PG & RESEARCH DEPARTMENT OF PHYSICS

B. Sc., PHYSICS

Programme Outcomes(POs)

1. Undergraduate students are to be imparted with a broad knowledge of fundamental Physics.

2. Undergraduate students are to be trained with basic and advanced experiments.

3. Undergraduate students are to be exposed to technical and creative skill based practicals.

4. Undergraduate students are to be imparted with computational physics with computer programming.

5. Undergraduate students are to be made to understand science with the environment.

Programme Specific Outcomes (PSO)

1. Enhancing the basic physics.

2. Realization of the impact of physics by experiments.

3. Awareness of technical and creative skills.

4. Development of thirst for higher learning programmes.

5. Enhanced social responsibility, internship, employability, ethics and Research orientation.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005
B.Sc., PHYSICS COURSE STRUCTURE UNDER CBCS SYSTEM
(For the candidates admitted from the year 2017-2018 onwards)

SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U16L1T1	6	3	3	25	75	100
	English - I	English - I	U17L1E1	6	3	3	25	75	100
	Core Course - I	Properties of Matter and Acoustics.	U16PH1C1	6	5	3	25	75	100
	Core Course - II	Core Practical – I	-	3	-	-	-	-	-
	First Allied Course – I	Allied Mathematics - I	U16MM1A4	5	3	3	25	75	100
	First Allied Course - II	Allied Mathematics - II	-	2	-	-	-	-	-
	Value Education	Value Education	U16VE1	2	2	3	25	75	100
				30	16				500
II	Tamil - II	Tamil – II	U16L2T2	6	3	3	25	75	100
	English – II	English– II	U17L2E2	6	3	3	25	75	100
	Core Course - II	Core Practical – 1	U16PH2C2P	3	4	3	25	75	100
	Core Course – III	Mechanics	U16PH2C3	6	5	3	25	75	100
	First Allied Course – II	Allied Mathematics - II	U16MM2A5	2	4	3	25	75	100
	First Allied Course – III	Allied Mathematics - III	U16MM2A6	5	3	3	25	75	100
	Environmental Studies	Environmental Studies	U16ES2	2	2	3	25	75	100
				30	24				700
III	Tamil - III	Tamil- III	U16L3T3	6	3	3	25	75	100
	English – III	English - III	U17L3E3	6	3	3	25	75	100
	Core Course – IV	Thermodynamics and Statistical physics	U16PH3C4	6	5	3	25	75	100
	Core Course – V	Core Practical - II	-	3	-	-	-	-	-
	Second Allied Course I	Allied Chemistry – I	U16CH3A1	5	3	3	25	75	100
	Second Allied Course II	Allied Chemistry – II	-	2	-	-	-	-	-
	Non Core Elective I	Laboratory Hygiene and Safety.	U16CH3N1	2	2	3	25	75	100
				30	16				500
IV	Tamil – IV	Tamil- IV	U16L4T4	6	3	3	25	75	100
	English – IV	English –IV	U17L4E4	6	3	3	25	75	100
	Core Course – V	Core Practical – II	U16PH4C5P	2	4	3	25	75	100
	Core Course - VI	Optics	U16PH4C6	5	5	3	25	75	100
	Second Allied Course II	Allied Chemistry – II Practical	U16CH4A2P	2	4	3	25	75	100
	Second Allied Course III	Allied Chemistry- III	U16CH4A3	5	3	3	25	75	100
	Skill Based Elective I	Desktop Publishing and Photoshop	U16PH4S1P	2	4	3	25	75	100
	Non Core Elective II	Water Pollution and Treatment	U16CH4N2	2	2	3	25	75	100
				30	28				800
V	Core Course – VII	Electricity and Magnetism	U16PH5C7	5	5	3	25	75	100
	Core Course – VIII	Atomic and Nuclear physics	U16PH5C8	5	4	3	25	75	100
	Core Course – IX	Quantum Mechanics	U16PH5C9	4	3	3	25	75	100
	Core Course - X	Core Practical III(General)	-	3	-	-	-	-	-
	Core Course - XI	Core Practical IV (Electronics)	-	3	-	-	-	-	-
	Elective Course I	Basic Electronics	U16PH5E1	4	4	3	25	75	100
	Skill Based Elective II	Electrical Wiring and Winding Lab	U16PH5S2P	2	4	3	25	75	100
	Skill Based Elective III	Programming in "C"	U16PH5S3P	2	4	3	25	75	100
	Soft Skill Development	Soft Skill Development	U16SSD3	2	2	3	25	75	100
				30	26				700
VI	Core Course - X	Core Practical III (General)	U16PH6C10P	3	4	3	25	75	100
	Core Course – XI	Core Practical IV (Electronics)	U16PH6C11P	3	5	3	25	75	100
	Core Course – XII	Solid State Physics	U16PH6C12	6	5	3	25	75	100
	Core Course – XIII	Spectroscopy and Laser Physics	U16PH6C13	6	5	3	25	75	100
	Elective Course - II	Digital Electronics and Microprocessor	U16PH6E2	5	5	3	25	75	100
	Elective Course - III	Numerical Methods	U16PH6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities			1				
		Gender Studies	U16EA4	1	1	3	25	75	100
				30	30				700
	TOTAL			180	140				3900

CHAIRMAN
BOARD OF STUDIES IN PHYSICS

CONTROLLER OF EXAMINATIONS

GOVERNMENT ARTS COLLEGE (AUTONOOUMS) KARUR-05
B.Sc., PHYSICS – I SEMESTER – CORE COURSE – I
(For the candidates admitted from the year 2016-2017 onwards)

PROPERTIES OF MATTER AND ACOUSTICS

Course Outcomes:

1. Analyze and comprehend regarding the strength of the solid materials of different size.
2. Differentiate between the streamline and turbulent flow of liquids and reason out the effects of liquids while flowing
3. Compare the viscosity and interfacial surface tension between the liquids
4. Understand the effect of gravitation on objects and understand the principle of rocket
5. Assimilate and analyze the motion in fluids and express the changes occurring in them in turns of boiling point and freezing point.

UNIT I: ELASTICITY

Elastic moduli - Poisson's ratio - Bending of a beam - Expression for bending moment - Depression of the loaded end of a Cantilever - Uniform - Non uniform bending - Theory - Experiment pin and microscope method - Work done in uniform bending – Non- uniform bending - Theory - Expression for couple per unit twist - Determination of rigidity modulus - Static torsion method with scale and telescope - Rigidity modulus by torsion pendulum with mass I shape girders

UNIT II: VISCOSITY

Stream line and Turbulent flow - Critical velocity – Poisseulle's formula - Determination of coefficient of viscosity by capillary flow method - Comparison of viscosities, Oswald's viscometer - Viscosity of a highly viscous liquid - Stoke's method - Variations of viscosity with temperature and pressure - Viscosity of gases - Mayer's formula for the rate of flow of a gas through a capillary tube - Rankine's method for the determination of viscosity of a gas.

UNIT III: SURFACE TENSION

Surface energy - Angle of contact and its determination - Excess of pressure inside curved - Cylindrical and spherical surfaces - Formation of drops - Experimental study of variation of surface tension with temperature - Drop weight method of determining surface tension and interfacial surface tension - Angle of contact of mercury - Quincke's method – Jaegar's method.

UNIT IV: OSMOSIS AND DIFFUSION

Osmosis: Vapour pressure osmosis - Experimental determination of osmotic pressure - Laws of osmotic pressure - Osmotic and vapour pressure of a solution - Determination of boiling point of solution and freezing point of solution - Diffusion: Fick's law – Experimental determination of diffusivity - Analogy between diffusion and thermal conduction – Applications.

UNIT V: ACOUSTICS

Theory of vibrations: Simple harmonic motion – Lissajous figures – Undamped vibration – Damped vibration –Forced vibration – Resonance and sharpness of resonance - Acoustics of buildings: Requisites of good acoustics – Sabine's reverberation formula - Ultrasonics: Properties – Production of ultrasonic waves: Magnetostriction method - Piezoelectric method – Applications.

BOOKS FOR STUDY

1. Brij Lal and N. Subramaniyam, *Properties of Matter* – Eurasia Publishing Housing, 1983
2. R. Murugesan, *Properties of Matter Properties of Matter and Acoustics* - S.Chand & Co, Delhi.
3. Brij Lal and Subramaniyam, *Text Book of Sound* – Vikas Publishing House, Delhi.
4. D.S. Mathur, *Elements of Properties of Matter*- S.Chand & Co, Delhi, 11th Edition, 2000.

BOOKS FOR REFERENCES:

1. P.E. Subramanian lyer, *Properties of Matter*.
2. L.P. Sharma and H.C. Saxena, *Oscillations, waves and sound*.

Sl. No.: [   ]   Subject Code: [U15MM3A1]

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., – I & III – SEMESTER - FIRST/SECOND ALLIED COURSE - I
(FOR CHEMISTRY AND PHYSICS MAJOR)
(For the candidates admitted from 2016-2017 onwards)

ALLIED MATHEMATICS-I

CALCULUS AND FOURIER SERIES

Course Outcomes

On successful completion of the course, the students will be able to
- Understand the nth derivative of second order differential equations by using Leibnitz theorem.
- Solve the problem by using the general properties of definite integrals.
- Acquire knowledge in solving the double and triple integrals on Cartesian Co-ordinates only.
- Understand the concept of Fourier series.

UNIT 1: Successive Differentiation – n^{th} derivative of standard functions (Derivation not needed) Simple problems only - Leibnitz theorem (proof not needed) and its applications. Curvature and radius of curvature in Cartesian Coordinates only (proof not needed) - Jacobians of two & three variables - Simple problem only.

UNIT 2: Integrating by parts – Bernoulli's formula - Evaluation of integrals of types 1.

$$\int \frac{dx}{a+b\,\cos\,x} \qquad 2.\int \frac{dx}{a+b\,\sin\,x} \qquad 3.\int \frac{(a\,\cos\,x+b\,\sin\,x+c)}{(p\,\cos\,x+q\,\sin\,x+r)}dx$$

UNIT 3: General Properties of Definite integrals - Evaluation of Definite integrals of type

$$1. \int_a^b \sqrt{(x-a)(x-b}dx \qquad 2. \int_a^b \frac{dx}{\sqrt{(x-a)(x-b}} \qquad 3. \int_a^b \sqrt{\frac{(x-a)}{(x-b)}}dx$$

Reduction formula when n is a positive integer for $1. \int_a^b e^{ax}x^n dx \qquad 2. \int_a^b \sin^n x dx$

$$3. \int_a^b \cos^n x dx \qquad 4. \int_0^{\pi/2} \cos^n x dx \qquad 5. \int_0^{\pi/2} \sin^n x dx \qquad 6. \int_0^{\pi/2} \sin^m x\,\cos^n x dx$$

(Proof not needed for 6 only).

UNIT 4: Evaluation of Double and Triple integral in simple cases – Changing the order and evaluating the Double integration. (Cartesian Coordinates only)

UNIT 5: Definition of Fourier series - Finding Fourier Co-efficients for a given periodic function with period 2π - Use of Odd and Even functions in evaluation of Fourier Co-efficients - Half range *sine* and *cosine* series.

TEXT BOOKS:
1. T. K. Manickavasagam Pillai, S. Narayanan, "Calculus Vol. I" S. Viswanathan Private Limited, 2011.
2. S. Arumugam, Issac and Somasundaram, "Trigonometry and Fourier series", New Gamma Publishers, Hosur, 1999.

CHAIRMAN   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – II - SEMESTER – CORE COURSE – II
(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL – I
(Any fifteen experiments)

Course Outcomes:
1. Perform experiments on any material to identify the strength the given objects
2. Deal with liquids based on their viscosity
3. Compare the thermal conductivity of solids
4. Analyze the heat capacity of liquids
5. Comment on the relation between frequency, length and tension of a stretched string under vibration.
6. Distinguish first order and second order spectrum

1. Young's Modulus - Non Uniform Bending - Pin and Microscope.

2. Young's Modulus - Uniform Bending - Optic lever method.

3. Young's Modulus - Cantilever Depression - Scale and Telescope Method.

4. Compound Pendulum - g and K.

5. Torsional Pendulum - Rigidity Modulus.

6. Surface tension and Interfacial surface tension of the given liquid - Drop weight method.

7. Sonometer - Verification of laws of transverse vibrations and determination of frequency of a tuning fork.

8. Sonometer – Determination of AC frequency.

9. Melde's Experiment.

10. Specific heat capacity of liquid - Newton's law of cooling.

11. Thermal Conductivity of bad conductor - Lee's disc method.

12. Spectrometer - refractive index of solid prism (A, D and μ).

13. Co-efficient of viscosity of the given liquid - Poiseuille's flow method.

14. Air Wedge -Thickness of wire and thickness of insulation.

15. Meter Bridge - Specific resistance.

16. P.O. Box - Temperature Co efficient of resistance.

17. Potentiometer - Calibration of low range voltmeter.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – II SEMESTER – CORE COURSE - III
(For the candidates admitted from the year 2016-2017 onwards)

MECHANICS

Course Outcomes:
1. Recognize the motion of the charged particle in electromagnetic field.
2. Describe conservation of energy, work, force, linear momentum and angular momentum
3. Learn the fundamentals of harmonic oscillator model, including damped and forced oscillators
4. Describe the production, detection of ultrasonic waves and applications
5. Explain the absorption and reflection of sound by various materials and describe the requirements for good architectural acoustics

UNIT – I: PROJECTILE
Newton's law of motion - Motion of two particles connected by a string passing over a smooth pulley - Atwood's machine - Motion of Body drawn along a smooth inclined plane - Motion of particle sliding down a rough inclined plane - Principle of conservation of energy - Freely falling body - Particle moving down a smooth inclined plane – laws of projectile - Path of a projectile in a parabola - Range of projectile on an inclined plane.

UNIT – II: DYNAMICS OF RIGID BODY
Moment of Inertia - Radius of gyration - Theorem of M.I - M.I. of circular disc, solid cylinder, hollow cylinder, solid sphere and hollow sphere - Centre of mass - Conservation of linear momentum - Relation between torque and angular momentum.

UNIT – III: CIRCULAR MOTION AND GRAVITATION
Circular motion: Expression for normal acceleration - Conical pendulum - Motion of a cyclist along a circular path - Motion of a railway carriage along a circular path - Motion of a particle in a smooth vertical axis - Motion of a suspended particle in a vertical axis - Gravitation: Newton's law of gravitation - Mass and density of earth - Kepler's law of planetary motion - Variation of 'g' with latitude, altitude and rotation of the earth.

UNIT – IV: STATICS
Friction - Laws of Friction - Co-efficient of friction - Equilibrium on a rough inclined plane - impulse - Collision - Oblique impact of smooth spheres - Direct impact of two smooth spheres - Loss of K.E. due to direct impact and oblique impact of two smooth spheres.

UNIT – V: HYDROSTATICS AND HYDRODYNAMICS
Centre of pressure - Centre of pressure of a rectangular lamina and triangular lamina - Atmospheric pressure - Variation of atmospheric pressure with altitude - Equation of continuity - Energy of liquid - Euler's equation - Forces against a dam – Bernoulli's theorem - Applications: Torricelli's theorem – Venturi meter - Pitot's tube.

BOOKS FOR STUDY:
1. R. Murugesan, *Mechanics and mathematical physics* - S.Chand & Company. (Third Revised Edition 2008).
2. Narayanamoorthy & Vishwanathan, *Text book of dynamics*.

BOOKS FOR REFERENCE:
1. D.S. Mathur *"Mechanics"*.
2. R. Murugesan *"Mechanics"* S.Chand & Company.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., – II & IV – SEMESTER – FIRST / SECOND ALLIED COURSE - II
(FOR CHEMISTRY AND PHYSICS MAJOR)
(For the candidates admitted from 2016 - 2017 onwards)

ALLIED MATHEMATICS –II

ALGEBRA, 3D AND TRIGNOMETRY

Course Outcomes

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

- Demonstrate algebraic facility with algebraic topics including linear, exponential, logarithmic and trigonometric functions.

- Ability to work solving the system of linear equations and compute the eigen values and eigen vectors.
- Ability to work some trigonometric expansions, hyperbolic and inverse hyperbolic functions.

UNIT 1:   Binomial, Exponential and Logarithmic series (Formulae only) - Summation and approximation related problems.

UNIT 2:   Symmetric, Skew symmetric, Orthogonal, Hermitian, Skew Hermitian and Unitary matrices - Characteristic equation, Eigen values, Eigen vectors - Cayley Hamilton's theorem(proof not needed)
- Simple problems only.

UNIT 3:   Equation of a Sphere -Tangent plane - Plane section of a sphere - Finding the center and radius of the circle of intersection (simple problems only).

UNIT 4:   Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer) - Expansion of $\operatorname{Sin}^{n}\theta$, $\cos^{n}\theta$, $\cos^{n}\theta\sin^{n}\theta$ in a series of sines and cosines of multiples of θ (θ- given in radians) - Expansion of $\operatorname{Sin}\theta$, $\operatorname{Cos}\theta$ and $\tan\theta$ in terms of powers (only problems in all the above)

UNIT 5:   Euler's formula for $e^{i\theta}$ - Definition of Hyperbolic functions – Formulae involving Hyperbolic functions - Relation between Hyperbolic and circular functions - Expansion of sinhx, coshx, tanhx in powers of x – Seperation of real and imaginary part of $\sin(x+iy)$, $\cos(x+iy)$, $\tan(x+iy)$, $\sinh(x+iy)$, $\cosh(x+iy)$, $\tanh(x+iy)$, $\sinh^{-1}(x+iy)$, $\cosh^{-1}(x+iy)$, $\tanh^{-1}(x+iy)$.

TEXT BOOKS:
1. T. K. Manickavasagam Pillai, T. Natarajan, K. S. Ganapathy, "Algebra Vol. I" S. Viswanathan Private Limited, Chennai-2010.
2. S. Narayanan, T. K. Manickavasagam Pillai, "Trigonometry" S. Viswanathan Private Limited and Vijay Nicole Imprints Pvt. Ltd.2010.
3. T. K. Manickavasagam Pillai, "Analytical Geometry of 3D and Vector Calculus", New Gamma Publishing House, 2010.

REFERENCE BOOKS:
1. Arumugam & Isaac, "Analytical geometry of 3D and Integral calculus", New Gamma Publications, 2011.
2. Arumugam & Isaac, "Trigonometry and Fourier series", New Gamma Publications.

CHAIRMAN   COE

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B. Sc.,–II & IV SEMESTER – FIRST/SECOND ALLIED COURSE - III
(FOR CHEMISTRY & PHYSICS MAJOR)
(For the candidates admitted from 2016-2017 onwards)

ALLIED MATHEMATICS – III

DIFFERENTIAL EQUATIONS, LAPLACE TRANSFORMS AND VECTOR CALCULUS

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

- Solving the ODE of first order and higher degree by using various methods
- Forming the PDE by using different approach and also solving the PDE by various methods
- Solving the second order ODE with constant coefficient using Laplace transform
- Knowing the concept of vector differentiation and integration

UNIT 1: Ordinary Differential Equations of first Order but of Higher Degree – Equation solvable for x, solvable for y, solvable for dy/dx, Clairaut's form (Simple case Only) – Linear Equations with constant coefficients – Finding Particular Integral in the case of e^{kx} Sin(kx), Cos(kx) (Where k is constant), X^k Where k is a positive integer, and e^{kx} f(x) Where f(x) is any function of x (only problems in all the above – no proof needed for any formula)

UNIT 2: Formation of Partial Differential Equations by Eliminating arbitrary constants and by Elimination of arbitrary functions – Definition of general, particular and complete solutions – singular integrals (geometrical meaning not required) – Solution of First Order Equations in standard forms: f(p, q) =0, f(y, p, q) = 0, f(z, p, q) = 0, $f_1(x, p) = f_2(y, q)$, z = xp + yq + f(p, q) – (only problems in all the above – Proof not needed for any formula)

UNIT 3: Laplace Transforms: Definition – L f(t), L (cos (at)), L (sin (at)), L (sin t^n) Where n is a positive integer, Basic theorems in Laplace Transforms (Formula only) – [e^{at} f(t)], L[e^{at} cos bt], L[e^{at} sin bt] – Inverse Laplace Transforms related to the above standard forms solving second order ODE with constant co-efficient using Laplace transforms.

UNIT 4: Vector Differentiation –Velocity and Acceleration vectors- Gradient of the vectors – Directional derivatives –Unit normal Vector – Tangent plane –Divergence – Curl – Solenoidal and irrotational vectors –Double operators – Properties connecting grad., div and curl of a vector.

UNIT 5: Vector Integration –Line Integral – Conservative force field - Scalar potential field – Work done by a force – Surface integral – (Statement, Application and verification only) - Gauss Divergence theorem, Stoke's theorem, Green's theorem.

TEXT BOOKS:
1. S. Narayanan, "Differential Equation", S. Viswanathan Publishers,1996.
2. S. Narayanan, T. K. Manickavasagam Pillai, "Calculus Vol. II", S. Viswanathan Pvt. Limited, 2003.
3. M. L. Khanna, " Differential Calculus", Jaiprakashnath and Co., Meerut -2004.

REFERENCE BOOK:
1. Kandasamy, Thilagavathy, Gunavathy, "Allied Mathematics Vol. II", S. Chand & Company Limited, New Delhi 2010.

CHAIRMAN   COE

Sl. No.: [ ]   Subject Code: | U15PH3C4 |

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-
05 B.Sc., PHYSICS - III SEMSTER – CORE COURSE - IV
(For the candidates admitted from the year 2016-2017 onwards)**

THERMODYNAMICS AND STATISTICAL PHYSICS

Course Outcomes:
1. Differentiate the terms heat and temperature and measure temperature using thermometer and convert one scale of temperature to another scale.
2. Understand specific heat capacity of gas and the different theories on specific heat capacity
3. Differentiate between principles and methods to produce low temperature, liquefy air, helium and hydrogen
4. Define postulates of kinetic theory of gases and arrive at theorem of equipartition of energy and derive Van der Waal"s equation.
5. Define different thermal processes and understand laws of thermodynamics and identify its outcomes

UNIT – I: HEAT

Specific heat of solids - Dulong and Petit's law - Specific heat capacities of gases - Determination of C_v by Joly's differential steam calorimeter - Determination of C_p by Regnault's method - Isothermal and adiabatic processes - Reversible and irreversible processes - Carnot's theorem - Proof - Internal combustion engines (Otto and diesel engines)
- Cycle of operation - Indicator diagram – Efficiency.

UNIT – II: THERMODYNAMICS

Entropy - Change of entropy in adiabatic process - Change of entropy in reversible and irreversible process - T-S diagram - Entropy of perfect gas - Kelvin's thermodynamic scale of temperature - Maxwell's thermo dynamical relations - Applications: Clausius-Clapeyron's equations – T-dS equations.

UNIT –III: CONDUCTION AND RADIATION

Conduction: Coefficient of thermal conductivity - Thermal conductivity of a good and bad conductor: Forbe's method - Lee's disc method - Radiation: Stefan's law - Determination of Stefan's constant (laboratory method) - Disappearing filament Optical Pyrometer - Solar constant - Temperature of the Sun - Water flow pyroheliometer - Water Stir Pyroheliometer.

UNIT – IV: LOW TEMPERATURE PHYSICS

Joule - Kelvin effect - Temperature of inversion - Porous plug experiment - Liquefication of gases (principle of regenerative cooling) - Adiabatic expansion process - Adiabatic demagnetization - Refrigerating mechanism - Liquefication of air
- Linde's process - Liquefication of Helium.

UNIT – V: STATISTICAL PHYSICS

Phase space - Statistical equilibrium - Micro and Macro states - Ensembles - Statistics of Particles - M.B - B.E - F.D statistics - Application of B.E statistics to photon gases - F.D statistics - Application of F.D. statistics to electron gas - Comparison of three statistics.

BOOKS FOR STUDY:
1. Brij Lal, Dr. N. Subrahmaniyam and P.S. Hemine, *Heat,Thermodynamics and Statistical Physics* - S.Chand & Co., New Delhi., 2010.
2. J.B. Rajam and C.L.Arora, *Heat and thermodynamics* - S.Chand &Co., New Delhi.
3. R. Murugesan, *Thermal Physics* - 1st Edition 2002.

BOOKS FOR REFERENCE:
1. D.S. Mathur, *Heat and thermodynamics* - S.Chand & Co., 2002.
2. Agarwal, Singhal, Sathyaprakash, *Heat and thermodynamics*.
3. H.C. Saxena and Agarwal *Thermal physics*.

CHAIRMAN – BOS   **COE**

[GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05

B.SC., - I & III - SEMESTER – FIRST / SECOND ALLIED COURSE - I
(For the candidates admitted from the year 2016-2017 onwards)
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)

ALLIED CHEMISTRY – I
Course Outcomes (CO)
On the successful completion of the course, the students will be able to

1. CO1   To estimate the chemical elements by using volumetric analysis.
2. CO2   To practice laboratory hygiene, first aid procedures and to identify water hardness.
3. CO3   To learn the various kinds of atomic models.
4. CO4   To follow the IUPAC nomenclature of Organic Compound, Polymer and Nuclear Chemistry.

UNIT- I   Volumetric Analysis : Standard Solution – Primary and Secondary Standards – Types of titrimetric reactions – reactions – redox- precipitation– EDTA titrations.
Laboratory Hygiene and Safety: Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous Chemicals.
Simple first aid procedure for Accidents: Acid in eye, alkali in eye, acid burns, alkali burns, poisoning, inhalation of gases, cut by glasses and heat burns.
Water: Soft water – Temporary and permanent handness of water - Treatment of water for municipal purpose – Softening of water - Definition – Softening by Zeolite Process.

UNIT –II   Atomic Structure: Rutherford's Nuclear Atom –Bohr's Model of the atom- Bohr Sommerfeld theory - Distribution of electrons –Paulis Exclusion Principle- Hund's Rule of maximum Multiplicity – Aufbau Principle.

UNIT –III   Radioactivity – Definition – types of radioactive rays – Nuclear energy – mass efect binding energy – magic Numbers – Nuclear fission – Nuclear fusion – difference between Nuclear fission and fusion – Nuclear power plant Isotopes, Isobars and Isotones.

UNIT –IV   Classification and Nomenclature of organic of Compounds classification of organic compounds – functional groups – homologous series. IUPAC System of nomenclature of simple and complex aliphatic compounds.

UNIT –V   Polymerisation – Introduction –Preparation of Polymers – addition polymers Polyethylene, PVC and Teflon) – Condensation polymers (nylon – 6,6 and terylene) Synthetic rubbers(BUNA, Butyl rubber and SBR) Thermoplastic and thermosetting plastics.

Books Recommended:

1.R.Gopalan, P.S.Subramanian, K.Rengarajan – Elements of Analytical Chemistry Sultan chand & Sons New Delhi -2

2.B.K.Sharma "Industrial Chemistry" GOEL Publishing House Meerut.

3.P.L.Soni and Mohan Katyal "Text Book of inorganic Chemistry 20th Received Edition, Sultan Chand 1992.

4.U.N.Dash-Nuclear Chemistry Sultan Chand & Sons New Delhi-2.

5.I.L.Finar-Organic Chemistry. The fundamental Principles ELBS English Lan.

6.P.L.Soni H.M.Chawla "Text Book of organic chemistry sultan chand and sons New Delhi-2.

7.B.S.Bahl and Arun Bahl 'Advanced Organice chemistry S.Chand and Co New Delhi.

CHAIRMAN – BOS   **COE**

Sl. No.: [ ]   Subject Code: [U16CH3N1]

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., PHYSICS - III SEMESTER – NON-CORE ELECTIVE - I
(For the candidates admitted from the year 2016-2017 onwards)

LABORATORY HYGIENE AND SAFETY

Course Outcomes (CO)

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

- To learn laboratory safety measure
- To gain the knowledge of storage and handling of chemicals
- To understand the safe limits vapour concentration
- To learn the first aid techniques
- To know the effects of poison and antidotes

Unit I

Laboratory safety measures: Lab discipline – Cleanliness and watchfulness. Maintenance of worktable, washing sink, fume hoods, fuel gas systems, instruments and equipments – Requirements for a safe laboratory. Use of apron overcoats, goggles gloves, etc.,

Unit II

Storage and handling of chemicals – carcinogenic chemicals – Handling of ethers – toxic and poisonous chemicals.

Unit III

Safe limits of vapour concentrations – Waste disposal and fume disposal – Precautions for avoiding accidents – cleansing agents – cleaning the apparatus and Instruments.

Unit IV

First – Aid techniques: Burns and Damages due to organic substances, acids, alkalis, burns in the eye- Inhalation of toxic vapours, hazardous chemicals, bromine, phenol and hot objects.

Unit V

Poisons and antidotes – Rules to avoid poisoning – emetics- universal antidote – treatments for specific poisons. Harmful effects of X-rays and lasers.

Books Recommended:

1. V.Gopalan, P.S.Subramaniam and K.Rengarajan, Elements of Analytical Chemistry.

2. Jayashree Ghosh, A Text Book of Pharmacetuical Chemistry.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05
B.Sc., PHYSICS – IV - SEMSTER – CORE COURSE –V
(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL – II

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

1. Conduct experiments on stretching wires and to identify its the strength

2. Deal with liquids based on their viscosity

3. Identify information such as purity and concentration of a solution

4.   Demonstrate the effect of magnetic field on current carrying conductors

5. Calibrate a voltmeter or ammeter

6. Analyze the effects of refractive index of a medium using optical instruments

(Any fifteen experiments)

1. Co-efficient of viscosity of the given liquid - Poiseuille's flow method.

2. Temperature of coefficient of resistance - Potentiometer.

3. Specific heat capacity of a liquid - Joule's calorimeter.

4. Emissive power of a surface - spherical calorimeter.

5. Convex Lens - f, R and μ.

6. Potentiometer - calibration of ammeter.

7. Figure of merit [current sensitivity and voltage sensitivity] - mirror galvanometer.

8. Refractive index of liquid prism - spectrometer.

9. Zener controlled voltage regulator.

10. Rigidity modulus - Static Torsion.

11. Surface Tension – Capillary rise method.

12. Resistance and specific resistance - Carey foster bridge.

13. Verification of Logic Gates - AND, OR, NOT, NAND and NOR using Ic's.

14. Transistor characteristics - CE Configuration.

15. Rigidity modulus of the given wire - Torsion pendulum with equal masses.

16. Spectrometer - i-d curve.

17. Spectrometer - Grating - Minimum Deviation method.

18. Determination of rigidity modulus of the given rod - Static torsion.

19. Kundt's tube - Young's modulus of the material of the rod.

20. Stoke's method - Viscosity of highly viscous liquid.

21. CRO study of wave forms - Lissajou's figures - frequency determination.

22. Newton's rings - Radius of curvature of a convex lens.

CHAIRMAN-BOS

COE

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS - IV SEMSTER – CORE COURSE VI
(For the candidates admitted from the year 2016-2017
onwards) OPTICS

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

1. Geometrical optics describes light propagation in terms of rays
2. Analyze the effects of refractive index of a medium using optics
3. Predict the curvature of a transparent medium
4. Understand the emergence of quantum concept
5. Distinguish between different photodevices and working

UNIT – I: GEOMETRICAL OPTICS

Aberrations - Spherical aberration in lens - Methods of reducing spherical aberration - Coma - Astigmatism - Curvature of the field - Distortion - Chromatic aberration in a lens - Achromatic lenses - Dispersive power: Achromatism in prism - Deviation without dispersion - Dispersion without deviation.

UNIT – II: INTERFERENCE

Introduction - Coherence - Conditions for interference - Interference in thin films - Interference due to reflected light - Conditions for Maxima and Minima - Air wedge - Testing the planeness of a surface – Michelson's interferometer - Principle - Construction - Working - Types of fringes - Applications – Determination of λ and dλ - Thickness of a thin transparent sheet - Fabry perot interferometer.

UNIT – III: DIFFRACTION AND OPTICAL INSTRUMENT

Fresnel's diffraction - Diffraction at a Circular aperture and Straight edge - Fraunhofer diffraction - Diffraction at a single slit - Double slit - N slits (diffraction grating) - Normal incident - Absent and overlapping spectra of diffraction grating - Huygens eye piece - Rayleigh's criterion - Resolving power of a telescope, microscope and grating.

UNIT – IV: POLARISATION

Huygen's explanation of double refraction in uniaxial crystals - Quarter wave plate and half wave plate - Babinet's compensator - Production and detection of plane elliptically and circularly polarised light – Nicol prism - Optical activity - Laurent's half shade polarimeter.

UNIT – V: QUANTUM OPTICS

Fibre optic system - Advantages over copper cable communication - Principle - Acceptance angle and Numerical aperture - Types of Optical fibre: Based on materials, refractive index and modes of propagation - Fibre optic communication system - Introduction to Non-linear optics - Linear medium - Nonlinear polarisation - Second harmonic generation.

BOOKS FOR STUDY:

1. N. Subramaniyam and Brij Lal, *A Text book of optics*, Revised by M.N. Avadhanullah, - S.Chand & Co., 2004.
2. R. Murugesan and Kiruthiga Sivaprasath, *Optics and spectroscopy* - S.Chand & Co., NewDelhi 2006.

BOOKS FOR REFERENCE:

1. P.K. Chakrabarthi, *Geometrical and Physical Optics* - New Central Book Agency, Kolkata., 2005.
2. D.R. Khanna and H.R. Gulati, *Optics* - R.Chand & Co., New Delhi. 1979.
3. Ajoy chatak, *Optics* – TMH, Delhi.

CHAIRMAN-BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.SC., - II & IV - SEMESTER – FIRST ALLIED COURSE - I
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)
(For the candidates admitted from the year 2016-2017 onwards)

ALLIED CHEMISTRY – II PRACTICAL

Course Outcomes (Co)
On the successful completion of the course, the students will be able to

1. CO1   Estimate the chemical elements by using volumetric analysis.
2. CO2   Practice laboratory hygiene, first aid procedures and to identify water hardness.
3. CO3   Analyze the importance of reactions of organic compounds.

1. Acidimetry and alkalimetry

a) Strong acid Versus Strong Base b) Weak acid Versus Strong base.
c) Determination of hardness of water

2. Permangnometry

a) Estimation of ferrous sulphate using $KMnO_4$

b) Estimation of oxalic acid using $KMnO_4$

3. Iodometry

a) Estimation of copper using thiosulphate b) Estimation of $K_2Cr_2O_7$
c) Estimation of $KMnO_4$ using thiosulphate

II ORGANIC ANALUSIS

A study of reactions of the following organic compounds:

1. Carbohydate

2. Amide

3. Aldehyde

4. Acid

5. Amine

6. Phenol

The students may be trained to perform the specific reactions

like Test for element (nitrogen only) Aliphatic or aromatic,
Saturated or unsaturated and functional group present and record their observation.

CHAIRMAN – BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05

B.SC., - II & IV - SEMESTER – FIRST / SECOND ALLIED COURSE – III
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)
(For the candidates admitted from the year 2016-2017 onwards)

ALLIED CHEMISTRY – III

Course Outcomes (Co)

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

1. CO1　Analyse the theory of molecular orbital and sulphur compounds and the theory of coordination compounds can be understood.
2. CO2　Review the optical properties of organic compounds and to analyse the aromaticity of hydrocarbons. Understand the chemistry of pesticides and chromatography principles.
3. CO3　Understand the various forms of catalysis and to predict knowledge of surface chemistry.

UNIT- I (15 Hours)

1.1 Molecular Orbital theory: Basic concepts of M.O. theory – Bonding and antibonding orbitals – Bond order – Application of M.O. theory to H_2, He_2, N_2, O_2 and F_2 molecules.

1.2 Compounds of Sulphur: Preparation, Properties, uses and structures of per acids of sulphur and sodium thiosulphate.

UNIT –II (15 hours)

Co-Ordination Chemistry: Nomenclature of Monomuclear complexes – Werner, Sidgwick theories Chelation – Application and structure of EDTA – Biological role of haemoglbin and chlorophyll (Elementary idea)

UNIT –III (15 hours)

3.1 Electron displacement Effect: Inductive Effect – Definition – Relative strengths of aliphatic mono carboxylic acids and aliphatic amines

3.2 Stereoisomerism: Optical isomerism – Optical activity – Chirality – Lactic and tartaric acids-racemic mixture-resolution. Geometrical isomerism – Maleic and fumaric acids.

UNIT –IV (15 hours)

4.1 Aromatic Hydrocarbons: Structure, Stability, Resonance and aromaticity of benzene. Electrophilic substitution reactions in benzene with mechanism – nitration, sulphonation, halogenation. Naphthalene – isolation, synthesis and properties

4.2 Organic halogen Compounds: Chemistry of Chloroform, Carbon tetra chloride, DDT, BHC and Freon -1,2

UNIT –V (15 hours)

5.1 Surface Chemistry: Emulsions, Gels – Definition, Preparation, Properties and applications.

5.2 Chromatography – Column, paper and thin layer chromatography.

5.3 Catalysis-types, Mechanisms and industrial applications.

Books Recommended:
1. P.L. Soni and Mohan katyal "Text Book of Inorganic Chemistry" 20th Revised Edition, Sultan Chand 1992.
2. R.B. Puri and L.R. Sharma "Principles of Inorganic Chemistry" Sultan Chand 1989.
3. R.D. Madan "Modern inorganic Chemistry" S. Chand and Co.Pvt. Ltd., 1987 New Delhi. 4. P.L. Soni "Text Book of Inorganic Chemistry" ,Sultan Chand and Co., New Delhi.
5. B.S. Bahl and ArunBahl 'Advanced Organic Chemistry' S.Chand and New Delhi.
6. B.R. Puri, L.R.SharmaamdmadanS.Pathania 'Principles of Physical Chemistry' ShobanLalNagin Chand and Co., Delhi.
7. P.L Soni "Text Book of Physical Chemistry" Sultan Chand and Co., New Delhi.

CHAIRMAN – BOS 　　　　　　　　　　　　　　　　　　　　**COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 5
B.Sc., PHYSICS-IV- SEMESTER-SKILL BASED ELECTIVE-I
(For the candidates admitted from the year 2016-2017 onwards)

DESKTOP PUBLISHING AND PHOTOSHOP - LAB

Course Outcomes:

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

1. Compile word document independently along with usage of access for generation of multiple end user.
2. Preparation of spread sheet and working with multiple data.
3. Hands on experience with MS Office.
4. To designing e books, brochures, visiting cards and other printing works.
5. Adobe pagemaker can take print in printing press

UNIT – I: MS OFFICE
MS Word:
Document formatting options – Tables, Bullets and Numbering – Font - Alignment Paragraph Formatting – Insert Picture, Clipart, Shapes and WordArt – Header and Footer - Text Box – Page Layout - Mail Merge – Spelling and Grammar.
MS Excel:
Cell Formatting Options – Formulae and Functions – Charts – Sort - Filter - Grouping.
MS Power Point:
Creating Slide show by using Animation Technique – Slide Master – Clip Art - Picture Editing.
UNIT – II: PAGE MAKER
Creating new Filets – Entering text – Defining Style – Saving files – Creating Frame – Inserting and removing pages – Adding shapes – Creating frame
– Creating header and footer – Using story Editor – Developing long documents – Using color – Printing – Practice on Multilingual software like INDIC .
UNIT – III: COREL DRAW
Drawing-lines, Shapes – Inserting Pictures, Objects, Tables, Templates – Use of Pick tools, Zoom tools, Free hand tool, Square tool, Rectangle tool, Text tool, Fill tool - Fonts used in designing of monograms, Logos, Posters, Stickers, Greeting cards, Wedding cards, Visiting cards - Adding special effects - Exporting drawings - Outlining and filling objects – Inserting symbols and Clip arts – Exporting file – Use features of Corel draw to create artistic characters and shapes.
UNIT – IV: PHOTOSHOP
The File menu - The Tools menu - Drawing lines and shapes – Formats - Photo Editing / Inserting setting up - Introduction of layers – The interface managing Palettes - Working with layers – WEB and WEB GALLERY using internet explorer – Image ready - Creating Animations and presentations - Different color scheme Palettes Digital Imaging - Working with different Palettes – Image adjustment options – Labels - Auto labels, Auto contrasts – Curves - Color balance – Posterize - Variations – Preparing the file and work area - Creating three Dimensional effects using Layers – Working with different tools – Editing Selections – Creating images and giving special effects using Filters – Using layer styles – Produce an image by mixing two or more different images using layer - Tips and tricks in Photoshop.
UNIT – V: PRINT PUBLISHING USING PAGEMAKER
Designing layouts for print - Integrating media elements on print layouts and saving files for print compatibility – Understanding how images are formed - Image file formats and their properties - Creating illustrations for visual media with good understanding of colors and formats – Designing for different visual medium and create professional images for print Advertising media.

CHAIRMAN-BOS   **COE**

Sl. No.: [   ]   Subject Code: U16CH3N1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., PHYSICS - III SEMESTER – NON-CORE ELECTIVE - I
(For the candidates admitted from the year 2016-2017 onwards)
LABORATORY HYGIENE AND SAFETY

Course Outcomes (CO)

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

- To study the types of water pollution
- To gain the knowledge of hardness of water and its types
- To study the BOD and COD and TDS of water
- To study the effect and treatment of tannery effluents
- To understand the characterization of industrial sffluents

Unit I

Water Pollution – Definition types of water pollution – Sources of water pollution – sewage and domestic wastes – their harmful effects – brief idea about sewage treatment – ISO parametas for drinking water.

Unit II

Hardness of water and its types – disadvantages of hard water – softening – Zeolite process – ion exchange process – Water borne diseases like cholera, typhoid, Stone formation – Causes and remedies.

Unit III

Chemical analysis of water – hardness (Ca&Mg) using EDTA method. Total Solids, dissolved oxygen, BOD, COD and TDS.

Unit IV

 Origin, Characteristics. Effects and treatment of effluents from Tannery and distillery industries.

Unit V

 Characteristics of Effluents from textile processing industry. Primary – treatment – Secondary reatment – Oxidation ponds and anaerobe digestion, Tertiary treatment – Evaporation, Reverse osmosis.

CHAIRMAN-BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05 B.Sc.,
PHYSICS – V SEMESTER – CORE COURSE – VII
(For the candidates admitted from the year 2016-2017 onwards)

ELECTRICITY AND MAGNETISM

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

1. Distinguish between magnetic effect of electric current and electromagnetic induction and to apply the related laws in appropriate circumstances.
2. Possess adequate knowledge to analyze electrical circuits using Kirchoff's laws.
3. Compare the principles and working of different types of galvanometer.
4. Distinguish between different types of magnetic materials and different kinds of magnetism manifested in materials.
5. Analyze magnetic properties of a ferromagnetic solid by analyzing or recording its hysteresis behavior.

UNIT – I: ELECTROSTATICS

Coulomb's law - Electric field due to a point charge - Electric potential - Relation between electric field and electric potential - Electric potential energy – Poisson's and Laplace equations - Flux of the electric field - Gauss's theorem - Electric field due to a uniformly charged solid sphere and a uniform infinite solid Cylindrical charge - Energy stored per unit volume in the medium surrounding the Charged conductor - Electrometer: Quadrant Electrometer - Measurement of ionization current - Attractive disc electrometer.

UNIT – II: MAGNETO STATICS

Definitions: Magnetic Induction - Magnetization - Magnetic susceptibility - Magnetic permeability - Relation between B, H and M - Properties of diamagnetic, paramagnetic and ferromagnetic materials - Soft and Hard Magnetic Materials – B- H curve for a magnetic material by magnetometer method – Ballistic Galvanometer method
- Hysteresis curve - Retentivity and Coercivity – Calculation of energy loss in a hysteresis cycle.

UNIT – III: MAGNETIC EFFECT OF CURRENT:

Ampere's Circuital Law - Biot-Savert's law - Magnetic induction at a point due to a straight conductor carrying current - Force between two parallel current carrying conductors - Fleming's left hand rule – Moving coil Galvanometer - Theory and working of moving coil ballistic galvanometer - Damping correction - Comparison of two capacitors using B.G.

UNIT–IV:CURRENT ELECTRICITY AND THERMO ELECTRICITY:

Current and Current Density - Expression for Current Density - Ohm's Law and Electrical Conductivity - Kirchhoff's Laws - Carey Foster's Bridge – Potentiometer - Calibration of Ammeter - Low range and High range voltmeter - Laws of Thermo e.m.f - Definition and Determination of Peltier and Thomson co- efficients - Application of thermodynamics to a thermocouple - Measurement of thermo e.m.f of a thermo couple using potentiometer - Thermo-electric Diagrams-Uses.

UNIT – V: ELECTROMAGNETIC INDUCTION:

Faraday's Laws of electromagnetic Induction - Self Inductance of a long solenoid
- Determination of Self Inductance by Rayleigh's Method - Mutual Inductance - Mutual Inductance between two Coaxial Solenoids - Experimental determination of Mutual Inductance by direct method - Coefficient of Coupling - Eddy Current - Uses - Earth Inductor - flux meter - Grassot Flux meter.

BOOKS FOR STUDY:

1. R. Murugesan, *Electricity and Magnetism* - S. Chand & Company Ltd, New Delhi, 2008.

BOOKS FOR REFERENCES:

1. Brij Lal and Subramaniyan, *Electricity and Magnetism* - Ratan Pragashan Publishing Ltd, Agra, 2000.
2. Shegal Chopra and Shegal, *Electricity and Magnetism* - S. Chand & Sons, New Delhi, 1987.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR-05
B.Sc., PHYSICS- V SEMESTER- CORE COURSE –VIII
(For the candidates admitted from the year 2016 - 2017 onwards)

ATOMIC AND NUCLER PHYSICS

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

1. Familiar use of X-rays is checking for the parts of bodies.
2. Vector atom model deals with total angular momentum of an atom.
3. Spectral lines are used to identify atoms and molecules
4. Understand different atom models
5. To discuss the elementary particles

UNIT – I: POSITVE RAY AND X-RAY ANALYSIS
Positive Rays: Positive ray properties - e/m of positive rays by Thomson's parabola method - Determination of critical potential – Frank- Hertz's Experiment - X-rays: Introduction – Properties - Production of X- rays - Continuous and Characteristic X-rays - Scattering of X-rays - Compton Scattering.

UNIT – II: VECTOR ATOM MODEL
Various quantum numbers - Coupling Schemes - Pauli's exclusion principle - Electronics configuration of elements - Periodic classification of elements - Magnetic dipole moment of electron due to orbital and spin motion - Bohr Magneton - Stern and Gerlach Experiment.

UNIT - III: FINE STRUCTURE OF SPECTRAL LINES
Special terms and notations - Selection rules - Intensity rule and interval rule - Fine structure of sodium D lines - Alkali spectra - spectrum of helium - Zeeman effect - Larmor's theorem - Debye's quantum mechanical explanation of the normal Zeeman effect - Anomalous Zeeman effect - Theoretical explanation Lande's g-factor - Explanation of splitting of D_1 and D_2 lines of sodium - Paschen back effect and Stark effect.

UNIT - IV: BASIC NUCLEAR PROPERTIES
Nuclear size, charge, mass, spin, isotopes, isomers - Nuclear Magnetic dipole moment - Electric quadrapole moment - Mass defect - Binding energy
- Packing fraction - Nuclear forces - Nuclear models: Shell model - Liquid drop model – Particle accelerators: Cyclotron - Betatron – Detectors: Wilson's cloud chamber - Bubble chamber.

UNIT-V: NUCLEAR REACTIONS AND ELEMENTARY PARTICLES
Q-value of nuclear reaction – Chain reaction - Nuclear reaction cross section - Nuclear Fission - Energy released in fission - Nuclear fusion – Nuclear breeder reactor - Source of Solar energy - Plasma - Magnetic bottle - Plasma confinement - Elementary particles: Baryons - Leptons - Mesons - Strange particles.

BOOKS FOR STUDY:
1. S. Murugesan, *Modern Physics* - S.Chand & Co.
2. J.B Rajam, *Modern Physics* - S. Chand & Co.

BOOKS FOR REFERENCES:
1. G. Jose Robin and A. Ubald Raj, *Modern Physics* - Indira Publications.
2. N. Subramaniam and Brij Lal, *Atomic And Nuclear Physics*.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., PHYSICS – V SEMESTER – CORE COURSE – IX
(For the candidates admitted from the year 2016-2017 onwards)

QUANTUM MECHANICS AND RELATIVITY

Course Outcomes:
On the successful completion of the course, the students will be able to
1. Calculate the de Broglie Wavelength of a wave associated with the particle
2. Describe wave function and derive the Schrödinger equation and interpret the wave function and eigen value equation.
3. Describe the different types of potentials and derive the solutions of Schrödinger equation for the same .
4. Analyze the effects of Relativity by Newtonian and Special Theory of Relativity
5. Explain the gravitational effect using General theory of Relativity

UNIT – I: FOUNDATIONS OF QUANTUM MECHANICS

Inadequacy of classical mechanics - Black body radiation - Characteristics of black body radiation - Kirchoff's law - Wien's law - Stefan's law - Rayleigh Jean's law - Energy distribution in black body - Planck's hypothesis and Radiation law - Planck's quantum theory - Properties of photons – Laws of photo electric effect - Experiment - Einstein's photo electric equation.

UNIT – II: MATTER WAVES

de-Broglie's waves - de-Broglie wavelength - de-Broglie concept of stationary orbits - de-Broglie wave length associated with electron accelerated through a potential difference - Velocity of de-Broglie waves - Properties of matter waves - Experimental verification of matter waves: G.P. Thomson experiment - Davisson and Germer's experiment.

UNIT – III: DEVELOPMENT OF QUANTUM MECHANICS

Concept of wave function and its physical significance - Wave velocity and group velocity - Relation between phase velocity and group velocity for a Non-Relativistic free particle - Normalized and orthogonal wave functions - Expansion theorem - Conditions satisfied by wave function - Heisenberg's uncertainty principle – Experiment: Heisenberg's Gamma ray microscope – Applications: Minimum energy of a harmonic oscillator – Energy of a particle in one dimensional box.

UNIT – IV: OPERATOR FORMALISM & SCHROEDINGER'S WAVE EQUATION

Operators associated with different observables - Expectation values of dynamical quantities - Eigen values and Eigen functions - Orbital angular momentum operator and their commutation rules – Time- Independent wave equation – Time-dependent wave equation – Application: Particle in one dimensional box.

UNIT – V: RELATIVITY

Frame of reference - Galilean transformation equations - Michelson - Morley experiment - Postulates of special theory of relativity - Lorentz transformation equations - Length contraction - Time dilation - Addition of velocities - Variation of mass with velocity - Mass-Energy equivalence - Relation between relativistic momentum and energy.

BOOKS FOR STUDY:
1. Satya Prakash, *Quantum Mechanics*, Pragati Prakashan, Meerut, 2008.
2. A.K. Saxena, *Principles of Modern Physics*, Narosa publishing house, New Delhi, 2005.
3. R. Murugesan & Kiruthiga Sivaprasath, *Modern physics*, S.chand publishing, New Delhi.

BOOKS FOR REFERENCE:
1. H.S. Mani and G.K. Metha, *Introduction to Modern physics*, EWP, New Delhi, LCSE, 1988.
2. B.L. Theraja, *Modern physics*, S. Chand publishing, New Delhi.
3. V. Rajendran and A. Marikani, *Applied Physics for Engineers*, TMH, New Delhi, 2001.

CHAIRMAN-BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.SC., PHYSICS -V SEMESTER – ELECTIVE COURSE-I
(For the candidates admitted from the year 2016-2017 onwards)

BASIC ELECTRONICS

Course Outcomes:

On the successful completion of the course, the students will be able to
1. Have a basic knowledge of semiconductor diode, rectifier and filter circuits.
2. Understand transistor biasing and working principle of Amplifiers.
3. Explain feedback and oscillatory circuits.
4. Comprehend the operation and characteristics of FET, MOSFET, SCR and UJT.
5. An idea about operational amplifiers.

UNIT-I SEMICONDUCTOR AND PN JUNCTION DIODE

Types of semiconductors - Intrinsic semiconductors - Extrinsic semiconductors - Forward and reverse biased PN junction – V-I characteristics - Half wave and full wave rectifiers – Ripple factor – Efficiency - Zener diode – Reverse characteristic of Zener diode – Zener diode shunt regulator – Clipping circuits – Positive clipper – Negative clipper – Clamping circuits – Voltage doubler.

UNIT-II SPECIAL PURPOSE DIODES AND OPTOELECTRONIC DEVICES

Tunnel diode – V-I Characteristics – Parameters – Varactor diode – PIN diode – Light Emitting diode – Multicolour LEDs - Seven segment display - Liquid crystal display – Advantages and disadvantages of LCDs – Photo diode – Photoconductive cell – Photovoltaic cell
–Laser diode.

UNIT –III BIJUNCTION TRANSISTOR AND FIELD EFFECT TRANSISTOR

BJT symbols – BJT biasing - Operation of npn and pnp transistors – Transistor configurations – Characteristics of a transistor in CB and CE configurations - Current gain in CB and CE configurations – Operating point – Load line – Voltage divider bias – h-parameters of a transistor – Hybrid equivalent circuit for CE transistor – FET and its types – JFET – Operation – Characteristics – Parameters – Types of MOSFET (qualitative analysis only)

UNIT-IV AMPLIFIERS AND OSCILLATORS

Classification of amplifiers: RC coupled amplifier – Frequency response of RC coupled amplifier – Power amplifiers – Class-A amplifier – Class-B amplifier - Class-B push-pull amplifier – Efficiency – Feedback amplifiers – Principle of feedback amplifier – Advantages and disadvantages of negative feedback.
Classification of oscillators: Barkhausen criterion - Hartley oscillator – Colpitt's oscillator – Phase shift oscillator – Wien bridge oscillator.

UNIT-V OPERATIONAL AMPLIFIER

Ideal OP-AMP – Inverting amplifier – Non-inverting amplifier – Differential amplifier – CMRR – d.c characteristics: Input bias current – Input offset current – Input offset voltage – a.c characteristics – Frequency response – Slew rate - Applications: Adder – Subtractor – Differentiator - Integrator – Comparators – Schmitt trigger – Weighted resistor DAC - R- 2R ladder DAC – Counter type ADC.

BOOKS FOR STUDY:

1. Dr. R.S. Sedha, *A text book of applied electronics* - Revised edition 2013 - S.CHAND Publishing, New Delhi **(For Unit-I to Unit-IV).**
2. D. Roy Choudhury, *Linear Integrated circuits* - Fourth edition, New age international (P) Limited, New Delhi **(For Unit-V).**

BOOKS FOR REFERENCE:

1. Bhargava Kulshreshta and Gupta, *Basic Electronics and linear circuits* - DTMH 1989.
2. Beboo and Burrows, *Integrated circuit and Semiconductor devices* - TMHG 1989.
3. Mill Man Halkias, *Integrated Electronics* - TMH.

CHAIRMAN-BOS   **COE**

Sl. No:

Subject Code: U16PH5S2P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 5
B.Sc., PHYSICS-V- SEMESTER - SKILL BASED ELECTIVE - II
(For the candidates admitted from the year 2016-2017 onwards)

ELECTRIC WIRING AND WINDING LAB

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

1. To check the electrical power supply from the switch
2. It shows the components of the circuits as simple shapes
3. Electrical wiring is the electrical distribution through the wires
4. Wiring diagram gives information about the relative position on the device

1. Control of a lamp through 2-way switch.

2. Two lamps dimmer

3. Series control of 2-lamps.

4. Parallel control of 2-lamps.

5. Control of 2-lamps with two switches and a 3-pin wall socket.

6. Service connections.

7. Estimations for a small pump house.

8. Estimation for a small house PVC WIRING.

9. Street lighting.

10. Estimation for SAW mill.

11. Designing of winding of a Transformer(230V, 12V-0-12V with 5 Amps)

12. Winding of a no volt coil for a direct OV line starter.

13. Winding of a fluorescent lamp choke.

14. End connections of a 3-phase induction motor.

15. Winding of a Rotor and stator of a single phase induction motor.

CHAIRMAN-BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 5
B.Sc., PHYSICS-V- SEMESTER - SKILL BASED ELECTIVE - III
(For the candidates admitted from the year 2016-2017 onwards)

PROGRAMMING IN C LANGUAGE (LAB)

Course Outcomes:
On the successful completion of the course, the students will be able to
1. Compile word document independently along with usage of access for generation of multiple end user.
2. Preparation of spread sheet and working with multiple data.
3. Execution of simple "C" Programme.
4. Assimilate knowledge on working of internet.
5. Hands on experience with MS Office and "C" Programming.

UNIT – I: BASIC STRUCTURE OF C PROGRAMMING

Programs - Constants - Variables - Data type – Declaration of variables - Defining symbolic constants, operators and expression - Reading a character - Writing a character - Formatted input and output statements.

UNIT – II: CONTROL STATEMENTS

Simple if, If-Else, Else-if ladder - Switching statements - Goes to statement - Break and continue looping - While-do - For statements.

UNIT – III: ARRAYS

User defined functions - String functions - Streat, strcpy, strlen, strcmp - Elementary idea.

UNIT–IV: DEVELOPMENT OF ALGORITHM, FLOW CHART AND PROGRAM FOR THE FOLLOWING.

1. Average of a set of numbers.
2. Area of a triangle.
3. Sorting a set of numbers in ascending and descending order.
4. Summing the series of numbers.
5. Solving the series of numbers.

UNIT –V: DEVELOPMENT OF ALGORITHM, FLOW CHART AND PROGRAM FOR THE FOLLOWING

1. Solving quadratic equation.
2. Finding factorial using recursion.
3. Calculating mean and variance.
4. Adding, subtracting and multiplication of matrices.
5. Determination of roots by Newton – Raphson method.
6. Numerical integration by Trapezoidal rule /Simpson's rule.

BOOKS FOR STUDY:

1. E. Balagurusamy, *Programming in ANSI "C"*.

BOOKS FOR REFERENCE:

1. Yashavant P. Kanitkar, *Let Us C* - Fifth Edition.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – VI - SEMESTER – CORE COURSE – X
(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL-III
(Any fifteen Experiments)

Course Outcomes:
1. Determine the wavelength of Mercury spectrum
2. Estimate the specific resistance of any conductor
3. Calibrate a High range voltmeter
4. Analyze frequency response of RLC circuit.
5. Explain diffraction pattern and calculate dispersive power of the grating

1. Koenig's Method - Uniform Bending-Young's Modulus.

2. Spectrometer - i-i' Curve.

3. Spectrometer - Small angle Prism.

4. Spectrometer - Grating Normal Incidence Method - dispersive power.

5. Spectrometer - dispersive power of a given prism.

6. Spectrometer - Cauchy's Constant.

7. Spectrometer - Fraunhofer lines.

8. Spectrometer - Hartmann's Formula.

9. Earth Inductor using B.G - Determination of B and H.

10. Field along the axis of a coil - Determination of M.

11. M and H absolute determination using deflection and vibration magnetometer.

12. Potentiometer - EMF of a thermocouple.

13. Potentiometer - Temperature Coefficient of thermistor.

14. Potentiometer - High range voltmeter calibration.

15. Band gap energy of Thermistor.

16. Ballistic Galvanometer - Figure of merit.

17. B.G. Absolute capacity of condenser.

18. B.G. - Absolute Self Inductance.

19. B.G - Absolute Mutual Inductance.

20. B.G – Comparison of Mutual Inductance.

21. Anderson's bridge - Self Inductance of a coil.

22. He – Ne Laser experiments.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – VI - SEMESTER-CORE COURSE - XI
(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL - IV

Course Outcomes:
1. Explain the characteristics and applications of operational amplifier
2. Verify FET and its characteristics
3. Design circuits using universal gates such as NAND and NOR
4. Design and verify truth tables of adder, subtractor.
5. Write mnemonics for simple applications using 8085 microprocessor

SECTION-A
ELECTRONICS
(Any twelve experiments)

1. Series and Parallel resonance circuits.

2. Single Stage - RC coupled amplifier - Transistor.

3. Emitter follower - Frequency response.

4. IC regulated power supply.

5. Hartley oscillator using transistor.

6. Colpitt's Oscillator using transistor.

7. Phase Shift Oscillator using IC 741.

8. Astable Multivibrator using IC 741.

9. FET Characteristics.

10. FET amplifier.

11. RS and JK Flip Flops using gates.

12. Universal Gates NAND/NOR and basic gates from universal gates.

13. Adder and Subtractor – Op-Amp.

14. Verification of De Morgan's theorems and Boolean Algebra.

15. OP-Amp: Integrator and Differentiator.

SECTION-B

MICROPROCESSOR 8085

(Any three experiments)

16. 8-bit Addition and Subtraction.

17. 8-bit Multiplication and Division.

18. Ascending and Descending Order.

19. Largest and Smallest number in an Array.

20. Conversion from decimal to hexadecimal system.

21. Conversion from hexadecimal to decimal system.

22. Sum of N numbers.

CHAIRMAN-BOS　　　　　　　　　　　　　　　　　　　　**COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – VI SEMESTER – CORE COURSE - XII
(For the candidates admitted from the year 2016-2017 onwards)
SOLID STATE PHYSICS

Course Outcomes:
On the successful completion of the course, the students will be able to
1. Knowledge of symmetry elements and Bravais lattice
2. Distinguish between crystalline and amorphous solids, calculate atomic packing factor for Cubic structure.
3. Analyze the success and failure of free electron theory, the origin of band gap and Hall effect.
4. Distinguish between different types of magnetic materials
5. Explore different kinds of polarization and its effects on dielectric constant and refractive index.

UNIT - I CRYSTAL STRUCTURE AND CHEMICAL BONDING
Elementary concepts of crystals: Distinction between crystalline and amorphous solids – isotropic and anisotropic crystals with examples - Space lattice - Primitive and Unit cell – Bravais lattices – Crystal directions - Miller indices – Separation between lattice planes in a cubic crystal - Crystal structure: SC, BCC, FCC and HCP - Bonding in solids-primary bonds – Ionic, covalent and metallic bonds – secondary bonds – Van-der Waals' bond and hydrogen bond.

UNIT II - CRYSTALLOGRAPHY
X ray Spectrum - Moseley's law - diffraction of X-rays by crystals - Bragg's law – Bragg's Diffractometer - Determination of Crystal structure: Debye Scherrer method – evaluation of lattice parameter 'a' for a simple cubic structure - Laue's method, rotating crystal method - Reciprocal lattice.

UNIT III – ELECTRONS IN SOLIDS
Free electron theory : Drude Lorentz theory – Expression for current density - Ohm's law – Electrical conductivity – Temperature dependence of electrical conductivity in metals - Thermal conductivity – Wide-Mann and Franz Law – Hall effect – Hall voltage and Hall coefficient – Mobility and Hall angle – Importance of Hall effect – Experimental determination of Hall coefficient.

UNIT IV MAGNETIC AND SUPERCONDUCTING MATERIALS
Magnetism – Langevin's theory of dia and paramagnetism – Wien's theory of ferromagnetism – Quantum theory of ferromagnetism (Heisenberg's model) – Domain theory of ferromagnetism- ferromagnetic hysteresis - Ferrites - Antiferromagnetic materials. Superconductors: Properties – Critical temperature – Isotopic effect – Meissner effect – Type I and Type II superconductors.

UNIT V - DIELECTRICS AND FERROELECTRICS
Basic definitions of dielectrics – Types of polarization – Effect of frequency and temperature on polarization – Local field (internal field) – Clausius–Mosotti relation - Dielectric loss and breakdown – Determination of Dielectric constant - Ferroelectric crystals - Ferroelectric domains - Hysteresis effect in a ferroelectric material.

BOOKS FOR STUDY:
1. C. Kittel, *Introduction to Solid State Physics* - John Wiley (2004).
2. M. Arumugam, *Material Science* - Anuradha Agencies, (2004).
3. G. Vijayakumari, *Engineering Physics* –Vikas Publications.

BOOKS FOR REFERENCE:
1. Raghavan, *Materials Science and Engineering* - (2004).
2. Azaroff, *Introduction to Solids* - (2004).
3. A.J. Deckker, *Solid State Physics* - (2004).

CHAIRMAN-BOS 　　　　　　　　　　　　　　　　　　　　　　 **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS–VI SEMESTER- CORE COURSE-XIII
(For the candidates admitted from the year 2016-2017 onwards)

SPECTROSCOPY AND LASER PHYSICS

Course Outcomes:
1. Microwave spectroscopy to detect dynamic phenomena of material
2. Analyse the prerequisite in a molecule towards its Rotational and vibrational activity
3. Raman spectroscopy gives the detailed information about chemical structure and molecular interaction
4. Understand the laser action phenomena, properties and applications of laser

UNIT-I: MICROWAVE SPECTROSCOPY

Introduction to EM radiation-The rotation of molecules, its spectra, Diatomic Molecules-Rigid diatomic molecule - Intensities of spectral lines-Effect of isotopic substitution - Non rigid, rotator its spectrum - Techniques and Instrumentation of Microwave Spectroscopy.

UNIT-II : VIBRATIONAL SPECTROSCOPY

Vibrating diatomic molecule - Energy of diatomic molecule - Harmonic Oscillator - Vibrating rotator -Vibration - Rotation Spectrum of CO - Vibrations of poly atomic molecules Fundamental vibrations and their symmetry - Overtones and combinations of frequencies - Sample preparation – Techniques and instrumentation.

UNIT-III: RAMAN SPECTROSCOPY

Classical theory of Raman Effect - Pure rotational Raman Spectra - Linear, Symmetric top molecules - Pure Vibrational Raman spectra - Raman activity of vibration - Rule of mutual exclusion Principle - Polarization of light and the Raman Effect - Techniques and instrumentation.

UNIT-IV: LASER PHYSICS

Introduction to Lasers - Laser principle – characteristics of laser – Einstein's co-efficient derivation - Population Inversion - Pumping action - Optical resonator- Types of lasers - Nd-YAG, CO_2, Dye laser and semiconductor laser - Homo - Junction and Hetro junction.

UNIT-V: APPLICATIONS OF LASER

Material processing: welding, drilling, cutting and heat treatment – Holography - construction and Reconstruction - Applications- Difference between Holography and Photography – LIDAR - Medical Application: Endoscope

BOOKS FOR STUDY:
     1. C.N. Banwell, *Fundamental of molecular spectroscopy,* - Tata Mcgraw Hill Publishing Co.Ltd., 3rd   Edition (1972).
     2. G. Aruldas *Molecular, Structure and spectroscop* – Prentice Hall of India.

REFERENCE BOOKS:
     1. B.B.Laud, *Lasers and non linear optics* - Wiley Eastern Ltd., (1985)
     2.K.Thiyagarajan and A.K.Ghatak, *LASERS : Theory and applications*- Macmillan India Ltd.

CHAIRMAN-BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – VI SEMESTER – ELECTIVE COURSE-II
(For the candidates admitted from the year 2016-2017 onwards)

DIGITAL ELECTRONICS AND MICROPROCESSOR

Course Outcomes:
1. Conversion between various number systems
2. Employ Logic gates for carrying out logic operations
3. Apply the concept of Boolean laws and employ a Karnaugh Map to reduce Boolean expressions.
4. Design various combinational and sequential circuits using flipflops.
5. Fundamentals of microprocessor 8085

UNIT -I: NUMBER SYSTEMS, LOGIC GATES & BOOOLEAN ALGEBRA AND K - MAPS

Different Number Systems - Binary, Octal and Hexa-decimal Conversion between the number systems. Different Digital codes – ASCII, BCD, Gray codes. AND, OR and NOT Gates
- Universality of NAND & NOR gates, Special Gates - Ex-OR, Ex-NOR - Boolean Laws, De- Morgan's Theorems. Simplification of Logical expression using Boolean algebra, Karnaugh Maps - 4 Variables.

UNIT - II: COMBINATIONAL AND MEMORY CIRCUITS

Half and full adder - Half and full Subtractor - Basic study of TTL, CMOS - Multiplexers and De-multiplexers - Encoders and Decoders - Read-only memories (ROM), PROM, EPROM and RAM.

UNIT - III: SEQUENTIAL CIRCUITS

Sequential Circuits: RS, D, JK and T Flip-Flops - Edge Triggered Flip-Flops – Master- Slave JK Flip-Flop – Shift Register: Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial- out and Parallel-in - Parallel-out - Counters: Asynchronous and Synchronous Counters, Decade Counter, UP- DOWN Counters, Ring Counter.

UNIT - IV: MICROPROCESSOR (8085)

Architecture of 8085 - Block diagram - Pin-out Diagram, Instruction Cycle - Interrupts - Addressing modes - Instruction Set - Data Transfer, Arithmetic, Logical, Branching and Machine Control Operations RIM and SIM - Memory Organisation and Addressing, Memory Interfacing and Memory Mapping.

UNIT - V: 8085 PROGRAMMING

Algorithm and Flowcharts - Simple programs - Addition and subtraction of two 8-bit data-Sum of a string of data - 8 bit Multiplication and Division - Masking of a data - Block transfer - Smallest and largest number in an array - Ascending and Descending order of array of numbers.

BOOK FOR STUDY:
1. Digital Principles and Applications by Donald P. Leach & Albert Paul Malvino. (Glenoe, 1995)
2. Microprocessor Architecture, Programming and Application with the 8085 by Ramesh S. Goankar (Prentice hall, 2002).

BOOK FOR REFERENCE:
1. Digital Fundamentals, 3rd Edition by Thomas L. Floyd (Universal Book Stall, India 1998).
2. Microprocessor Architecture, Programming and systems featuring the 8085 by William A. Rout. (Thomson Delmar Learning, 2006).

CHAIRMAN-BOS   **COE**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – VI SEMESTER – ELECTIVE COURSE – III
(For the candidates admitted from the year 2016-2017 onwards)

NUMERICAL METHODS

Course Outcomes:

On the successful completion of the course, the students will be able to
1. Curve fitting examines thev relationship between one or more independent variables
2. Transcendental equations contains trignometric , logarthmic, exponential functions
3. Numerical differenciation is an important technique for engineers
4. Numeriacal integration compute numerical approximation to the integral of the function at isolated points

UNIT – I: Curve Fitting

Principle of Least Squares – Method of Group Averages – Fitting a straight line linear regression – fitting a Parabola - Fitting an exponential curve.

UNIT – II: Solution Of Numerical algebraic, Transcendental And Differential Equation

Bisection Method – Methods of successive Approximations – Regula falsi Method – Newton Raphson method – Horner's Method – Euler's Method – modified Euler's Method – Runge Kutta Method .

UNIT – III: SIMULTANEOUS LINEAR ALGEBRAIC EQUATION:

Gauss Elimination Method – Gauss Jordon Method – Computation of Inverse of a Matrix Using Gauss – Elimination Method – Method of Triangularisation.

UNIT – IV: NUMERICAL DIFFERENTIATION:

Linear Interpolation: Newton Forward Interpolation Formula and Backward Interpolation formula. Interpolation with unequal intervals: Lagrange's interpolation Formula (No Derivation) Hermit's – Bessel's Interpolating Polynomials.

UNIT – V: NUMERICAL INTEGRATION:

Trapezoidal – Simpson's 1/3 Rule And 3/8 Rule – Practical Applications – Weddle's Rule – Gaussian Quadrature Formula.

BOOKS FOR STUDY:
1. Venkatraman, M.K. *Numerical Methods in Science and Engineering*, National Publishing Company – Chennai (1977).
2. Shastry, S.S. *Introductory Methods Of Numerical Methods* – Prentice – Hall Ltd.
3. Jain, Iyenger, S.R.K. And Jain R.K. *Numerical Methods For Scientific And Engineering Computation* – New Age Publishers.
4. V. Rajaraman, Numerical Methods By, Prentice – Hall India Pvt Ltd (2003).

Books for References:
1. B.D. Gupta, *Numerical Analysis* - Konark Pub .Ltd., Delhi (2001).
2. S.Arulmurugam, *Numerical Methods* - New Gamma Publishing , Palamkottai. (2003)
3. A.Singaravelu, *Numerical Methods* - Meenakshi Agency, Chennai (2004).
4. P.Kandasamy, K. Thilagavathy, *Calculus Of Finite Difference & Numerical Analysis* - S.Chand & Company LTD ., New Delhi-55. (2003).

CHAIRMAN-BOS

COE