GOBI ARTS & SCIENCE COLLEGE (AUTONOMOUS) : GOBICHETTIPALAYAM

SCHEME OF EXAMINATIONS - B.Sc. (MATHEMATICS) (15 BATCH)

No.	Code	Subject Title	Hrs	CIA	EOSE	Total	Credit
		SEMESTER : 1					
1	15U1TM01	PART I : TAMIL - I	3	25	75	100	3.0
2	13U2EN01	PART II : ENGLISH - I	3	25	75	100	3.0
3	08UAMA01	PART III : MAJOR CORE : CALCULUS	3	25	75	100	4.0
4	15UAMA02	CLASSICAL ALGEBRA	3	25	75	100	3.5
5	14UBPH01	PART III : ALLIED CORE : PHYSICS-I	3	25	75	100	4.0
6	15U4HE01	PART-IV: i)HUMAN EXCELLENCE:PAPER-I BASICS OF YOGIC LIFE	3	25	75	100	1.0
7	14U4EN01	ii) FOUNDATION SUBJECT-A: REMEDIAL ENGLISH-I	3	25	75	100	1.0
		SEMESTER : 2					
8	15U1TM02	PART I : TAMIL - II	3	25	75	100	3.0
9	13U2EN02	PART II : ENGLISH - II	3	25	75	100	3.0
10	08UAMA03	PART III : MAJOR CORE : DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	3	25	75	100	3.5
11	08UAMA04	TRIGONOMETRY, VECTOR CALCULUS AND FOURIER TRANSFORMS	3	25	75	100	4.0
12	14UBPH02	PART III : ALLIED CORE : PHYSICS-II	3	25	75	100	4.0
13	08UBPHP1	ALLIED CORE : PHYSICS PRACTICAL	3	25	75	100	2.0
14	15U4HE02	PART-IV : i)HUMAN EXCELLENCE:PAPER-II SUBLIMATION AND SOCIAL WELFARE	3	25	75	100	1.0
15	13U4HEP1	PRACTICAL – I: YOGA PRACTICE-I		100		100	1.0
16	14U4EN02	ii)FOUNDATION SUBJECT-A: REMEDIAL ENGLISH-II	3	25	75	100	1.0
17	12U4FN01	GENERAL AWARENESS	1.5		100	100	1.0
		SEMESTER : 3					
18	15U1TM03	PART I : TAMIL - III	3	25	75	100	3.0
19	13U2EN03	PART II : ENGLISH - III	3	25	75	100	3.0
20	08UAMA05	PART III : MAJOR CORE : MECHANICS	3	25	75	100	4.0
21	08UAMA06	MATHEMATICAL STATISTICS	3	25	75	100	3.5
22	14UBCH01	PART III : ALLIED CORE : CHEMISTRY	3	25	75	100	3.0
23	14U4HE03	PART-IV : i)HUMAN EXCELLENCE: PAPER-III MENTAL PROSPERITY AND HUMAN EXCELLENCE	3	25	75	100	1.0
24		ii)FOUNDATION SUBJECT-B	3		100	100	2.0

Contd....

SEMESTER : 4

25	15U1TM04	PART I : TAMIL - IV	3	25	75	100	3.0
26	13U2EN04	PART II : ENGLISH - IV	3	25	75	100	3.0
27	15UAMA07	PART III : MAJOR CORE : ANALYTICAL GEOMETRY	3	25	75	100	4.0
28	08UAMA08	OPERATIONS RESEARCH	3	25	75	100	3.5
29		PART III : ALLIED OPTIONAL:	3	25	75	100	5.0
30	08UBCHP1	ALLIED CORE:CHEMISTRY PRACTICAL	3	25	75	100	2.0
31	14U4HE04	PART-IV : i)HUMAN EXCELLENCE: PAPER-IV SCIENCE OF DIVINITY AND REALIZATION OF SELF	3	25	75	100	1.0
32	13U4HEP2	PRACTICAL – II: YOGA PRACTICE-II		100		100	1.0
33		ii)FOUNDATION SUBJECT-B	3		100	100	2.0
34		PART V : CO-CURRICULAR ACTIVITIES					1.0

SEMESTER : 5

35	08UAMA09	PART III : MAJOR CORE : REAL ANALYSIS-I	3	25	75	100	6.0
36	08UAMA10	COMPLEX ANALYSIS-I	3	25	75	100	6.0
37	08UAMA11	MODERN ALGEBRA-I	3	25	75	100	6.0
38	08UAMA12	PROGRAMMING IN C	3	25	75	100	4.0
39	08UAMAP1	MAJOR CORE PRACTICAL: PROGRAMMING IN C	3	25	75	100	2.0
40		PART III : MAJOR OPTIONAL:	3	25	75	100	4.0

SEMESTER : 6

41	14UAMA13	PART III : MAJOR CORE : REAL ANALYSIS-II	3	25	75	100	6.0
42	08UAMA14	COMPLEX ANALYSIS-II	3	25	75	100	6.0
43	08UAMA15	MODERN ALGEBRA-II	3	25	75	100	6.0
44	08UAMA16	DISCRETE MATHEMATICAL STRUCTURES	3	25	75	100	6.0
45	12UEMA01	MAJOR SKILL BASED PAPER : NUMERICAL METHODS	3	25	75	100	4.0
46	12UEMAP1	MAJOR SKILL BASED PRACTICAL	3	25	75	100	2.0

CREDIT:

PART I : 12 PART II : 12 PART III : MAJOR :88
ALLIED:20
---->108

PART IV : 13 PART V : 1 TOTAL : 146

B.Sc. (Mathematics)
SEMESTER-I
CALCULUS

Instructional Hrs: 75

Objectives: 1. To know the basic concepts of Differentiation.

2. To know the basic definition of Beta & Gamma functions.

3. To study the multiple integrals.

UNIT-I 15 Hrs

Length of the tangent, normal, subtangent and subnormal in Cartesian and polar coordinates. Curvature and radius of curvature in Cartesian Co-ordinates polar co-ordinates, implicit form and parametric form. The co-ordinates of centre of curvature. Equation of circle of curvature. Envelope, evolute and involute.

UNIT-II 15 Hrs

Asymptotes: Definition, Asymptotes of rational algebraic curve. Asymptotes parallel to co-ordinate axes. Asymptotes by inspection. Intersection of a curve and its asymptotes.
Asymptotes of polar curves.

Singular points: Concavity and convexity. Points of inflexion. Multiple points. Double points.

Curve Tracing in Cartesian and polar co-ordinates.

UNIT-III 15 Hrs

Integration: Reduction formulae. Definite integrals. Definitions of Beta and Gamma functions. Properties.

UNIT-IV 15 Hrs

Multiple integrals: Definitions of double and tripe integrals. Evaluation of double integrals. Change the order in double integrals. Evaluation of triple integrals. Jacobians Change of variables in double and triple integrals.

UNIT-V 15 Hrs

Fourier series: Definition. Determination of Fourier coefficients. Even and odd functions. Half range Fourier series.

Text Books:

CALCULUS VOL - I	T.K.MANICAVACHAGOM PILLAY S.NARAYANAN
CALCULUS VOL - II	T.K.MANICAVACHAGOM PILLAY S.NARAYANAN
CALCULUS VOL - III	T.K.MANICAVACHAGOM PILLAY S.NARAYANAN

B.Sc. (Mathematics)
SEMESTER-I
CLASSICAL ALGEBRA

Instructional Hrs: 60

Objectives: 1. To know the basic concepts of Convergency and Divergency.

2. To study Binomial, Exponential and Logarithmic series.

3. To study theory of Equations and theory of numbers.

UNIT-I 12 Hrs

CONVERGENCY AND DIVERGENCY OF SERIES: Infinite series Geometric series- Some general theorems concerning infinite series- The series is convergent when K is greater than unity and divergent when K equal to or less than unity- Cauchy's condensation test- D'Alembert's Ratio test-Cauchy's Root test- Raabe's test- Absolute convergence.
(Chapter 2: Sections 2.8 to 2.24 vol I)

UNIT-II 12 Hrs

BINOMIAL, EXPONENTIAL AND LOGARITHMIC SERIES: Binomial theorem for a rational index- Application of the Binomial theorem to the summation of series- Approximate values. Exponential limit-The Exponential theorem - Summation- The Logarithmic series- Euler's constant- Summation – The application of the exponential and logarithmic series to limits approximations.
(Chapter 3: Sections 3.5, 3.10 and 3.14, vol I) (Chapter 4: Sections 4.1 to 4.11, vol I)

UNIT-III 12 Hrs

THEORY OF EQUATIONS: Roots of an equation- Relations between the roots and co-efficient of equations- Symmetric functions of the roots- Transformation of equations- Reciprocal equations.
(Chapter 6: Sections 6.1 to 6.12, 6.15 and 6.16, vol I)

UNIT-IV 12 Hrs

THEORY OF EQUATIONS (Cont.): To increase or decrease the roots of a given equation by a given quantity- Removal of terms- Descartes' Rule of signs- Roll's theorem- Multiple roots- Horner's method and Newton's approximation.
(Chapter 6:Sections 6.17,6.19,6.24 to 6.26 and 6.30, vol I)

UNIT-V 12 Hrs

THEORY OF NUMBERS: Prime and composite numbers- Divisors of a given numbers N- Euler's Function $\phi(N)$-Integral part of real number. The highest power of a prime P Contained in n! The product of r consecutive integers is divisible by r! Congruences - Fermat's theorem.
Wilson's theorem and Lagrange's theorem (Statement and problems only)
Chapter-5, vol II.

TEXT BOOK:

1. Algebra, vol. I and vol. II- Manickavachagam Pillay and Others(2004) Published by: S.Viswanathan (Printers and Publishers) Pvt. Ltd, 38, McNichols Road, Chetput, Chennai – 600031.

SEMESTER – I

ALLIED CORE PHYSICS-I FOR MATHEMATICS

Instructional Hrs: 90

Objectives: 1. To acquire basic knowledge of Elasticity, Sound and Relativity.

2. To apply the laws of Thermodynamics to Thermodynamical system.

3. To understand the important concepts in Electricity and Magnetism.

UNIT – I: 18 hours

RELATIVITY : Theory of relativity – Frames of reference – Galilean transformation equation – Ether hypothesis – Michelson Morley experiment – Postulates of special theory of relativity – The Lorentz transformation equations – Length contraction – Time dilation – Addition of velocities – Variation of mass with velocity – Mass energy equivalence.

SOUND : Types of vibration: Undamped vibration, damped vibration, forced vibration, Resonance and sharpness of resonance – Doppler Effect – Derivation – Production of Ultrasonic waves – Piezo electric method – applications – Radar.

UNIT – II: 18 hours

ELASTICITY : Work done in stretching a wire – Bending of beams – An expression for the bending moment – Depression at the free end of a cantilever – Experimental determination of young's modulus by Non-uniform bending method – Uniform bending method with necessary theory.

Dynamics of Rigid bodies – Theory of compound Pendulum – Simple pendulum – Reversibility of Oscillator and suspension - Determination of g and Radius of gyration of a bar pendulum – Equivalent length – minimum Time period.

UNIT –III: 18 hours

THERMAL PHYSICS : Nature of heat: Definition of critical constants of a gas – Experimental determination of critical constants – Van der waals equation – critical constants interms of van der waal's constants – Demerits of van der waal's equation – Reduced equation of state.

LIQUEFACTION OF GASES : Joule – Kelvin porous plug experiment – Temperature of Inversion – Effects and Results of porous plug experiment – Theory of porous plug experiment – Relation between Boyle Temperature, Temperature of Inversion and critical temperature – Liquefaction of Helium – Properties of Liquid Helium.

UNIT – IV : 18 hours

SECOND LAW OF THERMODYNAMICS: Reversible and Irreversible processes – condition for Reversibility – Statements of second law – Carnot's Reversible Engine – Cycle – Indication Diagram – Efficiency of Carnot's Engine – Carnot's Theorem and its proof.

THERMAL CONDUCTION: Co-efficient of Thermal conductivity – Temperature gradient – Dimensional Formula – Thermal Diffusivity, Lee's Disc method of determining the thermal conductivity of a bad conductor.

SPECTROSCOPY: Types of Atomic and Molecular spectra – Theory of Rotational spectrum – Applications – Theory of Vibrational Rotational spectrum – Applications, Electronic band spectrum – Raman effect – Experimental set up to study Raman effect – Quantum theory of Raman effect – applications.

UNIT – V: 18 hours

ELECTRICITY: Chemical effect of electric current: Electrical conductivity of an electrolyte – Determination of specific conductivity of an electrolyte – Kohlrausch bridge – Arrhenius theory of electrolytic dissociation.

Helmholtz equations of varying currents: Growth and decay of current in a circuit containing a resistance and an inductance – charging and discharging a capacitor through a resistor – Measurement of high resistance by Leakage of charge – expressions for the average and RMS value of an alternating current – LCR parallel resonance circuits.

Books for study and Reference:

1. Electricity and Magnetism – R. Murugesan
2. Properties of Matter, Sound and Thermal Physics - R. Murugesan
3. Mechanics – P.R. Subramaniam and others.
4. Heat – Narayanamurthi M. and Nagarathnam N.

DEPARTMENT OF PHYSICS
COURSE: B.Sc. Physics
QUESTION PAPER PATTERN

(Major, Elective, Skilled Based Paper, Major Optional, Allied Optional Subjects)

Time: 3 Hours **Max. Mark :75**

SECTION – A (10 * 1 = 10 Marks)

Answer ALL questions
Question Numbers : 1 to 10
Type : Objective type questions
No. of questions from each unit : 2

SECTION – B (5 * 4 = 20 Marks)

Answer ALL questions
Question Numbers : 11 to 15
Type of answer : Either or type; short answer
No. of questions from each unit : 1
(At least two subdivisions in this section may be problem)

SECTION – C (5 * 9 = 45 Marks)

Answer ALL questions
Question Numbers : 16 to 20
Type of answer : Either or type; Essay type
No. of questions from each unit : 1

B.Sc. (Mathematics)
SEMESTER-II
DIFFERENTIAL EQUATIONS & LAPLACE TRANSFORMS

Instructional Hrs: 75

Objectives : 1. To know the basic concepts of Linear Differential Equations with constant and variable coefficients.

2. To know the basic concepts of ordinary and partial differential equations.

3. To study the Laplaces transforms.

UNIT-I 15 Hrs

Ordinary Differential Equations:

Equations of first order but of higher degree: Equations solvable for p, Equations solvable for x., Equations solvable for y, Clairaut's form. Equations that do not contain x explicitly. Equations that do that contain y explicitly. Equations homogeneous in x and y.

Linear differential equations of higher order with constant coefficients. Evaluation of equations of the form f(D) y=X, where X is x^m or e^x v or x^m v, where v is any function of x of the form e^{bx}, sin bx, cos bx, x^n.

UNIT-II 15 Hrs

Linear differential equations with variable coefficients. Equations reducible to the linear homogenous equations. Variation of parameters. Simultaneous equations of the form

1) $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$

2) $f_1(p)x+g_1(p)y=F_1(t)$
$f_2(p)x+g_2(p)y=F_2(t)$

UNIT-III Partial Differential Equations: 15 Hrs

Formation of Partial Differential Equations by eliminating constants and arbitrary functions. Definition of complete, singular and general solutions. Solution of first order partial differential equations of the form 1) f(p,q) = 0,
2) $f_1(x,p,q) = 0$, $f_2(y,p,q) = 0$, $f_3(z,p,q) = 0$, 3) $f_1(p,x) = f_2(q,y)$, &
4)z = px + qy + pq.

UNIT-IV Laplace Transformation: 15 Hrs

Definition of Laplace transform Laplace transform of elementary functions. Linearity property. Shifting property. Change of scale property. Laplace transform of derivatives. Laplace transform of Integrals. Periodic function and the theorem. Inverse Laplace transform.

UNIT-V 15 Hrs

Solving second order ordinary differential equations with constant coefficient and simultaneous linear differential equations using Laplace transforms.

Solving the partial differential equation of the form $P_p + Q_q = R$ (Lagrange's Equation)

Text Book:

Calculus Vol – III:S. NARAYANAN
T.K.MANICAVACHAGOM PILLAI

B.Sc. (Mathematics)
SEMESTER-II
TRIGONOMETRY, VECTOR CALCULUS AND FOURIER TRANSFORMS

Instructional Hrs: 60

Objectives : 1. The students will be able to handle with confidence a wide range of trigonometric identities.

2. To understand differential operators; line, surface and volume integrals; integral theorems.

3. To know the definition of the Fourier Transform and can apply the properties of the Fourier Transform.

TRIGONOMETRY:

UNIT-I 12 Hrs

Expansion of Cos nθ, Sin nθ, $\text{Cos}^n\theta$, $\text{Sin}^n\theta$, Hyperbolic Functions: Separation of real and imaginary parts of Sin(α+iβ), Sinh(α+iβ), Tanh(α+iβ), $\text{Tan}^{-1}(\alpha+i\beta)$,

UNIT-II 12 Hrs

Factorization- Logarithm of Complex numbers. Summation of Trigonometric Series.

VECTOR CALCULUS:

UNIT-III 12 Hrs

Scalar and Vector point functions- Differentiation of vector- Differential Operators- Directional derivatives- Gradient- Divergence and Curl.

UNIT-IV 12 Hrs

Integration of Vector: Line, Surface and Volume Integrals (Theorems of Gauss, Green, Stoke's-statements only) Simple Problem.

FOURIER TRANSFORMS:

UNIT-V 12 Hrs

Infinite F.T.- Properties of F.T- Shifting Theorem- Convolution Theorem- Infinite Fourier Cosine Transform- Sine Transforms- Fourier Transform of Derivative- Finite F.T- Finite Sine- Cosine Transform- Inversion Formula.

TEXT BOOKS:

1. Trigonomerty- by S.Narayanan and T.K.M. Pillai.
2. Vector Calculus- by P.Duraipandian and Laxmi Duraipandian.
3. Differential Equations, Fourier & Laplace Transforms- by P.R. Vital.

SEMESTER – II

ALLIED CORE PHYSICS-II FOR MATHEMATICS

Instructional Hrs: 90

Objectives: 1. To understand the atomic configuration of an atom.

2. To study the Nuclear and Elementary particles.

3. To know the importance of Electronics and Digital Electronic circuits.

UNIT – I: 18 Hours

STRUCTURE OF ATOM: Sommerfeld's relativistic atom model – Vector atom model – spatial quantization concept of electron spin, Orbital and spin angular momentum and magnetic momentum of electron – quantum numbers of vector atom model – Pauli Exclusion Principle – electronic configuration of atoms.

UNIT – II: 18 Hours

WAVE MECHANICS: De Broglie's concept of matter waves - De Broglie wavelength - characteristics of the De Broglie's matter waves - calculation of de-Broglie wavelength of material particles like electrons - wave velocity and group velocity for de-Broglie waves - Experimental study of matter waves –G.P.Thomson's experiment - Heisenberg's uncertainty principle - Experimental verification: Diffraction of an electron beam through a slit.

UNIT – III: 18 Hours

NUCLEAR PHYSICS: Theories of nuclear composition: Proton – electron hypothesis - Proton – neutron hypothesis - characteristics of nuclear forces - models of nuclear structure: Liquid drop model - Shell model – The synchrocyclotron - Artificial transmutation of elements: Transmutation by α-particle - Transmutation by protons - Transmutation by deuterons – Transmutation by neutrons - Elementary particles.

UNIT – IV: 18 Hours

ELECTRONICS: Construction, characteristics of Zener diode - Applications of Zener diode – LED - photodiode - Stages in a regulated dc power supply - Full wave bridge rectifier – working efficiency - Ripple factor and Advantages of a full wave bridge rectifier - Filters – capacitor filter - choke filter - π-filters and RC filter – Voltage regulation – Zener – regulator circuit - Half – wave voltage Doubler circuit.

OP-AMP: Circuit symbol - polarity conventions and virtual ground or summing point of an operational amplifier - Operational amplifier as an adder, subtractor, differentiator, integrator and comparator.

UNIT – V: **18 Hours**

DIGITAL ELECTRONICS

Logic gates: Logic symbol – Action – Truth tables of AND, OR, NOT, NAND, NOR gates - DE Morgan's theorem and its proof - Laws in Boolean Algebra – Simplification of Boolean expressions – Logic diagram for Boolean expression – truth table construction – NAND and NOR gates as a universal gates – simplification of Boolean expression by K – map method.

Books for Study:

1. Modern physics – R. Murugesan
2. Principles of electronics – V.K. Mektha
3. Introduction to Integrated Electronics (Digital & Analog) – V.Vijayendran – S.Viswanathan Printers & Publications.

Books for Reference:

1. Atomic Physics – J.B.Rajam
2. Basic electronics – solid state – B.L. Theraja
3. Digital principles and application – Malvino and Leach

DEPARTMENT OF PHYSICS
COURSE: B.Sc. Physics
QUESTION PAPER PATTERN

(Major, Elective, Skilled Based Paper, Major Optional, Allied Optional Subjects)

Time: 3 Hours **Max. Mark :75**

SECTION – A (10 * 1 = 10 Marks)

Answer ALL questions
Question Numbers : 1 to 10
Type : Objective type questions
No. of questions from each unit : 2

SECTION – B (5 * 4 = 20 Marks)

Answer ALL questions
Question Numbers : 11 to 15
Type of answer : Either or type; short answer
No. of questions from each unit : 1
(At least two subdivisions in this section may be problem)

SECTION – C (5 * 9 = 45 Marks)

Answer ALL questions
Question Numbers : 16 to 20
Type of answer : Either or type; Essay type
No. of questions from each unit : 1

ALLIED CORE PHYSICS PARCTICALS

For B.Sc. Mathematics and Chemistry

SEMESTER – I & II / III & IV

Instructional Hrs: 90

Objectives: To get the practical knowledge of Mechanics, Properties of matter, Optics, Electricity and Magnetism.

Any Sixteen Experiments:

1. Young's modulus – Non uniform bending – Pin & Microscope.
2. Young's modulus – Uniform bending – Pin & Microscope.
3. Young's modulus – Static Cantilever.
4. Rigidity modulus – Static Torsion.
5. Rigidity modulus – Torsional Pendulum.
6. Y, n & σ – Searle's method.
7. Acceleration due to gravity – Compound Pendulum.
8. Specific heat of a liquid – Cooling Method.
9. Thermal conductivity – Lee's Disc method.
10. Joule's Calorimeter.
11. Sonometer – A. C. Frequency.
12. Spectrometer – Solid Prism.
13. Spectrometer – Hollow Prism.
14. Spectrometer – Grating – Minimum Deviation.
15. Newton's Rings – Radius of Curvature.
16. Air Wedge – Thickness of a wire.
17. Meter Bridge – Specific Resistance.
18. Meter Bridge – Temperature Co-efficient.
19. Potentiometer – Ammeter – Calibration.
20. Potentiometer – Low Range – Voltmeter – Calibration.
21. Moment of magnet – TanC Position.

22. Moment of magnet – Circuit Coil.

23. Characteristics of Junction & Zener Diodes.

24. Verification of Truth Tables of Logic Gates: AND, OR, NOT, NAND and NOR.

25. Verification of Demorgan’s theorems – digital ICs.

B.Sc. (Mathematics)
SEMESTER-III
MECHANICS

Instructional Hrs: 75

Objectives: 1. To study the forces acting at a point of a body which in at rest or in a uniform motion.

2. To study the direct and oblique impacts.

3. To study the path of a projectile and central orbits.

UNIT-I

15 Hrs

Forces acting at a point:

i) Parallelogram law – Triangle law – polygon law of forces -λ – μ theorem.
ii) Condition for equilibrium of coplanar forces.

Parallel Forces Moments and Couples

i) Composition of parallel forces (like and unlike)
ii) Moment of a force a) about a point b) about a line. Varignon's theorem on moments.
iii) Couples: Definition and theorems.

UNIT-II 15 Hrs

i) Friction: Laws of friction – Angle of friction – coefficient of friction – Cone of friction. Equilibrium of a body on a rough inclined plane with & without any force.
ii) Equilibrium of strings and chains.

UNIT-III 15 Hrs

The Laws of motion:
Newton's law of motion Work, Power, Energy.

Collision of Elastic Bodies: Impulsive forces

Impact of a smooth sphere on fixed smooth plane, Direct and oblique impact of two smooth spheres, Loss of Kinetic energy during direct and oblique impacts.

UNIT-IV 15 Hrs

Projectiles:

Path of a projectile, Greatest height, time of flight, Range on an inclined plane through the point of projection – Maximum range.

UNIT-V

15 Hrs

Central Orbits:

Radial and transverse Components of Velocity and acceleration, Areal Velocity, Central orbits, Differential equation of a central orbit in polar coordinates, circular and elliptic orbits, Kepler's laws of planetary motion.

Text Books:

Dr.M.K. Venkataraman : Statics
Dr.M.K. Venkataraman : Dynamics

B.Sc. (Mathematics)
SEMESTER-III
MATHEMATICAL STATISTICS

Instructional Hrs: 60

Objectives: 1. To prepare students for life-long learning using statistical skills.

2. To train students thoroughly in solving the problems.

3. To develop skills pertinent to the practice of mathematics to think creatively and to synthesis information.

UNIT-I 12 Hrs

Frequency distribution: Continuous – Discrete – Measures of central tendency: Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean – Measures of Dispersion: Range: Quartile deviations – Mean Deviations – Standard deviation and variance – Moments – Skewness and Kurtosis.

UNIT-II 12 Hrs

Probability: Definitions of various terms – Axiomatic Probability – Random event – Mathematical probability – Addition and Multiplication Laws of probability – Independent events – conditional probability – Baye's Theorem – Simple applications.

UNIT-III 12 Hrs

Random variables: Distribution functions – Discrete random variable – Continuous random variable – Joint probability Mass Function – Joint probability distribution Function – Marginal distribution function – Joint density function- The conditional function.

UNIT-IV 12 Hrs

Mathematical Expectation – Addition and Multiplication theorem – Covariance – Expectation and variance of Linear combination of random variable – Moment generating function – Characteristic function – Probability generating function.

UNIT-V 12 Hrs

Theoretical distributions: Binomial distribution – Poisson distribution – Rectangular distribution – Normal distribution – Gamma distribution – Beta distribution.

Text Book:

"Fundamentals of Mathematical Statistics". – By S.C.Gupta and V.K.Kapoor.

SEMESTER – III
ALLIED CORE CHEMISTRY FOR MATHS

UNIT-I (18 hours)

Inorganic cementing materials - Introduction -lime and its manufacture - gypsum plaster - cement - types of cement. - chemical composition - manufacture of Portland cement - chemical composition of Portland cement - setting and hardening of Portland cement. Heat of hydration of cement - special cement – concrete and RCC - decay of concrete.

Glass: Raw materials and manufacture – composition and uses of soda glass, pyrex glass and safety glass.

Plasticity of clay - white wares - glazing - applications - earthenware's and stoneware's – optical fibers.

UNIT – II (18 hours)

General survey of chemicals used in everyday life.

Cosmetics: Talcum powder, tooth pastes, shampoos, nail polish, perfumes, - possible hazards of cosmetics use.

Soaps: Raw materials – definition of soap – manufacture by continuous hot process – cleaning action of soap.

Detergents: Introduction – classification with one example each (manufacture not necessary) – difference between soaps and detergents.

Plastics, polythene, pvc, bakelite, polyesters, resins, and their applications.

Natural rubber-synthetic rubbers-vulcanization - definition and its applications.

UNIT – III (18 hours)

Colour chemicals used in food - soft drinks and its health hazards.

Food preservatives-Definition-Examples-Methods of preservation-Low and high temperature-

Fertilizers - classification of fertilizers - requisites of a good fertilizers - nitrogenous fertilizers (urea only) - phosphatic fertilizers(super phosphate of lime - triple super phosphate) - potassic fertilizers (white & red potash)- calcium ammonium nitrate (CAN), ill effects of fertilizers - effect of fertilizers on soil pH.

Micronutrients - role of micronutrients

UNIT – IV (18 hours)

Electrochemistry: Specific and equivalent conductance – effect of dilution – determination. Kohlarusch law and its application. Application of conductance measurements – solubility of sparingly soluble salt – conductometric titrations.

Galvanic cells: Reversible and irreversible cells. Standard cell – emf and its measurement – standard electrode potential – measurement using standard hydrogen electrode. Electrochemical series and its application – Nernst equation.

P^H and buffer in living system. Determination of P^H using quinhydrone electrode.

UNIT – V (18 hours)

Photochemistry: Laws (Statements only). Quantum yield and its determination. Fluorescence and Phosphorescence – Photosensitization – Chemiluminescence.

Phase rule: Definition & Statement and explanation of terms involved – one component system – water system –condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only).

References

1. Text book of "Principles of Inorganic Chemistry" – Puri & Sharma
2. Text book of "Principles of Physical Chemistry" – Puri & Sharma
3. Text book of "Fundamentals of Bio-Chemistry" – J.L. Jain
4. Text book of allied chemistry – Dr V.Veraiyan

QUESTION PAPER PATTERN
(MAJOR AND ALLIED CHEMISTRY)

Effective from 2006- 2007 and thereafter

SECTION - A

Questions for answer not exceeds one or two sentences with no choice
10. Questions – 2 each from every unit (10 x 1 = 10)

SECTION - B

Short answer questions of either / or type
5 question – one each from every unit
(Answer – about 60 words) (5 x 4 = 20)

SECTION - C

Essay – type or sub – division type questions of either / or type
5 questions – one each from every unit
(Answer – about 200 words) (5 x 9 = 45)

Total = 75

B.Sc. (Mathematics)
SEMESTER-IV
ANALYTICAL GEOMETRY

Instructional Hrs: 75

Objectives: 1. To study Chord, tangent and normal in polar, Co-ordinates of a conic.

2. To study the Coplanar, skew lines and shortest distance of straight lines.

3. To study the equation of tangent and Normal for sphere, cone, cylinder and coincoids.

Two dimensions (Polar Co-ordinates):

UNIT-I 15 Hrs

Polar equation of a conic, directrix, chord, tangent and normal.

Three dimensions:

UNIT-II 15 Hrs

Straight lines: Condition for two lines to intersect (or coplanar), Skew lines, Shortest distance. Equation of the shortest distance and length of the shortest distance for two lines.

UNIT-III 15 Hrs

Sphere: Equation of a sphere – Different forms. Plane section of a sphere. Great circle, Small circle, Intersection of two spheres. Equation of sphere through a circle. Tangent line and tangent plane. Equation of the tangent plane. Condition of tangency.

UNIT-IV Cone: 15 Hrs

Cone, Right circular cone: Equation of a cone. – Different forms, Right circular cone – Different forms. Enveloping cone of the of sphere. Equation of the enveloping cone of a sphere. Condition for general equation of second degree to representation cone. Tangent line and tangent plane. Equation of the tangent plane. Condition of tangency, normal.

Cylinder:

Cylinder Right circular cylinder. Equation of a cylinder Equation of right circular cylinder. Enveloping cylinder of a sphere. Equation of the enveloping cylinder of a sphere.

UNIT-V 15 Hrs

Conicoid :

Conicoid, central conicoid. Equation, shapes of the central conicoid. Intersection of a conicoid and a line. Tangent line and tangent plane. Equation of the tangent plane. Condition of tangency. Director sphere. Normal.

Text Books:

Analytical Geometry Part- I (Two Dimensions)
Analytical Geometry Part- II (Three Dimensions)
By T.K. Manicavachagom pillay.
T. Natarajan.

B.Sc. (Mathematics)
SEMESTER-IV
OPERATIONS RESEARCH

Instructional Hrs: 60

Objectives: 1. To know the basic concepts of Linear programming problem and solving by different methods.

2. To understand the transportation, assignment, sequencing problems and solving by different methods.

3. To study the critical path method and PERT calculations.

UNIT-I 12 Hrs

The Linear Programming Problem – Mathematical formulation – Graphical Solution – LPP – Cannonical and Standard forms of LPP – Simplex method – Big – M method – Two – phase Simplex method.

UNIT-II 12 Hrs

DUALITY IN LPP

Concept of duality – Duality and simplex method – Dual simplex method – Dual simplex Algorithm.

UNIT-III 12 Hrs

TRANSPORATATION PROBLEM

North West corner Rule – Matrix Minima method – Vogel's Approximation method – Moving towards optimality – MODI method – Assignment Problem – Hungarian Assignment method.

UNIT-IV 12 Hrs

SEQUENCING PROBLEMS

Problem with n jobs and two machines – Problems with n jobs and three machines – Problems with n jobs and m machines.

UNIT-V 12 Hrs

NETWORK SCHEDULING BY PERT/CPM

Basic concepts – constraints in network – Time calculation – Critical path method – PERT calculations.

Text Book:

Operations Research: Kanti Swarup, P.K. Gupta and ManMohan.

ALLIED CHEMISTRY PRACTICALS

Instructional Hrs: 90

Objectives:
1. To learn about the basic concepts of co-ordination compounds.
2. Understanding the basic knowledge in organic chemistry.
3. To understand the concepts of electron chemistry.

I VOLUMETRIC ANALYSIS (STANDARD SOLUTION IS TO BE GIVEN)

1. Acidimetry:

   a. Estimation of sodium carbonate.
   b. Estimation of bicarbonate and carbonate in a mixture using two indicators.

2. Permangonometry:

   a. Estimation of Ferrous iron

3. Dichrometry:

   a. Estimation of Ferrous iron using internal indicator.

4. Complexometry:

   a. Estimation of Zn
   b. Estimation of Mg

II Organic Chemistry

1. Detection of elements (N, S and Halogens)

2. To distinguish between aliphatic and aromatic saturated and unsaturated compounds.

3. Functional group tests for phenols, aromatic amines, acids, amides and carbohydrates.

B.Sc. (Mathematics)
SEMESTER-V
REAL ANALYSIS - I

Instructional Hrs: 90

Objectives : 1. To know some basic concepts of real number system.

2. To study the basic concepts of point set topology of real number system.

3. To study the limit and continuity concepts.

UNIT-I 18 Hrs

The real and complex number systems: the field axioms. The order axioms – Geometric representation of real numbers, Intervals – Integers – the unique factorization theorem for integers – Rational numbers – Irrational numbers upper bounds maximum element least upper bound – The completeness axiom – Some properties of the supremum - properties of the integers deduced from the completeness – axiom – The Archimedean property of the real number system – rational numbers with finite decimal approximations to real numbers – Infinite decimal representation of real numbers absolute values and the triangle – inequality – The Cauchy – Schwartz Inequality – Plus and minus infinity and the extended real number system.

UNIT-II 18 Hrs

Some Basic Notions of set Theory: Notations – Ordered Pairs, Cartesian product of two sets – Relations and functions – Further terminology concerning functions one – to –one functions and Inverses – Composite functions – sequences – Similar sets – Finite and infinite sets – Countable and Uncountable sets- Uncountability of the real number system – set algebra – Countable collections of countable sets.

UNIT-III 18 Hrs

Elements of point set Topology: Euclidean space R^n, open balls and open sets in R^n – The structure of open sets in R – Closed sets Adherent points- accumulation points closed sets and adherent points – The Bolzano – Weierstrass theorem – the Cantor intersection theorem – Lindelof covering theorem – The Heine Borel – Covering theorem – Compactness in R^n - Metric spaces – Point set Topology in metric spaces – Compact subsets of metric spaces – Boundary of a set.

UNIT-IV 18 Hrs

Limits and Continuity: Convergent sequences in a metric space – Cauchy sequence complete metric spaces – Limit of a function – Limits of vector valued functions – Continuous functions – Continuity of composite functions, Continuous vector valued functions.

UNIT-V 18 Hrs

Examples of continuous functions – Continuity and inverse images of open and closed sets – Functions Continuous on compact sets – Topological mappings Bolzano's theorem connectedness – Components of metric space –
Arcwise connectedness – Uniform continuity – Uniform continuity and compact sets – Fixed points theorem for contractions – Discontinuities of real valued functions – Monotonic functions.

Unit – I Chapter 1 (1.1 to 1.20) Unit – II Chapter 2 (2.1 to 2.15)
Unit – III Chapter 3 (3.1 to 3.16) Unit – IV Chapter 4(4.1 to 4.5, 4.7 to 4.9, 4.10)
Unit – V Chapter 4(4.11 to 4.23) only vector valued functions in 4.10.

Text Book:

Tom M.Apostol, Mathematical Analysis; Addision Wesley (1974) second Edition.

BOOK FOR REFERENCE:

1. Walter Rudin : Principles of Mathematical Analysis,
M.C. Graw Hll Book Company (1953)

B.Sc. (Mathematics)
SEMESTER-V
COMPLEX ANALYSIS - I

Instructional Hrs: 90

Objectives: 1. To introduce the students to the basic ideas and definitions of complex numbers.

2. To enable the students to understand the concepts of power series and simple transformations.

3. To know how to integrate the complex integral by using Cauchy's theorem and Cauchy's integral formula.

UNIT-I 18 Hrs

Complex differentiation – Limits and continuity – Differentiability – Analytic functions in a region – Necessary and sufficient conditions for differentiation – CR equations – Harmonic functions.

UNIT-II 18 Hrs

Power series – Absolute convergence – Abel's theorem – Cauchy Hadamard theorem – Circle and Radius of convergence – Analyticity of a sum function of a power series in a circle of convergence – Elementry functions exponential, logarithmic, Trigonometric, Hyperbolic functions.

UNIT-III 18 Hrs

Simple transformations $\omega=z+\alpha$, $\omega=\alpha z$, $\omega=1/z$ - Bilinear Transformations, invariance of cross ratio – Conformal and isogonal mapping - $\omega=e^z$, $\omega=\cos z$, $\omega=1/2(z+1/z)$, $\omega = z^2$.

UNIT-IV 18 Hrs

Complex integration – Simply and multiply connected region – Cauchy's theorem (using Goursats Lemma) – Cauchy's integral formula for the first derivative – Cauchy's formula for higher derivatives, Morera's theorem.

UNIT-V 18 Hrs

Results based on Cauchy's theorem – Cauchy's inequality – Liouville's theorem – Fundamental theorem of Algebra – Maximum modulus theorem – Gauss theorem on mean value of harmonic functions on a circle.

Unit – I: Chapter – 2 (Section 1 to 7)
Unit – II: Chapter – 3 (Section 4 to 6)
Unit – III: Chapter – 4 (Section 1 to 13, 15 to 20, 25)
Chapter – 5 (Section 3, 5, 9)
Unit – IV: Chapter – 6 (Section 1 to3, 6, 8, 11, 13 to 15)
Unit – II: Chapter – 6 (Section 17, 18, 27, 32)

Text Book:

Functions of a complex variable by J.N.Sharma.

Reference Books:

Complex Analysis by P.Duraipandian.
Complex Analysis by A.R.Vasishtha.
Complex Variables by E.G.Phillips.

B.Sc. (Mathematics)
SEMESTER-V
MODERN ALGEBRA PAPER – I

Instructional Hrs: 90

Objectives: At the conclusion of the course the student should have a basic understanding of Abstract Algebra in modern terminology. This includes:

1. Identify, create and use mappings, binary operations, isomorphism and permutations.
2. Identify and use the properties of the number system, in particular the integers.
3. Identify and use the properties of groups, rings, and fields.

UNIT-I 18 Hrs

Preliminary: Sets, Mappings, Relations and Binary operation, Groups, Definition and example – Basic properties. Subgroups – Normal Subgroups and quotient groups.

UNIT-II 18 Hrs

Homomorphisms - Automorphisms – Cayley's theorem – Permutation groups.

UNIT-III 18 Hrs

Rings: Definitions and examples – Basic properties – special classes of rings – integral domain and fields – Homomorphisms of rings.

UNIT-IV 18 Hrs

Ideals and quotient rings – Maximal and principal ideals. The field of quotients of an integral domain.

UNIT-V 18 Hrs

Euclidean rings – A particular Euclidean ring.

Text Book:

"Topics in Algebra" by I.N. Herstein.

B.Sc. (Mathematics)
SEMESTER-V
PROGRAMMING IN C

Instructional Hrs: 90

Objectives : 1. To know the concepts of C language.

2. To write simple programs using files, arrays, structure, unions, operators, decision making if statements etc.,

3. To write simple applications using C.

UNIT-I 18 Hrs

Constants, Variables and data types: Introduction – Character set – C tokens – keywords and identifiers – constants – variables – Data types – Declaration of variables – Assigning values to variable – defining symbolic constants.

Operators and Expression: Introduction – Arithmetic operators – relational operators – Logical operators – Assignment operators – Increment and decrement – operators – conditional operators – Bitwise operators – special operators – Arithmetic expressions – Evaluation of expressions – precedence of arithmetic operators – some computational problems - Type conversions in expressions – operator precedence and associatively – mathematical functions.

UNIT-II 18 Hrs

Managing input and output operators: Introduction – reading a character – writing a character – formatted inputformatted output – case studies – Decision making and Branching.

Introduction – decision making with IF statement – simple IF statement – The IF-ELSE statement – Nesting of IF..ELSE statement – The ELSE IF ladder – The SWITCH statement – The ?: operator - The GOTO statement – case studies – review questions and exercises. Decision making and looping: Introduction – The WHILE statement – The DO statement – The FOR statement – Jumps in loops.

UNIT-III 18 Hrs

Arrays: Introduction – one dimensional array – two dimensional arrays – initializing two dimensional arrays – multidimensional arrays.

Handing of character strings: Introduction – Declaring and initializing string variables – Reading strings from terminal – writing strings to screen – Arithmetic operations on characters – putting strings together – comparison of two strings – string handling functions table of strings.

User defined functions: Introduction – Need for user defined functions – A multi-function program – The form of C functions – Return values and their types – Calling a function – category of functions – No arguments and no return values – Arguments but to return values – Arguments with return values – Handling of non-interger functions – Nesting of functions – Recursion – Functions with arrays – The scope and life time of variables in functions – ANSI C functions – Points to remember.

UNIT-IV 18 Hrs

Structure and Unions: Introduction – Structure definition – giving values to members – structure initialization – comparisons of – structure variable – Arrays of structures – Arrays with in structure – structures with in structures – structures and functions – unions – size of structures Bit fields.

UNIT-V 18 Hrs

Pointers: Introduction – understanding pointers – Accessing the address of variable – Declaring and initializing pointers – Accessing a variable through its pointer – pointer expressions – pointer increments and scale factors – pointers and functions – pointers and structures – points on pointers.

File Managements in C:

Introduction – Defining and opening a file – Closing a file – Input/ Output operations on files.

Text Book:

Programming in ANSI C by E.Balagurusamy, Tata McGraw Hill Publishing Company Limited., 2nd Edition, 1989.

Reference Books:

1. Computer programming in C by V.Rajaraman, Prentice, Hall of India Private Limited, 1995.
2. The Spirit of ‘C’ – An introduction to modern programming by Henry Mullish and Herbert L.Cooper, Jaico Publishing House 1996.

B.Sc. (Mathematics)
SEMESTER-VI
REAL ANALYSIS - II

Instructional Hrs: 90
Objective : To make the students understand the concept and Notation of pure Mathematics in a Logical Fashion.

UNIT-I 18 Hrs

Definition of derivative – Derivatives and continuity – Algebra of derivatives – The chain rule – One sided derivatives and infinite derivatives – Functions with non-zero derivatives – Zero derivatives and local extrema – Rolle's Theorem – The mean value theorem for derivatives – Intermediate value theorem for derivatives – Taylor's formula with remainder – Derivatives of vector valued functions – partial derivatives.

UNIT-II 18 Hrs

Properties of monotonic functions – Functions of bounded variation – Total variation – Additive property of total variation – Total variation on [a,x] as a function of x – Functions of bounded variation expressed as the difference of increasing functions – Continuous functions of bounded variation.

UNIT-III 18 Hrs

Notation – The definition of the Riemann – Stieltjes integral – Linear properties – Integration by parts – Change of variable in a Riemann – Stieltjes integral – Reduction to a Riemann integral – Step functions as integrators.

Reduction of a Riemann Stieltjes integral to a finite sum – Euler's summation formula.

UNIT-IV 18 Hrs

Monotonically increasing operators. Upper and lower integrals – Additive and linear properties of upper and lower integrals – Riemann's condition – Comparison theorems – Integrators of bounded variation –Sufficient conditions for existence of Riemann Stieltjes integrals – Necessary conditions for existence of Riemann Stieltjes integrals Mean value theorem for Riemann Stieltjes integrals – The integral as a function of the interval – second fundamental theorem of integral calculus.

UNIT-V 18 Hrs

Change of variable in a Riemann interval – Second mean value theorem for Riemann integrals – Riemann Stieltjes integrals depending on a parameter – Differentiation under integral sign – Interchanging the order of integration.

Unit – I Chapter 5 (5.1 to 5.14)
Unit – II Chapter 6 (6.1 to 6.8)
Unit – III Chapter 7 (7.1 to 7.10)
Unit – IV Chapter 7 (7.11 to 7.20)
Unit – V Chapter 7 (7.21 to 7.25)

Text Book:

Mathematical Analysis, by Tom.M.Apostol, Narosa Publishing House, Chennai. (1974), 2nd edition.

Books for Reference:

Principles of Mathematical Analysis by Walter Rudin,
Mc Graw Hill Book Company (1953).

B.Sc. (Mathematics)
SEMESTER-VI
COMPLEX ANALYSIS - II

Instructional Hrs: 90

Objectives: 1. To study the Taylor's and Laurents expansion of an analytic function.

2. To study the Rouche's theorem and find the number of zeros of an equation in a particular region.

3. To study the evaluation of real definite integrals.

UNIT-I 18 Hrs

Taylor's series – Laurent's series – Zeros and singularities – Residues and Residue theorem.

UNIT-II 18 Hrs

Meromorphic functions – Theorem on number of zeros minus numbers of poles – Principles of arguments – Rouche's theorem – Theorem that a function which is meromorphic in the extended plane is a rational function.

UNIT-III 18 Hrs

Real definite integrals using calculus of residues – integration over unit circle – integrals with $-\infty$ and $+\infty$ as lower and upper bounds with integrands P(x) / Q(x) where the degree of Q (x) exceeds that of P (x) at least by 2.

UNIT-IV 18 Hrs

Integrals of type sin (ax) f (x), cos (ax) f(x) where a > 0 and f (z)$\rightarrow$ 0 as z$\rightarrow \infty$ where f (z) does not have a pole on the real axis and when f (z) has finite number of poles on real axis, Integrals of the type

$$\int \frac{x^{n-1}}{1+x}\,dx,\quad 0 < n < 1$$

UNIT-V 18 Hrs

Analytic continuation – Natural boundaries.

Text Book:

1.Functions of Complex Variables – J.N. Sharma

Books for Reference:

1. Functions of Complex Variables – E.G. Philips.
2. Complex Analysis - Choudhri
3. Complex Variables - P.Duraipandian

B.Sc. (Mathematics)
SEMESTER-VI
MODERN ALGEBRA PAPER – II

Instructional Hrs: 90

Objectives: At the conclusion of the course the student should have a basic understanding of Abstract Algebra in modern terminology. This includes:

1. Prove properties about number systems, mappings, groups, rings and fields.

2. Classify and prove that an algebraic structure in a certain type of group, ring, or field.

3. Apply the theorems, proof techniques and standard computations to solve problems.

UNIT-I 18 Hrs

Matrices: Algebraic operation – triangular –diagonal scalar and unit matrices Transpose, adjoint and inverse of a square matrix – symmetric and skew – symmetric Hermitian and Skew Hermitian matrices – orthogonal and unitary matrices – rank of a matrix – characteristic roots and characteristic vectors of a square matrix.

UNIT-II 18 Hrs

Vector space: Definition and examples – Basic properties – Linear independence – Bases – Dimensions.

UNIT-III 18 Hrs

Finite dimensional vector spaces – Homomorphisms of vector spaces – Inner product spaces.

UNIT-IV 18 Hrs

Linear transformations – Algebra of Linear transformations – characteristic roots – Matrices.

UNIT-V 18 Hrs

Matrices – Canonical form; Triangular form.

Text Book:

For Unit – I: “Modern Algebra” by R.Balakrishnan & M.Ramabhadran.
For Units – II, III, IV & V: “Topics in Algebra” by I.N.Herstein.

B.Sc. (Mathematics)
SEMESTER-VI
DISCRETE MATHEMATICAL STRUCTURES

Instructional Hrs: 90

Objectives: 1. To translate statements from a natural language into its symbolic structures in logic.
2. To perform the operations associated with sets, functions and relations.
3. The students will able to understand some basic properties of graphs.

UNIT-I 18 Hrs

Mathematical Logic:
Connective:

Negation – Conjunction – Disjunction – Standard formulas and Truth Tables – Conditional and Biconditional - Well formed formulas – Tautologies – Equivalence of formulas – Duality law – Tautological implications – Formulas with distinct Truth Tables – Functionally complete sets of connectives.

UNIT-II 18 Hrs

Other Connectives – Normal forms – Disjunctive normal forms – Conjunctive normal forms – principle disjunctive normal forms – Principle conjunctive normal forms – Ordering and uniqueness of normal forms.

UNIT-III 18 Hrs

Set theory:

Relations and ordering – relations – properties of binary relations in a set – Relation matrix and the graph of a relation – Partition and covering of a set – Equivalence relations – Compatibility relations – Composition of binary relations Partial ordering – Partial Ordered set – Representation and associated terminology Functions Inverse functions – Binary and n- ary operations – Characteristic function of a set.

UNIT-IV 18 Hrs

Lattices as partially ordered sets- Some Properties of Lattices – Lattices as Algebraic Systems – Sub lattices, Direct product, and Homomorphism.
Boolean Algebra – Sub algebra, Direct product and Homeomorphisms.

UNIT-V 18 Hrs

Basic Concepts of Graph Theory – paths, Reachability and connectedness - Matrix representation of graphs – Trees.

Text Book:

Discrete Mathematical Structures with application to Computer Science.
- J.P. Tremblay, R. Manohar.

B.Sc. (Mathematics)
SEMESTER-VI
NUMERICAL METHODS (SKILL BASED)

Instructional Hrs: 60

Objectives: 1. To find numerical approximations to the roots of an equation by Bisection method, False position, Newton – Raphson method.

2.To find numerical solution to a system of linear equation by Gauss elimination, Gauss-Siedal Iteration methods.

3.To find numerical solution of a differential equation by Euler's modified Euler's predictor. Corrector and Runge Kutta methods. Similarly for integrations by several methods.

UNIT-I 12 Hrs

Solution of Algebraic and transcendental Equations: Bisection method – Iteration method – Method of false position – Newton – Raphson method.

UNIT-II 12 Hrs

Interpolation: Errors in polynomial interpolation – Finite differences of polynomial – Newton's formula – Gauss's Central difference formula – Stirling's formula – Bessel's formula – Evrett's formula.

UNIT-III 12 Hrs

Numerical differentiation and Integration:

Numerical differentiation only – Numerical Integration – Trapezoidal rule – Simpson's 1/3 rule – Simpson's 3/8 rule – Romberg integration.

UNIT-IV 12 Hrs

Linear systems of Equations:

Solutions of Linear systems – Matrix inversion method – Gaussian elimination method – Modification of the Gauss method to compute the inverse – Method of Factorization – Iterative method – Gauss Seidal – Gauss Jacobi method.

UNIT-V 12 Hrs

Numerical solution of ordinary differential equations.

Solution by Taylor's series – Piccard's method of successive – Euler's method – Modified Euler's method – Range – Kutta methods – Predictor – Corrector methods – Adam's Moulton method – Milne's method.

Text Book:

"Introductory methods of Numerical Analysis"
S.S. Sastry, Second Edition – Prentice Hall of India.

Reference Book:

Numerical methods for Scientific and Engineering computation M.K. Jain, S.R.K. Iyengar, R.K. Jain. Wiley Eastern Limited.

COMPUTER PRACTICALS (SKILL BASED)

Instructional Hrs: 30

LIST OF PRACTICALS

1. Newton's Raphson method
2. Linear interpolation.
3. Gauss elimination
4. Jacobi iteration.
5. Gauss – Seidal iteration.
6. Euler's method
7. Taylor's series method
8. Modified Euler's method
9. Second – order Runge – Kutta method
10. Fourth – order Runge- Kutta method

Reference Book:

"Introductory methods of Numerical Analysis" by S.S. Sastry. Prentice Hall of India.

QUESTION PAPER PATTERN

CORE SUBJECTS IN B.Sc. MATHEMATICS,
ALLIED SUBJECTS IN B.Sc. Physics / Physics (CA) / Chemistry
MAX MARKS: 75

SECTION –A
MARKS: 5 X 2=10

UNIT – I 1 or 2
UNIT – II 3 or 4
UNIT – III 5 or 6
UNIT – IV 7 or 8
UNIT – V 9 or 10

SECTION –B
MARKS: 5 X 4=20

UNIT – I 11 or 12
UNIT – II 13 or 14
UNIT – III 15 or 16
UNIT – IV 17 or 18
UNIT – V 19 or 20

SECTION –C
MARKS: 5 X 9=45

UNIT – I 21 or 22
UNIT – II 23 or 24
UNIT – III 25 or 26
UNIT – IV 27 or 28
UNIT – V 29 or 30

In Section C Sub divisions may be numbered as a, b if necessary.

ALLIED OPTIONAL
For students of other than Mathematics Department
SEMESTER IV
BUSINESS MATHEMATICS

Instructional Hrs:90
Objectives:1. To know the various interest for business proble.
2. To study the various operations of sets and matrix.
3. To study the basic concepts of differentiation & Integration.

UNIT-I **18Hrs**

Simple and compound Interest – Sinking Funds – Annuities – Present values – Discounts.

UNIT-II **18Hrs**

Arithmetic and Geometric progressions – Simple applications to business problems.

SETS:- Operations of sets – Venn Diagrams and applications to business and Economic Problems.

UNIT-III **18Hrs**

MATRIX –Matrix operations – Addition, Substraction and Multiplications – Rank of matrix – Inverse of Matrix and solutions of simultaneous Linear Equations.

UNIT-IV **18Hrs**

Differentiation of simple functions - First order and Second order – Maxima Minima and application as rate measures – Cost function – supply and demand functions etc. and Managerial functions.

UNIT-V **18Hrs**

Elementary Integration (as reverse process of differentiation) simple substitution and partial fraction methods. Simple application to Economics.

Text Book:

Business Mathematics and Statistics - PA. Navanitham

QUESTION PAPER PATTERN

MAX MARKS:75

SECTION –A (5 X 2 = 10)

UNIT – I	1 or 2
UNIT- II	3 or 4
UNIT- III	5 or 6
UNIT- IV	7 or 8
UNIT – V	9 or 10

SECTION – B (5 X 4 = 20)

UNIT – I	11 or 12
UNIT- II	13 or 14
UNIT- III	15 or 16
UNIT- IV	17 or 18
UNIT – V	19 or 20

SECTION – C (5 X 9 = 45)

UNIT – I	21 or 22
UNIT- II	23 or 24
UNIT- III	25 or 26
UNIT- IV	27 or 28
UNIT – V	29 or 30

In Section C Sub divisions may be numbered as a, b if necessary

MAJOR OPTIONAL
For students of other than Mathematics Department
SEMESTER V
OPERATIONS RESEARCH

Instructional Hrs: 90

Objectives: 1. The students will able to create awareness about optimization in utilization of resources.

2. To enable the students to understand the nuances of project management through operations research models.

3. Should determine the constraint, which will allow to find a relationship between variables.

UNIT- I **18Hrs**

Operations Research - An overview - Meaning - Scope - Models - Limitations. Linear programming problem - Mathematical formulation - Graphical solution - General LPP - Canonical and standard forms of LPP- Simplex Method.

UNIT - II **18Hrs**

Transportation problem - North West Corner rule - Matrix minima method- Vogel's Approximation Method - Optimum solution - MODI method

Assignment Problems - Hungarian Assignment Method - Minimization and Maximization problems.

UNIT - III **18Hrs**

Game theory - Two - person zero - sum games - Maximin Minimax principle - Graphical solutions of 2xn and mx2 games - Dominance property

UNIT - IV **18Hrs**

Sequencing problems - Problems with n- jobs through two machines - n - jobs through k machines.

UNIT- V **18Hrs**

Network scheduling by PERT/ CPM - Network and Basic components - Rules of Network Construction - Critical path Analysis.

PERT - PERT Probability Consideration in PERT - PERT calculations - Distinction between PERT and CPM.

TEXT BOOK:

Operations Research by Kanti Swarap, P.K.Gupta, and Manmohan. Eleventh Revised Edition(2003)

UNIT I: Chapter 1: Sections 1.1 to 1.3, 1.8.
Chapter2: Sections 2.1, 2.2
Chapter3: Sections 3.1 to 3.5
Chapter4: Sections 4.1, 4.3

UNIT II: Chapter 10: Sections 10.1 to 10.3, 10.9 to 10.12
Chapter 11: Sections 11.1 to 11.4

UNIT III: Chapter 17 Sections 17.1 to 17.7

UNIT IV: Chapter 12 Sections 12.1 to 12.5

UNIT V: Chapter 21 Sections 21.1 to 21.7

QUESTION PAPER PATTERN

MAX. MARKS: 75

SECTION - A

Marks: 5 x 2 = 10

UNIT - I	1 OR 2
UNIT - II	3 OR 4
UNIT - III	5 OR 6
UNIT - IV	7 OR 8
UNIT - V	9 OR 10

SECTION - B

Marks: 5 x 4 = 20

UNIT - I	11 OR 12
UNIT - II	13 OR 14
UNIT - III	15 OR 16
UNIT - IV	17 OR 18
UNIT - V	19 OR 20

SECTION - C

Marks: 5 x 9 = 45

UNIT - I	21 OR 22
UNIT - II	23 OR 24
UNIT - III	25 OR 26
UNIT - IV	27 OR 28
UNIT - V	29 OR 30

In Section C Sub divisions may be numbered as a, b if necessary