DEPARTMENT OF PHYSICS

B.Sc., PHYSICS SYLLABUS

(For the Candidates to be admitted from the year 2016-2017 onwards)



POOMPUHAR COLLEGE (AUTONOMOUS)

(of the Tamil Nadu H.R.& C.E Admn. Dept) (Accredited B+ By NAAC) MELAIYUR - 609 107

DEPARTMENT OF PHYSICS POOMPUHAR COLLEGE (AUTONOMOUS), MELAIYUR

COURSE STRUCTURE FOR UG COURSE UNDER CBSE (Applicable to the candidates admitted from the academic year 2016 – 2017 onwards)

SEMES	PART	SUBJECT	TITLE	HRS	CRED	EXA	MARKS
I	Ι	Tamil – I		6	3	3	100
	II	English – I		6	3	3	100
	III	First Allied – I		5	3	3	100
		First Allied – II		3	*	*	*
		Core Course – I	PROPERTIES OF MATTER AND ACOUSTICS	5	5	3	100
		Core Course – II	MAJOR PRACTICAL – I	3	*	*	*
	IV	Value Education	Value Education	2	2	3	100
Total				16	30	500	
	Ι	Tamil – II		6	3	3	100
	II	English – II		6	3	3	100
		First Allied – II		3	4	3	100
тт	ттт	First Allied – III		5	3	3	100
11	111	Core Course – II	MAJOR PRACTICAL – I	3	5	3	100
		Core Course – III	MECHANICS AND RELATIVITY	5	5	3	100
	IV	Environmental Studies	Environmental Studies	2	2	3	100
		Tota	1		25	30	700
	Ι	Tamil – III		6	3	3	100
	II	English – III		6	3	3	100
	III	Second Allied – I		5	3	3	100
III		Second Allied – II		3	*	*	*
		Core Course – IV	THERMAL PHYSICS	5	5	3	100
		Core Course – V	MAJOR PRACTICAL – II	3	*	*	*
	IV	Non Major Elective – I		2	2	3	100
Total					16	30	500
	Ι	Tamil – IV		6	3	3	100
	II	English – IV		6	3	3	100
	III	Second Allied – II		2	4	3	100
		Second Allied – III		5	3	3	100
IV		Core Course – V	MAJOR PRACTICAL – II	2	5	3	100
		Core Course – VI	OPTICS AND SPECTROSCOPY	5	5	3	100
	IV	Non Major Elective – II		2	2	3	100
		Skill Based Elective – I	ELECTRICAL INSTRUMENTS AND MEASUREMENTS	2	2	3	100
Total				27	30	800	

SEME ST	PAR T	SUBJECT	TITLE	HRS	CRE D	EXA M	MARK S
V	III	Core Course – VII	ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM	5	5	3	100
		Core Course – VIII	THEORETICAL PHYSICS	5	5	3	100
		Core Course – IX	ANALOG ELECTRONICS	5	5	3	100
		Core Course – X	MAJOR PRACTICAL – III	3	*	*	*
		Core Course – XI	MAJOR PRACTICAL – IV	3	*	*	*
		Major Based Elective–I	MICROPROCESSOR AND 'C' PROGRAMMING	5	4	3	100
	IV	Skill Based Elective - I	ELECTRIC MACHINES	2	2	3	100
		Skill Based Elective-III	ELECTRIAL WIRING	2	2	3	100
Total		Total		30	23		600
	III	Core Course – X	MAJOR PRACTICAL – III	3	5	3	100
		Core Course – XI	MAJOR PRACTICAL – IV	3	5	3	100
VI		Core Course – XII	ATOMIC AND NUCLEAR PHYSICS	6	5	3	100
		Core Course – XIII	DIGITAL ELECTRONICS	5	5	3	100
		Major Based Elective–II	MATERIALS SCIENCE	5	4	3	100
		Major Based Elective – III	OPTO ELECTRONICS AND FIBER OPTIC	5	5	3	100
	IV	Soft Skills Development	Soft Skills Development	2	2	3	100
		Gender Studies	Gender Studies	1	1	3	100
	V	Extension Activities	Extension Activities	-	1	-	-
Total			30	33		800	
Grand Total			180	140		3900	

Note: * Examination at the end of the even semester

List of Allied Courses

- 1. Allied Course I Mathematics
- 2. Allied Course II Chemistry

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks] The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks] The passing minimum for University Examinations **shall be 40% out of 60 marks [**i.e. 24 marks]

POOMPUHAR COLLEGE (AUTONOMOUS), MELAIYUR

COURSE STRUCTURE FOR ALL UG DEGREE COURSES (Applicable to the candidates admitted from the academic year 2016 – 2017 onwards)

PART	NAME OF THE PAPERS	NUMBER OF PAPERS	CREDITS
Ι	TAMIL	04	12
II	ENGLISH	04	12
	CORE (INCLUDING OPTIONAL)	16	78
III	FIRST ALLIED	03	10
	SECOND ALLIED	03	10
	NON-MAJOR ELECTIVE	02	04
	SKILLBASED ELECTIVE	03	06
IV	VALUE EDUCATION	01	02
	ENVIRONMENTAL STUDIES	01	02
	SOFT SKILLS DEVELOPMENT	01	02
	GENDER STUDIES	01	02
V	EXTENSION ACTIVITIES		01
	TOTAL	39	140

Question Paper Pattern

Question Paper Pattern (for Part I, II, III)

Total	75 marks
Part C Three questions out of five (One question from each unit)	3 x 10 = 30 marks
Part B Five questions (either or type) (One question from each unit)	5 x 5 = 25 marks
Part A Ten questions (Two questions from each unit – No choice)	10 x 2 = 20 marks

Question Paper Pattern (for Part IV only)

Total	75 marks
No unit shall be omitted)	
(Atleast one question from each unit, Not more than two questions from each unit	
Marks	
Three questions out of five.	3 x 15 = 45
Part B	
(One question from each unit)	
Three questions (either or type) marks	$3 \times 10 = 30$
Part A	

CORE COURSE I

Code:

PROPERTIES OF MATTER AND ACOUSTICS

UNIT – I Elasticity

Stress - strain - Hooke's law - 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 Bending of Beams

Bending of beams - Expression for bending moment - Cantilever - Expression for depression - Cantilever oscillations - 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 pin and Microscope.

UNIT – III Surface Tension

Definition and dimensions of surface tension - Molecular theory of surface tension -Excess of pressure inside a curved surface - application to a drop and soap bubble - Theory and determination of Surface tension and interfacial surface tension by drop weight method - interfacial surface tension - Variation of surface tension with temperature - Jaegar's experiment.

UNIT – IV Viscosity

Newton's law of viscous flow - Streamlined motion - Turbulent motion -Coefficient of viscosity and its dimension - Derivation of Poiseuilles' formula - Experiment to determine the coefficient of viscosity of liquid - Terminal velocity - Stoke's formula for highly viscous Liquids - experiment.

UNIT – V Acoustics

Fourier's theorem - Application to saw tooth wave and square wave - Music and noise Characteristics of musical sound, quality of tone, consonance and dissonance - musical scale - tempered scale - decibel - noise pollution - reverberation and time of reverberation - Sabine's formula - measurement of reverberation time absorption coefficient - Ultrasonics - production - Magneto striction Method properties and applications.

Books for Study :

- 1. R. Murugeshan, Properties of matter, S. Chand & Co. Pvt. Ltd., Revised edition, 2012.
- 2. D.S. Mathur, Elements of Properties of matter, S. Chand & Co. Pvt.Ltd., Revised edition, 2010
- 3. Brijlal & N. Subramanyam, Properties of matter, Vikas Publishng. Pvt. Ltd, 2005.
- 4. Brijlal & N. Subramanyam, 'A Text Book of Sound', Vikas Publishing. Pvt. Ltd, 2008

- 1. Feynman, *Lectures on Physics*. Vol. I & II by Richard P. Feynman, The New Millennium Edition, 2012.
- 2. David Halliday and Robert Resnick, Fundamentals of Physics by Wiley Plus., 2013.
- 3. B.H. Flowers and E. Mendoza, *Properties of matter*, Wiley Plus, 1991.
- 4. H.R. Gulati, Fundamentals of General properties of matter, S. Chand & Co. Pvt. Ltd, 2012.
- 5. Chatterjee and Sen Gupta, *A treatise on general properties of matter*, New central Books agency (p) Ltd, Kolkata, 2001.
- 6. R.L. Saihgal, A Text Book of Sound, S. Chand & Co. Pvt. Ltd, New Delhi.
- 7. Subramania lyer and Jeyaraman., Properties of matter
- 8. L.P. Sharma, H.C. Saxena, Oscillations, waves and sound.

CORE COURSE II

Code:

MAJOR PRACTICAL – I

Any twelve experiments

- 1. Non uniform bending Pin & Microscope
- 2. Uniform bending Single optic lever
- 3. Surface Tension Capillary rise method
- 4. Melde's experiment -T & L Mode
- 5. Compound pendulum g & k
- 6. Stoke's method Viscosity of highly viscous liquid.
- 7. Coefficient of viscosity of liquid-Poiseuille's flow method
- 8. Comparison of viscosity of two liquids Hare's apparatus
- 9. Potentiometer -Calibration of low range Voltmeter
- 10. Spectrometer μ of a solid prism
- 11.P.O box -Temperature coefficient of a coil
- 12. Meter bridge Specific resistance
- 13. Carey Foster's Bridge -Specific resistance
- 14. Surface Tension and interfacial Surface Tension Drop weight method.

Books for Study :

1. Dr. S. Somasundaram, Practical Physics, Apsara publications, Tiruchirapalli, 2012.

- 1. S. Srinivasan, A Text Book of Practical physics, S. Sultan Chand publications. 2005
- 2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi, 2011.

CORE COURSE III

Class: I - B.Sc., Physics

Code:

MECHANICS AND RELATIVITY

UNIT – I Projectile, Impulse and Impact

Projectiles - range - horizontal and inclined planes - Impulse - Impulsive force - Laws of impact - Impact of a smooth sphere on a smooth horizontal plane - Direct and oblique impacts between two spheres - Loss in kinetic energy.

UNIT – II Pendulum and centre of mass

Compound pendulum - Equivalent simple pendulum - Reversibility of centre of oscillation and suspension - Determination of g and radius of gyration period of oscillation of a Kater's Pendulum - Centre of mass - Velocity and acceleration of centre of mass - determination of motion of individual particle - system of variable mass - equation for a Rocket - Conservation of linear and angular momentum.

UNIT – III Gravitation

Newton's Law of Gravitation – Mass and density of earth – Inertial and Gravitation mass - Boy's method of determination of G - Gravitational potential and field due to spherical shell - Gravitational energy - centre of gravity of solid cone and tetrahedron - solid and hollow hemisphere.

UNIT – IV Centre of gravity, Centre of Pressure, Floating bodies

Centre of Pressure of vertical Rectangular lamina -Triangular lamina with Vertex at the surface - metacenter - metacentric height of a ship - Equation of continuity of flow - Euler's equation for unidirectional flow - Torricelli's theorem - Bernouli's theorem - Venturi Meter and Pitot tube.

UNIT – V Relativity

Frame of reference - Newtonian relativity - Galilean Transformation equations - Michelson Moreley experiment-Postulates of special theory of Relativity - Lorentz Transformation equations - length contraction-time dilation – Einstein mass - Energy Relation.

Books for study:

1. M. Narayanamurthi and N. Nagarathinam, *Dynamics*, The National Publishing Company 2005, Chennai.

2. M. Narayanamurthi and N. Nagarathinam, *Statics, Hydrostatics and Hydrodynamics* - The National Publishing Company 2005, Chennai.

Books for reference:

1. R. Murugesan, *Mechanics and Mathematical Physics*, S. Chand & Company Ltd., New Delhi, 2008. 2. D.S. Mathur, *Mechanics*, S. Chand & Company Ltd., New Delhi - 1990.

Code:

THERMAL PHYSICS

UNIT – I Specific Heat

Specific heat of solids -Einstein's theory of specific heat -Debye's theory -Specific heat of gases -Mayer's Relation - Quantization of various contributions to energy of diatomic molecules -Specific heat of diatomic gases - (Quantum Theory).

UNIT - II Conduction.

Coefficient of Thermal conductivity – Rectilinear flow of heat – Thermal conductivity of a good conductor – Forbe's method to find K - Lee's disc method for Bad conductors – Heat through a compound wall – Accreation of ice on Ponds –Electrical Conductivity- Wiedmann-Franz law.

UNIT – III Radiation

Radiation -Stefan's law Deduction of Newton's law from Stefan's law -Boltzmann law - Black body radiation - Wein's law - Rayleigh -Jean's law -Planck's law -Angstrom Pyrohelimeter -Solar constant -Surface temperature of Sun - Sources of solar energy.

UNIT – IV Low Temperature

Joule-Kelvin effect - Joule - Thomson's effect - Porous plug experiment -Liquefaction of gases - Linde's method -Adiabatic demagnetization -Liquefaction of He -Refrigerating mechanism -Air conditioning machines.

UNIT – V Thermodynamics

Zeroth law of thermodynamics -First law of thermodynamics - Heat engines - Reversible and irreversible process - Carnot's theorem -Second law of thermodynamics, Thermodynamic scale of temperature - Entropy -Change of entropy in reversible and irreversible processes - Temperature -entropy diagram (T.S) - Law of increase of entropy - Maxwell thermo dynamical relations -Clausius's Claypeyron's latent heat equations.

Books for Study:

1. Brijlaland Subramaniyam, Heat and Thermodynamics, S. Chand & Co., 2001.

2. J. B. Rajamand C. L Arora, Heat and Thermodynamics, S. Chand & Co.1983.

3. Brijlaland Subramaniyam, *Heat and Thermodynamics & Statistical physics*, S. Chand & Co. 2015.

Books for Reference:

1. M. Narayanamoorthy and N. Nagarathinam, *Heat*, National publishing Co, Chennai, Eight edition, 1987.

2. D.S. Mathur, Heat and Thermodynamics, S. Chand & Co. 2014.

CORE COURSE V

Code:

Class: II- B.Sc., Physics

MAJOR PRACTICAL – II

Any twelve experiments

- 1. Static Torsion -Determination of rigidity modulus.(η)
- 2. Torsional Pendulum Rigidity modulus(η) and moment of inertia(I)
- 3. Emissive power of a surface Spherical calorimeter.
- 4. Thermal conductivity of bad conductor Lee's disc method.
- 5. Specific heat capacity of liquid Newton's law of cooling
- 6. Joule's calorimeter Specific heat capacity of liquid.
- 7. Potentiometer -Ammeter calibration.
- 8. Potentiometer Determination of resistance.
- 9. Figure of merit of a Galvanometer.
- 10. Spectrometer μ of a liquid.
- 11. Spectrometer grating wavelength minimum deviation method.
- 12. Air Wedge Thickness of a wire.
- 13. Newton's rings Radius of curvature of a lens.
- 14. Construction of a full wave rectifier.
- 15. Characteristics of zener diode.

Books for Study :

1 Dr. S. Somasundaram, Practical Physics, Apsara publications, Tiruchirapalli, 2012.

Books for Reference:

S. Srinivasan, A Text Book of Practical physics, S. Sultan Chand publications, 2005.
 S. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi, 2011.

CORE COURSE VI

Code:

Class: II- B.Sc., Physics

OPTICS AND SPECTROSCOPY

UNIT – I Geometrical optics

Aberration in lenses - spherical aberration and methods of reducing it -Coma - Astigmatism - Aplanatic lenses - Chromatic aberration - Condition for achromatism of lenses in contact and separated by finite distance -Huygens and Ramdsen eyepieces.

UNIT – II Interference

Conditions for interference – Air wedge - Testing the planeness of surfaces -Newton's Rings - theory - determination of refractive index of a lens – Michelson interferometer -Haidinger's fringes - Determination of wavelength – wavelength separation.

UNIT – III Diffraction

Fresnel's diffraction – half period zone- rectilinear propagation of light - zone plate - Fraunhofer diffraction at single and double slits - plane diffraction Grating - Normal and Oblique incidences - absent spectra - overlapping of spectral lines - dispersive power of grating - resolving power of grating.

UNIT – IV Polarization

Polarization - double refraction - Nicol prism as a polarizer and analyzer - elliptically and circularlly polarized light - Quarter and Half wave plates - production and analysis of polarized light - dichroism - optical activity - Fresnel's explanation of rotation - Laurent's half shade polarimeter.

UNIT – V Spectroscopy

Electromagnetic spectrum - types of spectra-solar spectrum –Raman effect-Quantum theory of Raman effect - Instrumentation and application-Experimental verification UV-IR & FTIR spectra and applications.

Books for study:

- 1. Optics and Spectroscopy by R.Murugeshan and Kiruthiga Sivaprasath, S. Chand & Co., New Delhi (2006).
- 2. Dr. N. Subramaniyam, Brijlal and Dr.M.N. Avathanulu, *Optics*,S. Chand &Co. Pvt.Ltd.25 threvised edition , New Delhi ,2012 .
- 3. Dr. N. Subramaniyam, Brijlal and Dr.M.N. Avathanulu, *Otptics*, S. Chand & Co. Pvt. Ltd.- 9th revised edition, New Delhi ,2014.
- 4. Krishnapada Ghosh Anandamoy Manna, Text book of Physical Optics, McMillan India Ltd, First edition, 2007.

- 1. Singh & Agarwal, Optics and Atomic Physics, Pragati Prakashan Meerut, Nineth edition, 2002.
- 2. A.B. Gupta, *Modern Optics*, Books and allied (P) Ltd, Kolkata, First edition, 2006.
- 3. Ajoy Ghatak, Optics, (TMH), New Delhi, Fourth edition, 2009.
- 4. Arial Lipson, Stephen G.Lipson and Hentry Lipson, Optical Physics,
- 5. Cambrige, Fourth edition, 2011.
- 6. Schaum's outlines, Optics, Tata McGraw Hill, 2011.

SKILL BASED ELECTIVE I

Class: II- B.Sc., Physics

ELECTRICAL INSTRUMENTS AND MEASUREMENTS

UNIT – I

Absolute and secondary instruments - Electrical principles of operation - Essentials of indicating instruments - deflecting torque -Controlling torque - Damping torque - Moving iron ammeter and voltmeter - Attraction type M.I instruments-Repulsion type M.I. instruments - Sources of error.

UNIT – II

Moving coil instruments - Permanent magnet type instrument - Advantages and Disadvantages -Extension of range -voltmeter sensitivity – Multirange voltmeter.

UNIT – III

Dynamometer type instruments - Advantages and disadvantages -Thermocouple ammeter-Megger - Induction type voltmeter and ammeter - Induction ammeter - Induction voltmeter - Errors in induction instruments - Advantages and Disadvantages - Electrostatic voltmeter.

Book for study:

1. A textbook of Electrical Technology—Volume I- B.L.Theraja and A.K. Theraja

Code:

CORE COURSE VII

Code:

ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM

UNIT – I Electrostatics

Coulomb's inverse square law – Electric potential at a point due to a point charge - Gauss theorem - Intensity at a point due to a charged sphere and infinite plane charged conductor - Principle of a capacitor - Capacity of a spherical and cylindrical capacitors - Energy stored in a capacitor - Loss of energy due to sharing of charges - capacitors in series and parallel.

UNIT – II Current Electricity

Laplace's law and its applications - Field along the axis of a circular coil and Solenoid - Force on a conductor in a magnetic field — Theory of Ballistic Galvanometer -Figure of merit - Damping Correction – Kirchoff's laws -Wheatstone network - Carey Foster's Bridge –Potentiometer – principle calibration of ammeter - calibration of voltmeter.

UNIT – III Magnetism

Intensity of magnetization - Susceptibility –permeability and relation between them - Properties of para, dia and ferro magnetic materials -Hysterisis - B-H curve - application of BH curve - Ballistic galvanometer method for plotting B-H curve.

UNIT – IV DC & AC Circuits

Growth and decay of current in circuits containing L and R - Growth and decay of charge in a circuit containing C and R - High resistance by leakage-Alternating EMF applied to circuits containing L and R - C and R - L, C and R- Series and parallel resonance circuits - Sharpness of resonance - Q factor - Power in AC circuits - Power factor- Wattless current.

UNIT – V Electromagnetic Induction

Laws of electromagnetic induction - Self and mutual induction - Self inductance of a solenoid - Mutual inductance of a pair of solenoids - Coefficient of coupling - Experimental determination of self inductance by Rayleigh's method –Determination of mutual inductance.

Books for Study

- **1.** Brij lal and Subramaniyum Electricity and Magnetism S.Chand & Co.
- 2. R.Murugesan. Electricity and Magnetism, S.Chand & Co.

Books for Reference:

1. l..Narayanamoorthy and Nagaratnam, Electricity and Magnetism NPC, Chennai.

CORE COURSE VIII

Code:

Classical and Quantum Physics

UNIT – I Lagrangian formalism.

Mechanics for a system of particles – Degrees of freedom - Constraints -Generalized Co-ordinates - Transformation equations - Configuration space -Principle of virtual work-D Alembert's principle - Derivation of Lagrange's equations - Atwood's machine - Simple pendulum.

UNIT – II Hamiltonian formalism

Phase space - Generalized momentum - Cyclic co-ordinates - Conservation theorem for generalized momentum - Conservation theorem for energy – Hamilton's equations of motion from variational principle-Simple and Compound pendulum.

UNIT – III Dual Nature of Matter

De Broglie concept of matter waves - de Broglie wavelength - Wave velocity and group velocity – relation between them - Experimental study of matter waves - Davison and Germer experiment - G-P Thomson's experiment for verifying de Broglie relation - Heisenberg's uncertainty Principle - Gamma ray microscope - Electron microscope.

UNIT – IV Schrodinger's wave Mechanics

Basic postulates of wave Mechanics - Development of Schrodinger wave equation - Time independent and dependent equations - Properties of wave function - Eigen function and Eigen values - particle in a box.

UNIT – V Photo electric and Compton effects

Photo electric effect - Lenard, Richardson and Compton experiments laws of Photoelectric emission - Einstein's photoelectric equation -Millikan's experiment - Determination of Planck's constant - photo emissive cell - photo - voltaic cell - photo - conductive cell - photo multiplier -Compton effect - Theory - Experimental Verification.

Books for study:

1. S.L.Gupta., V. Kumar and H.V.Sharma, Pragathi Prakasan, *Classical Mechanics* Educational Publisher, Meerut, 25th edition, 2011.

2. Murughesan, R., Modern Physics, S.Chand & Co., New Delhi, 2006.

Books for Reference:

1. Arthur Beiser, Concept of Modern Physics: McGraw Hill Ed. V (1999).

2. H.Goldstein, Classical Mechanics, Narosa Book distributors, New Delhi 1980.

3. N.C.Rana and P.S.Joag, Classical Mechanics, Tata Mc Graw Hill, New Delhi 1991.

4. P M. Mathews and K. Venkatesan, A Text Book of Quantum Mechanics ,Tata McGrawHill, New Delhi, 1987.

Code:

ANALOG ELECTRONICS

UNIT – I Semiconductors and diodes

Intrinsic and extrinsic semi conductor - PN junction diode - Biasing of PN junction – V-I Characteristics of diode - Rectifiers - Half wave - full wave and bridge rectifiers - Break down mechanisms - Zener diode characteristics - Zener diode as voltage regulator.

UNIT – II Bipolar Transistors

Bipolar junction transistor - Basic configurations-current gains α and β - Relation between α and β - Characteristics of transistor - CB, CE mode - DC load line - DC bias and stabilization - fixed bias - voltage divider bias - Transistor as an amplifier - Transistor as a two port network - h Parameters.

UNIT – III Amplifiers and Oscillators

Single stage CE amplifier - Analysis by hybrid equivalent circuit - Power amplifiers - class B Power amplifier - Push - pull - its efficiency-General theory of feedback - Properties of negative feedback - Barkhausen's Criterion for oscillations - Hartley oscillator - Colpitt's oscillator.

UNIT – IV Special Semiconductor devices

FET - JFET - MOS FET (Depletion mode & Enhancement mode) - FET parameters - Comparison between FET and Transistor -Photo transistor - SCR - SCR as a switch - UJT - UJT relaxation oscillator.

UNIT – V Operational Amplifiers

Differential amplifier - Common mode rejection ratio - Characteristics of an ideal op-amp - Virtual ground - Inverting amplifier - Non inverting amplifier - Adder - subtractor - Integrator - Differentiator - Unity gain buffer.

Books for study

- 1) Mehta V.K., Principles of Electronics, S.Chand and company Ltd.
- 2) Chattopadhyay, D., Raxshit P.C.Sara, B.and Purkait, New Age International Ltd.

- 1) Theraja . B.L., Basic electronics solid state, S.Chand and Company Ltd (2002),
- 2) Sedha R.S., A text book of applied Electronics, S.Chand & company Ltd (2002).

Code:

MAJOR PRACTICAL – III

SECTION - A

Any 12 experiments only:

- 1. Spectrometer i-d curve
- 2. Spectrometer i-i' curve
- 3. Spectrometer- Dispersive power of prism.
- 4. Field along the axis of a coil determination of M.
- 5. Potentiometer EMF of a thermocouple.
- 6. Potentiometer Temperature coefficient of thermistor.
- 7. Ballistic Galvanometer-Figure of merit
- 8. Anderson's bridge self inductance of a coil.
- 9. Series and Parallel resonant circuits.
- 10. Koenig's method-Uniform bending
- 11. Spectrometer-Grating-Normal incidence.-wave length
- 12. Spectrometer Grating dispersive power. minimum deviation
- 13. Spectrometer ~ Cauchy's constants.
- 15. M and H Absolute determination using deflection and vibration magnetometer.
- 16. Potentiometer High range voltmeter calibration
- 17. B.G. Absolute capacity of condenser.
- 18. B.G.-Absolute determination of M.
- 19. Conversion of centigrade to Fahrenheit- using C programming.
- 20. Arranging numbers in ascending order/descending order- using C programming
- 21. Calculation of volume of sphere/cone/cube/rectangular cubiod- using C programming
- 22. Solving quadratic equation- using C programming
- 23. Sum of digits of a number- using C programming

Books for Study :

1. Dr. S. Somasundaram, *Practical Physics*, Apsara publications, Tiruchirapalli, 2012.

Books for Reference:

1. S. Srinivasan, A Text Book of Practical physics, S. Sultan Chand publications. 2005

2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi, 2011.

CORE COURSE XI

Code:

MAJOR PRACTICAL-IV

SECTION-B

Any twelve experiments

- 1. Regulated power supply using Zener diode- Percentage of voltage regulation.
- 2. Single stage CE amplifier Transistor
- 3. Hartley oscillator using transistor.
- 4. FET Characteristics.
- 5. AND, OR and NOT gates using discrete components Truth table
- 6. AND, OR and NOT gates using Integrated circuits
- 7. Op-Amp -Adder and Subtractor.
- 8. Op Amp Integrator and Differentiator
- 9. Emitter follower amplifier Frequency response.
- 10. Colpitt's oscillator using transistor.
- 11.Astable multivibrator using Op.Amp
- 12. Monostable Multivibrator-Transistor
- 13. Monostable Op.Amp
- 14.FET amplifier.
- 15. Universality of NAND and NOR gates
- 16.Demorgan's theorem and Boolean algebra- verification
- 17. SR Flip Flop circuit using gates.
- 18. Half Adder using gates
- 19. Half Subtractor using gates
- 20. 8-bit addition and 8-bit subtraction- using µp 8085.
- 21. 8-bit multiplication and Division- using µp 8085
- 22. Conversion from decimal to hexadecimal system- using µp 8085.
- 23. Conversion from hexadecimal to decimal system- using µp 8085
- 24. 16-bit addition- using µp 8085.
- 25. Conversion of binary to hexadecimal using µp 8085.
- 26. Conversion of hexadecimal to binary- using µp 8085.

Books for Study :

1. Dr.S.Somasundaram, Practical Physics, Apsara publications, Tiruchirapalli, 2012.

- 1. S.Srinivasan, A Text Book of Practical physics, S.Sultan Chand publications, 2005.
- 2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi, 2011.

MAJOR BASED ELECTIVE I

Code:

Class: III- B.Sc., Physics

MICROPROCESSOR AND 'C' PROGRAMMING

UNIT I Basics of Digital Computer

Basic components of a digital computer - Evolution of microprocessors - Important INTEL microprocessors - Hardware, Software and Firmware - Memory - Semiconductor memories - RAM, ROM - Flash memory - CCD memory - Cache memory - Buses.

UNIT II Intel 8085 and its Architecture

INTEL 8085 - Pin Diagram - Architecture - Various registers - Status Flags - Interrupts and their order of priority - Addressing modes - Direct, Register, Register indirect, Immediate and implicit addressing - Instruction set of 8085 (five modes).

UNIT III 8085 Programming

Addition - subtraction - multiplication -division of two 8 - bit numbers - Finding the largest and smallest number in a data array - Arranging a list of numbers in ascending or descending order-complement - shift - mask-look up table - multi byte addition and subtraction - decimal addition - subtraction.

UNIT IV Introduction to C

Basic Structure of C Programs – Character set – C tokens - Keywords and identifiers – constants – variables – Data types – declaration of variables – Assigning values to variables – Symbolic constants - Arithmetic operators - Relational, Logical and Assignment operators, Increment and Decrement operators – Conditional operator, Bitwise and Special operators – Arithmetic Expressions – Mathematical functions.

UNIT V Control Statements and Arrays

Data input and output – getchar, putchar, scanf, printf, gets, puts functions – Decision making and branching –if, if...else, else if ladder, switch, break, continue, goto – Decision making and looping – while, do... while, for, nested loops –Arrays (one -, two- and multi-dimensional arrays) - Declaration, Initialization of arrays.

Books for study:

1. B. Ram – *Fundamentals of Microprocessors and Microcontrollers*–Dhanpat Rai Publications (P) Ltd., New Delhi, 2013.

2. E. Balagurusamy – *Programming in ANSI C* – Tata McGraw Hill Education Private Limited, New Delhi, 2012.

Books For Reference:

1. R. S.Gaonkar-*Microprocessor Architecture, Programming, and Applications with the* 8085, Penram International Publishing (India) Private Limited, Mumbai 2007.

2. K. R. Venugopal and S. R. Prasad – *Programming with C* – Tata McGraw-Hill Publishing Company Limited, New Delhi, 2002.

SKILL BASED ELECTIVE II

Code:

Class: III- B.Sc., Physics

ELECTRIC MACHINES

UNIT I

Generation of alternating voltages and currents - Equations of the alternating voltages and currents - simple waveforms - complex waveforms – cycle -Time period - Frequency-Amplitude - Different forms of emf equations - Generator principle - simple loop generator yoke-pole cores and pole shoes - pole coils - Armature core - Armature windings – commutator - Brushes and Bearings.

UNIT II

DC motor - principle-comparison of generator and motor action significance of back emf - voltage equation of a motor - condition for maximum power - Motor characteristics - characteristics of series motor- characteristics of shunt motor - compound motors comparison of shunt and series motor - losses and efficiency.

UNIT III

Transformer - working principle of transformer – construction - Types of transformers - core and shell -Type transformer - Theory of ideal transformer - EMF equations - voltage ratio.

Book for study:S

- 1. A textbook of Electrical Technology Volume 1 B.L. Theraja and A.K. Theraja
- 2. A textbook of Electrical Technology Volume 2 B.L. Theraja and A.K. Theraja

SKILL BASED ELECTIVE III

Code:

Class: III- B.Sc., Physics

ELECTRICAL WIRING

UNIT I

Tools- Screw Drivers- pliers- packet knife- Hammers- wooden sawscratch awl- Hand drill- Ratchet bit brace- Auger bits- Raw plug tool-Hacksaw-centre punch- Twist drill- Putty knife-Blow lamp.

UNIT II

Sizes of wire-standard wire-Types of wires-Rubber covered, tapped, braided, compounded wires-Lead alloy sheathed wires-tough rubber sheathed wires-weather proof wires-Flexible wire- Method of installing wiring-cleat wiring - Tough rubber sheathed wiring- Lead sheathed wiring-Installation of conduit wiring.

UNIT III

Switches-surface switch- Flush switches-pull switches-Grid switches-Architrave switch-Rotary snap switches-Push button switches- Wiring system- looping in system- wiring of building- tree system- Ring system-Lamp circuits- simple circuits- series, parallel circuits- Master switch circuits.

Books for Study

1. Electrical Wiring, Estimating & Casting - SL. UPPAL

CORE COURSE XII

Code:

Class: III- B.Sc., Physics

ATOMIC AND NUCLEAR PHYSICS

Unit I Cathode Rays and positive Rays

Cathode rays - properties - charge of cathode rays - Millikan's oil drop method - Positive rays - Properties - e/m of Positive rays using Thomson's parabola method - Bainbridge- Aston's mass spectrograph - Determination of critical Potential - Franck and Hertz's experiment - Davison and Germer method.

Unit II Vector Atom model

Quantum numbers - L-S and j-j Couplings - Pauli's exclusion principle - electronic configuration of elements and periodic table - magnetic dipole moment of electron due to orbital and spin motion - Bohr magneton - Stern and Gelach experiment.

Unit III Fine structure of spectral line

Spectral terms and notations - selection rules- intensity rule - Fine structure of sodium D lines - Alkali spectra - Fine structure in Alkali spectra - Zeeman effect - Larmor's theorem - Debye's quantum mechanical explanation of the normal Zeeman effect - Anamolous Zeeman effect - theoretical explanation, Lande 'g' factor and explanation of splitting of D_1 and D_2 lines of sodium.

Unit IV Nuclear Properties and Accelerators

Review of basic properties of nuclei - mass, radius, binding energy, nuclear moments - isotopes - isobars - radioactivity Cyclotron - Betatron - Geiger Muller counter -Wilson cloud chamber – types of nuclear reaction - properities of γ rays - Half life-mean life - discovery of neutron - positron.

Unit V Nuclear Fission and Fusion

Liquid Drop Model - application to fission, fission fragments - Basic ideas of a nuclear reactor - thermonuclear reactions - Bethe's Theory of fusion solar energy - hydrogen bomb - Basic classification of subatomic particles – protons - leptons - mesons - baryons.

Books for study:

- 1. R. Murugesan, KiruthigaSivaprasath, Modern Physics, S. Chand & Co Ltd., New Delhi, 14th Revised edition, 2014.
- 2. J.B. Rajam, Atomic Physics, S. Chand & Co Ltd., New Delhi, Revised edition, 2009.
- 3. Gupta & Roy., Physics of the Nucleus, Books and Allied (P) Ltd. Kolkatta, 2011 .

- 1. Sehgal, Chopra and Sehgal, Modern physics, Sultan Chand & Sons, New Delhi.
- 2. Arthur Beiser, Shobhit Mahajan, S. RaiChoudhury, *Concepts of Modern Physics*, Sixth edition, SIE, 2009.
- 3. S.N. Ghoshal, Atomic Physics, S. Chand & Co Ltd., New Delhi, Revised edition, 2004.
- 4. S. N. Ghoshal, Nuclear Physics , S. Chand & Co., Edition ,2003.
- 5. M L Pandya& R. P. S. Yadav, *Elements of Nuclear Physics*, Kedaar Nath & Ram Nath ,2000.
- 6. SatyaPrakash, Nuclear Physics, A Pragati Prakasan Publication, 2011.
- 7. Jahan Singh, Fundamentals of Nuclear Physics, A Pragati Publication, 2012.
- 8. D.C.Tayal, Nuclear Physics, Himalaya Publishing House, 2009

CORE COURSE XIII

Code:

Class: III- B.Sc., Physics

DIGITAL ELECTRONICS

Unit I Number Systems and Logic Gates

Introduction to decimal, binary, octal, hexadecimal number systems – Inter conversions - One's and two's complements - Simple binary arithmetic operations - Addition, subtraction, multiplication and division – Binary subtraction using one's and two's complements - Positive and negative logic - Basic and derived logic gates, symbols and their truth tables - AND, OR, NOT, NAND, NOR, XOR, and XNOR.

Unit II Boolean algebra and Simplification of Logic Expressions

Boolean algebra - Basic laws of Boolean algebra- De-Morgan's theorems-Universality of NAND and NOR gates - Reducing Boolean expressions using Boolean laws - SOP and POS forms of expressions - minterms and maxterms - Karnaugh map simplification.

Unit III Combinational digital Systems

Half adder- full adder - Binary adder - Half subtractor- full subtractor -Binary subtractor Two's complement adder / subractor circuits - Decoder -Encoder - Multiplexer - Demultiplexer.

Unit IV Timer and flip flops

555 timer - monostable multivibrator - Astable multivibrator- logic gate-Flip flop – RS flip flop - clocked RS flip flop-JK flip flop- J-K master slave flip flop – T flip flop and D flip flop.

Unit V Counters and registers

Binary Counter – ring Counter - Four bit asynchronous Counter - ripple counter - Mod - 10 counter - Synchronous counter - Shift registers – shift left register - shift right register.

Books for Study

1. Digital Principles and Application, A.P. Malvino, D.P.Leach, IV Edition, McGraw Hill, New Delhi, 1986.

2. Digital Fundamentals, V. Vijayendran, S.Viswanathan, Printers & Publishers Private Ltd, Chennai, 2004.

3. Fundamentals of Microprocessor - 8085, V. Vijayendran, S.Viswanathan, Primes & Publishers rivate Ltd, Chennai, 2004.

Books for Reference

1. Fundamentals of Microprocessor and Microcomputers, B.Ram, Dhanpat Rai Publications, New Delhi, 2006, Digital Electronics, W.H.Gothmann, Prentice Hal! of India, Pvt, New Delhi 1996.

2. Fundamentals of Digital Electronics and Micropocessors, Anokh Singh, A.K.Chhabra, Chand & Co, New Delhi, 2003

MAJOR BASED ELECTIVE II

Code:

Class: III- B.Sc., Physics

MATERIALS SCIENCE

Unit I Chemical Bonds

Inter atomic – forces - Different types of chemical bonds - Ionic covalent bond or homopolar bond - Metallic bond - Dispersion bond - Dipole bond -Hydrogen bond – lattice energy of Nacl crystal.

Unit II Elementary crystallography

Space lattice-unit cell - lattice parameters –Types and structure of crystal -Bravais Lattice - Miller indices - symmetry elements - centre of symmetry plane of symmetry and axis of symmetry – cubic lattice - SC – BCC- FCC sodium chloride and Diamond crystal structures.

Unit III New Materials

Metallic glass and its applications - Fiber reinforced metals - SAW Materials and its applications - Biomaterials - ceramic - Nuclear engineering materials - Nanophase materials - SMART materials - conducting polymers - optical materials.

Unit IV Super conducting materials

Superconductivity – properties - Meissner's effect - types of superconductors - Type I and Type II – High temperature superconductors - Josephson effects and it applications – SQUIDS - Applications of superconductor.

Unit V Non Destructive Testing

Radiographic methods – X ray and Gamma ray radiographs-comparison -Liquid penetrate method - Magnetic methods - Ultrasonic methods -Metallurgical microscope - Electron microscope and SEM - Material processing using laser - powder metallurgy.

Books for study:

- 1. Materials Science by M.Arumugam, Anuradha Publishers'.1990 idayalkaruppur, Kumbakonam.
- 2. Dr. M.N. Avadhanulu, Material science, S.Chand & Company, New Delhi, 2014.

- 1. V. Raghavan, Material Science and Engineering, Printice Hall India., 2004.
- 2. V. Rajendran, Material Science, Tata McGraw Hill Ltd, New Delhi,2001.

MAJOR BASED ELECTIVE III

Code:

Class: III- B.Sc., Physics

OPTO ELECTRONICS AND FIBER OPTICS

Unit I Interaction of Light with Matter

Introduction - Absorption - optical absorption in metals, dielectrics and semiconductors - Reflection - trap - excitons - colour centers -Generation of colour centers - Luminescence – photo Luminescence.

Unit II Opto electronic Materials

Construction of LED - Advantages of LEDs in electronic display – LCD - Characteristics of LCD materials - Action of LCD display device – Photodetectors – Expression for photo conductivity gain - Detector performance parameters - Photo conductive materials - Photo diode – LDR – Phototransistors.

Unit III Lasers

Introduction - Stimulated emission - Einstein's coefficients - Absorption and amplification of radiation - Optical feed back - Threshold condition for lasing - Properties of lasers - Radiant power, Coherence - Coherence length - Laser spot size - Beam divergence, - CO_2 laser, semiconductor laser – Applications of Laser.

Unit IV Fiber optic Communication

Introduction - Principles of light transmission in a fiber - Numerical aperture - Fiber profiles - Modes of propagation - Losses in fibers - Light sources -Laser diode - Light detector - Avalanche photo diode - Fiber optic communication link (Block diagram) - Advantages of fiber optics communication.

Unit V Optical Data Storage

Surface Storage - Phase change recording - Magneto optical data storage - Hi- tech evolved in system development - Automatic focussing - Automatic track following- capacity of CD - advantages of CD - holographic storage - Construction of a hologram - Reconstruction of a hologram.

Books for study

1. Palanisamy P.K.Semiconductor Physics and Opto electronics, Ed II Scitech - ublications. (2003),

2. Palanisamy P.K. Material Science Ed If Scitech (2003).

3. Tripathi K.N, Mathur P.C, Ainashi Kapoor, Yinod K. Sharma, Opto electronics – BS Publications (2004).

ALLIED PHYSICS I

Code:

Class: I- B.Sc., Maths & Chemistry

UNIT-I Mechanics

Centre of Gravity – Centre of Gravity of a solid hemisphere and hollow hemisphere - solid cone - Centre of Gravity of a solid tetrahedron.

States of Equilibrium: Equilibrium of a rigid body – Stable, unstable and neutral equilibrium – Example.

Stability of Floating bodies - Metacentre - Determination of Metacentric height of a ship.

UNIT-II Properties of matter

Elasticity – Stress – Strain – Young's modulus - Bending of beams – Expression for the bending moment – Determination of Young's modulus by bending of a beam – Non uniform bending and Uniform bending.

Viscosity - Streamline flow and Turbulent flow - Poissullie's flow– Determination of coefficient of viscosity of a liquid.

Surface Tension - Drop weight method - Surface tension and interfacial tension.

UNIT-III Sound

Simple Harmonic Motion – composition of simple harmonic motion - along a straight line- at right angles to each other- Lissajou's figures and their applications - Intensity of Sound - Decibel, Phonon - Intensity measurement by hotwire microphone method - Acoustics of buildings - Ultrasonics - Production by Mangnetostriction method - Properties and applications.

UNIT –IV Thermal Physics

Newton's law of cooling - verification - Specific Heat Capacity of a liquid by Cooling - Coefficient of thermal conductivity - bad conductor- Lee's Disc Method - Stefan's Law of radiation - solar constant - Angstrom's pyroheliometer -Temperature of the sun.

UNIT -V Optics

Interference - Introduction – Air wedge – Newton's rings – Colours of thin films. Diffraction - Plane diffraction Grating – Theory of plane transmission Grating.

Polarization – Nicol prism as polarizer and analyzer- Quarter wave plate – Half wave plate – Production and detection of plane, circularly and elliptically polarized light – Specific rotatory power – Determination of specific rotatory power using Laurent's half shade Polarimeter.

Books for study

- 1. 1.Allied Physics I, Prof. A. Sundaravelusamy.
- 2. R. Murugeshan, Properties of matter, S. Chand & Co. Pvt. Ltd., Revised edition, 2012.
- 3. Narayanamoorthyand N. Nagarathinam , *Mechanics Part II*, The National ublishing Company , Chennai, 2005.
- 4. Dr.N. Subramaniyam,Brijlal and Dr.M.N.Avathanulu,Optics, S. Chand &Co. Pvt.Ltd.- 25 th revised edition, New Delhi, 2012.
- 5. V.Vijayendran, S.Viswanathan, *Digital Fundamentals*, Printers & Publishers Private Ltd, Chennai, 2004.

- 1. Brijlal and Subramaniyan, Properties of Matter, S. Chand & Co.Pvt.Ltd.2005.
- 2. Brijlal and Subramaniyan., Thermal Physics, S. Chand & Co 2001.

- Murugeshan and Kiruthiga Sivaprasath., A Text Book of Optics., S.Chand & Co. vt.Ltd.- 9 th revised edition Ramnagar 2014, Newdelhi-110055.
 Mehta V.K., Principles of Electronics, S.Chand and company Ltd, 2014

ALLIED PHYSICS II

Code:

Class: I- B.Sc., Maths & Chemistry

PRACTICALS

Any Twelve Experiments

- 1. Young's Modulus Non uniform bending pin and Microscope.
- 2. Rigidity modulus Torsional pendulum.
- 3. Uniform bending scale and Telescope.
- 4. Surface tension Drop weight method interfacial surface tension between two liquids drop weight method.
- 5. Viscosity of a liquid comparision of viscosities Hare's apparatus.
- 6. Specific heart capacity of a liquid Newton's law of Cooling
- 7. Specific heat capacity of a liquid Joule's calorimeter
- 8. Meter bridge Specific Resistance
- 9. Carry Foster's Bridge Specific Resistance Determination.
- 10.Potentiometer calibration of low range voltmeter
- 11. Thermal conductivity of a bad conductor Lee's disc method.
- 12. Table galvanometer Figure of merit
- 13.Spectrometer Refractive index of glass prism
- 14.Spectrometer Mercury spectrum grating minimum deviation method
- 15.Air wedge Thickness of the given thin wire.
- 16. Characteristics of a Zener diode
- 17.AND, OR, NOT, Logic gates- Verification of truth tables using discrete components.
- 18.AND, OR, NOT, Logic gates using integrated circuit.

Books for Study :

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

- 1. S.Srinivasan, A Text Book of Practical physics., S.Sultanch and publications.
- 2. Department of Physics, Practical Physics, (B.Sc Physics Main), St.Joseph's College, Tiruchirapalli 1998.

ALLIED PHYSICS III

Code:

Class: I- B.Sc., Maths & Chemistry

UNIT – I Electrostatics

Electric charge - Coulomb's Law -Electric field-Electric intensity and Electric potential due to a point charge - Gauss Theorem - Application to electric intensity due to infinite plane sheet - Capacitors - Principle of a capacitor - Energy of a charged Capacitor - Sharing of charges and loss of energy - Capacity of a parallel plate capacitor.

UNIT – II Magnetism

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

UNIT – III Atomic Physics

Sommerfield - Vector atom Models - various quantum numbers and quantization of orbits - Pauli's exclusion principle -X-rays - Continuous and Characteristic X-rays - Moseley'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 - elementary particles and their classifications.

UNIT – V Digital Electronics

Decimal, binary, octal and hexa decimal number systems and their mutual conversions - Basic logic Gates - AND. OR, NOT - Universal Gates - NOR, NAND -Boolean Algebra - Laws of Boolean Algebra - Demorgan's theorem -Truth table verification- Half adder and Half subtraction using gates.

Books for Study:

1. R. Murugesan., *Electricity and Magnetism.* S. Chand & Co, New Delhi, Third Revised edition, 2001.

2. R. Murugeshan, Kiruthiga Sivaprasath, Modern Physics., S. Chand & Co, New Delhi, First edition, 1984,.

3. R. S. Sedha, A text book of Digital Electronics, S. Chand & Co, New Delhi, First edition ,2004.

Books for Reference:

1. Narayanamurthi, *Electricity and Magnetism*, The National Publishing Co, First edition, 1988.

2. J. B. Rajam, Atomic Physics., S. Chand & Company Limited, New Delhi, First edition, 1990.

3. B. N. Srivastava, Basic Nuclear Physic, Pragati Prakashan, Meerut, 2005.

4. Albert Paul Malvino, *Digital principles and Applications*, McGraw-Hill International ditions, New York, 2002.

NON MAJOR ELECTIVE I

Code:

Class: II - B.Sc., B.Com., B.A

ENERGY PHYSICS

Unit I Conventional and Solar Energy Sources

World's reserve of commercial energy sources and their availability -Coal, oil and natural gas - applications - Merits and Demerits-Renewable - renewable and conventional energy comparison - solar energy - solar water heater - water desalination -Photovoltaic generation - merits and demerits

Unit II Biomass energy and its Utilization

Biomass energy - classification - photosynthesis - Biomass conversion process.- Gobar gas plants (KVIC) - wood gasification - advantages & disadvantages of biomass energy source.

Unit III: Other forms of energy sources

Geothermal energy - wind energy - Ocean thermal energy conversion - energy waves - tides - Applications - Merits and Demerits.

Books for Study:

1. D.P. Kothari, K.C. Singal & Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India Pvt. Ltd., New Delhi (2008).

2. Suhas P Sukhatme, Solar energy -- Principles of thermal collection and storage, Tata McGraw-Hill Publishing company, New Delhi, Second edition, 2012.

Books for Reference:

1.Renewable Energy sources and their environmental impact - S.A. Abbasi and Nas Abbasi PHI Learning Pvt. Ltd., New Delhi (2008).

NON MAJOR ELECTIVE II

Code:

Class: II - B.Sc., B.Com., B.A

LASER PHYSICS

Unit I: Fundamentals of LASER

Laser Characteristics - Spontaneous emission - stimulated emission -Einsteins Coefficients - meta stable state - Principle of laser -Population inversion - pumping.

Unit II: Production of LASER & Industrial Applications

Helium - Neon Laser - Ruby Laser - CO_2 Laser - Semiconductor Laser - Laser cutting - welding - drilling - Hologram - Recording and reconstruction of hologram.

Unit III: Lasers in Medicine & communication

Lasers in Surgery - Lasers in ophthalmology - Lasers in cancer treatment- Optic fibre, communication - Total internal reflection -Block diagram of fibre optic communication system - Advantages of fibre optic communication.

Book for Study:

1. An introduction to LASERS - N. Avadhanulu, S. Chand & Company (2001)

- Laser fundamentals William T. SiifVast Cambridge University Press - Published in South Asia by foundation books, 23, Ansari Road, New Delhi
- 2. LASER Theory and Application K. Thyagarajan and AX Ghatak, Mac millan, India" Ltd.