

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005**

**B.Sc., PHYSICS COURSE STRUCTURE UNDER CBCS SYSTEM**

(For the candidates admitted from the year 2011-2012 onwards)

SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U11L1T1	6	3	3	25	75	100
	English - I	English - I	U11L1E1	6	3	3	25	75	100
	Core Course - I	Properties of Matter and Acoustics.	U11PH1C1	6	5	3	25	75	100
	Core Course - II	Core Practical – I	-	3	-	-	-	-	-
	First Allied Course – I	Allied Mathematics - I	U11MM1A4	5	3	3	25	75	100
	First Allied Course - II	Allied Mathematics - II	-	2	-	-	-	-	-
	Environmental Studies	Environmental Studies	UES1	2	2	3	25	75	100
				<b>30</b>	<b>16</b>				<b>500</b>
II	Tamil - II	Tamil – II	U11L2T2	6	3	3	25	75	100
	English – II	English– II	U11L2E2	6	3	3	25	75	100
	Core Course - II	Core Practical – 1	U11PH2C2P	3	4	3	25	75	100
	Core Course – III	Mechanics and Relativity.	U11PH2C3	6	5	3	25	75	100
	First Allied Course – II	Allied Mathematics - II	U11MM2A5	2	4	3	25	75	100
	First Allied Course – III	Allied Mathematics - III	U11MM2A6	5	3	3	25	75	100
	Value Education	Value Education	UVE2	2	2	3	25	75	100
				<b>30</b>	<b>24</b>				<b>700</b>
III	Tamil - III	Tamil- III	U11L3T3	6	3	3	25	75	100
	English – III	English - III	U11L3E3	6	3	3	25	75	100
	Core Course – IV	Thermal Physics	U11PH3C4	6	5	3	25	75	100
	Core Course – V	Core Practical - II	-	3	-	-	-	-	-
	Second Allied Course I	Allied Chemistry – I	U11CH3A1	5	3	3	25	75	100
	Second Allied Course II	Allied Chemistry – II	-	2	-	-	-	-	-
	Non Core Elective I	Laboratory Hygiene and Safety.	U11CH3N1	2	2	3	25	75	100
				<b>30</b>	<b>16</b>				<b>500</b>
IV	Tamil – IV	Tamil- IV	U11L4T4	6	3	3	25	75	100
	English – IV	English –IV	U11L4E4	6	3	3	25	75	100
	Core Course – V	Core Practical – II	U11PH4C5P	2	4	3	25	75	100
	Core Course - VI	Optics	U11PH4C6	5	5	3	25	75	100
	Second Allied Course II	Allied Chemistry – II Practical	U11CH4A2P	2	4	3	25	75	100
	Second Allied Course III	Allied Chemistry- III	U11CH4A3	5	3	3	25	75	100
	Skill Based Elective I	Office Automation	U11PH4S1	2	4	3	25	75	100
Non Core Elective II	Water Pollution and Treatment	U11CH4N2	2	2	3	25	75	100	
				<b>30</b>	<b>28</b>				<b>800</b>
V	Core Course – VII	Electricity and Magnetism	U11PH5C7	5	5	3	25	75	100
	Core Course – VIII	Atomic Physics	U11PH5C8	5	4	3	25	75	100
	Core Course – IX	Basic Electronics	U11PH5C9	5	4	3	25	75	100
	Core Course - X	Core Practical III(General)	-	3	-	-	-	-	-
	Core Course - XI	Core Practical IV (Electronics)	-	3	-	-	-	-	-
	Elective Course I	Spectroscopy and Laser Physics	U11PH5E1	5	5	3	25	75	100
	Skill Based Elective II	Surface Mount Technology Lab	U11PH5S2P	2	4	3	25	75	100
Skill Based Elective III	Electrical Wiring & Winding Lab	U11PH5S3P	2	4	3	25	75	100	
				<b>30</b>	<b>26</b>				<b>600</b>
VI	Core Course - X	Core Practical III (General)	U11PH6C10P	3	4	3	25	75	100
	Core Course – XI	Core Practical IV (Electronics)	U11PH6C11P	3	5	3	25	75	100
	Core Course – XII	Solid State Physics	U11PH6C12	6	5	3	25	75	100
	Core Course – XIII	Wave Mechanics and Nuclear Physics	U11PH6C13	6	5	3	25	75	100
	Elective Course - II	Integrated Electronics	U11PH6E2	5	5	3	25	75	100
	Elective Course - III	Numerical Methods	U11PH6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities			1				
	Gender Education	8UEA6	1	1	3	25	75	100	
				<b>30</b>	<b>30</b>				<b>700</b>
<b>TOTAL</b>				<b>180</b>	<b>140</b>				<b>3800</b>

**GOVERNMENT ARTS COLLEGE (AUTONOOUMS) KARUR-05**  
**B.Sc., PHYSICS – I SEMESTER – CORE COURSE – I**  
 (For the candidates admitted from 2011-12 onwards)

**PROPERTIES OF MATTER AND ACOUSTICS**

**UNIT – I : Elasticity -I**

Stress – Strain diagram – Elastic Moduli - Work done per unit Volume in Shearing Strain – Relation between Elastic constants – Poisson's ratio – Expression for Poisson's ratio in terms of Elastic Constants - Twisting couple on a wire – Work done in twisting -Torsional Pendulum – Determination of Rigidity modulus of a wire.

**UNIT – II : Elasticity -II**

Expression for bending moment- Cantilever- Expression for depression - Experiment to find Young's modulus - Cantilever oscillation – Expression for period – Uniform Bending – Expression for Elevation – Experiment to find Young's modulus using pin and microscope – Non Uniform Bending – Expression for depression – Experiment to determine Young's modulus using mirror and telescope.

**UNIT -III Surface Tension**

Definition and dimensions of Surface Tension – Excess of pressure inside a drop and bubble - Excess of pressure inside a over curved surface – Angle of contact - Jaegar's 'method - Determination of surface tension by Drop weight method - Variation of surface tension with temperature– Formation of drops

**UNIT – IV Viscosity**

Stream line motion – Turbulent motion – Co efficient of viscosity and its dimensions – Rate of flow of liquid in a capillary tube - Poiseuille's formula - Experiment to determine the coefficient of viscosity of liquid.- Motion in a viscous medium – Terminal Velocity and Stoke's formula – Determination of the coefficients of viscosity of a highly viscous liquid by Stoke's method – Lubricants.

**Diffusion:** Diffusion— Fick's law – Experimental determination of diffusivity – Analogy between diffusion and thermal conduction – Applications.

**UNIT – V Acoustics**

Classification of sound – Characteristics of musical sound – Decibel -Loudness – Weber-Fechner law – Reverberation and reverberation time – Sabine's formula for reverberation time– Absorption coefficient – Acoustics of buildings  
 Ultrasonics – Production by Piezo electric oscillator method – Properties and Applications.

**Books for study**

1. Properties of Matter - Brijlal and Subramaniyam
2. Properties of Matter and Acoustics - R. Murugesan.
3. Text Book of Sound - Brijlal and Subramaniyam
4. Properties of Matter - D.S. Mathur

**Books for References:**

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

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**COE**

Sl. No.: 1130

Subject Code: U11PH1A1

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**  
**B.Sc.,- I SEMESTER – ALLIED COURSE – I**  
**(FOR CHEMISTRY & MATHEMATICS MAJOR)**  
**(For the candidates admitted from 2011-12 onwards)**

**ALLIED PHYSICS – I**

**UNIT – I Mechanics:**

Centre of Gravity – Centre of gravity of a solid hemisphere – Hollow hemisphere and Solid cone.-Stability of Floating Bodies: Meta centre – Determination of meta centric height of a ship.

**UNIT – II Sound :**

Simple Harmonic Motion – Composition of two simple harmonic motion - Along a Straight Line - At right angles to each other – Lisajou’s figures and their applications – Classification of sound – Characteristics of musical sound – Decibel -Loudness – Weber- Fechner law – Reverberation and reverberation time – Sabine’s formula for reverberation time – Acoustics of buildings

**UNIT –III Properties of Matter :**

Diffusion : Fick’s Law – Coefficients of diffusion – Experimental determination of coefficient of diffusion - Application- Osmosis: Laws of Osmotic Pressure – Berkeley and Hartley method of determining osmotic pressure – Elevation of boiling point and depression of freezing point.

**UNIT IV THERMAL PHYSICS**

Newton’s law of cooling – Verification of Newton’s law of cooling – Specific heat capacity of liquid by cooling – Bomb calorimeter –Conduction –Thermal conductivity of a bad conductor- Lee’s disc method – Stefan’s law of radiation- Angstrom pyroheliometer – Surface temperature of the sun .

**UNIT V OPTICS** - Electromagnetic spectrum- Spectral response of human eye-UV and IR Spectroscopy – Raman effect –Experimental arrangement –Applications of Raman effect  
Fiber Optic Communication: Introduction – Optical fiber –Numerical aperture – Coherent bundle – Fiber optic communication system and its advantages- Multi mode fiber optic sensors

Books for study

1.Allied Phsyics I & II- R.Murugeasan

2Allied Physics I – A.Sundaravelusamy

Books for Reference

1. Mechanics I& II – Narayanamoorthy
2. Heat and thermodynamics - Brijlal and Subramaniyam
3. Optics - Brijlal and Subramaniyam

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**COE**

Sl. No.: 12P7

Subject Code: U11PH2C2P

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**  
**B.Sc., PHYSICS – I & II - SEMESTER – CORE COURSE – II**  
(For the candidates admitted from 2011-12 onwards)

**CORE PRACTICAL – I**

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. Surface tension and Interfacial surface tension of the given liquid – Drop weight method.
6. Sonometer verification of laws of transverse vibrations and determination of frequency of a tuning fork.
7. Sonometer – AC frequency.
8. Melde's Experiments.
9. Specific heat capacity of liquid – Newton's law of cooling.
10. Thermal Conductivity of bad conductor – Lee's disc method.
11. Long Focus Convex Lens –  $f$ ,  $R$  and  $\mu$ .
12. Long Focus Concave Lens –  $f$ ,  $R$  and  $\mu$ .
13. Air Wedge – Thickness of wire and thickness of insulation.
14. Meter Bridge- Specific resistance.
15. P.O. Box – Temperature Co efficient of resistance.
16. Potentiometer – Calibration of low range voltmeter.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05  
**B.Sc., – I & II - SEMESTER – FIRST ALLIED COURSE – II**  
(FOR CHEMISTRY & MATHEMATICS MAJOR)  
(For the candidates admitted from 2011-12 onwards)

**ALLIED PHYSICS – II - LAB**

1. Young's Modulus – Non Uniform Bending – Pin and Microscope.
2. Surface tension and Interfacial Surface tension – Drop weight method.
3. Coefficient of Viscosity of liquid using graduated burette.
4. Specific heat capacity of liquid by cooling method.
5. Lee's Disc – Thermal Conductivity of a bad conductor.
6. Spectrometer – Grating – Normal incidence method
7. Spectrometer – refractive index of solid prism (A,D and  $\mu$  )
8. Newton's Ring – Radius of curvature of a convex lens
9. Sonometer – Verification of laws.
10. Carey Foster's bridge – specific resistance.
11. Meter bridge – Determination of specific resistance
12. EMF of thermocouple – Direct deflection method.
13. Characteristics of a junction diode.
14. Construction of a full Wave rectifiers.
15. AND, OR and NOT Logic gates - Verification of truth table using discrete Components.

**Books for reference**

1. A Text book of Practical Physics - M.N. Srinivasan and others – Sultan chand & Son, New Delhi.
2. Practical Physics – A. Dhanalakshmi and K.R. Paramasivam - Apsara publication, Trichy.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05****B.Sc., PHYSICS - II SEMESTER – CORE COURSE III**

(For the candidates admitted from 2011-12 onwards)

**MECHANICS AND RELATIVITY**

- UNIT – I Dynamics – Projectile, Impulse and Impact:** Projectile – Range of horizontal and inclined plane – Impulse – Impact – Impulsive force – Laws of Impact – Impact of a smooth sphere on a smooth horizontal plane – Direct and oblique impacts – Laws of Kinetic Energy – Motion of two interacting bodies – reduced mass.
- UNIT – II Dynamics of Rigid Bodies:** Kinetic energy of rotation – Theory of Compound Pendulum – Equivalent simple pendulum – Reversibility of centers of oscillation and suspension – Determination of  $g$  and radius of gyration of a bar pendulum – Moment of Inertia – M.I of a solid and Hollow Sphere-Hemisphere
- UNIT - III Statics – Gravitation and Center of Gravity:** Gravitational potential and field due to spherical shell – Gravitational energy – Boy's method of determination of  $G$  – Centre of gravity of solid tetrahedron. Solid and hollow hemisphere – Stability of equilibrium.
- UNIT -IV Hydrostatics and Hydrodynamics:** Centre of Pressure – Vertical rectangular lamina – Vertical triangular lamina – Vertical circular lamina – Atmospheric pressure its variation with altitude – Reasons for such variation. Equation of continuity of flow – Euler's equation for unidirectional flow – Torricelli's theorem – Bernoullie's theorem and application to Vernturimeter and Pitot's tube.
- UNIT - V Relativity:** Galilean –relativity, Galilean transformation – Michelson Morley experiment and its importance – Einstein's postulates – Lorentz transformation and its interpretation – Consequence of Lorentz Transformation – Length contraction – Variation of mass with velocity-Simultaneity time dilation - Relativistic addition of velocities.

**Text Book:**

1. Mechanics – Part I & II – Narayanamoorthy.
2. Mechanics and Relativity – R. Murugeasan.

**Reference:**

1. Mechanics – D.S.Mathur.

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## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05

**B.Sc - III SEMESTER- FIRST ALLIED COURSE-III**

(FOR CHEMISTRY AND MATHEMATICS MAJOR)

(For the candidates admitted from 2011 – 12 onwards)

**ALLIED PHYSICS –III****UNIT – I Electrostatics**

Coulomb's law – Gauss theorem, its applications -Field due to an infinite long plane, sphere and cylinder – Mechanical force on the surface of a charged conductor – Electrostatics energy in the medium – Formation of cloud on charged particles.

Capacitors – Principles of a capacitor – Capacity of capacitor – Capacity of an isolated sphere and cylinder – Energy of a charged capacitor – Sharing of charges and loss of energy.

**UNIT – II Electricity**

Kirchhoff's Law's and their applications to Wheatstone's network – Condition for bridge Balance – Carey Foster's bridge – Variation of resistance with temperature – Laws of electromagnetic induction – Expressions for induced EMF – Self and Mutual induction - Coefficient of coupling – Determination of coefficient of self inductance by Rayleigh's method – Eddy current and its applications.

**UNIT – III Atomic Physics**

Atom models – Sommerfeld's and Vector atom models – Pauli's exclusion principle – Various quantum numbers and quantization of orbits

X- rays – Continuous and Characteristic of X-rays – Mosley's law and its importance – Bragg's law – Miller Indices – Determination of crystal structure by Laue's powder photograph method.

**UNIT – IV Nuclear Physics**

Nucleus – Nuclear Size – Charge – Mass and Spin – Liquid drop and shell models-.Nuclear radiations and their properties – Particle accelerators – Betatron and Proton – Synchrotron, Particle Detectors – Cloud chamber and Bubble Chambers.

**UNIT – V Digital Electronics**

Digital Electronics – Decimal - Binary – Octal and Hexa Decimal Number Systems and their Mutual Conversions – 1's and 2's Compliment of a Binary Arithmetic (addition, subtraction, multiplication and division) – Binary subtraction by 1's and 2's - complement methods - Basic Logic gates AND, OR, NOT, NOR, NAND, and EX-OR gates – NAND and NOR as Universal building gates – Boolean Algebra – De Morgan's theorems – Their verifications using truth tables.

**Books for Study:**

- 1.Allied Physics I & II – R.Murugesan
- 2.Allied Physics II – A. Sundaravelusamy

**Books for Reference:**

- 3.Electricity and magnetism – Brijlal and Subramanian
- 4.Modern Physics – R. Murugasan
- 5.Principles of Digital Electronics – Malvino and Leach.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05****B.SC ., PHYSICS – III SEMSTER – CORE COURSE –IV****(For the candidates admitted from 2011-12 Onwards)****THERMAL PHYSICS****UNIT I Heat**

Calorie –definitions–Specific heat capacity – Definition of  $C_p$  and  $C_v$  – Mayer’s relation – Newton’s law of cooling – Change of state- Latent heat-Equation of perfect gas- Vanderwall’s equation of state– Critical constants and their determinations . Transmission of Heat- Coefficient of thermal conductivity – Good conductor of thermal conductivity - Forbe’s method- Bad conductor of thermal conductivity-Lee’s disc method

**UNIT II Thermodynamics**

Laws of thermodynamics — Zeroth law - First law - Second law - Entropy - Concept of entropy –Entropy of a perfect gas - Change in the entropy in adiabatic process – Change of entropy in a reversible and irreversible cycle- T-S diagram – Thermodynamic scale of temperature - Maxwell’s thermodynamical relations.

**UNIT III Heat Engines**

Isothermal and Adiabatic process- Work done during Isothermal and Adiabatic process- Reversible and Irreversible process –Carnot’s cycle- Efficiency – Carnot’s engine and Refrigerator- Carnot’s theorem- Proof-Internal combustion engines [ Otto and Diesel ] – Cycle of operation – Indicator diagram – Efficiency .

**UNIT IV Low Temperature Physics**

Joule – Kelvin effect –Temperature of Inversion - Porous plug experiment- Liquefaction of gases [Principle of regenerative cooling]– Adiabatic expansion process – Adiabatic demagnetization-Refrigerating mechanism –liquefiacation of air-Linde’s process –Liquefaction of Helium I & II.

**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 – F.D gases as degenerate gases -Comparison of M.B – B.E – F.D Statistics.

Text:

1. Heat and Thermodynamics –J.B Rajan and C.L Arora
2. Heat Thermodynamics – Brijlal and Subramaniam

Reference:

1. Thermodynamics and Statistical Physics –Sharma and Shankar
2. Statistical Mechanics –Satya Prakash and C.A Agarwal

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Sl. No.: 1336

Subject Code: U11PH3N1

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**

**B.Sc., - III SEMESTER – NON CORE ELECTIVE – I**

**(FOR CHEMISTRY MAJOR)**

(For the candidates admitted from the year 2011 -12 onwards)

**ENERGY PHYSICS - I**

- UNIT- I**      **Conventional Energy Sources:** Various Forms of Energy – Renewable and Conventional Energy Systems – Comparison – Coal, Oil and Natural Gas – Availability – Statistical Details.
- UNIT- II**      **Non – Conventional Energy Sources:** Renewable Energy Sources – Solar Energy - Nature of Solar Radiation – Components – Electromagnetic Energy Spectrum – Spectral Distribution.
- UNIT-III**      **Sun:** Solar Constant Solar Angles – Types of Pyroheliometers – Armstrong Pyroheliometer – Silver Disc Pyroheliometer Abbot’s Pyroheliometer – Estimation of Average Solar Radiation.
- UNIT –IV**      **Solar Heaters And Coolers:** Solar Heaters – Crop Driers, Space Cooling – Solar Cooling – Solar Pands, Solar Cookers.
- UNIT-V**      **Water Desalination – Solar Still:** Water Desalination – Solar Still – Solar Thermal Power Generation – Conversion of Light into Electrical Energy – Photovoltaic Generation Basics – Types of Solar Cells – Merits and Demerits of Solar Energy.

**Text Books**

1. G.D. Rai “Solar Energy Utilization” – Ed – V (1995)
2. S.P. Sakhatore, “Solar Energy” – Tata McGraw Till Publication Company, Ed., 11, 1997.
3. Solar Energy – C.G. Agerwal.

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Sl. No.: 1337

Subject Code: U11PH3A4

## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.SC., - III SEMESTER – SECOND ALLIED COURSE – I  
(FOR COMPUTER SCIENCE MAJOR)

(For the candidates admitted from 2011-12 onwards)

### APPLIED PHYSICS – 1

#### UNIT – I

Electrostatics: Fundamentals of Electrostatics – Gauss Theorem and its Application – Intensity Due to a charged sphere – Intensity at a Point Between two Charged Parallel Plane Conductors – intensity at a Point Due to Uniformly charged – Cylinder – Action of Points – electrostatic Potential – Capacity – principle of a Capacitor – spherical and Cylindrical Capacitors – Capacitors in Series and in Parallel – energy of a Charged Capacitor – Energy Loss Due to sharing of Charges – Types of Capacitors.

#### UNIT – II

Magnetostatics: Magnetic Field – Magnetic flux Density – Magnetization- Intensity of Magnetization – Permeability – Susceptibility – Relation Between them – Magnetic Potential due to a Dipole – Relation Between Potential and Intensity – Magnetic shell and its Potential at any Point – Properties of Dia. Para, and Ferro Magnetic Materials – Hysteresis – Magneto Meter Method – Finding Coerivity, Reentivity and Energy loss From hysteresis Loop – ( I-H Curve).

#### UNIT – III

Current Electricity: Lap lace Law – intensity at a Point due to Straight Current Carrying Conductor – Circular coil – solenoid – field due to them at Point on their Axis when a current Flows . Force between two parallel conductors – kirchoffs law – Application to wheat Stone's Bridge – Carey Foster's Bridge – Potentiometer – measurement of Current and Resistance – Calibration of Low and High range Voltmeters – Fleming's Left hand Rule Theory of Moving coil Galvanometer – Conversion of Galvanometer into an Ammeter and Voltmeter – Ballistic Galvanometer.

#### UNIT – IV

Electromagnetic Induction: Law of electromagnetic Induction – self Inductance and Mutual Inductance – Determination of Self Inductance by Anderson's Methods- Co-efficient of Mutual Induction – Determination of Mutual Inductance by Absolute Method – Coefficient of coupling – Transformer Theory and working – Eddy current.

#### UNIT – V

Alternating Current: A.C. Circuits with single components – Double components – Measurement of current and voltages- Power in AC Circuit – Power Factor Derivation – Watt less current – choke – Series and Parallel Resonance Circuits – impedance – A factor – Selectivity and Sharpness of Resonance – Oscillatory Discharge of a condenser.

Book for study

1. Electricity and Magnetism – Brijlal, Subramaniam – Ratan Pratan Prakashan Mandri. Delhi 1995
2. Applied of Physics – I – A. Sundravelusami

Book for References

1. Electricity and Magnetism – Narayanamurthy and Nagarathinam.
2. Electricity and Magnetism – D.L. Seghal and Chopra.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05****B.SC ., PHYSICS –IV - SEMSTER – CORE COURSE –V****(For the candidates admitted from 2011-12 onwards)****CORE PRACTICAL – II****(Any 14 experiments only)**

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. Potentiometer – calibration of ammeter
6. Figure of merit[ current sensitivity and voltage sensitivity] - mirror galvanometer
7. Refractive index of liquid prism – spectrometer
8. Zener controlled voltage regulator
9. Rigidity modulus – Static Torsion
10. Emissive power of a surface – Spherical calorimeter
11. Resistance and specific resistance – Carey foster bridge
12. Logic gates [ using discrete components ] – AND , OR & NOT
13. Transistor characteristics – CE Configuration
14. Rigidity modulus of the given wire – Torsion pendulum
15. Spectrometer – i-d curve
16. Determination of rigidity modulus of the given rod – Static torsion
17. Kund's tube- Young's modulus of the material of the rod
18. Stroke's method – Viscosity of highly viscous liquid
19. CRO study of wave forms – Lissajou's figures – f determination.
20. Newton's rings – Radius of curvature of the given convex lens.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05**  
B.Sc., PHYSICS – IV SEMESTER – SKILL BASED ELECTIVE -1  
(For the candidates admitted from 2011-2012 onwards)

**OFFICE AUTOMATION LAB**

**MS-WORD**

a) Text manipulation

1. Change the font size and type
2. Aligning and justification of text
3. Underlining the text
4. Indenting the text
  - Preparing a bio-data
  - Prepare a letter

b) Usage of numbering, Bullets, Footer and Headers

Usages of Spell check and find & Replace

1. Prepare a document in newspaper format
2. Prepare a document with bullets, footer & headers

c) Tables and manipulation

- a. Creation, Insertion, Deletion (Columns and rows) and usage of Auto format.
  - Create a Mark Sheet using Table and find out the total marks.

b. Picture insertion and alignment

Prepare a greeting card

c. Creation of document using templates

Creation of templates

- i. Prepare a letter using the template
- ii. Prepare a bio-data using various kinds of templates

d. Mail Merge Concepts

Prepare an invitation to be sent to specific addresses, in the data source

## **MS- EXCEL CELL EDITING**

1. Describe the types of functions
2. File Manipulations
3. Data sorting- Ascending and Descending ( both numbers and alphabets)
4. Worksheet preparation
5. Marklist preparation for a student
6. Electricity bill preparation
7. Inventory Report preparation
8. Invoice report preparation
9. Drawing graphs

## **MS-POWERPOINT**

- a) Insert Clip and Pictures

Frame movements of the above

- 1) Create a slide show presentation for a seminar (Choose your own topic)
- 2) Create non-bulleted and bulleted body text
- 3) Apply the appropriate text attributes

- b) Insertion of new slides

Preparation Organization Charts.

- 1) Create a slide preparation for an invitation
  - a. Insert an object from a bitmap file
  - b. Enter the text in the slide view
  - c. Apply appropriate text attribute
  - d. Rotate the object to 45 degree (approximately)
  - e. Apply shadow to the object

- c) Preparation using wizards

Using of design templates

Create a slide show presentation to display percentage of marks in each semester for all students.

- a. Use bar chart ( X- axis: Semester, Y-axis: % marks)
- b. Use different presentation template and different transition effect for each slide.
- c. Use different text attribute in each slide.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05**  
B.Sc., – IV SEMESTER – SECOND ALLIED COURSE – II  
(FOR COMPUTER SCIENCE MAJOR)  
(For the candidates admitted from 2011-12 onwards)

APPLIED PHYSICS – II - LAB

1. Semi conductor diode – Characteristics.
2. Zener Diode – Characteristics.
3. FET – Characteristics.
4. Transistor Characteristics – CE Configuration.
5. Transistor Characteristics – CB Configuration.
6. Bridge Rectifier and Zener controlled regulated power supply
7. Field along the axis of a coil – M
8. Potentiometer – Measurement of resistance.
9. Potentiometer – Measurement of current.
10. Carey Foster's Bridge – Specific resistance
11. Calibration of a thermistor and determination of its Energy gap.
12. Series and Parallel resonance circuit.
13. RC Coupled amplifier.
14. FET amplifier.
15. Astable multivibrator.
16. Mathematical operations – Addition and subtraction using op – amp.
17. Field along the axis of a coil – Determination of BH value.

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## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

**B.Sc., PHYSICS – IV SEMESTER – CORE COURSE – VI**

(For the candidates admitted from 2011-12 onwards)

**OPTICS****UNIT -1 Lens Aberration**

Spherical lens – Spherical Aberration- Spherical Aberration of thin lens – Ray Tracing – Chromatic aberration- Methods of reducing spherical aberration – Coma – Aplanatic surface – astigmatism – Curvature of field – Distortion.

**UNIT –II Optical Instruments**

Huygen's Eyepiece – Resolving Power – Rayleigh criterion of resolution – Resolving power of a - Telescope - Microscope - Prism - Grating – Dispersive power of a grating.

**UNIT III Interference**

Colours in thin films – Air wedge- Haidinger fringes-Newton's rings –Michelson's interferometer and its applications – Determination of Wavelength of a source and difference in wavelength of sodium light –Interference filter –Stationary waves in light.

**UNIT –IV Diffraction**

Fresnel's diffraction – Diffraction at a (i)Circular Aperture (ii)Straight Edge – Fraunhofer Diffraction at a single slit – Diffraction Pattern- Grating with theory – Oblique incidence – Overlapping at spectral lines –Absorption spectra.

**UNIT V Polarization**

Nicol Prism as an analyzer and polarizer – Huygen's explanation of double refraction in uniaxial crystals – Quarter wave plate and half wave plate –Babinet's compensator –Optical activity – Fresnel's explanation of optical activity – Laurent's Half shade polarimeter.

**Books for study**

1. Optics by Brijlal and Subramaniam

**Books for References**

1. Optics – Jenkins and White - McGraw Hill
2. Optics – Ajoy Chatak (TMH) - Delhi

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05****B.Sc., – IV SEMESTER – NON CORE ELECTIVE – II****(FOR CHEMISTRY MAJOR)**

(For the candidates admitted from 2011-12 onwards)

**ENERGY PHYSICS - II**

- UNIT- I      Biomass Energy**  
Biomass Energy – Classification – Photo Synthesis – Biomass Conversion Process – Gobar Gas Plants – Wood Gasification – Ethanol From Wood – Advantages and Disadvantages of Biomass Energy Source.
- UNIT- II      Other Energy Sources**  
Geothermal Energy – Wind Energy – Ocean Thermal Energy Conversion (OTEC) – Energy From Waves and Tides (Basic Ideas, Nature, Application, Merits and Demerits of These)
- UNIT-III      Nuclear Power**  
Nuclear Power – Fusion and Fission – Basic Principles of Magneto – Hydro – Dynamics – Solar Production of Hydrogen – Liquid Hydrogen as a Fuel in Future.
- UNIT-IV      Energy Storage**  
Conservations of Energy – Patterns of Energy Consumption in Domestic, Industrial, Transportation and Agricultural Sectors – Conservation Principles in these Sectors
- UNIT-V      Impacts Of Non – Conventional Energy**  
Energy Crisis and Possible Solutions – Energy Option for the Developing Countries – Impacts Due to Non – Conventional Energy Sources – Global Warming.

**References:**

1. Back James: Constitution of United States.
2. Wheare, K.C: Modern Constitution.
3. Strong,C.F.: Modern Governments.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05**  
**B.SC., - IV SEMESTER – SECOND ALLIED COURSE – III**  
**(FOR COMPUTER SCIENCE MAJOR)**  
(For the candidates admitted from 2011-12 onwards)

APPLIED PHYSICS III

UNIT – I

Semiconductor Physics: Theory of energy bands in crystals – Distinction between conductors, Insulators and Semi conductors – Intrinsic and Extrinsic semiconductor – Hall effect semiconductors – Zener diode – Tunnel diode – Backward diode – Break down voltage – Avalanche breakdown.

UNIT – II

Transistors: PNP and NPN transistors – Dc characteristics of CE and CB configuration – Hybrid parameters – Functions of Transistors as an amplifier and Oscillator – FET – N – channel and P – channel FET – Performance Characteristics – FET amplifier.

UNIT – III

Laser and Masers: Basic concepts of stimulated emission – Population Inversion and Meta stable state – Ammonia maser – Ruby laser and He – Ne laser production - Application.

UNIT – IV

Opto Electronic Devices: LED – Radiation transition – Luminent efficiency – Method of Excitation – visible LED – Materials for LED – LED configuration and performance – Photo conduction – Photo Diode – photo transistor – Digital clock – Seven Segment display - LCD.

UNIT – V

Operational Amplifiers: The basic operational amplifier – inverting and non inverting operational amplifier – Differential operational amplifier – CMRR – Basic uses of operational amplifier as sign and scale changer. Phase shifter – Integrator – Differentiator and adder – D/A binary weighted method – R – 2R Ladder method – A/D Successive approximation – Counter type method – Opamp as a comparator .

Book for study

1. Applied Physics by A. Sundaravelusamy.

Book for References

1. Micro Electronics - Jacob – McGraw Hill.
2. The fundamentals of solid state physics – Theraja, Sultan chand & Co.
3. Pulse and digital electronics – G.K. Mithal and Vanvasi – Khanna Publications – Delhi.
4. Functional Electronics – Ramanan – TMH – 1994.
5. Electronic Devices and circuits – Millmanm and Halkins – TMH 1991.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05****B.Sc., PHYSICS- V SEMESTER-CORE COURSE VII**

(For the candidates admitted from 2011-2012 onwards)

**ELECTRICITY AND MAGNETISM.****UNIT-I Electrostatics:**

Coulomb's law – Electric intensity and Electric potential due to a point charge – Relation between them – Gauss law and its proof only – Electric Images – Electric Intensity due to an earthed conducting sphere applying the Principle of electric images. Electrometers – Quadrant Electrometer – Measurement of Ionization current – Attracted disc electrometer and its applications.

**UNIT-II Magnetic Properties of Material:**

Introduction – Magnetic field – Flux density– Intensity of Magnetization -susceptibility – Permeability – Definition –  $I_H$  and  $B_H$  curves for a magnetic material (a) Magneto meter method (b) Ballistic Galvanometer method - Terrestrial magnetism - Magnetic elements – Dip Circle.

**UNIT-III Chemical Effects of Electric Current:**

Faradays laws of electrolysis – Ionic velocities and Mobilities- Calculation and experimental determinations of ionic mobilities. Laws of Thermo Electricity – Peltier Co-efficient – Thomson Co-efficient – Application of thermo Dynamics to a Thermo couple and connected relations – Thermo electric diagram and its applications.

**UNIT-IV Electromagnetic Induction:**

Self Inductance- Determination of Self Inductance by Rayleigh;s method – Mutual Inductance – Determination of Mutual Inductance by direct Method – Coupling Constants **DC circuits:** Growth and decay of current in a circuit containing L/R- charge and discharge of a condenser throw resistance- Determination of High Resistance by leakage method.- Application of Electro Magnetic Induction – Grassot's fluxmeter.

**UNIT-V CIRCUIT THEORY:**

AC Circuits with Double Components – Measurement of Current and Voltage-series and parallel resonance circuits – Power in AC circuit – Wattless Current – Choke - AC Bridges: Owen Bridge – Anderson's Bridge – Maxwell's Bridge.

Text Book:

1.Electricity And Magnetism- R.Murugasan

Reference Book:

1.Electricity and Magnetism – Brijlal and Subramaniam

2.Electricity and Magnetism- Tiwari

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Sl. No.: 1565

Subject Code: U11PH5C8

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**  
**B.Sc., PHYSICS – V SEMESTER CORE COURSE – VIII**  
**(For the candidates admitted from 2011-12 onwards)**

**ATOMIC PHYSICS**

**UNIT-I Positive ray analysis:**

Properties of positive rays- $e/m$  Thomson's method - Parabola method-Aston's and Bain's bridge Mass spectrometer-Determination of critical potential-Franck and Hertz's experiment.

**UNIT-II Photo Electricity:**

Photoelectric emission- Laws - Lenard's experiment- Richardson & Compton experiments-Einstein's photoelectric equation-Experimental verification of Einstein's photoelectric equation by Millikan's experiment.

**UNIT-III Vector Atom Model:**

Various quantum numbers, L-S and j-j couplings- Pauli's exclusion principle- Electronic configuration of elements and periodic classification- Magnetic dipole moments of electron due to orbital and spin motion- Bohr magnetron- Stern and Gerlach experiment.

**UNIT-IV Fine Structure of spectral Lines:**

Spectral terms and notations- Selection rules- Intensity rule and interval rule- Fine structure of Sodium D lines- Alkali Spectra- Fine structure in Alkali spectra- Spectrum of Helium- - Larmor's theorem- Debye's quantum mechanical explanations - Zeeman effect- Normal Zeeman effect- Anomalous Zeeman effect- Theoretical explanation, Lande's 'g' factor and explanation of splitting of  $D_1$  and  $D_2$  lines of sodium.

**UNIT-V X Rays:**

Introduction to X Rays -Bragg's Law- Bragg's X-ray Spectrometer- Origin and analysis of continuous X-ray spectrum and characteristics of X-ray Spectrum-Moseley's law and its importance-Compton effect-Derivation for expression for change in wavelength-Its experimental verification.

**Books for Study:**

1.Modern Physics by R.Murugeshan.

**Reference:**

1.Modern Physics by J.P Rajan

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## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

**B.Sc., PHYSICS – V SEMESTER – CORE COURSE IX**

(For the candidates admitted from 2011-12 onwards)

**BASIC ELECTRONICS****UNIT-I SEMICONDUCTOR DEVICES:**

Introduction – Intrinsic Semiconductor – Extrinsic Semiconductor – PN junction diode – Zener diode - Voltage Ampere Characteristics – Zener as a voltage regulator – Half wave and full wave rectifiers – Bridge rectifier – Efficiency – Ripple Factor voltage doublers.

**UNIT-II Bipolar Junction Transistor:**

Transistor Action – Transistor Characteristics in CB and CE Modes – Analysis of Transistor Amplifier – Transistor Biasing – Two port representation of a Transistor – ‘h’ parameter – Determination of ‘h’ parameter – AC equivalent circuit using h – parameter.

**UNIT-III Special Semi Conductor Devices:**

FET – JFET – MOSFET – FET parameter – Comparison between FET and Transistor – Photo Transistor – Characteristics of SCR & UJT – Application of SCR as a switch and UJT as a relaxation oscillator.

**UNIT-IV Amplifiers and Oscillators:**

Voltage and power amplifiers: Classification of amplifiers – RC coupled Transistor Amplifier – Power Amplifiers – Class A Power Amplifier – Push pull – Class B Power amplifier – Gain of amplifier with feedback – Emitter follower – Effects of negative feedback – Oscillators – Concept of feedback oscillators – Hartley, Colpitts, Phaseshift and Wein’s Bridge oscillators.

**UNIT-V Opto-electronics Devices:**

Fundamental of light-Principle - working of- LED-LCD-Photo PN junction- Photodiode-photo conductivity cell- phototransistors-Laser diode.

**References:**

1. Principle of Electronics – V.K. Metha – S. Chand and Co.
2. Elements of Electronics – Anand Prakash, Chopra and segal – S.Chand and Co.
3. Basic Electronics and linear circuits – Bhargava Kulshreshba and Gupta DTMH 1989.
4. Integrated circuit and Semiconductor devices – Beboo and Burrows – TMHG 1989.
5. A Text Book of Applied Electronics.
6. Integrated Electronics – Mill Man Halkias - TMH

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05****B.Sc., PHYSICS – V SEMESTER - ELECTIVE COURSE – I**

(For the candidates admitted from 2011-12 onwards)

**SPECTROSCOPY AND LASER PHYSICS****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 Spectroscopy:**

Vibrating diatomic molecule - Energy of diatomic molecule- Harmonic Oscillator- Vibrating rotator- Vibration - Rotation Spectrum of CO - Vibrations of poly atomic molecules-Fundamentals vibrations and their symmetry- Overtones and combination 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 – Principle of Spontaneous emission and stimulated emission.-Population inversion, pumping. - Derivation of Einstein's A and B coefficients. -Types of lasers – He-Ne, CO<sub>2</sub>, Nd-YAG and semiconductor laser (homojunction & heterojunction) qualitative

**UNIT-V Applications of Laser**

Applications of laser in materials processing - Lasers in welding, drilling, heat treatment, cutting – Medical applications - Holography (construction & reconstruction).-Applications -LIDAR

## Reference Books:

1. Fundamental of molecular spectroscopy C.N.Banwell,Tata Mcgraw Hill Publishing Co.Ltd.,3<sup>rd</sup> Edition(1972).
2. Lasers and non linear optics, B.B.Laud Wiley Eastern Ltd.,(1985)

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**

**B.Sc., PHYSICS-V- SEMESTER-SKILL BASED ELECTIVE-II**

(For the candidates admitted from 2011-2012 onwards)

**SURFACE MOUNT TECHNOLOGY LAB**

1. SMT. Package and soldering fundamentals drawing.

- i) Surface mounting Vs Hole Mounting.
- ii) Differentiate b/w Ic-chip and Ic Package-40 pin DIP.

2. SMT Assembly

- a) Overview of solder paste.
- b) Overview of components placement process.
- c) Overview of solder paste depression process.

3. Solder paste on PCB pad.

Time Vs Temperature profile of a solder joint types of SMT PCB AND then assembly process.

4. Overview of Pasting.

Types of faults encountered in PCB diagnostic.

5. PCB Design

Artwork- layout – Single layer board – Multilayer board.

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Sl. No.: 15P6

Subject Code: U11PH5S3P

**GOVERNMENT ARTS COLLEGE(AUTONOMOUS) KARUR-05**

**B.Sc., PHYSICS-V- SEMESTER-SKILL BASED ELECTIVE-III**

(For the candidates admitted from 2011-2012 onwards)

**ELECTRIC WIRING AND WINDING LAB**

1. Control of a lamp throw 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.

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Sl. No.: 16P8

Subject Code: U11PH6C10P

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**

**B.Sc., PHYSICS -VI - SEMESTER – CORE COURSE – X**  
(For the candidates admitted from 2011-2012 onwards)

**CORE PRACTICAL-III**

**Section-A-General**  
(Any 12 Experiments only)

1. Koenig's Method-Uniform Bending-Y
2. Spectrometer  $i-I^1$  Curve.
3. Spectrometer-Small angle Prism.
4. Spectrometer-Grating minimum deviation and 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. Field along the axis of a coil-Determination of M
10. M and H absolute determination using deflection and vibration magnetometer.
11. Potentiometer-EMF of a thermocouple
12. Potentiometer- $X_0$ of thermistor.
13. Potentiometer-High range voltmeter calibration.
14. Ballistic Galvanometer –Figure of merit.
15. B.G.Absolute capacity of condenser.
16. B.G.-Absolute L
17. B.G-Absolute M
18. Anderson's bridge- AC self inductance of a coil.

**Section-B Using C language.**  
( Any three Experiments only)

19. Arranging words in alphabetical order.
20. Picking the largest and smallest of a set of numbers.
21. Solving quadratic equations.
22. Multiplication of two square matrices.
23. Integration-Simpson's rule/Trapezoidal method.
24. Solving Equation by Newton-Raphson's method.
25. Convert Celsius to Fahrenheit/Fahrenheit to Celsius

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Sl. No.: 16P9

Subject Code: U11PH6C11P

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**  
**B.Sc., PHYSICS- VI - SEMESTER-CORE COURSE -XI**  
(For the candidates admitted from 2011-2012 onwards)

**CORE PRACTICAL - IV**

**Section-A-ELECTRONICS**  
(Any 12 experiments only)

1. Series and Parallel resonance circuits(CRO can be used)
2. Single Stage-RC couples amplifier-Transistor.
3. Emitter follower amplifier-Frequency response.
4. Hartley Oscillator using transistor.
5. Colpitt's Oscillator.
6. Astable Multivibrator .
7. FET Characteristics.
8. FET amplifier.
9. Verification of Logic Gates-AND, OR, NOT, NAND, NOR and EXOR using Ic's-Truth Table
10. Universal Gates NAND/NOR and basic gates from Universal gates.
11. Adder and Subtractor- Op.-Amp.
12. Demorgan's theorem and Boolean Algebra.
13. OP-Amp- integrated and Differentiator.
14. JK Flip Flop using gates.

**Section-B-Microprocessor 8085(Any 3 only)**

15. 8-Bit Addition and Subtraction.
16. 8-bit Multiplication and Division.
17. Conversion from decimal to hexadecimal system.
18. Conversion from hexadecimal to decimal system.
19. Sum of N number.

Sl. No.: 1647

Subject Code: U11PH6C12

## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

### B.Sc., PHYSICS – VI SEMESTER – CORE COURSE - XII

(For the candidates admitted from 2011-12 onwards)

#### SOLID STATE PHYSICS

- UNIT- I      Crystal Structure:**  
Crystal Lattice – Primitive cell and Unit cell – Two and three Dimensional classes of crystals – Miller indices – Crystal Planes – Reciprocal lattice – Structure of Crystals – SC, FCC, BCC, and HCP – Non Bravais Lattice Structure – NaCl, CrCl, ZnS and Diamond structure.
- UNIT- II      X-Ray Diffraction:**  
Diffraction of X rays by crystals – Bragg’s law - Experimental methods Laue, Rotating Crystal, Powder photograph methods– Neutron diffraction – Absorption of X-rays – Classical theory.
- UNIT-III      Theory of Magnetism :**  
Different types of magnetic materials – Classical theory of dia and para magnetism – Quantum theory of Para magnetism – Quantum theory of ferromagnetism (Heissenberg’s model) – Anti Ferromagnetism and ferri magnetism.
- UNIT-IV      Di – Electrics :**  
Basic definition in Dielectrics – Different types of polarization - Frequency and temperature effects on polarization – Dielectric loss – Local field on internal field – Clausius – Mosotti relation – Determination of Dielectric constant.
- UNIT-V      Super Conductivity:**  
Super Conductors – Occurrence of super conductors (BCS theory). Properties of super conductor – Meissener effect – Josephson effect - Applications of super conductors.

#### References:

1. Introduction to Solid State Physics – C.Kittel Willey and sons
2. Solid State Physics – S.O.Pillai
3. Solid State Physics – Gupta – Saxena.
4. Material Science – Arumugam
5. Solid State Physics – P.K.Palanisamy.

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Sl. No.: 1648

Subject Code: U11PH6C13

## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

### B.Sc., PHYSICS – VI SEMESTER – CORE COURSE - XIII

(For the candidates admitted from 2011-2012 onwards)

#### WAVE MECHANICS AND NUCLEAR PHYSICS

##### UNIT- I Introduction

Black body radiation –Energy spectrum of a blackbody –Stefan’s-Boltzmann law- Wien’s displacement law- Rayleigh Jean’s law –Planck’s quantum theory of blackbody radiation – Photon and its properties – Laws of photo electric effect – Einstein’s photoelectric equation.

##### UNIT- II Dual Nature of Matter

De Broglie’s Concept of matter waves – De Broglie wave length – G.P. Thomson’s experiment for verifying de Broglie relation Davison - Germer experiment – Heisenberg’s uncertainty principle – Application of uncertainty principle.

##### UNIT-III Schrodinger’s Wave Equation

Wave function – Time independent and dependent Schrodinger’s wave equations- Applications –Particle in a box[ one dimension] –Electrons in a metal-Physical significance of the wave function- Eigen function and Eigen values – Expectation value.

##### UNIT-IV Basic Nuclear Properties

Nuclear Size, charge, Mass, Spin – Isotopes, Isomers – Nuclear magnetic dipole moments – Electric quadrapole moments – Mass defect - Binding energy – Packing fraction – Nuclear forces- Nuclear Models: Shell Model – Liquid drop model. Accelerator: Betatron – Proton synchrotron. Detectors: – Wilson’s cloud chamber – Bubble chamber.

##### UNIT-V Nuclear Reactions and Elementary Particles

Q-Value of Nuclear reaction – Nuclear Reaction cross section – Nuclear fission – Energy released in fission. Nuclear fusion – Source of solar energy – Plasma – Magnetic Bottle – Plasma confinement. Elementary particle: Baryons – Leptons – Measons – Strange particles.

##### Reference Books:

1. Modern Physics – S.Murugesan – S.Chand & Co.
2. Modern Physics – J.B.Rajan – S.Chand &Co
3. Modern Physics – G. Josr Robin A.Ubald Raj – Indira Publication.

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Sl. No.: 1649

Subject Code: U11PH6E2

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05**

**B.Sc., PHYSICS – VI SEMESTER – ELECTIVE COURSE – II**

(For the candidates admitted from 2011-2012 onwards)

**INTEGRATED ELECTRONICS**

**UNIT – I Basic Operational Amplifier:**

Operational Amplifier Architecture – Measurement of Operational Amplifier- Parameter frequency response compensation – Slew rate - CMRR- Inverting and Non- Inverting Operational Amplifier- Differential amplifier.

**Basic Uses of Operational Amplifier:**

Operational amplifier as sign and scale changer and phase shifter-Adder- Subtractors -Integrator - differentiator-D/A converter-A/D/ Converter-Operational Amplifier as a comparator.

**UNIT-II Binary Logic:**

Number system and logic gates- Boolean function- Complement of a function- Synthesis of Boolean function- Simplification of Boolean function-Karnaugh map (upto '4' variables) - Sum of products and product of sum simplifications.

**UNIT-III Combinational and Sequential Logic Circuits:**

Half adder, Full adder, Subtractor-code conversion-Comparators-Decoder, Encoders Multiplexer-Demultiplexer-Variou types of flip flops- (Clocked-RS Flip flop-JK Flip flop-D Flip Flop-D Flip Flop-Master slave flip flop-Shifter register-Counters.

**UNIT-IV Fabrication Of Integrated Circuits:**

Integrated Circuits – Monolithic – IC fabrication – Epitaxial growth – Etching and masking – IC components – Resistors – Capacitors – Diode – Transistors – IC Package integrator.

**UNIT-V Microprocessor:**

Introduction-Architecture of 8085-Memory organization-Register Structures-Addressing modes- Instruction set-Programming for addition-Subtraction-BCD addition-Greatest number and smallest number-sum of series.

**References:**

1. Interegrated Electronics- Mill Man Hakins –TMH
2. Fundamentals of Digital Electronics – Mavino and Leach
3. Microprocessor – B. Ram

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Sl. No.: 1650

Subject Code: U11PH6E3

## GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

### B.Sc PHYSICS – VI SEMESTER – ELECTIVE COURSE III

(For the candidates admitted from 2011-12 onwards)

#### NUMERICAL METHODS

- 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 – Method of Successive Approximations – Regular 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 – Jordan Method – Computation of Inverse of a Matrix Using Gauss – Elimination Method – Method of Triangularisation.
- UNIT-IV**      **Interpolation:**  
Linear Interpolation: Newton Forward Interpolation Formula and Backward Interpolation Formula. Interpolation with Unequal Intervals: Lagrange’s Interpolation Formula (No Derivation) Hermite’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 Formulae.

#### Text book:

1. Venkataraman, M.K. (1977) Numerical methods in Science and Engineering, National Publishing Company – Chennai.
2. Shastry, S.S. Introductory methods of numerical methods – Prentice – Hall Ltd.
3. Jain, Iyengar, S.R.K. and Jain R.K. Numerical methods for Scientific and Engineering Computation – New Age Publishers.

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