

PERIYAR EVR COLLEGE (AUTONOMOUS & ACCREDITED), TIRUCHIRAPPALLI - 23

PG AND RESEARCH DEPARTMENT OF PHYSICS

B.Sc. PHYSICS (2018 - 19 ONWARDS)

COURSE PATTERN

S. No	COURSE TITLE			Exam Hours	Hours	Credits	Internal Exam	External Exam	Total
SEMESTER I									
01	Part I	TAMIL I	Tamil I	3	6	3	25	75	100
02	Part II	ENGLISH I	English I	3	6	3	25	75	100
03	Part III	CORE I	Properties of Matter and Acoustics	3	6	6	25	75	100
04		CORE-P II*	Practical-I General and Electronics	3	2	-	-	-	
05		ALLIED I	Allied Mathematics I	3	4	4	25	75	100
06		ALLIED-P II*	Allied Mathematics II	3	2	-	-	-	
07	Part IV	VE	Value Education	3	2	2	25	75	100
08		SBE I	Ms Word & Power Point Presentation Practicals	3	2	2	40	60	100
Total					30	20	165	435	600
SEMESTER II									
09	Part I	TAMIL II	Tamil II	3	6	3	25	75	100
10	Part II	ENGLISH II	English II	3	6	3	25	75	100
11	Part III	CORE III	Mechanics and Relativity	3	6	6	25	75	100
12		CORE-P II*	Practical-I General and Electronics	3	4	4	40	60	100
13		ALLIED-P II*	Allied Mathematics II	3	2	2	25	75	100
14	Part IV	ALLIED- III	Allied Mathematics III	3	4	4	25	75	100
15		ES	Environmental Studies	3	2	2	25	75	100
Total					30	24	190	510	700
SEMESTER III									
16	Part I	TAMIL III	Tamil III	3	6	3	25	75	100
17	Part II	ENGLISH III	English III	3	6	3	25	75	100
18	Part III	CORE IV	Heat and Thermodynamics	3	4	4	25	75	100
19		CORE-P V*	Practical II General and Electronics	3	2	-	-	-	
20		ALLIED IV	Allied Chemistry - I	3	4	4	25	75	100
21		ALLIED-P V*	Allied Chemistry Practical	3	2	-	-	-	
22		ME I	Energy Physics	3	4	4	25	75	100
23	Part IV	SBE II	MS-Excel Practical	3	2	2	40	60	100
Total					30	20	165	435	600
SEMESTER IV									
24	Part I	TAMIL IV	Tamil IV	3	6	3	25	75	100
25	Part II	ENGLISH IV	English IV	3	6	3	25	75	100
26	Part III	CORE VI	Optics and Spectroscopy	3	6	6	25	75	100
27		CORE-P V*	General and Electronics Practical	3	4	4	40	60	100
28		ALLIED-P V*	Allied Chemistry Practical	3	2	2	40	60	100
29		ALLIED- VI	Allied Chemistry II	3	4	4	25	75	100
30	Part IV	NME I	Applied Chemistry	3	2	2	25	75	100
Total					30	24	205	495	700

S.No	COURSE TITLE			Exam Hours	Hours	Credits	Internal Exam	External Exam	Total
SEMESTER V									
31	Part III	CORE VII	Electricity and Magnetism	3	6	5	25	75	100
32		CORE VIII	Atomic Physics	3	6	4	25	75	100
33		CORE IX	Basic Electronics	3	6	4	25	75	100
34		CORE- P X	Practical III- General and Electronics	3	4	4	40	60	100
35		ME II	Programming in C	3	4	4	25	75	100
36	Part IV	NME II	Chemistry in Every Day Life	3	2	2	25	75	100
		SSD	Soft Skill Development	3	2	2	25	75	100
37	Part V	EA	Extension Activity	3		1	25	75	100
Total					30	26	215	585	800
SEMESTER VI									
38	Part III	CORE XI	Wave mechanics and Nuclear Physics	3	6	5	25	75	100
39		CORE XII	Solid State Physics	3	6	5	25	75	100
40		CORE XIII	Digital Electronics	3	5	5	25	75	100
41		CORE-P XIV	Practical IV- General and Electronics	3	5	4	40	60	100
42		ME III	Electronic Instrumentation	3	5	4	25	75	100
43	Part IV	SBE III	Desktop Publishing Lab	3	2	2	40	60	100
44	Part V	GE	Gender Equality	3	1	1	25	75	100
Total					30	26	205	495	700
Grand Total					180	140	1145	2985	4100

Non Major Electives offered by Department of Physics

S. No	Title	Department	Semester
1	Everyday Physics	Chemistry	IV
2	Non conventional energy resources	Chemistry	V

Skill based Electives offered by Department of physics

S. No	Title	Department	Semester
1	MS Word Practical's	Physics	I
2	MS Excel Practicals	Physics	III
3	Desktop Publishing Lab	Physics	VI

PROPERTIES OF MATTER AND ACOUSTICS***UNIT I: ELASTICITY***

Stress, Strain – Moduli of elasticity – Work done – Relation between elastic moduli – Poisson's ratio σ
- Couple per unit twist – Determination of rigidity modulus by static torsion method – Bending moment – Cantilever – Non – uniform bending: pin and microscope method – Searle's method for η , n , and σ .

UNIT II: VISCOSITY AND SURFACE TENSION

Motion in a viscous medium – Coefficient of viscosity and its dimension – Poiseuille's formula – Experiment to determine the coefficient of viscosity of a liquid - Stoke's formula and Experiment – Surface Tension: Definition, Explanation – Excess of pressure inside a curved surface – Surface Tension by drop weight method – Interfacial Surface Tension – Experiment - Variation of S.T. with temperature.

UNIT III: GRAVITATION AND SPACE PHYSICS

Newton's law – Boy's method of finding 'g' – Gravitational potential and Intensity due to a sphere and shell – Variation of 'g' with altitude, latitude and rotation of earth – Escape velocity – Stationary orbits – Orbital velocity – Launching of satellites (basic ideas).

UNIT IV: OSMOSIS AND DIFFUSION

Osmosis – Osmotic pressure – Laws of osmotic pressure – Experiment – Lowering of vapour pressure – Elevation of boiling point and depression of freezing point – Diffusion - Coefficient of diffusion - Fick's laws – Determination of diffusivity – Applications.

UNIT V: ACOUSTICS

Intensity of sound – Decibel – Intensity level –Laws of transverse vibrations – Melde's string method – Acoustics of buildings – Sabine's formula – Ultrasonics – Production by Piezoelectric and Magnetostriction method – Properties – Applications.

Books for Study:

1. Properties of Matter – D.S. Mathur, S. Chand & Co., New Delhi - 2004
2. Properties of Matter – R. Murugesan, S. Chand & Co., New Delhi - 2004
3. Sound – R.L Saihgal, S. Chand & Co., 1998.
4. Properties of Matter - Sundaravelusamy (Tamil medium book)

MECHANICS AND RELATIVITY***UNIT I: DYNAMICS AND RIGID DYNAMICS***

Impulse- Impact - Laws of impact - Impact of a smooth sphere on a horizontal plane - Direct and oblique impact between two spheres - Moment of inertia-Angular momentum and kinetic energy of a rotating body-Theorem of parallel and perpendicular axis- Compound Pendulum: Determination of acceleration due to gravity and radius of gyration.

UNIT II: STATICS

Centre of Gravity - C.G of a solid hemisphere-Hollow hemisphere-Solid cone – Friction - laws of friction - Co-efficient of friction - Cone of friction - Angle of friction - Static and Dynamic friction- Equilibrium of a body on a rough inclined plane with and without the application of an external force.

UNIT III: HYDROSTATICS

Fluid pressure and its properties – Centre of pressure of a rectangular, triangular and irregular lamina immersed in a liquid-Floating bodies - Laws of floatation - Stability of floating bodies – Metacentre - determination of metacentric height of a ship - Variation of atmospheric pressure with altitude.

UNIT IV: CLASSICAL MECHANICS

Mechanics for a system of particles – Constraints - Conservation theorem for linear momentum and energy–Degrees of freedom-Phase space-Configuration space–Principle of virtual work - D'Alembert's Principle - Lagrangian equation from D'Alembert's Principle - Application: simple pendulum.

UNIT V: RELATIVITY

Newton's laws and their limitations - Inertial frames – Galilean transformations and invariance - Michelson-Morley experiment - Postulates of special theory of relativity – Lorentz transformation – Relativity of space and time - Mass energy equivalence - Physical significance.

Books for Study:

1. Mechanics - D.S. Mathur, S. Chand & Co, New Delhi.
2. Dynamics - M. Narayanamoorthy, National Publishing Co, Madras.
3. Statics, Hydrostatics and Hydrodynamics - M. Narayanamoorthy and Nagarathinam, the National Publishing Co. Madras.
4. Mechanics - R. Murugesan, S. Chand & Co – New Delhi.
5. Classical Mechanics - J.C. Upadhyaa, Himalaya Publishing House.
6. Classical Mechanics - H. Goldstein.

MAJOR PRACTICAL –I**(Any 14 experiments only)**

1. Non-uniform bending - pin and microscope.
2. Uniform bending - pin and microscope.
3. Determination of viscosity - capillary flow method
4. Static torsion - determination of 'n'.
5. Torsional pendulum - determination of 'n' and Moment of Inertia.
6. Compound pendulum - determination of 'g' and 'k'.
7. Surface tension and interfacial surface tension - drop weight method.
8. Specific heat capacity of a liquid - Newton's law of cooling method.
9. Sonometer – verification of laws and frequency determination of given tuning fork
10. Surface tension by capillary rise
11. Spectrometer – Refractive index of a solid prism.
12. Air wedge - determination of thickness of a thin wire.
13. Potentiometer - calibration of low range voltmeter
14. Meter bridge - specific resistance.
15. Study of characteristics of a junction diode.
16. Study of characteristics of a Zener diode.
17. Sonometer – Determination of AC Frequency.
18. Single Optic Lever – Scale and telescope method.
19. Melde's string – Frequency of the vibrator.
20. Focal length of a concave lens.

SEMESTER: I

CODE: SBE I

SKILL BASED ELECTIVE I

MS WORD AND POWER POINT PRESENTATION PRACTICALS

MS WORD

1. Opening, saving and closing a document.
2. Cutting, copying, pasting, modifying the font, line spacing and Tabs.
3. Spell check, grammar, Find and replace
4. Text alignment, inserting numbers and bullets.

MS POWERPOINT

5. Inserting table and Figure
6. Typing mathematical symbols and equations.
7. Inserting a graph in a slide.
8. Inserting Audio/ Video visuals media files
9. Introducing Time lag in Presentation
10. Format slides or presentations

CORE COURSE-IV
HEAT AND THERMODYNAMICS

UNIT I: THERMODYNAMICS

Zeroth and First law of thermodynamics – Isothermal and Adiabatic process – work done during isothermal and adiabatic process – reversible and irreversible process – second law of thermodynamics – Carnot's reversible engine - efficiency in terms of temperature – Entropy – change in entropy in reversible and irreversible process – Temperature entropy diagram – Maxwell's thermodynamic equations.

UNIT II: LOW TEMPERATURE PHYSICS

Vander Waal's equation of state – values of critical constants in terms of a and b – Porous plug experiment – theory of porous plug experiment – Joule Kelvin effect – Liquefaction of hydrogen by Dewar method – Liquefaction of helium by H. K. Onnes method – Helium I & II properties – Adiabatic demagnetization.

UNIT III: TRANSMISSION OF HEAT

Conduction – Coefficient of thermal conductivity – Measurement of thermal conductivity – Forbe's method – Lee's disc method for bad conductor – Thermal radiation – Black body – Stefan's law – deduction of Newton's law from Stefan's law – Solar constant – Temperature of the Sun – Determination of solar constant by water flow Pyrheliometer.

UNIT IV: CALORIMETRY

Specific heat of solids and liquids – Dulong and Petit's law – Variation of specific heat with temperature – Newton's law of cooling – Specific heat capacity of liquid by cooling – specific heat capacity of gases – Mayer's relation - determination of C_v by Joly's differential steam calorimeter – determination of C_p by Regnault's method.

UNIT V: STATISTICAL MECHANICS

Statistical equilibrium – probability theorem in statistical thermodynamics – Maxwell – Boltzmann's distribution law – Application to ideal gas – Phase space – Fermi-Dirac distribution law – Bose-Einstein distribution law – comparison of three statistics – Application to photon gas (Planck's radiation law).

Books for Study:

1. Heat and Thermodynamics – J.B. Rajam and C.L. Arora S. Chand Publications, 1979.
2. Thermodynamics and Statistical Physics – Sharma and Sarkar, Himalaya Publishing House.
3. Heat and Thermodynamics – Brijlal and N. Subramanian, S. Chand Limited, 2001.
4. Statistical Mechanics – Satya Prakash and C. Agarwal
5. Thermal Physics – R. Murugesan, S. Chand & Co, New D

**ELECTIVE CORE - I
ENERGY PHYSICS*****UNIT I: SUN***

The characteristics of Sun - Solar constant - Electromagnetic energy spectrum - spectral distribution - Solar radiation on earth's surface - Solar angles - Types of Pyrheliometers - Angstrom Pyrheliometer, Eppley Pyrheliometer, Abbots silver disc Pyrheliometer - Estimation of average Solar radiation.

UNIT II: SOLAR COLLECTORS

Liquid flat plate collectors - General characteristics - Collection efficiency - Focusing type solar collectors - Concentrator and Receiver geometric - General characteristics of focusing collectors - Optic losses - Construction of reflectors.

UNIT III: SOLAR HEATERS AND COOLERS

Solar air heaters: types, performances and applications – storage system: electrical storage, thermal storage, chemical storage and pebble bed storage.

Solar cooling systems - Vapour compression systems and heat pumps -Absorption air conditioning - Open and cooling system - Natural methods of air conditioning.

UNIT IV: SOLAR GENERATORS

Solar thermal power generation - Solar still - Solar pump - Solar pond - Solar cooker - selective coating. Conversion of light into electrical energy - Photovoltaic power generation - types of solar cells.

UNIT V: OTHER ENERGY SOURCES

Fossil fuel resources - Need for alternate energy resources - Biological conversion – Biogas – Geothermal - Ocean Thermal Energy Conversions - Wind power - Basic principles of Magneto-hydrodynamics - Solar production of hydrogen - Liquid hydrogen as a fuel in future.

Books for Study and Reference:

1. Solar energy utilization - G. D. Rai - Khanna Publications, New Delhi, 1993.
2. Solar energy – C. G. Agarwal

CORE COURSE VI
OPTICS AND SPECTROSCOPY

UNIT I: GEOMETRICAL OPTICS

Refraction through lenses - Cardinal points and Cardinal planes – Chromatic aberration in lenses and achromatic condition for two lenses separated by a distance – Spherical aberration in a lens and methods of minimizing it – Huygens’s and Ramsden’s eyepieces – construction, theory, merits and demerits.

UNIT II: DIFFRACTION

Rectilinear propagation of light – Zone plate – Fresnel and Fraunhofer diffraction – Plane diffraction grating – Determination of wavelength – Absent spectra – Overlapping spectra – Dispersive and resolving powers of a grating – Comparison between prism and grating spectra.

UNIT III: POLARIZATION

Transverse nature of light – double refraction – Nicol prism – Quarter wave plate and Half wave plate – production and analysis of circularly, elliptically and plane polarized light – Specific rotation – Laurent’s half shade Polarimeter – determination of specific rotation of sugar solution - Bi-quartz Polarimeter.

UNIT IV: SPECTROSCOPY

Spectra – continuous, line and band spectra – Solar spectrum – Electromagnetic spectrum – Ultra-violet spectrum – Instrumentation – Infra Red spectrum – Instrumentation – Applications of IR spectra – Raman effect – Experimental study of Raman effect – Quantum theory – Applications.

UNIT V: FIBER OPTICS

Optical fiber: structure, principle and classifications (single mode and multimode) – Theory of propagation – Numerical aperture – Coherent bundle – Fiber optic sensors – Fiber endoscope – Fiber optic communication systems (Block Diagram) and their advantages.

Books for Study:

1. Optics – Brijlal and Subrahmanyam – S. Chand & Co, 2012.
2. Optics – Ajoy Ghatak – Tata Mc Graw Hill – New Delhi, 2005.
3. Optics and spectroscopy – R. Murugesan, S. Chand Publishing, New Delhi, 2010.

CORE COURSE-V
MAJOR PRACTICAL II

(Any 14 experiments only)

1. Cantilever - Determination of 'q' - mirror and telescope method.
2. Viscosity of a highly viscous liquid – Stoke's method.
3. Lee's disc - Thermal conductivity of a bad conductor.
4. Newton's rings - Determination of R and refractive index(μ)
5. Potentiometer - Ammeter calibration
6. Post Office box- Determination of temperature coefficient of Thermistor
7. Carey Foster's bridge method - Determination of Specific resistance.
8. Potentiometer - Specific resistance.
9. Determination of M and B_H using deflection and vibration magnetometer.
10. Figure of merit – Table Galvanometer.
11. Potentiometer - Temperature coefficient of resistance.
12. Spectrometer – Liquid prism.
13. Transistor Characteristics – CE mode.
14. Spectrometer - Grating – Minimum deviation method.
15. Comparison of magnetic moment – Deflection magnetometer.
16. Specific heat capacity – Joule's calorimeter.
17. EMF of thermocouple – Table Galvanometer.
18. Emissivity of the surface.
19. Carey Foster's Bridge – Verification of laws of resistance.
20. Liquid lens.

SEMESTER III

SKILL BASED ELECTIVE II

MS EXCEL PRACTICALS

1. Profit and loss - Inputting data and use of formula.
2. Deposit-worksheet - calculation of simple interest, compound interest etc.
3. Mark list-worksheet-sorting-copying cells-handling decimals.
4. Pie diagrams and bar charts -Plan expenses, unemployment etc.
5. Use of functions - statistical, mathematical and financial.
6. Sorting the data.
7. Plotting the graph for the given data.
8. Calculation of physical parameters (M & H, Refractive index, Young's modulus and Thermal conductivity).

CORE COURSE VII

ELECTRICITY AND MAGNETISM

UNIT I: ELECTROSTATISTICS

Coulombs law - Gauss law and its applications (electric field due to a uniformly charged sphere, hollow cylinder and solid cylinder) - electric potential - potential at a point due to a uniformly charged conducting sphere - Principle of a capacitor - Expression for the capacity of a spherical capacitor - Energy of a capacitor - Loss of energy due to sharing of charges.

UNIT II: CURRENT ELECTRICITY

Biot - Savart's law - Application to field along the axis of a circular coil and solenoid - force on the conductor in a magnetic field - Kirchoff's laws - Wheatstone's network - Carey Foster's bridge - determination of temperature coefficient of a coil - Potentiometer - Principle of a potentiometer - calibration of an ammeter and a voltmeter.

UNIT III: MAGNETISM

Intensity of Magnetization - Magnetic Susceptibility - Magnetic Permeability - Relation X between B and H - B-H curve - Energy loss due to magnetic Hysteresis - Ballistic Galvanometer method of plotting B-H curve - Importance of Hysteresis curve - Choice of magnetic materials

UNIT IV: ELECTROMAGNETIC INDUCTION

Laws of electromagnetic induction - Expression for induced emf - Self inductance of a solenoid - Rayleigh's method of finding self inductance of a coil - Mutual inductance - Determination of mutual inductance between pair of coils - Coefficient of coupling - Eddy current and its applications.

UNIT V: DC AND AC CIRCUITS

Growth and decay of current in an LR circuit - Growth and decay of charge in a CR circuit - Determination of high resistance by leakage - AC Circuits: LR, CR, and LCR circuits (Series and parallel) - Comparison - Sharpness of resonance - Power factor - Wattless current - Skin effect.

Books for study and references:

1. Electricity and Magnetism - Brijlal and Subramanyam - Ratan Prakashan Mandir - New Delhi - 1995
2. Magnetism and Electricity - Khare and Srivastava - AtmaRam and sons - New Delhi.
3. Electricity and Magnetism - R. Murugesan, S. Chand, New Delhi, 2008

CORE COURSE VIII**ATOMIC PHYSICS*****UNIT I: ATOM MODELS***

Vector atom model – L-S and J-J coupling Spatial quantization - Spinning electron - Various quantum numbers – Pauli's exclusion principle - Electronic configuration of elements - magnetic dipole moment due to orbital and spin - Bohr magnetron - Motion of the electron – Stern - Gerlach experiment.

UNIT II: ZEEMAN EFFECT

Zeeman effect – Larmor's theorem – Debye's quantum mechanical explanation of normal Zeeman effect – Anomalous Zeeman effect – Theoretical explanation – Lande 'g' factor – Paschen - Back effect – Explanation of Stark effect (no proof).

UNIT III: X-RAYS CRYSTALLOGRAPHY

X - rays – Continuous and characteristics X - rays – Hard and soft X - rays – Mosley's law and its importance – X - ray study of crystal structures – Laue's method – Rotating crystal method – Powder crystal method.

UNIT IV: PHOTOELECTRIC AND COMPTON EFFECT

Photoelectric effect – Richardson and Compton experiments – Laws of Photoelectric emission – Einstein's photoelectric equation – Millikan's experiment – Determination of Plank's constant – Compton Effect – Theory and experimental verification.

UNIT V: LASERS

Spontaneous and Stimulated emission – Population inversion – Properties of laser beam – He – Ne laser – Carbon dioxide laser – Semi conductor laser – Dye laser – Medical, Industrial and Scientific applications of laser.

Books for Study:

1. Modern Physics – R.Murugesan – S. Chand & Co, New Delhi, 2008.
2. Lasers Theory and Applications – Thyagarajan and Ghatak – McMillan, Plenum Press, 1981.
3. Solid State Physics – S. L. Gupta & V. Kumar – K. Nath and Co., Meerut.
4. Atomic Physics – J. B. Rajam – S. Chand & Co.
5. Concepts of Modern Physics – A Beiser – Tata Mc Graw Hill, 1987.

CORE COURSE IX
BASIC ELECTRONICS

UNIT I: SEMICONDUCTOR DIODE

Intrinsic semiconductor - Extrinsic semiconductor - N-type and P-type semiconductor - PN Junction diode - Volt-ampere characteristics - Zener diode - Half wave and full wave rectifier - Bridge rectifier using PN diodes - Efficiency - Ripple factor - Zener regulated power supply.

UNIT II: TRANSISTORS

Bipolar junction transistor - Transistor action - Configurations of transistor - CB,CE and CC and its Characteristics - Comparison - Transistor biasing circuits - Essentials of a transistor biasing - Fixed bias circuit - Voltage divider biasing circuit - FET - construction and working - characteristics - Parameters.

UNIT III: TRANSISTOR AMPLIFIERS

Action of transistor as an amplifier-Single stage transistor amplifier – Analysis using h-parameters- Equivalent circuit method-Load line and operating point-Power amplifiers - Difference between Audio and power amplifier - Classifications of power amplifiers - Push Pull amplifier.

UNIT IV: FEEDBACK IN AMPLIFIERS AND OSCILLATORS

Feedback in amplifier - Voltage gain of feedback amplifier - Advantages of negative feedback - Emitter follower - Positive feedback - Amplifier as an oscillator -Hartley and Colpitt's oscillator – Multivibrators: Astable, Monostable and Bistable multivibrator using transistors

UNIT V: INTEGRATED CIRCUITS

Integrated Circuits – Monolithic - IC fabrication - IC components – Resistor –Capacitors – diodes – Transistor - IC package and Symbols - Operational amplifier – Characteristics – Comparator - Inverting and Non-inverting Op Amp – Adder – Subtractor - Differentiator and Integrator.

Books for Study:

1. Principles of Electronics - V. K. Metha - S. Chand & Co.
2. Elements of Electronics - Anand Prakash, Chopra and Segal – S. Chand & Co.
3. Basic Electronics and Linear circuits – N.N Bhargava D.C Kulsheshta and S.G. Gupta, Tata Mc Graw Hill, 1989.
4. Integrated circuits and Semiconductor devices - Deboo and Burrous – Mc Graw Hill, 1987.

ELECTIVE CORE II
PROGRAMMING IN C

UNIT I: INTRODUCTION

Structure of a C programming - Character set - Data types - Tokens, identifiers, keywords - Variables and constants - Operators - Arithmetic relational, logic - Assignment, increment, decrement - Bit wise and Conditional operators - Special operators - comma, size of, pointer operator – Arithmetic expressions - input-output statements - getchar(), putchar(), scanf and printf.

UNIT II: CONTROL STATEMENT

If-if else – Nested if-else - else if ladder - Switch statement - goto statement - While, do-while - for - Continue statement - Arrays - One dimensional array - Two dimensional array – Declaration & initialization of Arrays - Character array - declaring and initializing character array - string functions - strcat(), strcmp(), strcpy(),strlen().

UNIT III: FUNCTION

Defining function - return values and their types - category of function (functions with no argument with no return values, arguments with return values, no arguments with return values) - storage classes (automatic, external, static, register)

UNIT IV: STRUCTURES AND UNION

Defining – declaration - accessing a structure member - structure initializing the structure - array of structure - array within structure - structure with in structure (basic idea only) – pointer - accessing the address of the variable - declaring & initializing a pointer variable.

UNIT V: FILE AND PROGRAMS

Files - file pointer - opening and closing files - formatted I/O with files (fscanf, fprintf). Simple programs –Solution of Harmonic Oscillator - Time period of the simple pendulum - Average of n numbers - Conversion of Fahrenheit to Celsius and Celsius to Fahrenheit - Solving quadratic equations - Smallest and largest element in an array.

Books for Study:

1. Programming in C (ANSI)-E.Balagurusamy-4th Edition - Tata Mc Graw Hill Pub. New Delhi.
2. Programming in C R. Subburaj - Vikas Pub. House Pvt Ltd, New Delhi.
3. The spirit of C - Mullish Cooper - Jaico Pub. House - New Delhi

SOFT SKILLS DEVELOPMENT**Unit I**

Know Thyself/ Understanding Self

Introduction to Soft Skills – Self discovery – Developing positive attitude – Improving perceptions – Forming values.

Unit II

Interpersonal Skills/ Understanding Others

Developing interpersonal relationship – Team building – group dynamics – Net working – Improved work relationship.

Unit III

Communication Skills / Communication with Others

Art of listening - Art of reading – Art of speaking – Art of writing – Art of writing – e - mails – e- mail etiquette.

Unit IV

Corporate Skills/ Working with Others

Developing body language – Practising etiquette and mannerism – Time management – Stress management.

Unit V

Selling Self / Job Hunting

Writing resume / C.V – interview skills – Group discussion – Mock interview – Mock GD – Goal setting – Career Planning

Text Books:

1. K. Meena and V. Ayothi (2013) A Book on Development of Soft Skills (Soft Skills: A Road Map to Success), P.R Publishers & Distributors, No,B – 20 & 21 , V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli - 620 002.
2. K. Alex (2012) Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi – 110 055

Reference books

1. Developing the leader within you John C Maxwell
2. Good to great by *Jim Collins*
3. The seven habits of highly effective people Stephen Covey
4. Emotional Intelligence Daniel Goleman
5. You can win Shive Khera
6. Principle centred leadership Stephen Covey.

MAJOR PRACTICAL –III

(General and Electronics experiments)

(Any 14 experiments)

1. Koenig's method –Non uniform bending –Determination of q.
2. Spectrometer – i-d curve.
3. Spectrometer – Grating – normal incidence method.
4. Potentiometer - High range voltmeter.
5. Potentiometer - EMF of a thermocouple.
6. Series resonant circuit.
7. Parallel resonant circuit.
8. Zener regulated power supply.
9. Hartley oscillator using transistor
10. OP-AMP - Adder and Subtractor.
11. Logic gates using discrete components.
12. NAND as universal gates using ICs.
13. NOR as universal gates using ICs.
14. Single stage RC coupled amplifier using transistor.
15. C Program to find the largest and smallest of given numbers.
16. C Program to solve the given Quadratic equation.
17. C Program to find the area of circle and triangle.
18. C program for temperature conversion
19. Determination of absolute Capacitance of a Condenser.
20. Comparison of EMF of Cells – BG

CORE COURSE XI

WAVEMECHANICS AND NUCLEAR PHYSICS

UNIT I: PROPERTIES OF NUCLEUS, PARTICLE ACCELERATORS, DETECTORS

Properties of Nucleus – size, charge, mass, density, spin, parity – Nuclear magnetic dipole moment – Binding energy – Packing fraction – Nuclear forces – Nuclear model – Liquid drop model (qualitative treatment only) – Accelerator – Betatron – Proton synchrotron – Detector: G.M. Counter – Wilson's cloud chamber.

UNIT II: INDUCED RADIOACTIVITY AND RADIOACTIVE SPECTRA

Radioactivity-Natural and Induced radioactivity – Artificial transmutation – Applications of radio isotopes – Discovery and detection of Neutron – basic properties of neutron – Theory of Alpha decay – Alpha ray spectra – Fine structure – Beta ray spectra – Neutrino hypothesis – Gamma ray spectra – Internal conversion – Nuclear isomerism.

UNIT III: NUCLEAR FISSION, FUSION AND ELEMENTARY PARTICLES

Nuclear Fission – Energy released - Chain Reaction – Atom bomb – Nuclear Reactor - Nuclear fusion – Hydrogen cycle – Carbon – Nitrogen cycle – Stellar energy – Plasma - Elementary particles – Classifications – Baryons, Leptons and Mesons - Antiparticles – Conservation of laws - Quarks.

UNIT IV: DUAL NATURE OF MATTER

De-Broglie's concepts of matter waves – De-Broglie's wavelength – Wave velocity and group velocity – Experimental study of matter waves – Davison and Germer experiment – G.P. Thomson's experiment for verifying De-Broglie's relation – Heisenberg's uncertainty principle.

UNIT V: SCHRÖDINGER'S WAVE MECHANICS

Basic concepts of wave mechanics – Development of Schrödinger's wave equation – Time independent and time dependent form of wave equation – Properties of wave function – Orthogonal and normalized wave function – Eigen function and Eigen values – Applications of Schrodinger's equation – Linear Harmonic Oscillator.

Books for study

1. Modern Physics – S. Murugesan S Chand & Co, New Delhi, 1994.
2. Modern Physics – J. B. Rajam S Chand & Co
3. Nuclear Physics – Irwing Kaplan – Addison & Wesley Publishing Company, 1955.

SOLID STATE PHYSICS**UNIT I: CRYSTAL STRUCTURE**

Types of crystals– unit cell – lattice parameters – Bravais lattices-Lattice planes and Miller indices – inter planar spacing in a cubic lattice– Cubic lattice–SC – BCC – FCC–HCP– Crystal structure of Sodium chloride, Caesium chloride and Diamond.

UNIT II: BONDING IN SOLIDS

Force between atoms – Cohesive energy – Calculation of cohesive energy – Ionic bonding – Calculation of lattice energy of ionic crystals – Calculation of Madelung constant of ionic crystals – Born- Haber cycle – Covalent bond – Metallic bond – hydrogen bonds – Van der Waal.

UNIT III: SEMICONDUCTORS

Properties of semiconductors – Effects of electric field on N-type and P-type semiconductors – Conductivity in a semiconductor – Hall Effect – Determination of Hall Voltage, carrier concentration and mobility – Applications of Hall Effect.

UNIT IV: CONDUCTING AND DIELECTRIC MATERIALS

Physical properties of metals – Classification of conducting material – Free electron theory – Wiedmann - Franz law – Dielectric constant – Types of polarization – Electronic, Ionic, Orientation and Space charge polarisation - Types of dielectric materials – Clausius – Mossotti equation – Applications.

UNIT V: MAGNETIC MATERIAL AND SUPER CONDUCTIVITY

Types of magnetic materials – Langevein's (Classical) theory of para and dia magnetism – Weiss theory of ferromagnetism – Properties of dia, para and ferro magnetic material – Superconductivity – Properties- Meissner's effect – BCS theory (qualitative treatment only) – Types of superconductors – Applications.

Books for Study:

1. Solid State Physics VI Edition – S.O. Pillai, New Age International (P) Publisher, Chennai.
2. Material Science – M. Arumugam, Anuratha Publications, Kumbakonam.
3. Modern Physics – R. Murugesan – S. Chand & Co., New Delhi, 1994.
4. Fundamentals of Solid State Physics – B. S. Saxena, R. C. Gupta, P. N. Saxena – Pragati Prakashan, Meerat.
5. Solid State Physics – S. L. Gupta, V. Kumar - K. Nath & Co., - Meerut.

CORE COURSE XIV

DIGITAL ELECTRONICS AND MICROPROCESSOR

UNIT I: NUMBER SYSTEM

Decimal, Binary, Octal and Hexadecimal number systems - Conversion- BCD codes, Excess -3, Gray code - Alphanumeric code - BCD addition, subtraction - 9's and 10's compliments - 1's and 2's compliments-subtraction using 1's and 2's compliments

UNIT II: COMBINATIONAL LOGIC SYSTEM AND DATA PROCESSING CIRCUITS

Logic gates, symbols, and their truth tables, (AND, OR, NOT, XOR, XNOR and NAND) - Universality of NAND and NOR gates - Half adder - Full adder - Half subtractor - Full subtractor – 2's compliment adder / Subtractor - Decoder - Encoder – Multiplexer - Demultiplexer.

UNIT III: SIMPLIFICATION OF BOOLEAN EXPRESSION

Boolean algebra - Fundamental concepts - Basic laws - Duality theorem - De Morgan's theorem - Reducing Boolean expressions using Boolean laws - SOP and POS forms of expressions - Minterm - Maxterms - Karnaugh's map (four variables).

UNIT IV: SEQUENTIAL LOGIC SYSTEM

R-S Flip-Flop using NAND and NOR gates - Clocked R-S Flip-Flop- D Flip-Flop - T flip-flop - J-K Flip-Flop and J-K Master - Slave Flip-flop – Counter - Ripple counter - Mod 10 counter - Ring counter - 3 bit register using D flip-flop- D/A converter - Weighted resistor method - A/D: Successive approximation method.

UNIT V: MICROPROCESSOR

Intel 8085 microprocessor: architecture, registers, ALU - Instruction formats - Addressing modes - Types of instructions - Assembly Language Programming - Programs for addition, subtraction, multiplication and division.

Books for study:

1. Digital computer electronics - Albert Paul Malvino, Glencoe, 1992
2. Microprocessor - Badri Ram, Dhanpat Rai & Sons, 1993.
3. Digital electronics – Tokheim – Schaum Series, McGraw-Hill Education, 1994.
4. Digital electronics and microprocessor – Vijayendran, Viswanathan, S., Printers & Publishers Pvt. Ltd, 2009.

ELECTIVE CORE III

ELECTRONIC INSTRUMENTATION

UNIT I: BASIC CONCEPTS OF MEASUREMENT

Definition - Accuracy and Precision - Type of errors - Gross error - Systematic errors - Random errors - Nature of units: Fundamental & derived quantities - Absolute units – Dimensions - Systems of mechanics units - Systems of electrical units - Introduction of SI systems of units - Dimension in electrostatic and electromagnetic system - Dimension of electrical and magnetic quantities - Standards of measurement – Standard for mass, length, volume, time & frequency - Electrical standards-standard of temperature – IEEE standards.

UNIT II: ELECTRONIC INSTRUMENTS

Introduction - Analog and digital instruments – Function of instruments -electronic versus electrical instruments - Essential of electronic instrument - Basic meter movement - Characteristics of moving coil meter movements - Variation of basic meter movement - Converting basic meter to DC ammeter, DC voltmeter, ohmmeter - Multi range DC ammeter & DC voltmeter - Electronic voltmeter - DC VTVM - Electronic voltmeter for AC - The digital voltmeter(DVM) - Q-meter.

UNIT III: BRIDGE MEASUREMENT

Introduction: Wheatstone bridge - Kelvin bridge - Effect of connecting leads -Kelvin double bridge - AC bridge & their application - Condition for bridge balance -Maxwell bridge - Hay bridge - Schering bridge.

UNIT IV: TRANSDUCERS

Classification - Position transducer - Pressure transducer - Self generating inductive transducers - Linear Variable Differential Transducer (LVDT) - Piezoelectric transducer - Strain gauge - Temperature Transducer - Thermistor –Thermocouple - Acoustic Transducers: Ribbon microphone - Crystal microphone-Loud speaker.

UNIT V: DISPLAY UNITS

CRO – CRT - Normal operation of CRO – Triggered - Non triggered scopes -dual trace CRO-dual beam CRO - Lissajous figures - Frequency determination -Applications of a CRO.

Books for study:

1. Modern electronic instrumentation and measurement techniques - Albert D Helfrick and William D. Cooper, Prentice - hall of India private limited,1999.
2. Electronics & electrical measurement & instrumentation J. B. Gupta - S. K. Kataria & sons, Delhi, thirteenth edition.
3. Basic electronics and solid state - B. L. Theraja - S. Chand & Company Ltd., New Delhi - 2000.

DESKTOP PUBLISHING LAB

PHOTOSHOP

1. Design a College Broacher / Birthday Card.
2. Cropping, rotating and overlapping the image.
3. Create a single image from Multiple image.
4. Creating an image with multilayer's.

COREL DRAW

5. Design a Visiting Card / Greeting Card using Draw & Text tools.
6. Create a logo for a Company / College.

PAGE MAKER

7. Type and format a letter using text tool.
8. Prepare an Invitation for College Day /Sports Day.

GENDER EQUALITY**Unit – I: CONCEPTS OF GENDER**

Sex – Gender – Biological Determinism – Patriarchy – Feminism – Gender Discrimination – Gender Division of labour – Gender Stereotyping – Gender Sensitivity – Gender Equity – Equality – Gender Mainstreaming - Empowerment.

Unit – II: WOMEN’S STUDIES Vs GENDER STUDIES

UGC’s Guidelines – VII to XI Plans – Gender Studies: Beijing Conference and CEDAW – Exclusiveness and Inclusiveness.

Unit – III: AREAS OF GENDER DISCRIMINATION

Family – Sex Ratio – Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Policies and Planning .

Unit – IV: WOMEN DEVELOPMENT AND GENDER EMPOWERMENT

Initiatives – International Women’s Decade – International Women’s Year – National Policy for Empowerment of Women – Women Empowerment Year 2001 – Mainstreaming Global Policies .

Unit – V: WOMEN’S MOVEMENTS AND SAFEGUARDING MECHANISM

In India National /State Commission for Women(NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention of Sexual Harassment at Work Place Supreme Court Guidelines – Maternity Benefit Act – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rd and 74th Amendment for PRIS

Books for Reference:

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited, 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited1993
4. Pernau Margrit, Ahmad Imtiaz, Reifeld Hermut (ed.,)Family and Gender : Changing Valuesin Germany and India, New Delhi: Sage Publications,2003

5. Agarwal Bina, Humphries Jane and Robeyns Ingrid(ed.,) Capabilities , Freedom , and Equality: Amartya Sen's Work from a Gender Perspective, New Delhi : Oxford University Press ,2006
6. Rajadurai. S.V, Geetha.V, Themes in Caste Gender and Religion,
Tiruchirappalli: Bharathidasan University, 2007
7. Misra Geetanjali, Chandiramani Radhika (ed.,) Sexuality, Gender and
Rights: Exploring Theory and Practice in South and Southeast Asia, New Delhi: Sage
Publication, 2005
8. Rao Anupama (ed.,) Gender &Caste: Issues in Contemporary Indian
Feminism, New Delhi: Kali for Women, 2003
9. Saha Chandana, Gender Equity and Gender Equality: Study of Girl Child in
Rajasthan Jaipur: Rawat Publication, 2003.
10. Krishna Sumi, (ed.,), Livelihood and Gender: Equity in Community Resource
Management, New Delhi: Sage Publication, 2004
11. Pludi.A Michele (ed.,) praeger Guide to the Psychology of Gender, London:
Praeger Publisher, 2004
12. Wharton .S Amy, The Sociology of Gender: An Introduction to Theory and
Research, USA: Blackwell Publishing, 2005
13. Mohanty Manoranjan (ed.,) Class, Caste, Gender: Readings in Indian
Government and Politics – 5, New Delhi: Sage Publications, 2004.
14. Arya Sadhna Women, Gender Equality and the State, New Delhi: Deep &Deep
Publication, 2000
15. Mishra .O.P, Law Relating to Women &Child, Allahabad: Central Law Agency
, 2001
16. Chari Leelavathi, Know Your Rights, Madras; Tamilnadu Social Welfare
Board, 1987
17. Bhattacharya Malini, Sexual Violence and Law, Kolkata; West Bengala
Commission For Women, 2002
18. Sexual Harassment at the Workplace – A Guide, New Delhi; Sakshi, 1999
19. Women's Integrated National Development Trust.

SEMESTER –VI

Major practical-IV (General and Electronics experiment)

(Any 14 experiment)

1. Field along the axis of the coil –Determination of M.
2. Spectrometer – $i-i'$ curve.
3. Spectrometer – Dispersive power of the material of the prism.
4. Spectrometer – Dispersive power of Grating
5. Spectrometer - Cauchy's constant.
6. Determination of M and H – TAN C position.
7. Potentiometer- Temperature coefficient of a thermistor.
8. Basic logic gates using ICs.
9. Verification of De Morgan's laws using ICs.
10. FET characteristics.
11. Colpitt's oscillator using Transistor
12. OP-AMP –Integrator and differentiator.
13. Astable multivibrator using OP-AMP.
14. Half adder and full adder using basic gates.
15. RS, D and JK flip- flop.
16. 8085 Microprocessor - 8-bit addition and subtraction program.
17. 8085 Microprocessor - 8-bit multiplication and division program.
18. 8085 Microprocessor – Masking (LSB and MSB)
19. Figure of merit – BG
20. Monostable multivibrator using transistor.

ALLIED PHYSICS- I
(FOR MATHS AND CHEMISTRY STUDENTS)

UNIT I: MECHANICS

Laws of friction - Co-efficient of friction - Cone of friction - Angle of friction - Static and dynamic friction - Equilibrium of a body on an inclined plane with and without the application of an external force – Lubricants - Centre of pressure - Centre of pressure of a rectangular lamina immersed in a liquid - Stability of floating bodies - Meta center - Determination of meta centric height of a ship.

UNIT II: PROPERTIES OF MATTER

Stress, strain, moduli of elasticity - Work done - Relation between elastic moduli - Poisson's ratio - Bending moment – Cantilever - Non-uniform bending - pin and microscope method – Searle's method for q , n , σ - I form of girders

UNIT III: THERMAL PHYSICS

Newton's law of cooling - Specific heat capacity of a liquid - Specific heat capacity of a gas - C_p and C_v - Mayer's relation - Determination of C_v by Jolly's differential steam calorimeter - Determination of C_p by Regnault's method –Conduction - Coefficient of thermal conductivity - Lee's disc method.

UNIT IV: OPTICS AND SPECTROSCOPY

IR and UV spectroscopy - Raman effect – Experiment – Applications - Lasers and Masers - Stimulated emission - Population inversion - Ruby laser - He-Ne laser -Optical fibre - Numerical aperture - Coherent bundle - Fibre optic communication system and its advantages.

UNIT V: SOUND

Ultrasonic waves – Production: Magnetostriction and Piezoelectric method - properties and applications - Acoustics of buildings – Reverberation - Sabine's formula.

Books for Study

1. Statics, Hydrostatics and Hydrodynamics - Narayanamoorthy and Nagarathinam, Nation Publishing, Chennai.
2. Properties of matter - D. S. Mathur, S. Chand Limited, 2008.
3. Heat and Thermodynamics - Brijlal and Subramaniam, S. Chand, Limited, 2001.
4. Optics - Brijlal and Subramaniam, S. Chand, 2006.
5. Optics - Ajoy Ghatak - Tata Mc Graw Hill, Delhi.
6. Allied Physics -1 - A. Sundaravelusamy.

ALLIED PHYSICS II
(FOR MATHS AND CHEMISTRY STUDENTS)

UNIT I: ELECTROSTATICS

Coulomb's theorem - Mechanical force experienced by a charged surface - Energy stored in the medium – Capacitors – Principle of a capacitor - Capacitance of a cylindrical capacitor - Energy stored in a charged capacitor – Loss of energy on sharing of charges between two capacitors.

UNIT II: CURRENT ELECTRICITY AND ELECTROMAGNETIC INDUCTION

Potentiometer – principle - Calibration of an ammeter - Magnetic induction at the centre of a circular coil carrying current - Fleming's Left Hand rule - Moving coil ballistic galvanometer – Self inductance – Mutual Inductance - Coefficient of coupling between two coils.

UNIT III: ATOMIC PHYSICS

Atom models - Vector atom model - Quantum numbers in vector atom model – Pauli's exclusion principle - X ray - Continuous and characteristics of X rays - Mosley's law and its importance - Miller indices- Determination of crystal structure – Laue's Method - Powder crystal method.

UNIT IV: NUCLEAR PHYSICS

Detectors - Ionization chamber - GM counter - Wilson's cloud chamber - Artificial transmutation of elements – Rutherford's experiment - Artificial radio activity – discovery – preparation of radio elements - Application of radio isotopes.

UNIT V: DIGITAL ELECTRONICS

Logic gates – AND, OR, NOT, NAND, NOR and XOR gates – NAND and NOR as Universal building block - Boolean laws - Boolean algebra - De Morgan's theorem – Verification using truth tables – Half adder and subtractor – Full adder and subtractor .

Books for study:

1. Electricity and Magnetism, R. Murugesan, S. Chand Limited, 2008.
2. Modern Physics, R. Murugesan, S. Chand Limited, 2008.
3. Digital Electronics, R. P Jain, Tata Mc Graw Hill, 2010.
4. Allied physics II, A. Sundaravelsamy, Motion Mountain.

ALLIED PHYSICS PRACTICAL**(Any 14 experiments only)**

1. Non-uniform bending-pin and microscope.
2. Uniform Bending – Scale and Telescope method.
3. Surface tension and interfacial surface tension-drop weight method.
4. Co-efficient of viscosity of a liquid using graduated burette.
5. Specific heat capacity of a liquid by cooling method.
6. Lee's disc-thermal conductivity of a bad conductor.
7. Spectrometer -Refractive index of a solid prism
8. Surface Tension- Capillary rise method.
9. Air wedge-Thickness of wire
10. Newton's rings-radius of curvature of a convex lens.
11. Sonometer - verification of laws.
12. Carey Foster's Bridge -Specific resistance.
13. Characteristics of Zener diode.
14. Potentiometer-Calibration of low range voltmeter
15. Characteristics of a junction diode.
16. AND, OR and NOT logic gates-verification of truth tables using ICs.
17. NAND as universal gate.
18. NOR as universal gate
19. Half adder and subtractor.
20. Compound pendulum – Determinating 'g'

APPLIED PHYSICS – I
(For Computer Science Students)

UNIT I: ELECTROSTATICS

Fundamentals of electrostatics – Gauss theorem and its application – Intensity due to a charged Sphere - Intensity at a point due to uniformly charged cylinder – Capacitor – Principle of a capacitor – Spherical and cylindrical capacitors – Capacitors in series and parallel – Energy of a charged capacitor – Energy loss due to sharing of charges.

UNIT II: MAGNETOSTATICS

Magnetic field – Magnetic flux density – Magnetization – Intensity of magnetization – Permeability – Susceptibility – Relation between them – Properties of dia, para and ferro magnetic materials – Hysteresis – BG method – coercivity, retentivity and energy loss from hysteresis loop (BH curve).

UNIT III: CURRENT ELECTRICITY

Kirchoff's laws – Carey Foster's bridge – Determination of temperature co-efficient of resistance – Potentiometer – Measurement of current and resistance – Calibration of low range voltmeter – Fleming's left hand rule – Ballistic galvanometer – Damping correction in BG.

UNIT IV: ELECTROMAGNETIC INDUCTION

Laws of electromagnetic induction – Induced e.m.f – Self inductance - Determination of self inductance – Rayleigh's method – Mutual inductance – Coefficient of mutual inductance - Absolute method – Co-efficient of coupling - Eddy current.

UNIT V: ALTERNATING CURRENT

RMS value of current and voltage - Series and parallel resonance circuits – Impedance – Q factor – Selectivity and Sharpness of resonance - Power in A.C Circuit (LC, CR, LCR) – Wattless current - Choke coil

Books for study:

1. Electricity and Magnetism – Brijlal and Subramanian – Ratan Prakashan Mandir – New Delhi – 1995.
2. Electricity and Magnetism – Narayanamurthy & Nagarathinam, Penguin Books, India.
3. Electricity and Magnetism – D. L. Seghal and Chopra, Sultan Chand & Sons, 2014.

APPLIED PHYSICS – II
(For Computer Science Students)

UNIT I: SEMICONDUCTOR PHYSICS

Semiconductors - Intrinsic semiconductor – Extrinsic semiconductor – PN junction Diode – Forward bias and reverse bias characteristics – Half wave rectifier – Full wave rectifier - Zener diode - characteristics - Zener diode as voltage regulated power supply .

UNIT II: TRANSISTORS

Bipolar junction transistors – Configurations - Characteristics of CE and CB configurations – Relation between α and β – FET – Construction – Theory – characteristics of FET – Parameters – comparison of FET and Transistor.

UNIT III: OPTOELECTRONICS

Light Emitting Diode – theory – construction –applications – Liquid Crystal Display – construction – working – PN Junction photo diode – Photoconductive cell – theory and working – Photo transistor – Photovoltaic cell – Laser Diode – theory and characteristics.

UNIT IV: INTEGRATOR CIRCUIT

Introduction – Advantages of ICs, scales of integration – classification of ICs by structure – classification of ICs by function – IC technology – monolithic ICs – fabrication of IC components: transistor, diode, capacitor, complete monolithic ICs – applications.

UNIT IV: OPERATIONAL AMPLIFIER

Op – Amp – Ideal operational Amplifier – characteristics – Virtual ground – Inverting amplifier, non inverting amplifier, unity follower, adder, subtractor, integrator, differentiator, logarithmic and anti logarithmic amplifier.

Books for Study:

1. Electronic devices and circuits – B.L. Theraja & A.K. Theraja S. Chand & company Ltd. 1999 edition.
2. Principle of Electronics by V.K. Mehta and Rohit Mehta S. Chand & company Ltd. 1999 edition.
3. Applied Physics - Sundaravelusamy

APPLIED PRACTICAL FOR COMPUTER SCIENCE

(Any 14 experiments only)

1. Field along the axis of a coil - Magnetic moment.
2. Series resonant circuit.
3. Zener diode characteristics.
4. PN Junction diode characteristics.
5. Potentiometer - Ammeter calibration.
6. Potentiometer –specific resistance of the given coil.
7. Transistor characteristics-CB mode.
8. Transistor characteristics- CE mode.
9. Zener regulated power supply.
10. Carey Foster’s bridge - Specific resistance.
11. Astable multivibrator using OP-AMP.
12. Basic logic gates using ICs.
13. Verification of De Morgan’s theorem using ICs.
14. Parallel resonant circuit.
15. Half adder and Half Subtractor using ICs
16. NAND as a universal gate
17. NOR as a universal gate.
18. OP – Amp Scale Changer.
19. OP – Amp inverting of Non- inverting.
20. OP- Amp Subtractor

NON MAJOR ELECTIVE COURSE - I**EVERYDAY PHYSICS*****UNIT I: LASER AND FIBER OPTICS***

Laser applications in industries: cutting, welding, hole drilling - LIDAR and Laser tracking - Laser in medicine - Fiber optic communication system – Advantages – Holography – Application of holography.

UNIT II: ELECTRICITY

Condenser – Principle of a capacitor - types: mica, paper, variable, electrolytic and guard ring condenser – Atmospheric Electricity - Causes of atmospheric electricity – Lightning Conductor.

UNIT III: ELECTROCHEMISTRY

Electrolysis – Applications of electrolysis – Simple voltaic cell – Daniel cell – Lechlanche cell - Dry cell – Atomic battery - Standard cells: Lead acid accumulator, Nickel Iron Accumulator.

UNIT IV: OPTOELECTRONIC DEVICES

Photodiode - Phototransistor - Photoconductor – LED - LCD - Solar cell.
(principle, construction, working and applications)

UNIT V: SOLAR ENERGY

Solar air heater, Design of solar cooling system – Natural methods of air conditioning - Ocean thermal Electric conversion (open and close cycle) – Wind energy Conversion (horizontal and vertical types).

Books for study:

1. Optics and Spectroscopy – R. Murugesan, S. Chand, New Delhi, 2010.
2. Electricity and magnetism – Brijlal and Subramanyam, Ratan Prakashan Mandir, 1966.
3. Modern physics – R. Murugesan, S. Chand, New Delhi, 2008.
4. Solar energy utilization – G. D. Rai, Khanna publications, New Delhi, 1993.

NON MAJOR ELECTIVE II**NON – CONVENTIONAL ENERGY RESOURCES**

(To be offered to the students of other departments)

UNIT I: RENEWABLE ENERGY SOURCES

Conventional energy sources: Electricity production by water, radioactive materials and fossil fuel – Energy resources and their availability – Need for alternative energy resources – Types of renewable energy resources – Advantages.

UNIT II: SOLAR ENERGY FUNDAMENTALS

Physical principle of conversion of solar radiation into heat – Basic idea of solar collectors – Applications of solar energy – Solar water heating – Solar electric power generation – Solar cooker – Solar energy in space.

UNIT III: WIND ENERGY

Basic principle of wind conversion – Types of wind mills – Advantages and disadvantages of wind energy conversion (WECs) – Applications of wind energy.

UNIT IV: OTHER FORMS OF ENERGY

Energy from biomass – Biogas generation – KVIC biogas plant – Biogas from plant waste – Main applications of biogas – Basic ideas of ocean thermal electric conversion (OTEC).

UNIT V: ENERGY FOR THE FUTURE

Basic principle for tidal power – Advantages and limitations of tidal power generation – Use of hydrogen as an energy sources – Production of hydrogen by solar method - Hydrogen as a fuel in future.

Books for Study:

1. Solar energy Utilization – G. D. Rai, Khanna publications, New Delhi, 1993.
2. Principle and practices of Solar Energy – C. P. Anantha Krishnan and Sethu Rao.