UMM6C15	**CC-XV:** Dynamics	5	5	25	75	100
	3	24UMM6MBE2A	**MBE-II:** Graph Theory	5	4	25	75	100
		24UMM6MBE2B	**MBE-II:** Mathematical Modeling					
		24UMM6MBE2C	**MBE-II:** Non-Linear Differential Equations					
	3	24UMM6PW	Project work	4	3	40	60	100
	4	24UMM6SBE2A	**SBE-II:** Quantitative Aptitude – II	3	2	25	75	100
		24UMM6SBE2B	**SBE-II:** Arithmetic And Mental Ability – II					
		24UMM6SBE2C	**SBE-II:** General Aptitude For Competitive Examinations- II					
	4	24U6ES	Gender studies	1	1	25	75	100
			Self Paced Learning-II	-	2*			
	Total			**30**	**25**	**-**	**-**	**700**
I-VI	V		Extension Activities	-	1	-	-	-
Total				**180**	**140**			**4100**

Semester	Course code	Title of the course	Hours	Credits
I	24UMM1C1	CC-I: THEORY OF EQUATIONS & DIFFERENTIAL CALCULUS	5	5

Objectives

To impact the techniques available in the literature in solving the algebraic equations and Calculus.

UNIT I (15 Periods)

Theory of equations - Remainder theorem - imaginary roots - Irrational roots - Relation between the roots and the coefficients - Symmetric functions of the roots.

UNIT II (15 Periods)

Sum of the powers of the roots of an equation - Newton's theorem - Transformation of equations - Roots multiplied by a given number.

UNIT III (15 Periods)

Reciprocal roots - Reciprocal equations- Standard forms - Increasing and decreasing the roots of a given equation by a given constant - Removal of terms and consequent problems.

UNIT IV (15 Periods)

Methods of successive differentiation – Leibnitz's theorem and its application - Increasing & Decreasing functions - Maxima & Minima of function of two variables.

UNIT V (15 Periods)

Curvature - Radius of curvature in Cartesian and polar coordinates – Centre of curvature – Evolutes & Involutes.

BOOKS FOR STUDY

1. T.K. Manicavachagom Pillay, T. Natarajan and K. S. Ganapathy, Algebra Volume I, S.Viswanathan (Printers & Publishers) Pvt Limited, Edition 2010

   UNIT I - *Chapter VI (Sections 1 to 12)*

   UNIT II - *Chapter VI (Sections 13 to 15.2)*

   UNIT III - *Chapter VI (Sections 15.3 to 19)*

2. S.Narayanan and T.K. Manicavachagom Pillay, Calculus Volume I, S.Viswanathan (Printers & Publishers) Pvt Limited, Chennai -2011.

   UNIT IV - *Chapter III (Sections1.1 to 2.2),*

   Chapter V (Section 1.1 to 1.4)

   UNIT V - *Chapter X (Sections 2.1 to 2.6)*

REFERENCE BOOK(S)

1. S.Arumugam and Issac, Calculus, Volume1, New Gamma Publishing House, 1991.
2. S.Arumugam and A.T. Isaac, Algebra, New Gamma Publishing House, 2011.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Understanding the concept of theory of equations	**K1**
CO 2	Realize the sum of the powers of the roots of an equation	**K2**
CO 3	Learn about reciprocal roots and reciprocal equations	**K3**
CO 4	Apply Leibnitz's theorem and its examples	**K3**
CO 5	Understanding the concept of curvature	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
I	24UMM1C1	CC-I: THEORY OF EQUATIONS & DIFFERENTIAL CALCULUS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	3	3	2	3	2	2.4
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	3	3	2	2.2
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
I	24UMM1C2	CC-II: ANALYTICAL GEOMETRY(3D)	5	4

Objectives

To get a clear idea about Geometrical figure namely sphere and good foundation in Geometry.

UNIT I (15 Periods)

Distance between two points, Projections, direction ratio and direction cosines of a joining two points – Angle between the lines, Conditions for perpendicularity and parallelism.

UNIT II (15 Periods)

The plane - The Equation of the plane passing through the points - Angle between two planes – Length of the perpendicular – Bisecting plane.

UNIT III (15 Periods)

The Straight line –Symmetric form – Equation of a straight line passing through two given points – The plane and the straight line – Angle between a plane and a straight line.

UNIT IV (15 Periods)

Coplanar lines – Shortest distance between two lines – Skew lines.

UNIT V (15 Periods)

The Sphere – Equation of a sphere – Equation of the tangent plane – Simple problems.

BOOKS FOR STUDY

1. T. K. Manicavachagom Pillay & T. Natarajan Analytical Geometry of Three dimensions, S.Viswanathan Printers, Revised Edition – 1996, Reprint 2001.

   UNIT I - *Chapter I*

   UNIT II - *Chapter II*

   UNIT III - *Chapter III (Sections 1 to 6)*

   UNIT IV - *Chapter III (Sections 7 and 8)*

   UNIT V - *Chapter IV*

REFERENCE BOOK

1. Dr. S. Arumugam and A.T. Issac. Analytical Geometry 3D and Vector Calculus, New Gamma Publishing House, Edition Jan 2011

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	To calculate the distance between two points direction ratio	K3
CO 2	Determine the plane angle between two planes	K4
CO 3	Classify the plane and the straight line	K3
CO 4	Concept of a plane, its various forms determination of planes under given conditions.	K4
CO 5	To be able to understand properties of straight lines and spheres	K5

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code		Title of the Course							Hours	Credits
I	24UMM1C2		CC-II: ANALYTICAL GEOMETRY(3D)							5	5
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	1	2	3	2	3	2	2.2
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.1

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Semester	Course code	Title of the course	Hours	Credits
I	24UPH1A1	AC-I: GENERAL PHYSICS –I	3	3

Objective: To understand basic theories and experiments in Physics.

UNIT 1: PROPERTIES OF MATTER (12 Periods)

Elasticity: Stress-Strain - Young's modulus-Bending of beams - Expression for the bending moment - Measurement of Young's modulus by bending of a beam - Non-uniform bending and Uniform bending. Viscosity: Determination of coefficient of viscosity of a liquid (Variable pressure head). Surface Tension: Drop weight method of determining the surface tension of a Liquid - Experiment to determine the interfacial tension.

UNIT II : MECHANICS (8 Periods)

Centre of Gravity - Centre of Gravity of a solid hemisphere - Hollow hemisphere - Centre of Gravity of a solid cone. States of Equilibrium: Equilibrium of a rigid body Stable, unstable and neutral equilibrium - Example. Stability of Floating bodies- Metacenter -Determination of Metacentric height of a ship.

UNIT III : THERMAL PHYSICS (10 Periods)

Radiation: Black body - Stefan's law - Newton's law of cooling - Newton's law of cooling from Stefan's law - Experimental determination of Stefan's constant law - Rayleigh -Jean's law - Planck's law. Heat Conduction Coefficient of Thermal Conductivity Determination of Thermal Conductivity of a bad Conductor by Lee's disc method.

UNIT IV : OPTICS (8 Periods)

Geometrical Optics: Spherical aberration of a thin lens Methods of reducing spherical aberration. Interference: Introduction - Air wedge - Newton's rings. Diffraction: Plane diffraction Grating - Theory of plane transmission Grating.

UNIT V : ELECTRONICS (7 Periods)

Intrinsic and extrinsic semiconductor - PN Junction diode - Biasing of PN junction - V-I characteristics of junction diode - Recutiers - Half wave - Full wave and bridge rectifiers-Zener diode - Characteristics of Zener diode - Voltage regulator

BOOKS FOR STUDY

1. R. Murugeshian, Properties of matter, S. Chand & Co. Pvt. Ltd., Revised edition, 2012.
2. Narayanamoorthyand N. Nagarathinam, Mechanics - Part II, The Natiora! Publishing Company, Chennai,2005.
3. Dr.N. Subramaniyam,Brijlal and Dr.M.N.Avathanulu, Optics, S. Chand &Co. Pvt.Ltd.-25 threvised edition, New Delhi, 2012.

REFERENCE BOOK(S) :

1. Brijlal and Subramaniyan, Properties of Matter, S. Chand & Co.Pvt.Ltd.2005.
2. Brijlal and Subramaniyan., Thermal Physics, S. Chand & Co 2001.
3. Mehta V.K., Principles of Electronics, S.Chand and company Ltd, 2014

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about stress and strain and difference between stress and strain.	K3
CO 2	Acquire knowledge about value for centre of gravity for different matrials.	K4
CO 3	Learn about radiation.	K3
CO 4	Acquire knowledge about nature and properties of electromagnetic energy in the light spectrum.	K4
CO 5	Learn about semi conductor and their types.	K5

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
I	24UPH1A1	AC-I: GENERAL PHYSICS –I					3	3			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	1	2	3	2	3	2	2.2
CO-2	2	1	2	2	2	**3**	3	2	3	2	2.2
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	**3**	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

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Semester	Course code	Title of the course	Hours	Credits
I & II	24UPH1A1P	AC-I: GENERAL PHYSICS – PRACTICAL	3	3

Objective

To acquire basic understanding of laboratory technique and to educate and motivate the students in the field of Physics.

LIST OF EXPERIMENTS: (ANY 12)

1. Non-Uniform bending - Pin and Microscope.
2. Uniform bending-scale and Telescope.
3. Surface tension and Interfacial Surface tension by Drop weight Method.
4. Surface tension by Capillary rise Method.
5. Thermal conductivity of a bad conductor - Lee's disc Method.
6. Spectrometer-Refractive index of a solid prism.
7. Spectrometer-Grating-Normal incidence.
8. Newton's Rings-'R' determination.
9. Potentiometer-low range voltmeter.
10. Carry Foster's Bridge - Resistance Determination.
11. Meter bridge-Specific resistance.
12. Characteristics of a junction diode-Forward resistance and knee voltage.
13. Basic logic gates- AND, OR and NOT gates using discrete components.

TEXT BOOK(S):

1. Dr.S.Somasundaram, Practical Physics, Apsara publications, Tiruchirapalli, 2012.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi2011.

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Semester	Course code	Title of the course	Hours	Credits
II	**24UMM2C3**	**CC-III: INTEGRAL CALCULUS**	**5**	**5**

Objectives

To get a clear idea about integrations and good foundation in integrals.

UNIT I (15 Periods)

Revision of all integral models – simple problems .

UNIT II (15 Periods)

Definite integrals - Integration by parts & reduction formula

UNIT III (15 Periods)

Geometric Application of Integration-Area under plane curves: Cartesian coordinates - Area of a closed curve - Examples - Areas in polar co-ordinates.

UNIT IV (15 Periods)

Double integrals – changing the order of Integration – Triple Integrals.

UNIT V (15 Periods)

Beta & Gamma functions and the relation between them – Integration using Beta & Gamma functions.

BOOK FOR STUDY

1. S.Narayanan and T.K.Manicavachagom Pillai, Calculus Volume II, S.Viswanathan (Printers & Publishers) Pvt Limited, Chennai -2011.

   UNIT I - *Chapter 1 section 1 to 10*

   UNIT II - *Chapter 1 section 11, 12 & 13*

   UNIT III - *Chapter 2 section 1.1, 1.2, 1.3 & 1.4*

   UNIT IV - *Chapter 5 section 2.1, 2.2 & 4*

   UNIT V - *Chapter 7 section 2.1 to 2.5*

REFERENCE BOOK(S)

1. Shanti Narayan, Differential & Integral Calculus.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Represent the revision of all integral models	K3
CO 2	Analyze the definite integrals and integration by parts	K4
CO 3	Plan and deliver the area of closed curve	K5
CO 4	Appreciate the beta and gamma functions	K4
CO 5	Various integration formulae	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
II	24UMM2C3	CC-IV INTEGRAL CALCULUS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	3	2	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	1	2	3	1	3	2	3	2	2.1
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	3	2	1	3	2	2	2	3	2	2.2
Mean overall score											2.1

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
II	24UMM2C4	CC-IV: TRIGONOMETRY AND VECTOR CALCULUS	5	4

Objectives

To enrich with the knowledge of trigonometric functions and to have a good foundation in vector calculus.

UNIT I (15 Periods)

Expansions of sin (nx), cos (nx), tan (nx) – Expansions of $\sin^n x$, $\cos^n x$, Multiples of $\sin^n x$, $\cos^n x$ - Expansions of sin(x), cos(x), tan(x) in powers of x

UNIT II (15 Periods)

Hyperbolic functions – Relation between hyperbolic & Circular functions- Inverse hyperbolic functions.

UNIT III (15 Periods)

Vector differentiation – velocity & acceleration - Vector & scalar fields – Gradient of a vector - Directional derivative – divergence & curl of a vector solenoidal & irrotational vectors – Laplacian double operator – simple problems

UNIT IV (15 Periods)

Vector integration – Tangential line integral – Conservative force field – scalar potential - Work done by a force - Normal surface integral- Volume integral – simple problems

UNIT V (15 Periods)

Gauss Divergence Theorem – Stoke's Theorem- Green's Theorem – Simple problems & Verification of the theorems for simple problems

BOOKS FOR STUDY

1. S. Narayanan, T.K. Manicavachagam Pillay, Trigonometry, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.

   UNIT I - *Chapter 3*

   UNIT II - *Chapter 4*

2. M.L. Khanna, Vector Calculus, Jai Prakash Nath and Co., 8th Edition, 1986.

   UNIT III - *Chapter 1 Section 1 &*

   Chapter 2 Sections 2.3 to 2.6, 3, 4, 5, 7

   UNIT IV - *Chapter 3 Sections 1, 2, 4*

   UNIT V - *Chapter 3 Sections 5 & 6*

REFERENCE BOOKS

1. S.Arumugam & others, Trigonometry, New Gamma Publications -1985 (Revised Edition)
2. Duraipandian, P.Duraipandiyan and Lakshmi Vector Analysis, Emarald publishers (1986).
3. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. III, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Illustrate the expansion of sin(nx),cos(nx),tan(nx)-expansion of $\sin^n x$, $\cos^n x$	K3
CO 2	Relate the relation between hyperbolic and circular functions	K4
CO 3	Design and implement the vector differentiation	K5
CO 4	Recognize the gauss divergence theorem	K4
CO 5	To be able to understand line integral, surface integral and volume integral and understand their inter-relations and their applications	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
II	24UMM2C4	CC-III: TRIGONOMENTRY AND VECTOR CALCULUS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	3	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
II	24UPH2A2	AC-I: GENERAL PHYSICS-II	3	3

Objective

This course is to high light the Modern Physics and digital Electronics

UNIT 1: ELECTROSTATICS (9periods.)

Coulomb's inverse square law - Gauss theorem and its applications (Intensity at a point due to a charged sphere & cylinder)- Principle of a capacitor - Capacity of a spherical and cylindrical capacitors - Energy stored in a capacitor - Loss of energy due to sharing of charges Capacitors in series and parallel.

UNIT II: MAGNETISM (9periods.)

Intensity of magnetization - Susceptibility - Types of magnetic materials - Properties of para, dia and ferromagnetic materials B-H curve-Applications of B-H curve- Magnetic energy per unit volume- ferrimagnets and their applications.

UNIT III: ATOMIC PHYSICS (9periods.)

Atom Models:Sommerfield's and Vector atom Models - Pauli's exclusion Principle Various quantum numbers and quantization of orbits. X-rays Characteristic X-rays Mosley's Law and importance - Bragg's law - Miller indices - Determination of Crystal Structure by Laue's photograph method.

UNIT IV: NUCLEAR PHYSICS (9periods.)

Introduction about Nucleus - Classification of Nuclei - Nuclear Size - Charge - Mass and Spin- Liquid drop model. Nuclear Radiations and their properties, particle accelerators - Betatron Four types of reactions.

UNIT V: DIGITAL ELECTRONICS (9 periods)

Decimal Binary Octal and Hexa Decimal number systems and their inter Conversions-1's and 2's complement of a Binary number and Binary arithmetic (Addition, Subtraction, Multiplication and Division- Basic logic gates- AND, OR, NOT, NAND, NOR. and EX-OR gates- NAND and NOR as universal building gates.

TEXT BOOK(S):

1. R. Murugesan., Electricity and Magnetism. S. Chand & Co, New Delhi, Third Revised edition, 2001.
2. R. Murugeshan, KiruthigaSivaprasath, Modern Physics., S. Chand & Co, New Delhi, First edition, 1984,

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about stress and strain and difference between stress and strain.	K3
CO 2	Acquire knowledge about value for centre of gravity for different matrials.	K4
CO 3	Learn about radiation.	K3
CO 4	Acquire knowledge about nature and properties of electromagnetic energy in the light spectrum.	K4
CO 5	Learn about semi conductor and their types.	K5

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
II	24UPH2A2	AC-I: GENERAL PHYSICS-II					3	3			
Couse outcomes	Programme outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	3	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	3	2.3
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	**3**	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III	24UMM3C5	CC-V: ALGEBRA & FOURIER SERIES	5	5

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of algebra

UNIT I (15 Periods)

Binomial, exponential theorems-their statements and proofs- their immediate application to summation and approximation only

UNIT II (15 Periods)

Logarithmic series theorem-statement and proof-immediate application to summation and approximation only.

UNIT III (15 Periods)

Summation of series

UNIT IV (15 Periods)

Fourier series- definition - Fourier Series expansion of periodic functions with Period 2π and period 2a – Use of odd & even functions in Fourier Series.

UNIT V (15 Periods)

Half-range Fourier series – definition- Development in Cosine series & in Sine series Change of interval

BOOK FOR STUDY

1. Algebra-T.K .Manicavachasam Pillai, T.Natarajan, K-S Canapathy. S. Viswanatham (Printers & Publishers Private Ltd-2012)

   UNIT I - *Chapter 3[section 1,10,14] Chapter 4[section 1 to 5]*

   UNIT II - *Chapter 4[section 5 to 11]*

   UNIT III - *Chapter 5[section 1 to 5]*

2. Higher Engineering mathematics, Dr. B.S. Grewal, khanna publishers, 38th edition 2004

   UNIT IV - *Chapter 10*

   UNIT V - *Chapter 10*

REFERENCE BOOK(S)

1. Mathematics for B.Sc. Branch I -Vol. I- P. Kandasamy and K. Thilagavathy S. Chand and Company Ltd, New Delhi, 2004.
2. Algebra. -- N.P.Bali- Laxmi publications P.Duraipandiyan and Lakshmi Duraipandian, Vector Analysis, Emarald publishers(1986).
3. Differential, Fourier & Laplace Transform, Probability P.R. Vittal

Course Outcomes:

CO No.	CO-STATEMENTS	Cognitive Levels (K-Levels)
	On the Successful completion of the course the student would be able to	
CO 1	Evaluate binomial theorem and their immediate applications to summation	K4
CO 2	Write about the exponential and logarithmic series	K3
CO 3	Understand the concept of Fourier series	K3
CO 4	Analyze the Fourier series and use of odd and even functions in Fourier series.	K5
CO 5	Associate various types of fourier series for solving problems	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
III	24UMM3C5	CC-V: ALGEBRA AND FOURIER SERIES					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	1	2	3	2	3	2	2.2
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III	24UMM3C6	CC-VI: THEORY OF NUMBERS	5	5

Objectives

To learn the basic concepts of statistics and the basic ideas of theory of numbers

UNIT I (15 Periods)

Introduction – Divisibility – Greatest Common Divisor – Prime numbers – The fundamental theorem of arithmetic – The Euclidean algorithm

UNIT II (15 Periods)

Introduction – The Mobius function $\mu(n)$ – The Euler totient function $\varphi(n)$ – A relation connecting φ and μ – A product formula for $\varphi(n)$ – Multiplicative functions.

UNIT III (15 Periods)

Definition and basic properties of Congruences – Residue classes and complete residue systems - Linear Congruences – Reduced residue systems and the Euler- Fermat Theorem – Polynomial Congruences modulo p, Lagrange's theorem – Applications of Lagrange's theorem – Simultaneous linear Congruences, The Chinese remainder theorem.

UNIT IV (15 Periods)

Quadratic residues – Legendre's symbol and its properties – Evaluation of (-1/p) and (2/p) – Gauss lemma.

UNIT V (15 Periods)

The quadratic reciprocity law – Applications of the reciprocity law – The Jacobi symbol – Applications to Diophantine equations.

BOOK FOR STUDY

1. Tom M. Apostol, Introduction to Analytical Number Theory, Narosa Publishing House, New Delhi.

   UNIT I - *Chapters 1 Section 1.1 to 1.5, 1.7*

   UNIT II - *Chapter 2 Section 2.1 to 2.5, 2.9*

   UNIT III - *Chapter 5 Section 5.1 to 5.7*

   UNIT IV - *Chapter 9 Section 9.1 to 9.4*

   UNIT V - *Chapter 9 Section 9.5 to 9.8*

REFERENCE BOOK(S)

1. David M. Burton, Elementary Number Theory, W.M.C. Brown Publishers, Dubuque, Lawa, 1989
2. George Andrews, Theory of Numbers
3. Fundamentals of Number Theory, William. J. Leveque, Addison Wesley Publishing Company, Phillipines, 1977

Course Outcomes:

CO No.	CO-STATEMENTS	Cognitive Levels (K-Levels)
	On the Successful completion of the course the student would be able to	
CO 1	Differentiate the fundamental theorem of arithmetic	K4
CO 2	Obtain the mobious function (n)	K3
CO 3	Illustrate basic properties of congruence's	K3
CO 4	Know the concept of quadratic residues	K5
CO 5	Students study various theorems on primes and also learn congruence which are used in cryptography	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
III	24UMM3C6	CC-VI: THEORY OF NUMBERS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	3	2	3	2	2.2
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III	24UMM3A3	AC-III: MATHEMATICAL STATISTICS-I	3	3

Objectives

To learn the basic concepts of statistics and the basic ideas of statistical data's

UNIT I (9 Periods)

Statistical data – Primary data and Secondary data (definitions only), Formation of frequency distribution, various measures of central tendency – mean, median, mode, geometric mean, harmonic mean – simples problems – properties of above measures.

UNIT II (9 Periods)

Measures of dispersion – Range quartile deviation, mean deviation, standard deviation – their coefficients – merits and demerits (simple problems) – Skewness and kurtosis .

UNIT III (9 Periods)

Probability – Definition, axiomatic approach to probability – Additive and Multiplicative laws of Probability (two variables only) and conditional probability – simple problems – concepts of random variables – discrete and continuous random variables – distribution function, pmf, pdf and their properties – simple problems.

UNIT IV (9 Periods)

Mathematical expectation – addition and multiplication theorems (two variables only). Moment generating and characteristics functions, their properties. Conditional expectation and conditional variance (simple problems)

UNIT V (9 Periods)

Binomial and Poisson distributions – moments, moment generating function, cumulant generating function (simple problems) – fitting binomial distribution and gamma distribution

BOOK FOR STUDY

1. Gupta S.C. and Kapoor V.K. Fundamental of Mathematical Statistics Sultan Chand & sons

UNIT I - *Chapter 1 & 2[2.1 -2.9]*

UNIT II - *Chapter 2[2.13,2.14,2.16,2.17]*

UNIT III - *Chapter 3[3.8,3.9,3.91,3.10,3.11] Chapter 5[5.3.1,5.4.1]*

UNIT IV - *Chapter 6[6.*1,6.4,6.9] *Chapter 7[7.1,7.3]*

UNIT V - *Chapter 8[8.4.1,8.4.6,8.5.2,8.5.5] Chapter 9[9.5]*

REFERENCE BOOK(S)

1. S.P. Gupta, Statistical Methods (Revised edition 2001)

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Recognize the statistical data and properties of above measures	K4
CO 2	Design and implement of measure of dispersion	K3
CO 3	Understanding the concept of probability, definition, axiomatic approach to probability	K3
CO 4	Calculate the binomial and poison distributions	K5
CO 5	Describe the concept of probability theory and identify its applications in real situations.	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
III	24UMM3A3	AC-III: MATHEMATICAL STATISTICS-I					3	3			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	2	3	1	2	3	2	3	3	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	1	2	3	3	3	2	3	2	2.3
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III & IV	24UMM3A2P	AP-II: MATHEMATICAL STATISTICS PRACTICAL	3	2

Objectives

To train the students in solving statistical problems

UNIT I (9 Periods)

Moments of central tendency – A.M, median, G.M and H.M – measures of dispersion – quartile deviation, standard deviation and coefficient of variation – measures of skewness – calculations of first four moments, central moments, B_1, B_2

UNIT II (9 Periods)

Bivariate discrete probability distribution – marginal distribution and conditional distribution – calculation of mean, variance, covariance, correlation coefficient, expectation – conditional expectations and conditional variance

UNIT III (9 Periods)

Fitting of binomial, poison and normal distribution (area method only)

UNIT IV (9 Periods)

Calculation of karlpearsons coefficient of correlation, spearman's rank correlation and regression equations

UNIT V (9 Periods)

Large sample tests – test of single mean – difference between means – single proportion and difference between proportion – exact sample test –'t' test for single mean, difference between mean, paired't' test chi-square test for goodness of fit and independence of attributes

BOOK FOR STUDY

1. R.S.N. Pillai and Bagavathi, practical statistics, second edition 2013

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Problem solving skills of students are enhanced.	K4
CO 2	Theoretical concepts are strengthened by solving maximum no. of problems	K3
CO 3	Due to one to one interaction with the teacher doubts of the students get cleared if any.	K3
CO 4	Plan and deliver the large sample tests and exact sample test.	K5
CO 5	Students learn how to apply mathematical concepts to practical and real life problems.	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
III	24UMM3A2P	AP-II: MATHEMATICAL STATISTICS PRACTICAL					3	2			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III	24UMM3N1A	NME-1:MATHEMATICS FOR COMETITIVE EXAMINATION-I	2	2

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students preparethemselves for various competitive examinations

UNIT I (6 Periods)

Numbers – HCF –LCM –Problems on numbers

UNIT II (6 Periods)

Decimal Fractions and Simplification

UNIT III (6 Periods)

Surds and Indices –Partnership –Allegation or Mixture

UNIT IV (6 Periods)

Ratio and Proportion – Partnership – Allegation or Mixture

UNIT V (6 Periods)

Average –Problems on Age

TEXT BOOK(S)

Scope and treatment as in "Quantitative Aptitude" by R.S.Aggarwal, S.Chand & Company Ltd.,Ram Nagar ,New Delhi (2007

UNIT I- Chapters 1, 2 &
UNIT II- Chapters 3 &4
UNIT III- Chapters 9, 10 & 11
UNIT IV- Chapters 12, 13 & 20
UNIT V- Chapters 6 & 8

Course Outcomes:

On the Successful completion of the course the student would be able to

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Develop number – HCF-LCM	**K3**
CO 2	Evaluate decimal fraction and simplification	**K3**
CO 3	Know about surds and indices	**K3**
CO 4	Plan and deliver ratio and proportion	**K4**
CO 5	Know about Allegation or Mixture	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
III	21UMM3N1A	NME-1:MATHEMATICS FOR COMETITIVE EXAMINATION-I					2	2			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III	**24UMM3N1B**	**NME-1: OPERATIONS RESEARCH**	**2**	**2**

Objectives:

To introduce the various techniques of Operations Research and make the students solve real lifeproblems in Business and Management

UNIT I (6 Periods)

Introduction to Operations Research, scope, phases- merits and limitations – concept of optimization

UNIT II (6 Periods)

Operation Research – An Overview – Mathematical Formulation of Linear Programming Problem - Graphical Solution of Linear Programming Problem

UNIT III (6 Periods)

Transportation Problem – General Transportation Problem – Loops In T.P – Solution of TP – InitialBasic Feasible Solution

UNIT IV (6 Periods)

Assignment Problem – Mathematical Formulation – Hungarian Methods

UNIT V (6 Periods)

Network Scheduling By Critical Path Method (CPM)

TEXT BOOK(S)

Operation Research by Kanthiswarup, P.K. Gupta, Manmohan 9th Revised Edition 2001, Reprint2002.Sultan Chand & Sons, New Delhi.

UNIT I - Chapter 1
UNIT II - Chapter 1, 2 & 3 section 3.1 to 3.5
UNIT III - Chapter 10 section 10.1 to 10.8
UNIT IV - Chapter 11 section 11.1, 11.2, 11.3
UNIT V - Chapter 21 section 21.1 to 21.5

Course Outcomes:

On the Successful completion of the course the student would be able to

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Understanding the concept of operation research scope and phase	**K3**
CO 2	Recognize graphical solution of linear programming problem	**K3**
CO 3	Represent transportation problem and initial basic feasible solution	**K3**
CO 4	Calculate assignment problem and Hungarian methods	**K4**
CO 5	Obtaining optimal solutions	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course							Hours	Credits
III	24UMM3N1B	NME-1: OPERATIONS RESEARCH							2	2
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	1	2	3	2	2.2
CO-5	2	2	2	1	3	2	2	2	3	2	2.1
Mean overall score											2.1

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
III	24UMM3N1C	**NME-1:** STATISTICS-I	**2**	**2**

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of statistics

UNIT I (6 Periods)

Statistics – Definition – Nature – Scope and Objectives – Diagrammatic representation – One, two and three dimensional diagrams

UNIT II (6 Periods)

Graphic representation-Histogram, Frequency Polygon, Frequency Curve, Histogram and Pie diagram – Classification and tabulation

UNIT III (6 Periods)

Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean

UNIT IV (6 Periods)

Measures of Dispersion - Range, Quartile Deviation, Mean Deviation, Standard Deviation and co-efficient of variation

UNIT V (6 Periods)

Simple Correlation - Karl Pearson's Co-efficient of Correlation and Spearman's Rank Correlation – Problems

TEXT BOOK(S)

1. Gupta S.C. and Kapoor V.K: Fundamentals of Mathematical Statistics – Sultan Chand& Sons.

UNIT I - Chapter 1
UNIT II - Chapter 2 (Sec: 2.1, 2.2)
UNIT III - Chapter 2 (Sec: 2.3 - 2.9)
UNIT IV - Chapter 2 (Sec: 3.1 – 3.8)
UNIT V - Chapter 10 (Section 10.3, 10.6)

BOOKS FOR REFERENCE

1. R.S.N. Pillai and Bagavathi ,Practical statistics, Second edition(2013)

Course Outcomes:

On the Successful completion of the course the student would be able to

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Analyze one, two, and three dimensional diagrams	**K3**
CO 2	Appreciate graphic representation-histogram, frequency polygon	**K3**
CO 3	Develop measure of central tendency	**K3**
CO 4	Illustrate simple correlation and Karl Pearson's co-efficient of correlation	**K4**
CO 5	Represent the histogram, frequency polygon, frequency curve	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
III	24UMM3N1C		**NME-1:** STATISTICS-I							**2**	**2**
Couse outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											**2.2**

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
IV	24UMM4C7	CC-VII: DIFFERENTIAL EQUATIONS & LAPLACE TRANSFORMS	5	5

Objectives:

To impact the techniques an available in the literature in differential equations & transforms and good foundation in the concept of differential equations

UNIT I (15 Periods)

First order, higher degree differential equations solvable for x, solvable for y, solvable for dy/dx, Clairauts form – Conditions of integrability of M dx + N dy = 0 – simple problems.

UNIT II (15 Periods)

Particular integrals of second order differential equations with constant coefficients - Linear equations with variable coefficients – Method of Variation of Parameters (Omit third & higher order equations).

UNIT III (15 Periods)

Formation of Partial Differential Equation – General, Particular & Complete integrals – Solution of PDE of the standard forms - Lagrange's method - Solving of Charpit's method and a few standard forms.

UNIT IV (15 Periods)

Laplace Transforms –standard formulae –Basic Theorems & simple applications

UNIT V (15 Periods)

Inverse Laplace Transform – Use of Laplace Transform in solving ODE with constant coefficients.

BOOK FOR STUDY

1. T.K. Manicavachagom Pillay & S. Narayanan, Differential Equations, S. Viswanathan Publishers Pvt. Ltd., 1996.

   UNIT I - *Chapter 4 [Sections 1, 2 & 3] Chapter 2 [Section 6]*

   UNIT II - *Chapter 5 [Sections 1,2,3,4 & 5]Chapter 8 [Section 4]*

   UNIT III - *Chapter 12 [Sections 1 – 6]*

   UNIT IV - *Chapter 9 [Section 1 – 5]*

   UNIT V - *Chapter 9 [Section 6 – 10]*

REFERENCE BOOK(S)

1. Arumugam & Isaac, Differential Equations, New Gamma Publishing House, Palayankottai, 2003

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Evaluate binomial theorem and their immediate applications to summation	K4
CO 2	Write about the exponential and logarithmic series	K3
CO 3	Understand the concept of Fourier series	K3
CO 4	Analyze the Fourier series and use of odd and even functions in Fourier series.	K5
CO 5	Associate various types of fourier series for solving problems	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
IV	24UMM4C7	CC-VII: DIFFERENTIAL EQUATIONS & LAPLACE TRANSFORM					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	3	3	3	2	3	2	2.3
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	2	2	3	2	2	3	2	2	3	2	2.3
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											2.3

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
IV	24UMM4C8	CC-VIII: SEQUENCES AND SERIES	5	5

Objectives:

To lay a good foundation for classical analysis and study the behavior of sequences and series

UNIT I (15 Periods)

Sequences – Bounded Sequences – Monotonic Sequences – Convergent Sequence – Divergent Sequences – Oscillating sequences

UNIT II (15 Periods)

Algebra of Limits – Behavior of Monotonic functions

UNIT III (15 Periods)

Some theorems on limits – subsequences – limit points - Cauchy sequences

UNIT IV (15 Periods)

Series – infinite series – Cauchy's general principal of convergence –Comparison – test theorem and test of convergence using comparison test (comparison test statement only, no proof)

UNIT V (15 Periods)

Test of convergence using D Alembert's ratio test – Cauchy's root test –Alternating Series – Absolute Convergence (Statement only for all tests)

BOOK FOR STUDY

1. Dr. S. Arumugam & Mr. A. Thangapandi Isaac Sequences and Series – New Gamma Publishing House – 2002 Edition

   UNIT I - *Chapter 3[Section 3.0 – 3.5] Page No: 39 - 55*

   UNIT II - *Chapter 3[Section 3.6, 3.7] Page No: 56 – 82*

   UNIT III - *Chapter3 [Section 3.8 - 3.11] Page No: 82 - 102*

   UNIT IV - *Chapter 4[Section (4.1 , 4.2)] Page No: 112 - 128.*

   UNIT V - *Relevant part of Chapter 4 and Chapter 5: Section 5.1 & 5. Page No: 157 - 167.*

REFERENCE BOOK(S)

1. Algebra – Prof. S. Surya Narayan Iyer
2. Algebra – Prof. M.I. Francis Raj.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about sequences, bounded sequences and monotonic sequences	K4
CO 2	To calculate the algebra of limits and behavior of monotonic functions	K3
CO 3	Relate the some theorems on limits and limit points	K3
CO 4	Knowing limits and Cauchy sequences	K5
CO 5	Getting a good function for classical analysis	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
IV	**24UMM4C8**		**CC-VIII: SEQUENCES AND SERIES**							**5**	**5**
Couse outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	**2**	2	2	3	2	2	3	2	2.1
CO-5	2	3	2	1	3	**2**	3	2	3	2	2.3
Mean overall score											**2.2**

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
IV	24UMM4A4	AC-IV: MATHEMATICAL STATISTICS-II	3	3

Objectives

To learn the basic concepts of discrete continuous distribution and learn the test of significance

UNIT I (9 Periods)

Correlation Analysis: Introduction – Types of correlation – Methods of studying correlation – Karl Pearson's coefficient of correlation – Coefficient of correlation and probable error – Properties of Correlation coefficient – Rank correlation coefficient – concurrent deviation method – Merits and limitation of correlation.

UNIT II (9 Periods)

Regression Analysis: Introduction – Uses of Regression Analysis – Difference between correlation and Regression Analysis – Regression Lines – Regression Equations – Standard Error – Limitation of Regression analysis.

UNIT III (9 Periods)

Normal distribution – M.G.F, Binomial, Poisson and Chi-square distribution tending to normal statement of central limit theorem. Characteristics functions and its properties. Statement of uniqueness theorem and continuity theorem

UNIT IV (9 Periods)

Continuous distributions – rectangular, exponential, beta, gamma distribution – Sampling distribution, 't', 'F' and Chi – square distribution.

UNIT V (9 Periods)

Test of significance – definition of null hypothesis, alternative hypothesis, sampling distribution, standard error and critical region. Type I and Type II errors, one tailed and two tailed tests. Large sample test for single mean, difference between mean, single proportion and difference between proportions

BOOK FOR STUDY

1. Gupta S.C. and Kapoor V.K. Fundamental of Mathematical Statistics Sultan Chand & sons

UNIT I - *Chapter 10*

UNIT II - *Chapter 11*

UNIT III - *Chapter 8,9*

UNIT IV - *Chapter 15,16*

UNIT V - *Chapter 14*

REFERENCE BOOK(S)

1. S.P. Gupta, Statistical Methods (Revised edition 2001)

Course Outcomes:

CO No.	CO-STATEMENTS	Cognitive Levels (K-Levels)
	On the Successful completion of the course the student would be able to	
CO 1	Illustrate the normal distribution-m, g, f, binomial, poison, and chi-square distribution	K4
CO 2	Realize the small sample test-'t' test for single mean	K3
CO 3	Know the basic of tests of significance	K3
CO 4	Understanding the concept of correlation and rank correlation	K5
CO 5	Identify the concepts of a discrete probability Distribution and compute the moments, Cumulants, m.g.f and various constants of a discrete probability Distribution and its applications.	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
IV	24UMM4A4	AC-IV: MATHEMATICAL STATISTICS-II					3	3			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
IV	24UMM4N2A	**NME-II:MATHEMATICS FOR COMPETITIVE EXAMINATION-II**	**2**	**2**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

UNIT I (6 Periods)

Chain Rule – Time and Work – Pipes and Cisterns

UNIT II (6 Periods)

Time and Distance – Problems on Trains –Boats and Streams

UNIT III (6 Periods)

Simple Interest – Compound Interest – Stocks and Shares

UNIT IV (6 Periods)

Clocks – Area - Volume and Surface Area

UNIT V (6 Periods)

Permutations and Combinations

TEXT BOOK(S)

Scope and treatment as in "Quantitative Aptitude " by R.S.Aggarwal, S.Chand & company limited, Ram Nagar,New Delhi – 2015

UNIT I - Chapters 14, 15 &16
UNIT II - Chapters 21, 22 & 29
UNIT III - Chapters 17, 18 & 19
UNIT IV - Chapters 24, 25 & 28
UNIT V - Chapters 30 & 31

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Represent chain rule and time and work	**K3**
CO 2	Plan and design time, distance, boat and stream problem	**K3**
CO 3	Calculate simple interest, compound interest	**K4**
CO 4	Write a note on permutations and combinations	**K4**
CO 5	Know about Volume and surface area	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
IV	24UMM4N2A	**NME-II:MATHEMATICS FOR COMPETITIVE EXAMINATION-II**					**2**	**2**			
Couse outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											**2.2**

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
IV	24UMM4N2B	NME-II:NUMERICAL METHODS	2	2

Objectives:

To introduce the various techniques of numerical analysis and study the behavior of numerical analysis

UNIT I (6 Periods)

Algebraic and Transcendental equation – Finding a root of the given equation using Bisection Method, Method of False Position

UNIT II (6 Periods)

Finite differences – Forward, Backward– Newton's forward and backward difference interpolation formulae – Interpolation with unevenly spaced intervals – Lagrange's interpolating Polynomial.

UNIT III (6 Periods)

Numerical – Integration using Trapezoidal rule and Simpson's 1/3 and 3/8 rules & Romberg integration

UNIT IV (6 Periods)

Solution to Linear Systems – Gauss Elimination Method – Laplace Equation - Jacobi and Gauss Siedal iterative methods

UNIT V (6 Periods)

Numerical solution of ODE – Solution by Taylor's Series Method, Picard's Method, Euler's Method

TEXT BOOK(S)

1. S.S. Sastry, Introductory Methods of Numerical Analysis, Prentices Hall of India Pvt., Limited, 2001 Third Edition

   UNIT I - Chapter 2: Sections 2.2 to 2.4
   UNIT II - Chapter 3: Sections 3.3.1, 3.3.2, 3.3.4, 3.9, 3.9.1
   UNIT III - Chapter 5: Sections 5.4, 5.4.1, 5.4.2, 5.4.3, 5.4.6
   UNIT IV - Chapter 6 & 8: Sections 6.3, 6.3.2 & 8.3.1, 8.3.2
   UNITV - Chapter 7: Sections 7.1, 7.2, 7.3, 7.4, 7.4.2

BOOKS FOR REFERENCE

1. S.Narayanan and Others, Numerical Analysis, S. Viswanathan Publishers, 1994
2. A. Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

Course Outcomes:

On the Successful completion of the course the student would be able to

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Solve algebraic and transcendental equation	**K3**
CO 2	Develop interpolation with unevenly spaced intervals	**K3**
CO 3	Appreciate integration using trapezoidal rule and simpson's 1/3 rule	**K3**
CO 4	Know about numerical solution of ODE	**K4**
CO 5	Know methods of finding approximate values for definite integrals.	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course								Hours	Credits
IV	24UMM4N2B	NME-II:NUMERICAL METHODS								2	2
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
IV	24UMM4N2C	**NME-II:STATISTICS-II**	**2**	**2**

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of statistics

UNIT I (6 Periods)

Simple Regression – Regression co-efficient – Line Regression – Properties of Regression co –efficient -Problems

UNIT II (6 Periods)

Skewness, Kurtosis, Moments, Meaning, test of skewness, characteristics of dispersion and skewness. Measures of skewness, objectives. Karl Pearson's Coefficient of skewness, Bowley's coefficient of skewness

UNIT III (6 Periods)

Probability- Definition, axiomatic approach to probability - Additive and Multiplicative laws of Probability (two variables only) and Conditional probability – simple problems

UNIT IV (6 Periods)

Test of significance – Definition of null hypothesis, alternativehypothesis, Type Iand Type II errors, one tailed and two tailed tests.Large sample testfor single mean, Difference between means.

UNIT V (6 Periods)

Small sample tests –'t' test for single mean. Difference between means. Chi-square test for goodness of fit and independence of attributes

TEXT BOOK(S)

1. Gupta S.C. and Kapoor V.K. Fundamentals of Mathematical Statistics – Sultan Chand &Sons, New Delhi 2002.

   UNIT I - Chapter 11 (Sec: 11.2.1, 11.2.2)

   UNIT II - Chapter 2 (Sec: 2.15 – 2.17)

   UNIT III - Chapter 3 (Sec: 3.8, 3.9.1, 3.10, 3.11)

   UNIT IV - Chapter 14 (Sec: 14.4, 14.4.1, 14.4.2, 14.4.4, 14.7, 14.7.1, 14.7.2)

   UNIT V - Chapter 15, 16 (Sec: 15.6, 15.6.2, 15.6.3, 16.3, 16.3.1, 16.3.2)

BOOKS FOR REFERENCE

1. R.S.N. Pillai and Bagavathi ,Practical statistics, Second edition(2013)

Course Outcomes:

On the Successful completion of the course the student would be able to

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Learn about simple regression and line regression	**K3**
CO 2	Illustrate skewness, kurtosis and moments	**K3**
CO 3	Develop small sample tests and independence of attributes	**K4**
CO 4	Plan and deliver probability and conditional probability	**K4**
CO 5	Deduce statistical inference of a given data through sampling techniques.	**K4**

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course								Hours	Credits
IV	24UMM4N2C	NME-II:STATISTICS-II								2	2
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5C9	CC-IX: NUMERICAL ANALYSIS	5	5

Objectives

To introduce the various techniques of numerical analysis and study the behavior of numerical analysis

UNIT I (15 Periods)

Algebraic and Transcendental equation – Finding a root of the given equation using Bisection Method, Method of False Position, Newton Raphson Method, Iteration method.

UNIT II (15 Periods)

Finite differences – Forward, Backward and Central differences – Newton's forward and backward difference interpolation formulae – Interpolation with unevenly spaced intervals – Lagrange's interpolating Polynomial.

UNIT III (15 Periods)

Numerical – Integration using Trapezoidal rule and Simpson's 1/3 and 3/8 rules - Romberg's Method

UNIT IV (15 Periods)

Solution of Linear Systems – Gauss Elimination Method – Jacobi and Gauss Siedal iterative methods

UNIT V (15 Periods)

Numerical solution of ODE – Solution by Taylor's Series Method, Picard's Method, and Euler's Method, Runge Kutta second and fourth order methods.

BOOK FOR STUDY

1. S.S. Sastry, Introductory Methods of Numerical Analysis, Prentices Hall of India Pvt., Limited, 2001 Third Edition.

   UNIT I - *Chapter 2: Sections 2.2, 2.3, 2.4, 2.5*

   UNIT II - *Chapter 3: Sections 3.3.1, 3.3.2, 3.3.3, 3.6, 3.9, 3.9.1*

   UNIT III - *Chapter 2: Sections 5.4, 5.4.1, 5.4.2, 5.4.3,5.4.6*

   UNIT IV - *Chapter 2: Sections 6.3.2 & 6.4*

   UNIT V - *Chapter 2: Sections 7.1, 7.2, 7.3, 7.4, 7.4.2, 7.5*

REFERENCE BOOK(S)

1. S.Narayanan and Others, Numerical Analysis, S. Viswanathan Publishers, 1994
2. A. Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Solve algebraic and transcendental equations	K4
CO 2	The problems which cannot be solved by usual formulae and methods can be solved approximately by using numerical techniques.	K3
CO 3	Write about numerical integration using trapezoidal rule and Simpson's rule	K3
CO 4	Realize the numerical solution of ODE	K5
CO 5	To learn to apply the various numerical techniques for solving real life problems.	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM5C9	CC-IX: NUMERICAL ANALYSIS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5C10	CC-X: ABSTRACT ALGEBRA	5	5

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of algebra

UNIT I (15 Periods)

Groups: Definition and Examples – Elementary properties of a group – Equivalence Definition of a Group – Permutation Groups.

UNIT II (15 Periods)

Subgroups – Cyclic Groups – Order of an Element – Cosets and Lagrange's Theorem.

UNIT III (15 Periods)

Normal subgroups and Quotient Groups – Isomorphism – Homomorphism.

UNIT IV (15 Periods)

Rings - Definition and Examples – Elementary properties of rings – Isomorphism - Types of rings – Characteristics of a rings – Sub rings – Ideals – Quotient rings.

UNIT V (15 Periods)

Maximal and Prime Ideals – Homomorphism of rings – Field of quotient of an integral domain – unique factorization domain – Euclidean domain.

TEXT BOOK(S)

1. N.Arumugam & A.Thangapandi Isaac, Modern Algebra, New Gamma Publishing House - June1997

   UNIT I - *Chapter 3 Sections 3.1 to 3.4*

   UNIT II - *Chapter 3 Sections 3.5 to 3.8*

   UNIT III - *Chapter 3 Sections 3.9 to 3.11*

   UNIT IV - *Chapter 4 Sections 4.1 to 4.8*

   UNIT V - *Chapter 4 Sections 4.9 to 4.11, 4.13 to 4.14*.

BOOKS FOR REFERENCE

1. T.K. ManicavachagamPillai, T. Natarajan, K.S. Ganapathy, Algebra, Vol. I, S. Viswanathan Pvt Limited, Chennai, 2004
2. M.L.Santiago, Modern Algebra, Arul Publications, Madras, 1988.
3. M.L.Santiago, Modern Algebra, Tata McGraw Hill, 2003.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Understanding the concept of groups, cyclic groups	K4
CO 2	Discuss about the normal subgroups and quotient groups	K3
CO 3	Plan and deliver the vector spaces. Definition and examples	K3
CO 4	Implement the basis and dimension	K5
CO 5	Present concepts and properties of various algebraic structures	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
V	**24UMM5C10**		**CC-X: ABSTRACT ALGEBRA**							**5**	**5**
Couse outcomes	**Programme outcomes(POs)**					**Programme Specific Outcomes(PSOs)**					**Mean scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	3	2	2	3	2	3	2	2.4
CO-2	2	2	2	2	2	3	3	2	3	2	2.3
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	3	2	3	2	2	3	2	2.3
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											**2.3**

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5C11	CC-XI: REAL ANALYSIS	5	5

Objectives:

Understand the real number system and countable concepts in real number system and provide a Comprehensive idea about the real number system.

UNIT I (15 Periods)

Real Number system – Field axioms –Order relation in R. Absolute value of a real number& its properties –Supremum & Infimum of a set – Order completeness property – Countable & uncountable sets

UNIT II (15 Periods)

Continuous functions –Limit of a Function – Algebra of Limits – Continuity of a function – Types of discontinuities – Elementary properties of continuous functions –Uniform continuity of a function.

UNIT III (15 Periods)

Differentiability of a function –Derivability & Continuity –Algebra of derivatives – Inverse Function Theorem – Daurbouxs Theorem on derivatives

UNIT IV (15 Periods)

Rolle's Theorem –Mean Value Theorems on derivatives- Taylor's Theorem with remainder- Power series expansion

UNIT V (15 Periods)

Riemann integration –definition – Daurbouxs theorem –conditions for Integrability – Integrability of continuous & monotonic functions - Integral functions –Properties of Integrable functions - Continuity & derivability of integral functions – The Fundamental Theorem of Calculus and the First Mean Value Theorem

BOOKS FOR STUDY

1. M.K. Singhal & Asha Rani Singhal, A First Course in Real Analysis, R.Chand & Co., June 1997, Edition

   UNIT I - *Chapter 1[Section 1 to 6,10]*

   UNIT II - *Chapter 5*

   UNIT III - *Chapter 6 Section 1 to 5*

   UNIT IV - *Chapter 8 Section 1 to 6*

2. Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995

   UNIT V - *Chapter 6 Section 6.2, 6.3, 6.5, 6.7, 6.9*

REFERENCE BOOK(S)

1. Goldberge, Richard R, Methods of Real Analysis, Oxford & IBHP Publishing Co., New Delhi,1970.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Analyze the real number system in field axioms	K4
CO 2	Calculate the continuous function and limit of a function	K3
CO 3	Discuss about derivability and continuity	K3
CO 4	Learn about role's theorem	K5
CO 5	To study various types of sets and relations, and concept of countable and uncountable.	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM5C11	CC-XI: REAL ANALYSIS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	2	2	2	2	3	3	2	3	2	2.3
CO-3	2	2	2	3	3	2	3	2	3	2	2.4
CO-4	2	2	3	2	2	3	2	2	3	2	2.3
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											2.3

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5C12	CC-XII: STATICS	5	4

Objectives:

To provide the basic knowledge of equilibrium of a particle and develop a working knowledge to handle practical problems

UNIT I (15 Periods)

Introduction – Forces acting at a point: Triangle of forces – Resolution of force –Condition of equilibrium.

UNIT II (15 Periods)

Parallel forces and Moments: Resultant of parallel forces – Theorems on Moments – Moment about an axis – couples.

UNIT III (15 Periods)

Equilibrium of three forces acting on a rigid body: Conditions of equilibrium – Trigonometrically theorems and problems - Coplanar forces: Reduction of Coplanar forces – Equation of Line of action of the resultant **–** Conditions of equilibrium

UNIT IV (15 Periods)

Friction: Introduction – Laws of Friction – Definitions – Equilibrium of a particle on a rough inclined plane.

UNIT V (15 Periods)

Equilibrium of strings: Equation of the Common Catenary -Parabolic Catenary

BOOK FOR STUDY

1. M.K.Venkataraman, Statics, Agasthiyar Publications, 17th edition, 2014

   UNIT I - *Chapter1 & 2[Section 1-7,11,16]*

   UNIT II - *Chapter 3 & 4*

   UNIT III - *Chapter 5 (Section 1-6), Chapter 6 (Section 1-12).*

   UNIT IV - *Chapter 7 (Section 1-13)*

   UNIT V - *Chapter 9 (Section 1- 8)*

REFERENCE BOOK(S)

1. A.V.Dharmapadham, Statics, S.Viswanathan Publishers Pvt.Ltd, 2006.
2. P.Duraipandian, LaxmiDuraipandian and MuthamizhJayapragasam, MechanicsS.Chand& Company PVT, LTD, 2014
3. S.L.Lony, Elements of Statics and Dynamics, Part-I, A.I.T.B.S.Publishers,2007.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Laws of forces and their properties	K4
CO 2	Relate the parallel forces and moments	K3
CO 3	Plan and deliver the equilibrium of three forces	K3
CO 4	Learn about laws of friction and its properties	K5
CO 5	Application to real life problems	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM5C12	CC-XII: STATICS					5	4			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5MBE1A	MBE-1A: OPERATION RESEARCH	5	4

Objectives: To introduce the various techniques of Operations Research and the students solve real life problems in Business and Management

UNIT I (15 Periods)

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases - Canonical and standard forms of Linear Programming Problem - Simplex method.

UNIT II (15 Periods)

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form -Dual simplex method.

UNIT III (15 Periods)

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) – Degeneracy in TP – Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem – special cases in assignment problem.

UNIT IV (15 Periods)

Queuing theory - Queuing system - Classification of Queuing models – Poisson Queuing systems Model I (M/M/1)(∞/FIFO) only.

UNIT V (15 Periods)

PERT and CPM – Basic components – logical sequencing - Rules of network construction- Critical path analysis - Probability considerations in PERT.

BOOK FOR STUDY

1. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, 13th edition, Sultan Chand and Sons, 2007.

   UNIT I - *Chapter 2, 3 & 4 (Section 2.1 to 2.4, Section 3.1 to 3.5, Section 4.1 - 4.3)*

   UNIT II- *Chapter 4 Sec 4.4, Chapter 5 Sec 5.1 to 5.4, 5.9*

   UNIT III -*Chapter 10 Sec 10.1, 10.2,10.8,10.9,10.12,10.13,*
   Chapter 11 Sec 11.1 to 11.4

   UNIT IV- *Chapter 21 Sec 21.1, 21.2, 21.7 to 21.9.*

   UNIT V- *Chapter 25 Sec 25.1 to 25.4, 25.6, 25.7*

REFERENCE BOOK(S)

1. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K, Resource Management Techniques, A.R. Publications, 2002.
2. Taha H.A., Operations Research: An introduction, 7th edition, Pearson PrenticeHall, 2002

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Understanding the concept of linear programming and simplex method	K4
CO 2	Obtaining optimal solutions	K3
CO 3	Increasing the effectiveness of management decisions	K3
CO 4	Plan and deliver queuing theory	K5
CO 5	Learning logical analysis	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM5MBE1A	MBE-1A: OPERATION RESEARCH					5	4			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	3	3	2	2.3
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	2	3	3	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5MBE1B	MBE-1B: STOCHASTIC PROCESSES	5	4

Objectives:

To know probability and distribution function, understand the concept Stochastic Process, identify Markov chains, Poisson Process and Birth and death Process and know the concept of queuing theory with some examples

UNIT I (15 Periods)

Generating function - Laplace transforms – Laplace transforms of a probability distribution function - Difference equations – Differential difference equations – Matrix analysis.

UNIT II (15 Periods)

Stochastic Process - Notion – Specification – Stationary Process - Markov Chains – Definition and examples – Higher transition probabilities.

UNIT III (15 Periods)

Classification of states and chains – Determination of higher transition probabilities – Stability of Markov system – Limiting behavior

UNIT IV (15 Periods)

Poisson Process and related distributions – Generalization of Poisson Process – Birth and death process

UNIT V (15 Periods)

Stochastic Process in queuing and reliability – queuing systems – M/M/1 models – Birth and death process in queuing theory – Multi channel models – Bulk Queues.

TEXT BOOK(S)

1. J.Medhi, Stochastic Processes,

   UNIT I - *Chapter 1 Section 1.1, 1.2, 1.3 Appendix A 1, 2, 3, 4*

   UNIT II - *Chapter 2 Section 2.1 - 2.3 & Chapter 3 Section 3.1, 3.2*

   UNIT III - *Chapter 3 Section 3.4 - 3.6*

   UNIT IV - *Chapter 4 Section 4.1 – 4.4*

   UNIT V - *Chapter 10 Section 10.1 - 10.5*

REFERENCE BOOK(S)

1. First Course in Stochastic Processes by Samuel Karlin.
2. Stochastic Processes by Srinivasan and Metha (TATA McGraw Hill).
3. Elements of Applied Stochastic Processes by V

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Appreciate the differential difference equations	K4
CO 2	Represent the stochastic process and Markov chains	K3
CO 3	Determine the stability of Markov system	K3
CO 4	Obtain Poisson process and related distributions	K5
CO 5	Describe a time-inhomogeneous Markov chain and its simple applications	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code		Title of the Course							Hours	Credits
V	24UMM5MBE1B		MBE-1B: STOCHASTIC PROCESSES							5	4
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5MBE1C	MBE-1C: FUZZY MATHEMATICS	5	4

Objectives:

To know the basic definitions of fuzzy set theory and the fundamentals of fuzzy Algebra

UNIT I (15 Periods)

Introduction- Fuzzy subsets-Lattices and Boolean Algebras- L fuzzy sets-operations on fuzzy – level sets – properties of fuzzy subsets

UNIT II (15 Periods)

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

UNIT III (15 Periods)

Introduction- Algebra of fuzzy relations - logic – connectives

UNIT IV (15 Periods)

Some more connectives - Introduction-fuzzy subgroup - homomorphic image and Pre-image of sub-groupoid

UNIT V (15 Periods)

Fuzzy invariant subgroups - fuzzy sub rings

BOOK FOR STUDY

1. S. Nanda and N. R. Das Fuzzy Mathematical concepts, Narosa Publishing House, New Delhi, 2010.

REFERENCE BOOK(S)

1. M.Ganesh, Introduction to Fuzzy Sets & Fuzzy Logic, Prentice Hall of India Pvt.Ltd., 2006.
2. John N.Mordeson and Premch and S.Nair, Fuzzy Mathematics, Spring verlong, 2001

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about the fuzzy subsets and its properties	K4
CO 2	Calculate the algebraic product and sum of two fuzzy subsets	K3
CO 3	Classify the homomorphic image and pre-image of sub-groupoid	K3
CO 4	Implement fuzzy invariant subgroups	K5
CO 5	Classify and explain open and closed sets, limit points, convergent	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code		Title of the Course							Hours	Credits
V	24UMM5MBE1C		MBE-1C: FUZZY MATHEMATICS							5	4
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5SBE1A	SBE-1A: QUANTITATIVE APTITUDE-I	3	2

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Discuss numbers-HCF-LCM
2. Illustrate problems on numbers
3. Calculate percentage and profit and loss
4. Analyze ratio and proportion

UNIT I (6 Periods)

Numbers – HCF –LCM –Problems on numbers

UNIT II (6 Periods)

Decimal Fractions and Simplification

UNIT III (6 Periods)

Problems on Numbers - Surds and Indices

UNIT IV (6 Periods)

Percentage – Profit and Loss

UNIT V (6 Periods)

Ratio and Proportion - Partnership

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand & Company Ltd., Ram Nagar, New Delhi (2007)

   UNIT I - Chapters 1 &2

   UNIT II - Chapters 3 & 4

   UNIT III - Chapters 7 &9

   UNIT IV - Chapters 10 & 11

   UNIT V - Chapters 12 & 13

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about HCF and LCM	K4
CO 2	Know decimal fractions and simplification	K3
CO 3	Realize problems on numbers, surds and indices	K3
CO 4	Make the students understand the basics of percentage, profit and loss	K5
CO 5	Know the ratio and proportion and partnership	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course								Hours	Credits
V	24UMM5SBE1A	SBE-1A: QUANTITATIVE APTITUDE-I								3	2
Couse outcomes	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5SBE1B	SBE-1B: ARITHMETIC AND MENTAL ABILITY-I	3	2

Objectives

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Appreciate problems on train
2. Develop allegation and mixture
3. Know about simple interest
4. Plan and deliver compound interest

UNIT I (6 Periods)

Problems on trains

UNIT II (6 Periods)

Boats & Streams

UNIT III (6 Periods)

Allegation & Mixture

UNIT IV (6 Periods)

Simple Interest

UNIT V (6 Periods)

Compound Interest

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

   UNIT I - Chapters 18

   UNIT II - Chapters 19

   UNIT III - Chapters 20

   UNIT IV - Chapters 21

   UNIT V - Chapters 22

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about the problems on trains	K4
CO 2	Know about boats & streams	K3
CO 3	Realize the allegation & mixture	K3
CO 4	Make the students understand the basics of simple interest	K5
CO 5	Know the compound interest	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM5SBE1B	SBE-1B: ARITHMETIC AND MENTAL ABILITY-I					3	2			
Couse outcomes	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	2	1	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
V	24UMM5SBE1C	SBE-1C: GENERAL APTITUDE FOR COMPETITIVE EXAMINATION-I	3	2

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Understanding the concept of probability
2. Recognize square roots and cube roots
3. Represent races and games of skill
4. Write a note on calendar

UNIT I (6 Periods)

Probability

UNIT II (6 Periods)

Square roots & Cube roots

UNIT III (6 Periods)

Logarithms

UNIT IV (6 Periods)

Races & Games of Skill

UNIT V (6 Periods)

Calendar

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

   UNIT I - Chapters 31

   UNIT II - Chapters 5

   UNIT III - Chapters 23

   UNIT IV - Chapters 26

   UNIT V - Chapters 27

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about the probability	K4
CO 2	Know about the square roots & cube roots	K3
CO 3	Realize the logarithms	K3
CO 4	Make the students understand the basics of races & games of skill	K5
CO 5	Know the calendar	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM5SBE1C	SBE-1C: GENERAL APTITUDE FOR COMPETITIVE EXAMINATION-I					3	2			
Couse outcomes	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	3	1	2	3	3	2	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	2	1	3	2	2	3	2	3	2	1	2.1
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.1

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6C13	CC-XIII: LINEAR ALGEBRA	6	5

Objectives:

To give a comprehensive idea about the vector spaces and inner product spaces and good foundation in all the concepts of matrices

UNIT I (18 Periods)

Vector Spaces: Definition and Examples – Subspaces – Linear Transformation – Span of a set.

UNIT II (18 Periods)

Linear independence – Basis and Dimension – Rank and Nullity – Matrix of a Linear Transformation.

UNIT III (18 Periods)

Inner Product Spaces: Definition and examples – Orthogonally – Orthogonal complement.

UNIT IV (18 Periods)

Matrices: Elementary Transformation – Rank of a Matrix – Simultaneous linear equations – Characteristic Equations and Cayley Hamilton theorem – Eigen values and Eigen vectors.

UNIT V (18 Periods)

Bilinear forms: Bilinear form – Quadratic forms – Reduction of a quadratic form to the diagonal form.

BOOK FOR STUDY

1. Dr. S.Arumugam and Mr. A. Thangapandi Isaac, Modern Algebra, SciTech Publications Ltd.,Edition 2003, Reprint Nov 2011.

   UNIT I - *Chapter 5 Section 5.1 to 5.4*

   UNIT II - *Chapter 5 Section 5.5 to 5.8*

   UNIT III - *Chapter 6*

   UNIT IV - *Chapter 7 Section 7.4 to 7.8*

   UNIT V - *Chapter 8*

REFERENCE BOOK(S)

1. Algebra, N.P.Bali- Laxmi publications P.Duraipandiyan and Lakshmi Duraipandian, Vector Analysis, Emarald publishers(1986)

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Acquire the knowledge of basic concepts in vector spaces	K1
CO 2	Understand the concepts of linear transformations, Dimension of vector spaces, inner product spaces and matrix representation of linear transformation	K2
CO 3	Explain the basic concepts of vector spaces with suitable examples.	K3
CO 4	Evaluate basis, orthogonal complements, characteristics equations and bilinear forms	K5
CO 5	Illustrate with suitable examples	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
VI	24UMM6C13	CC-XIII: LINEAR ALGEBRA					6	5			
Couse outcomes	Programme outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	2	2	3	2	3	2	2.4
CO-2	2	2	2	2	2	3	3	2	3	2	2.3
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	3	2.3
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											2.3

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6C14	CC-XIV: COMPLEX ANALYSIS	6	5

Objectives:

To introduce the various techniques of complex analysis and study the behavior of complex analysis

UNIT I (15 Periods)

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

UNIT II (15 Periods)

Elementary transformations – Bilinear transformations – cross ratio – fixed points of bilinear transformation – some special bilinear transformations.

UNIT III (15 Periods)

Complex integration – definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives

UNIT IV (15 Periods)

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

UNIT V (15 Periods)

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

BOOK FOR STUDY

1. S.Arumugam, A.Thangapandi Isaac & A.Somasundaram, Complex Analysis, New Scitech Publications (India) Pvt.Ltd. November 2003.

   UNIT I - *Chapter 2 Sections 2.1 to 2.8*

   UNIT II - *Chapter 3 Sections 3.1 to 3.5*

   UNIT III - *Chapter 6 Sections 6.1 to 6.4*

   UNIT IV - *Chapter 7 Sections 7.1 to 7.4*

   UNIT V - *Chapter 8 Sections 8.1 to 8.3*

REFERENCE BOOK(S)

1. P.P.Gupta – Kedarnath & Ramnath, Complex Variables, Meerut – Delhi.
2. J.N. Sharma, Functions of a Complex Variable, Krishna Prakasan Media (p) Ltd. 13th Edition 1996-97
3. T.K.Manickavachagam Pillai, Complex Analysis,S.Viswanathan Publishers Pvt. Ltd 1994

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Acquire the knowledge of complex-valued functions, analytic functions, Harmonic functions and bilinear transformation	K1
CO 2	Understand series expansions, singularities, Cauchy's theorem and its consequences.	K2
CO 3	Identify types of singularities, poles and residues	K3
CO 4	Analyze the results associated to definite integrals and Cauchy's integral formulae	K4
CO 5	Evaluate the region of convergence by applying Taylor's series, Laurent's series	K5

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
VI	24UMM6C14	CC-XIV: COMPLEX ANALYSIS					6	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	3	2	2	3	2	2	3	2	2.2
CO-5	2	3	2	1	3	3	3	2	3	2	2.4
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6C15	CC-XV: DYNAMICS	5	5

Objectives:

To provide a basic knowledge of the behavior of objects in motion and develop a working knowledge to handle practical problems

UNIT I (18 Periods)

Introduction-Kinematics: Velocity-Relative Velocity-Angular Velocity – Acceleration-Relative Acceleration-Motion in a straight line under uniform acceleration.

UNIT II (18 Periods)

Projectile: Projectile-Path of a projectile-Characteristics-Horizontal projection-Projectile up/down an inclined plane-Enveloping parabola

UNIT III (18 Periods)

Collision of Elastic Bodies: Introduction-Definitions-Fundamental Laws of impact-Impact of a smooth sphere on a fixed smooth plane-Direct impact of two smooth spheres-Oblique impact of two smooth spheres-Dissipation of energy due to impact- Compression and Restitution-Impact of a particle on a rough plane.

UNIT IV (18 Periods)

Simple Harmonic Motion: Introduction-S.H.M. in straight line-Compositions of simple harmonic motions of the same period.

UNIT V (18 Periods)

Motion Under The Action Of Central Forces: Velocity and acceleration in polar coordinates-Equiangular spiral-Differential Equation of central orbits-Pedal Equation of the central orbit-Two-fold problems in central orbits.

BOOK FOR STUDY

1. Dr.M.K.Venkataraman, Dynamics, Agasthiyar Publications, Thirteenth Edition, July 2009.

UNIT I - *Chapter 2, Chapter 3, Section 3.1-3.22*

UNIT II - *Chapter 6, Sections 6.1-6.17*

UNIT III - *Chapter 8, Sections 8.1-8.11*

UNIT IV - *Chapter 10, Sections 10.1-10.13*

UNIT V - *Chapter 11, Sections 11.1-11.13*

REFERENCE BOOK(S)

1. P.Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam, Mechanics S.Chand & Company PVT, LTD, 2014
2. A.V. Dharmapadham, Dynamics, S. Viswanathan Publishers Pvt.Ltd.2006.

Course Outcomes:

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Behavior of motion of objects	K4
CO 2	Applications of projectile in practical problems	K3
CO 3	Simple harmonic motion and its applications	K3
CO 4	Behavior of elastic bodies in real life problems	K5
CO 5	Law of forces in central orbits	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
VI	24UMM6C15	CC-XV: DYNAMICS					5	5			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	1	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	1	2	2	2	2	3	2	2	3	2	2.1
CO-5	2	3	2	1	3	2	3	2	3	2	2.3
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6MBE2A	MBE-IIA: GRAPH THEORY	5	4

Objectives:

To introduce the notion of graph theory and its applications and learn the techniques of combinatory in Graph Theory

UNIT I (12 Periods)

Introduction - The Konigsberg Bridge Problem - Graphs and sub graphs - Definition and Examples - Degrees – Sub graphs - Isomorphism.–independent sets and coverings.

UNIT II (12 Periods)

Matrices - Operations on Graphs - Walks, Trails and Paths – Connectedness and Components - Eulerian Graphs.

UNIT III (12 Periods)

Hamiltonian Graphs (Omit Chavatal Theorem) - Characterization of Trees - Centre of a Tree

UNIT IV (12 Periods)

Planarity: Introduction - Definition and Properties - Characterization of Planar Graphs.

UNIT V (12 Periods)

Directed Graphs: Introduction - Definitions and Basic Properties – Some Applications: Connector Problem - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm.

TEXTBOOK(S)

1. S. Arumugam and S. Ramachandran, Invitation to Graph Theory, Sci Tech Publications (India) Pvt. Ltd., Chennai, 2006.

   UNIT I - *Chapter 1 Sec 1.0, 1.1 and Chapter 2 Sec 2.0, 2.1, 2.2, 2.3, 2.4.2.6*

   UNIT II -*Chapter 2 Sec 2.8,2.9,Chapter 4 Sec 4.1,4.2 and Chapter 5 Sec 5.0,5.1*

   UNI III - *Chapter 5 Sec 5.2, Chapter 6 Sec 6.0, 6.1, 6.2.*

   UNIT IV - *Chapter 7 Sec 7.0, 7.1, 7.2*

   UNIT V - *Chapter 9 Sec 9.0, 9.1 Chapter 10 Sec 10.0, 10.1, 10.2*

REFERENCE BOOK(S)

1. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India, 2004.
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, Tata McGraw-Hill Edition, 2004.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Plan and deliver the Konigsberg bridge problem	K4
CO 2	Implement the matrices and connectedness and components	K3
CO 3	Know about the Hamiltonian graphs	K3
CO 4	Recognize the kruskal's algorithm	K5
CO 5	Relation between matrices and graph theory	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code		Title of the Course							Hours	Credits
VI	24UMM6MBE2A		MBE-2A: GRAPH THEORY							5	4
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	2	3	2	3	2	2.3
CO-2	2	1	2	2	2	2	3	2	3	2	2.1
CO-3	2	2	1	2	3	2	3	2	3	2	2.2
CO-4	1	2	2	2	2	3	2	2	3	2	2.3
CO-5	2	2	2	1	3	3	2	2	3	2	2.2
Mean overall score											2.2

Prepared by **Verified by** **HOD**

Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6MBE2B	MBE-II B: MATHEMATICAL MODELING	5	4

Objectives:

To study the mathematical models through ode and difference equations and train the students to develop mathematical models in real life problems

UNIT I (12 Periods)

Mathematical Modeling through Ordinary Differential Equations of First order: Linear Growth and Decay Models – Non-Linear Growth and Decay Models –Compartment Models – Dynamic problems – Geometrical problems.

UNIT II (12 Periods)

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

UNIT III (12 Periods)

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

UNIT IV (12 Periods)

Mathematical Modeling 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 (12 Periods)

Mathematical Modeling through Graphs: Solutions that can be Modeled Through Graphs – Mathematical Modeling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

BOOK FOR STUDY

1. J.N. Kapur, Mathematical Modeling, Wiley Eastern Limited, New Delhi, 1988.

   UNIT I - *Chapter 2, Sec 2.1 to 2.6*

   UNIT II - *Chapter 3, Sec 3.1 to 3.6*

   UNIT III - *Chapter 4, Sec 4.1 to 4.4*

   UNIT IV - *Chapter 5, Sec 5.1to 5.5*

   UNIT V - *Chapter 7, Sec 7.1 to 7.5*

REFERENCE BOOK(S)

1. J.N. Kapur, Mathematical Models in biology and Medicine, EWP, New Delhi, 1985.

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Acquire knowledge on basic principles of mathematical modeling.	K1
CO 2	Understand the importance of mathematical modeling in the fields of linear and nonlinear growth, dynamics, epidemics and economics.	K2
CO 3	Apply the concepts of differential equations to study decay models, population dynamics, modeling of geometric problems and investment model.	K3
CO 4	Identify and appreciate the unifying influence of mathematical modeling in different disciplines	K3
CO 5	Analyze and translate a real-world problem into mathematical problem.	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
VI	24UMM6MBE2B	MBE-II B: MATHEMATICAL MODELING					5	4			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	1	2	2	2	3	3	2	3	3	2.3
CO-2	2	3	2	1	2	3	3	2	3	3	2.4
CO-3	1	2	3	2	3	2	3	2	3	3	2.4
CO-4	1	2	2	3	1	2	3	2	3	3	2.2
CO-5	1	2	2	2	3	1	3	2	3	3	2.2
Mean overall score											2.3

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Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6MBE2C	MBE-II C: NON LINEAR DIFFERENTIAL EQUATIONS	5	4

Objectives:

To study Non - linear DE and its properties and study oscillation and stability properties of the solutions

UNIT I (12 Periods)

First order systems in two variables and linearization: The general phase plane-some population models – Linear approximation at equilibrium points – Linear systems in matrix form.

UNIT II (12 Periods)

Averaging Methods: An energy balance method for limit cycles – Amplitude and frequency estimates – slowly varying amplitudes – nearly periodic solutions – periodic solutions: harmony balance – Equivalent linear equation by harmonic balance – Accuracy of a period estimate.

UNIT III (12 Periods)

Perturbation Methods: Outline of the direct method – Forced Oscillations far from resonance - Forced Oscillations near resonance with Weak excitation – Amplitude equation for undamped pendulum – Amplitude Perturbation for the pendulum equation – Lindstedt's Method – Forced oscillation of a self – excited equation – The Perturbation Method and Fourier series.

UNIT IV (12 Periods)

Linear Systems: Time Varying Systems – Constant coefficient System – Periodic Coefficients – Floquet Theory – Wronskian.

UNIT V (12 Periods)

Stability: Poincare stability – solutions, paths and norms – Liapunov stability Stability of linear systems – Comparison theorem for the zero solutions of nearly – linear systems.

BOOK FOR STUDY

1. Nonlinear Ordinary Differential Equations, D.W.Jordan, & P.Smith, Clarendon Press, Oxford, 1977.

REFERENCE BOOK(S)

1. Differential Equations by G.F.Simmons, Tata McGraw Hill, NewDelhi (1979).

2. Ordinary Differential Equations and Stability Theory By D.A.Sanchez, Freeman (1968).

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Understanding the concept of linear programming and simplex method	K4
CO 2	Obtaining optimal solutions	K3
CO 3	Increasing the effectiveness of management decisions	K3
CO 4	Plan and deliver queuing theory	K5
CO 5	Learning logical analysis	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
VI	24UMM6MBE2C	MBE-2C: NON LINEAR DIFFERENTIAL EQUATIONS					5	4			
Couse outcomes	Programme outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	1	2	2	2	3	3	2	3	3	2.3
CO-2	2	2	2	1	2	2	3	2	3	3	2.2
CO-3	1	2	2	2	3	2	3	2	3	3	2.3
CO-4	1	2	2	3	1	2	3	2	3	3	2.2
CO-5	1	2	2	2	3	1	3	2	3	3	2.2
Mean overall score											2.2

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Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6SBE2A	SBE-II A: QUANTITATIVE APTITUDE-II	3	2

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Illustrate problems on age
2. Solve chain rule
3. Discuss time and work
4. Learn about pipes and cistern

UNIT I (6 Periods)

Problems on Ages

UNIT II (6 Periods)

Chain Rule

UNIT III (6 Periods)

Time & Work

UNIT IV (6 Periods)

Pipes & Cistern

UNIT V (6 Periods)

Time & Distances

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude " by R.S.Aggarwal, S.Chand& company limited, Ram Nagar,New Delhi – 2015

   UNIT I - Chapters 8

   UNIT II - Chapters 14

   UNIT III - Chapters 15

   UNIT IV - Chapters 16

   UNIT V - Chapters 17

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about the problems on ages	K4
CO 2	Know about the chain rule	K3
CO 3	Realize the time & work	K3
CO 4	Make the students understand the basics of the pipes & cistern	K5
CO 5	Know the time & distances	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM6SBE2A	SBE-II A: QUANTITATIVE APTITUDE-II					3	2			
Couse outcomes	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	3	1	2	3	3	2	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	2	1	3	2	2	3	2	3	2	2	2.2
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

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Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6SBE2B	SBE-II B: ARITHMETIC AND MENTAL ABILITY-II	3	2

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Design and implement area
2. Plan and deliver volume and surface of area
3. Recognize stocks and shares
4. Represent permutations and combinations

UNIT I (6 Periods)

Area

UNIT II (6 Periods)

Volume & Surfaces Areas

UNIT III (6 Periods)

Clocks

UNIT IV (6 Periods)

Stocks & Shares

UNIT V (6 Periods)

Permutations & Combinations

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

   UNIT I - Chapters 24

   UNIT II - Chapters 25

   UNIT III - Chapters 28

   UNIT IV - Chapters 29

   UNIT V - Chapters 30

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about the basics of Area	K4
CO 2	Know about the volume & surfaces areas	K3
CO 3	Realize the clocks	K3
CO 4	Make the students understand the basics of the stocks & shares	K5
CO 5	Know the permutations & combinations	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM6SBE2B	SBE-II B: ARITHMETIC AND MENTAL ABILITY-II					3	2			
Couse outcomes	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	3	1	2	3	3	2	2	2.3
CO-2	2	1	2	2	3	2	3	2	3	3	2.3
CO-3	2	2	2	2	3	2	3	2	2	2	2.2
CO-4	2	1	3	2	2	3	2	3	2	1	2.1
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.2

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Semester	Course code	Title of the course	Hours	Credits
VI	24UMM6SBE2C	SBE-1C: GENERAL APTITUDE FOR COMPETITIVE EXAMINATION-II	3	2

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Understanding the concept of true discount
2. Appreciate banker's discount
3. Develop heights and distances
4. Illustrate odd man out and series

UNIT I (6 Periods)

True Discount

UNIT II (6 Periods)

Banker's Discount

UNIT III (6 Periods)

Heights & Distances

UNIT IV (6 Periods)

Odd Man Out & Series

UNIT V (6 Periods)

Average

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

   UNIT I - Chapters 32

   UNIT II - Chapters 33

   UNIT III - Chapters 34

   UNIT IV - Chapters 35

   UNIT V - Chapters 6

Course Outcomes:

CO No.	CO-STATEMENTS On the Successful completion of the course the student would be able to	Cognitive Levels (K-Levels)
CO 1	Learn about the true discount	K4
CO 2	Know about the banker's discount	K3
CO 3	Realize the heights & distances	K3
CO 4	Make the students understand the basics of the odd man out & series	K5
CO 5	Know the average	K4

Relationship matrix for Course outcomes, Programme outcomes/ Programme specific outcomes

Semester	Course code	Title of the Course					Hours	Credits			
V	24UMM6SBE2C	SBE-1C: GENERAL APTITUDE FOR COMPETITIVE EXAMINATION-II					3	2			
Couse outcomes	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	3	1	2	3	3	2	2	2.3
CO-2	2	1	2	2	2	3	3	2	3	2	2.2
CO-3	2	2	2	2	3	2	3	2	3	2	2.3
CO-4	2	1	3	2	2	3	2	3	2	1	2.1
CO-5	2	3	2	1	3	3	2	2	3	2	2.3
Mean overall score											2.1

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