DEPARTMENT OF PHYSICS

H.H.THE RAJAH'S COLLEGE(AUTO)

PUDUKKOTTAI – 622 001

COURSE STRUCTURE

AND

SYLLABI

FOR UG PROGRAMME

CHOICE BASED CREDIT SYSTEM

(2015 – 2016 ONWARDS)

H.H. THE RAJAH'S COLLEGE (AUTONOMOUS), PUDUKKOTTAI

B.SC Physics Programme Pattern-CBCS(2015-2016)Onwards

Sl. No.	Sem	Paper	Hrs/week	Credit	Exam hrs.	Marks		
						Internal	External	Total
1	I	Part-I – Tamil- I/ Hindi – I	6	3	3	25	75	100
2	I	Part-II – English – I	6	3	3	25	75	100
3	I	Major Paper – I – Properties of Matter and Sound	6	5	3	25	75	100
	I	Major Paper – II (Practical-I)*	3					
4	I	Allied Paper – I – Mathematics – I	5	5	3	25	75	100
5	I	Environmental Science	2	2	3	25	75	100
	I	Soft Skill – I * - Fundamental Electric Works	2					
6	II	Part-I – Tamil-II/ Hindi – II	6	3	3	25	75	100
7	II	Part-II – English – II	6	3	3	25	75	100
8	II	Major Paper – II (Practical-I)*	3	4	3	40	60	100
9	II	Major Paper – III – Mechanics and Relativity	6	5	3	25	75	100
10	II	Allied Paper – II – Mathematics – II	5	5	3	25	75	100
11	II	Value Education	2	2	3	25	75	100
12	II	Soft Skill – I * - Electrical Appliances	2	4	3	25	75	100
13	III	Part-I – Tamil- III/ Hindi – III	6	3	3	25	75	100
14	III	Part-II – English – III	6	3	3	25	75	100
15	III	Major Paper – IV – Thermal and Statistical Physics	5	4	3	25	75	100
	III	Major Paper – V(Practical-II)*	3					
	III	Allied Paper – III* - Chemistry	3					
	III	Allied Paper – IV(Chemistry Practical)*	3					
16	III	Non-Major Elective – I - Chemistry in everyday life	4	2	3	25	75	100
17	IV	Part-I – Tamil- IV/ Hindi – IV	6	3	3	25	75	100
18	IV	Part-II – English – IV	6	3	3	25	75	100
19	IV	Major Paper – V(Practical-II)*	3	4	3	40	60	100
20	IV	Major Paper – VI – Optics and Spectroscopy	5	4	3	25	75	100
21	IV	Allied Paper – III* - Chemistry	3	5	3	25	75	100
22	IV	Allied Paper – IV(Chemistry Practical)*	3	5	3	40	60	100
23	IV	Soft Skill –II -Electric Generators and Electric Motors	2	4	3	25	75	100

24	V	Major Paper – VII – Electricity, Magnetism and Electromagnetism	4	4	3	25	75	100
25	V	Major Paper – VIII – Atomic Physics	4	4	3	25	75	100
26	V	Major Paper –IX – Basic Electronics	5	4	3	25	75	100
	V	Major Paper – X(Practical-III)*	3					
	V	Major Paper – XI(Practical-IV)*	3					
27	V	Elective Paper – I – Laser Physics and Fibre optics	5	5	3	25	75	100
28	V	Non-Major Elective – II – Astronomy	2	2	3	25	75	100
29	V	Soft Skill – III – Multimedia and Animation	4	4	3	25	75	100
30	V	Major Paper – X(Practical-III)*	3	4	3	40	60	100
31	V	Major Paper – XI(Practical-IV)*	3	4	3	40	60	100
32	VI	Major Paper – XII – Solid State Physics	5	5	3	25	75	100
33	VI	Major Paper – XIII – Digital Electronics and Micro Procesor	5	5	3	25	75	100
34	VI	Major Paper – XIV – Wave Mechanics and Nuclear Physics	4	4	3	25	75	100
35	VI	Elective Paper – II – Computational Physics	5	5	3	25	75	100
36	VI	Elective Paper – III – Mobile Communication	4	4	3	25	75	100
37	VI	Gender Studies	1	1	3	25	75	100
		Extension Activities		1				
			178	140				3700

*** Exams will be held at the end of even semester**

CC01 : – PROPERTIES OF MATTER AND SOUND

UNIT I: GRAVITATION **SUB.CODE: JSPHA1**

Newton's law of gravitation – Determination of G by Boy's method – Cavendish method – Mass of earth and gravitational filed of sun – Gravitational field – Gravitational potential at a point due to a body of mass m – Equipotential surface – Gravitational potential and field at a point outside and inside a solid sphere – Inertial and gravitational mass – Orbital velocity – Time period – Stationary satellite – Escape velocity – Acceleration due to gravity, value of g at the poles and at the equator – Variation of g with altitude, Depth and rotation of the earth.

UNIT – II : ELASTICITY

Moduli of elasticity – Relation between them – Poisson's ratio – Bending of beams – Uniform and non uniform bending – Cantilever depression and oscillation – Koenig's method

Torsion – Couple per unit twist of solid and hollow cylinders – Work done in twisting a wire – Torsion pendulum – Searle's method of finding elastic constants of a short wire.

UNIT - III: VISCOSITY AND DIFFUSION

Viscosity – Streamline and turbulent flow – coefficient of viscosity – Reynolds's number and its significance - variation of viscosity with temperature and pressure – Difference between friction and lubrication coefficient of viscosity of highly viscous liquid by Searle's viscometer – Meyer's modification of Poiseuille's formula – Rankine's method.

Diffusion – Graham & Fick's laws – Determination of diffusivity

UNIT IV : SURFACE TENSION AND OSMOSIS

Excess of pressure inside spherical and cylindrical drops and bubbles - Surface tension and interfacial surface tension by method of drops – Jaeger's method – Angle of contact - Quinke's method for mercury(with and without angle of contact)

Osmosis – Laws of Osmotic pressure – Experimental determination of Osmotic pressure – Elevation of Boiling point and depression of freezing point.

UNIT –V : SOUND

Intensity of sound – Decibel – Intensity level Phon – Laws of transverse vibrations – Melde's string method – Acoustics of buildings – Sabine's formula – Doppler effect – Derivation for change in frequency – Lissajous figures – Uses – Ultrasonics – Properties - Production by Piezoelectric and Magnetostriction methods – Applications.

Books for study:

1. D.S. Mathur- Properties of Matter,S.Chand&Co,Delhi-2004
2. R.Murugesan- Properties of matter, S.Chand&Co, Delhi-2004
3. RL.Saihgal,S.Chand&Co-1998
4. Brijal&Subramanyam- Properties of matter,S.Chand&Co-2004
5. C.L. Arora- Waves and oscillations,S.Chand&Co- 2002
6. Brijal & Subramanyam , Text Book of Sound

CC02 : PRACTICAL – I

SUB.CODE: JSPHB2P

Any 15 Experiments

1. Determination of g and k using compound pendulum
2. Determination of Young's modulus by nonuniform bending(pin and microscope)
3. Determination of Young's modulus by uniform bending(scale and telescope)
4. Determination of Rigidity modulus by static torsion apparatus
5. Determination of surface tension and interfacial surface tension by drop weight method
6. Verification of laws of transverse vibrations in a stretched string using sonometer.
7. Determination of frequency of the vibrator by Melde's string apparatus
8. Determination of viscosity by graduated burrette method
9. Determination of specific heat capacity of liquid by Newton's cooling method
10. Determination of thermal conductivity of a bad conductor by Lee's disc method
11. Determination of focal length, radius of curvature and refractive index of a long focus convex lens
12. Determination of focal length, radius of curvature and refractive index of a concave lens
13. Determination of temperature coefficient of resistance using Post Office box
14. Determination of internal resistance of a cell using potentiometer
15. Determination of refractive index of the material of the prism by spectrometer
16. Study of V-I characteristics of a junction diode.
17. Determination of thickness of a wire by forming Air wedge

SOFT SKILL I : ELECTRICAL APPLIANCES

SUB.CODE: JSBPHEC1

UNIT I : AUTOMATIC ELECTRIC IRON, MIXER AND GRINDER

Parts of an automatic electric iron box - Heating arrangement – Thermostat – wiring requirements – nonsticking contact surface

Parts of a mixer – motor – RPM control – over load indicator

Parts of a grinder – motor – grinding arrangement – trouble shooting

UNIT – II : ELECTRIC FAN AND FLUORESCENT LAMP

Parts of a fan – motor – winding – rotor and stator – swing arrangement of a table fan – use of condenser and regulators

Parts – Choke – Starter – Bulb – wattage calculation – luminous efficacy - compact fluorescent lamps

UNIT – III : AIR CONDITIONERS AND REFRIGERATORS

Parts of an A/C and refrigerator – Power supply – compressor loads – tonnage calculation – location selection for installation

UNIIT - IV : WASHING MACHINES

Parts of a washing machine – supply load – water supply – earthing – automatic and semiautomatic type machines – motor speed control – over load indication.

UNIT V : HOUSE WIRING

Single phase, two phase and three phase electrical supply – neutral and line – fuse wire and working of a fuse – tripper- switch installation – one way and two way switches – plugs – wiring for lamps and motors

Books for study and reference :

L. R. Hans & M. L. Anwani, Basic shop practicals in Electrical Engineering, Dhanpat Rai, Delhi

Xavier and Radhakrishnan (Tamil Version)

ENVIRONMENTAL STUDIES

UNIT –I **SUB.CODE: JSECS**

(a) Nature of environment and environmental studies:
(b) Definition, scope and importance: need for public awareness.
(c) Renewable an non-renewable resources and their management
(d) A preliminary knowledge on the following resources: forest, water, mineral, food and energy.

UNIT – II

(a) Concept of an ecosystem, structure of an ecosystem, producers, consumers and decomposers.
(b) Energy flow in the ecosystem, food chains, food webs and ecological pyramids.

UNIT - III

(a) Biodiversity and its conservation – Introduction – definition genetic – species and ecosystem diversity
(b) Biogeographical classification of India, value of biodiversity: consumptive use, productive use social, ethical, esthetic and option values.
(c) Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
(d) Endangered and endemic species of India, conservation of biodiversity.

UNIT – IV

(a) Environmental pollution – Definition, causes, effects control measures of Air pollution, water pollution and Soil pollution, Marine pollution, Noise pollution. Thermal and nuclear pollution:
(b) Solid waste management: causes, effects and control measures of urban and industrial wastes.

UNIT – V

(a) Social issues and problems from unsustainable to sustainable development, urban problems related to energy conservation.
(b) Population growth, variation among nations
(c) Population explosion – Family welfare programme
(d) Environmental and human health, Human rights, Value education, HIV/AIDS, Women and child welfare.

CC03 : MECHANICS AND RELATIVITY

UNIT - I : STATICS **SUB.CODE: JSPHC2**

Centre of gravity: Center of Gravity of a solid hemisphere, hollow hemisphere, tetrahedron and solid cone – Friction: Laws of friction – Coefficient of friction –Angle of friction-Cone of friction – Equilibrium of a body on a rough inclined plane – Applications of friction: friction clutch.

UNIT - II PROJECTILE, IMPULSE AND IMPACT

Projectile – Path of a projectile –Range on an inclined plane – Impulse –Impact – Impulsive force –Laws of impact – Impact of a smooth sphere on a horizontal plane-Direct and Oblique impact between two smooth spheres -Loss of Kinetic energy – Motion of two interacting bodies –Reduced mass.

UNIT - III DYNAMICS OF RIGID BODIES

Moment of Inertia – Angular momentum – Torque – Conservation of linear and angular momentum –Kinetic energy of rotating body –Theory of Compound Pendulum – Determination of g and k – Centre of Mass –Velocity and acceleration centre of mass – M.I. of a diatomic molecule.

UNIT - IV HYDROSTATICS AND HYDRODYNAMICS

Centre of Pressure – Centre of Pressure of a rectangular lamina and triangular lamina – Atmospheric Pressure – Variation of atmospheric pressure with altitude height of homogeneous atmosphere –Equation of Continuity – Energy of liquid in motion – Euler's equation – Bernoulli's theorem – Pitot tube –Venturimeter.

UNIT- V :LAGRANGIAN MECHANICS AND RELATIVITY

Mechanics of a system of particles – Constraints – Generalized co-ordinates – Principle of virtual work – D'Alembert's principle – Lagrange's equation from D'Alembert's principle – Appliction to Simple pendulum

Special Theory of Relativity – Intertial frames – Galilean and Lorentz transformations – Length contraction and time dilation – Addition of Velocities – Mass energy equivalence

Books for study:

1. Narayanamoorthy –Mechanics Part I and II, National Publishing Company
2. D.S. Mathur – Mechanics II Edition, S.Chand and Co,- 2001.
3. R.Murugeshan Mechanics and Mathematical Methods, S.Chand and Co,- 2002.
4. R.Murugeshan, Modern Physics, S. Chand & Co.

VALUE EDUCATION

SUB.CODE: JSCEV

UNIT – I : MEANING AND NATURE OF VALUE EDUCATION

Meaning and concepts of value education – origin – nature - classification of values – view of eminent thinkers – meaning of value education – need for value education.

UNIT - II : OBJECTIVES AND DEVELOPMENT OF HUMAN VALUE

Role of School and colleges in the development of human values – objectives of value oriented education. Ethical and social values – Gandhiji's non violence – Gokak committee.

UNIT - III :STRATEGIES AND APPROACHES TO VALUE EDUCATION

Role of education school, family, teacher for the personal value development – concept ional frame work – strategy suggested by J R Frankel – NCERT approach to value Education – Role play technique in value education – value based curriculum – teachers role.

UNIT - IV : SOURCES OF VALUES

Sources of values – Traditional Indian values, sources of values – culture, Education, Religions – Hinduism, Christiansim, Islam, Buddhism –Indian constitutions as source for democratic values – equality – secularism, democracy, Research and resources in value education.

UNIT - V : METHODS OF TEACHING AND DOCUMENTS ON HUMAN VALUE EDUCATION

Methods of teaching value education – Guidelines for developing value among students. Problems in promoting value Education – Documents of value education – Recommendation of the committee appointed by the central advisory Board of Education – Recommendation of the university education commission 1964 -1966. National policy on education 1986-1992.

Books for study and reference

1. J.C. Aggarwal, Education for values Environment and Human Rights, Shipra publications, New Delhi 2005.
2. Dube S.C. Modernization and development, The search for an alternative paradigm, zee books ltd. London: 1988
3. Mansell R and When U, Knowledge societies: Information Technology for sustainable Development, Oxford University press, New York.
4. World bank knowledge for development world development report, Oxford Unit Press, New york.

CC04:THERMAL AND STATISTICAL PHYSICS

SUB.CODE: JSPHD3

UNIT - I SPECIFIC HEAT

Specific heat capacity of solid and liquids – Dulong and Pettit's law – Variation of specific heat and atomic heat with temperature –Barton's correction – Newton's laws of cooling – Specific heat capacity of liquids by cooling –Two specific heat capacity of gases –Mayer's relation –Determination of specific heat at constant volume by Joly's method and specific heat capacity at constant pressure by Reynold's method.

UNIT - II TRANSMISSIONS OF HEAT

Coefficient of thermal conductivity –Rectilinear flow of heat along a bar – Forbe's method to find K –Lee's method for bad conductors –Thermal conductivity of glass – Heat flow through a compound wall – Newton's law – Verification – Statement and derivation of Stefan's law – Determination of Stefan's constant (Laboratory method) –Distribution of energy in the spectrum of a black body –Derivation of Planck's law

UNIT - III THERMODYNAMICS

Intermolecular force of attraction – Porous plug –Theory and experiment – Joule –Kelvin effect –Temperature of inversion –Zeroth law of thermodynamics – Heat and work – a path function – First law thermodynamics for change in the state of a closed system – Specific heat capacity of gas – Derivation of adiabatic gas equation – Derivation for efficiency of a Carnot's engine in terms of temperature – Clausius inequality – Entropy and Second law – Change in entropy for an irreversible process

UNIT - IV MAXWELL'S THERMO DYNAMICAL RELATIONS

Concept of entropy – T-S diagram – Entropy of a perfect gas – Derivation of Maxwell's thermodynamics relations –Applications – TdS equations –Clapeyron's latent heat equation – Specific heat relation – Helmholtz function – Gibb's function –Enthalpy.

UNIT - V STATISTICAL THERMODYNAMICS

Phase space – Statistical equilibrium – Microstates and macro states – Maxwell – Boltzmann distribution law - Ensembles (Concept only)- Quantum statistics – Fermi Dirac distribution law – Applications to electron gas – Bose Einstein distribution law – Application to photon gas – Radiation laws(Planck, Rayleigh Jeans and Wien) .

Books for study:

1. Heat and thermodynamics – Brijilal and Subramaiyan, S.Chand & co., New Delhi - 2000.
2. Heat and Thermodynamics – Mathur, D.S.Sultan Chand & Sons, New Delhi – 1978.
3. A. Textbook of Heat and Thermodynamics –Rajam.J.B and Arora, C.L., S.Chand & co Ltd , New Delhi – 1979.
4. Thermal Physics – P.Thangaraj and D.Jayaraman.

CC05: PRACTICAL – II

SUB.CODE: JSPHF4P

Any 15 Experiments

1. Determination of Young's modulus by cantilever depression (scale and telescope)
2. Determination of Rigidity modulus using Torsional pendulum
3. Determination of surface tension by capillary rise method
4. Determination of viscosity by Searle's viscometer
5. Determination of viscosity by Stoke's method
6. Determination of specific heat capacity of liquid by Joule's calorimeter method
7. Determination of refractive index of the material of the prism by i-d curve method using spectrometer
8. Determination of wavelength of prominent lines of mercury spectrum by Normal incidence method using spectrometer and grating
9. Determination of specific resistance of given material of wire using Carey Foster's bridge
10. Determinaiton of figure of merit of a mirror galvanometer
11. Determination of emf of a thermocouple by direct deflection method using mirror galvanometer
12. Determination of temperature coefficient of resistance using Potentiometer
13. Determination of M and H using deflection and vibration magnetometers
14. Determination of impedance and power factor of a coil
15. Study of VI characteristics of a zener diode.
16. Construction of full wave rectifier with filter.
17. Determination of emissive power of a surface by spherical calorimeter

SOFT SKILL II : ELECTRIC GENERATORS AND ELECTRIC MOTORS

SUB.CODE: JSBPHEC2

UNIT I: DC-GENERATORS AND WINDING

Working Principles – AC to DC by Commutator – PARTS of DC Generator – Yoke – Field Pole – Armature core e and winding – Commutator – Brushes.

Types of winding – Loop and Wave winding – EMI equation of generator – Permanent magnet generator- Electromagnet generator.

UNIT II : TYPES OF GENERATORS AND TROUBLE SHOOTING

Series Generator – Shunt Generator – Compound Generator – Commutator .

Dc Generator – Losses in DC generator – Efficiency- Rating and trouble shooting

UNIT III : POLY PHASE SYSTEM

Different system of generation of AC supply – Two Phase system – Three phase system – Phase sequences – Three phase winding – Star and Delta – Power in a three Phase system.

UNIT IV : DC MOTOR AND CHARACTERISTICS

Motor – Working principle of DC motor – Terns used in DC motors – Armature torque – Shaft torque.

Characteristics – Torque and Armature characteristics – Speed and Armature – Current characteristics – Efficiency of DC motor – Rating of DC motor-DC Shunt characteristics – DC series – Characteristics – Compound motor – Differential –Cummulative – Compound motor.

UNIT IV APPLICATIONS AND GENERAL ASPECTS

Application - Necessity of starters- Types of Starters – Starting – Changing – Direction.

Speed variation of DC series voltage control method – Speed control of shunt voltage control method – Losses in DC motor.

Books for study :

S. Dhogal, Basic Electrical Engineering with numerical problems vol. I and II, TMH

CC06 : OPTICS AND SPECTROSCOPY

SUB.CODE: JSPHE4

UNIT - I GEOMETRICAL OPTICS

Defects of images – Spherical aberration – Methods of reducing spherical aberration – Coma – Aplanative surfaces – Astigmatism – Distortion – Curvature chromatic aberration – Condition for achromatism of two lenses in contact and out of contact – Optical instruments – Ramsden's eyepiece – Huygen's eyepiece – Its comparison – Gauss eyepiece.

UNIT II – INTERFERENCE

Interference of light – Coherent sources – Phase difference – Path difference – Fresnel's mirror – Fresnel's Biprism – Determination of wavelength of light, distance between two virtual sources – Lloyd's single mirror – Interference in thin films – Interference due to reflected beam – air wedge – Newton's Rings- Determination of R and μ – Michelson's Interferometer

UNIT - III DIFFRACTION

Fresnel's and Fraunhofer diffraction – Fresnel's diffraction at a straight edge and circular aperature – Zone plate – Difference between zone plate and convex lens – Fraunhofer diffraction at a single slit, double slit and Nslits- theory of plane transmission grating – Dispersive power of a grating – Resolving power of a telescope, microscope , prism and grating – Comparison of grating and prism.

UNIT - IV POLARIZATION

Double refraction – Optics axis – Ordinary and extradinary rays- Huygen's explanation of double refraction in uniaxial crystals – Nicol prism – quarter wave plate – Half wave plate – Production and detection of plane, circularly and elliptically polarized light – Optical activity – Fresnel's explanation with analytical treatment – Specific rotatory power – determination by half shade and biquartz polarimeter.

UNIT - V SPECTROSCOPY

X-ray spectra – continious and Characteristics spectra – Mosley's law – Applications – Molecular spectra – Spectra of diatomic molecules – Pure rotational spectra – Vibration – Rotation spectra – Selection rules – Raman effect – experimental study – Raman effect in solids and gases – Explanation of ramnan effect – Application of Raman effect in molecular spectra.

Books for study:

1. A text book of optics - Brijilal Subramanian
2. Optics – Second edition - Ajoy ghatak
3. Spectroscopy - Gurdeep Chatwal and Sham Anand
4. Fundamentals of Molecular spectroscopy - CN.Banwell
5 Optics and spectroscopy - R.Murugesan

CC07 : ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM

SUB.CODE: JSPHG5

UNIT- I : ELECTROSTATICS

Gauss theorem – Applications, Charged sphere, charged cylinder and infinite plane – Coloumb's theorem – Mechanical force on unit area of charged sphere – Energy stored in electrostatic medium – Electrified soap bubble – Cloud formation – Capacitors – Principles – Capacity of a spherical and cylindrical capacitor

UNIT – II : MAGNETIC PROPERTIES OF MATERIALS

Definitions of magnetic physical quantities – Cycle of magnetization and hysterisis loss - IH Curve – BH Curve – Magneto meter method – BG method –— Area of BH loop – Applications of BH curve – Properties of para, dia, and ferro magnetic materials - Curie's laws and curie point

UNIT - III CURRENT ELECTRICITY AND MAGNETIC EFFECTS OF CURRENT

Carey –Foster bridge –Determination of resistance and temperature coefficient of resistance of a coil.

Magnetic field at a point a long the axis of a solenoid – Ampere's theorem and its proof – Application – Field along the axis of a circular coil.

Ballistic galvanometer –Theory – Determination of quantity sensitiveness – Damping correction –Determination of capacitance of a capacitor.

UNIT - IV DC AND AC CIRCUITS

Growth and decay of charge in LR, CR and LCR circuits – Condition for discharge to be oscillatory –High resistance – Determination by leakage method.

AC circuits containing double components LC,LR,CR –LCR circuit – Series and parallel resonance circuits – Q.factor –Wattless current – Choke – Power factor –Skin effect –Tesla coil.

UNIT V ELECTRO MAGNETIC INDUCTION

Laws of electromagnetic induction – Self induction –Mutual induction –Expression for both – Determination of L by Rayleigh's and Anderson's methods – Determination of M by absolute method –Eddy current –Application.

Rotating magnetic field –Principle of induction motor –Couple acting on a coil placed in a rotating magnetic field.

Books for study:

1.Electricity and Magnetism: Brijlal Subramaniyam – 1996,
2. Electricity and Magnetism: Dr.D.N.Vasudeva – 1996, S.Chand&Co ; Delhi
3. Electricity and Magnetism: R.Murugesan,S.Chand&Co, Delhi

CC08: ATOMIC PHYSICS

SUB.CODE: JSPHH5

UNIT – I : POSITIVE RAYS

Properties – e/m of Positive rays – Thomson's Parabola method – Aston's Bain bridge Dempster's mass spectrographs – Determination of critical potential – Franck and Hertz's experiment.

UNIT – II PHOTO ELECTRICITY

Photo Electric emission – Laws – Lenard's experiment – Richardson and Compton experiment – Einstein's photoelectric equations – Experimental verification of Einstein's photoelectric equation by Millikan's experiments.

UNIT – III ATOM MODELS

Bohr – Sommerfeld relativistic atom model – Vector atom model – Quantum numbers associated with vector atom model – Coupling Schemes – Pauli's exclusion principle – Magnetic dipole moment due to orbital rotation and spin of electron – Bohr magneton – Stern Gerlach experiment.

UNIT – IV FINE STRUCTURE OF SPECTRAL LINES

Optical spectra – Spectral terms and notations – Selection rules – Intensity rule – Fine structure of sodium D lines Zeeman effect – Lorentz classical theory of normal Zeeman effect and expression for Zeeman shift – Debye's quantum mechanical explanation of normal Zeeman effect – Larmor's theorem – Anomalous Zeeman effect – Land's 'g' factor – Lorentz unit – Paschen-Back effect – Stark effect.

UNIT – V X- RAYS

Bragg's law – Bragg's X- ray spectrometer – Origin and analysis of continuous X-ray spectrum and characteristic X-ray spectrum – Moseley's law and its importance – Compton effect – Derivation of expression for change in wavelength its experimental verification.

Books for study:

1. Modern Physics – R.Murugesan – S.Chand & Co ; New Delhi

CC09 : BASIC ELECTRONICS

SUB.CODE: JSPHI5

UNIT-I SEMICONDUCTOR DIODES

P-N Junction diodes – Characteristics – Zener diode – Avalanche breakdown – LED – Photo diode – Varactor diode – Schottky diode – Tunnel diode – Applications – Rectifier – Half wave, full wave and bridge rectifiers – Filters – Clipping – Clamping – Voltage regulation using Zener diode – Voltage Doubler and Tripler - SCR – Characteristics – Application (as a switch).

UNIT-II TRANSISTORS

CB and CE configurations – Characteristics – h parameters – Transistor biasing – Method of biasing – Transistor as an amplifier – AC and DC Equivalent circuits.

FET, JFET and MOSFET – Characteristics and Parameters of FET - FET amplifier – UJT – Characteristics – Photo transistor.

UNIT – III AMPLIFIERS

Voltage and Power amplifier – Amplifier, Classification – RC Single stage amplifiers – RC coupled amplifiers, Power amplifier, Class A, Class B and Class C amplifier – Negative feed back amplifier – Emitter follower.

UNIT – IV OSCILLATORS

Positive feed back in amplifiers – Principles of positive feed back oscillators – LC Oscillators (Tuned base, tuned collector, Hartley and Colpitt's oscillator) – RC oscillators (Phase Shift Oscillator) – Crystal oscillators – Multivibrators – Astable, Monostable, Bistable, Schmitt trigger – Relaxation oscillator.

UNIT – V OPERATIONAL AMPLIFIER

Difference amplifier – Ideal operational amplifier – Characteristics – Inverting and non-inverting Op-Amp – Parameters of Op-Amp – Applications of Op-Amp – Comparator, scale changer – Adding and subtracting Op-Amp – Integrator – Differentiator – Logarithmic amplifier – Antilog Amplifier – Solving differential and simultaneous equations.

Books for Study:

1. Basic Electronics, Solid State - B.L. Thereja - S.Chand & Co
2. Principles of Electronics - V.K. Mehta - S.Chand & Co
3. Elements of Solid state Electronics - A. Ambrose and T.Vincent Devaraj, Meera Publications.

CC10 : PRACTICAL III

SUB.CODE: JSPHM6P

Any 15 Experiments

Section A: General Physics Experiments (Any 12)

1. Determination of refractive index of the material of the prism by i-I' method using spectrometer
2. Determination of dispersive power of a prism using spectrometer
3. Determination of wavelength of mercury lines by minimum deviation method using spectrometer and grating
4. Determination of Cauchy's constant using spectrometer
5. Determination of refractive index of a lens by forming Newton's rings
6. Determination of angle of a small angled prism using spectrometer
7. Determination of quantity sensitivity of a ballistic galvanometer
8. Determination of absolute capacity of a condenser using ballistic galvanometer
9. Determination of self inductance of a coil by Anderson's method using ballistic galvanometer
10. Determination of mutual inductance between pair of coils using ballistic galvanometer
11. Comparision of mutual inductances between pairs of coils using ballistic galvanometer
12. Determination of moment of a magnet by nullifying the field produced along the axis of a circular coil
13. Determination of Young's modulus by Koenig's method
14. Calibration of high range voltmeter using potentiometer
15. Determination of emf of a thermocouple using potentiometer

Section B: C Programming (Any 3)

1. Arranging words in alphabetical order
2. sorting of numbers in ascending and descending order
3. Addition and subtraction of square matrices
4. Conversion of Farenheit temperature into Celsius temperature
5. Solving quadratic equatioN

CC11 : PRACTICAL IV

SUB.CODE: JSPHN6P

Any 15 Experiments

Section A: Electronics Experiments (Any 12)

1. Series and Parallel resonance circuits
2. Transistor Characteristics CE mode
3. Regulated power supply
4. Emitter follower amplifier
5. Tuned collector oscillator
6. Hartley oscillator
7. Colpitt's oscillator
8. Phase shift oscillator
9. Astable multivibrator
10. Monostable multivibrator
11. FET characteristics
12. Logic gates – using ICs
13. NAND and NOR as universal gates
14. Opertional amplifier – adder and subtractor
15. Operational amplifier – integrator and differentiator
16. Half adder and Half subtractor
17. Boolean expression simplifications using ICs

Section B: Microprocessor (Any 3)

1. 8 bit addition and subtraction
2. 8 bit multiplication and division
3. Biggest number among a list
4. Smallest number among a list
5. Conversion from decimal to Hexa and vice versa.

ELECTIVE I: LASER PHYSICS & FIBRE OPTICS

SUB.CODE: JSPHEC1

UNIT - I PHYSICS OF LASERS

Basic principle of Laser – Einstein coefficients – Condition for light amplification – Population inversion – Thresold condition – Line Shape function – Optical resonators(Qualitative only) – Three level and Four level systems.

UNIT – II TYPES OF LASERS

Ruby Laser – Nd – YaG Laser – He-Ne Laser, Co2 Laser – Dye Laser Semi Conductor Laser – Q Switching & mode locking (qualitative) – Experimental methods.

UNIT III APPLICATION OF LASER

Application of Laser in industry – Cutting – Welding - Drilling – Surface hardening – Medical applications – Laser as diagnostic & therapeutic tool – Holography – Theory of recording & reconstruction – Applications of holography – Holographic interferometry in non destructive testing, Acoustic holography and Holographic microscopy – Lasers in compact disc players.

UNIT IV THEORY OF OPTIC FIBRES

Basic structure of an optic fibre – Acceptance angle – Numerical aperture – Propagation of light through an optical fibre – Theory of modes formation – Classification of fibres – Step index & graded index fibres – Comparision of the two types – Single mode & multimode fibres – Losses in fibres – Dispersion in fibres – Fabrication of fibres.

UNIT - V FIBRE OPTIC COMMUNICATION

Optical communication – Advantages – Light sources – Modulation methods – Photo detectors – Optical couplers – Splicing – Communication systems (Block diagram) – Repeaters – Fibre cables – Measurements of numerical aperture & optical time domain reflectometers.

Books for study:

1. K.Thyagarajan, A.K.Ghatak – Laser theory and applications, Cambridge university press.
2. Avadhanulu M.N; - An introduction to Lasers&Applications , S.Chand & Co, New Delhi.
3. Subir Kumar Sarkar – Optical Fibres & Fibre Optic communication system, S.Chand & Co ; New Delhi 2001.
4. R.K.Gaur&S.L.Gupta(eight edition) – Engineering Physics, Dhanpat Rai publications,New Delhi.
5. P.K.Palanisamy – Physics for Engineering, Scitech Publications private Ltd.

SOFT SKILL III MULTIMEDIA AND ANIMATION

SUB.CODE: JSBPHEC3

Unit : 1

Introduction: Multimedia, Interactive multimedia, Hypermedia – Composition, Mechanism, Text, Graphics, Audio, Film, Video – the stages of multimedia projects – Planning, Design, Development, 3D studio, 3D softwares - Flash, Adobe Photoshop, CorelDraw, Adobe premier, Adobe Effects, compution boser.

Unit : 2

View ports, camera viewport, lightning viewport, Menu, tools menu, Max panels. Materials and Mapping: Types of materials, Metal box parts, Extended parameters, Maps: co ordinates in maps, 2D & 3D Maps, UVW mapping. Environment: Types of effects, Rendering effects, Lights: light options. Camera: applications, types and options.

Unit : 3

Video post and poster processing: parts of video posting, Add scene event, Add image input event, video post parameter, Add image filter event, lenses effects. Sounds: Audio editor, channel mixer, noise gate, Animation: controls, graph editor, keys, frame rate, assign control in animation, top sheet option.

Unit : 4

Motion panel: Display panel, utility panel, Rendering: active shadier flatter, options, render elements, current render, ram player, array. Animation and Visual effects presentation: create to object, Explain pencil, top, table, selling fan, torch light, Nokia cell phone. Character studio: Terminator, bones, skin object, Create Biped animation.

Unit : 5

Poser: Animation of object, applications of poser, Particle illusion, Bluff Titler Dx9: bluff titler, Crazy talk 4, its me, Video composting keys and post production, 2D animation convert to 3D animation, 3D Animation shortcut keys, Combustion, Story board or Script.

Reference books:

1. 3 ds studio max 7.0. Animation and visual effects. Grafix B.Kannan. 2007. Kannadasan pathippagam.
2. A Text book of Multimedia. Vishnu priya sing. 2006. Computech publications limited
3. Multimedia fundamentals. M. Andopieter. 2004. Karpagam publications.

CC12 : SOLID STATE PHYSICS

SUB.CODE: JSPHJ6

UNIT - I: CRYSTAL STRUCTURE AND IMPERFECTIONS

Miller Indices- packing factor for SC, BCC, FCC and HCP structures-zinc blende and diamond structure-structure determination: Lau method, Powder and rotating crystal method.

Imperfections: Point – line-surface and volume defects.

UNIT - II: CONDUCTING AND SEMICONDUCTING MATERIALS

Band theory of solids- classical free electron theory of metals-electrical conductivity- thermal conductivity – Wiedmann – Franz law – Lorentz number.

Statistics of electrons and holes in intrinsic semiconductors – electrical conductivity – statistics of extrinsic semiconductors – Hall effect – determination of Hall effect – Applications.

UNIT III : MAGNETIC MATERIALS

Definitions- different types of magnetic materials-Langevin's theory of dia and para magnetism-Weiss theory of paramagnetism- Heisenberg interpretation on internal field – domain theory of ferromagnetism- Antiferromagnetism-ferrites – applications.

UNIT IV: DIELECTRIC AND SUPERCONDUCTIVITY

Definitions – polarizations-different types- electronic and ionic polarization-dielectric loss- local field- Clausius – Mossotti equation- dielectric breakdown – uses of dielectric materials (capacitors and transformers).

Superconductivity- transition temperature – Meissner effect- London equation – Type I and Type II superconductors- BCS theory – high T_c superconductor – applications.

UNIT V : NEW MATERIALS AND NON-DESTRUCTIVE TESTING

Metallic glasses-Nano materials- Shape Memory Alloys-Bio materials-applications

NDT: liquid penetrant method- ultrasonic flaw detector – radiography method-X-ray fluoroscopy.

Books for study:

1. Material science -Dr.A.Arumugam.
2. Solid state physics -S.O.Pillai.

CC13 : DIGITAL ELECTRONICS & MICROPROCESSOR

SUB.CODE: JSPHK6

UNIT - I BOOLEAN ALGEBRA AND LOGIC GATES

Binary number system – Weighted binary codes – ASCII code – Binary arithmetic – 1's, 2's complement addition – Boolean algebra – Basic logic gates – Laws of Boolean algebra NAND,NOR universal logic gates – Exclusive OR gate – Half adder – Full adder – Half subtractor – full subtractor – Parallel binary adder – 1's,2's complement adder – BCD adder.

UNIT -II KARNAUGH MAP, LOGIC FAMILIES AND COMBINATIONAL SYSTEM

K map – 2,3and 4 variable K map – Reduction of Boolean expressions – SOP and POS expression – Reduction using K map – Characteristics of logic families – RTL,DTL and TTL family – Multiplexer – Demultiplexer – Decoder – BCD to 7 segment decoder – Encoder – Decimal to BCD encoder.

UNIT -III SEQUENTIAL SYSTEMS

Basic flip flop – RS flipflop – Clocked RS flip flop – D flip flop – Triggering of flip flop – Edge triggered JK flip flop – Master slave JK flip flop.

Ripple counter – Up and down ripple counter – Modul counter – Decade counter – Divide by N counter – Ring counter.

Shift register – Serial in, serial out shift register – serial in parallel out shift register.

UNIT IV D/A AND A/D CONVERSION

Digital to analog conversion – Binary weighted resistor conversion – Binary ladder conversion – Analog to Digital conversion – Counter type conversion – Continuous conversion – Successive approximation conversion – Semi conductor memories – RAM – ROM memories – Magnetic memories – magnetic bubble memory – Magnetic disc, magnetic tape memories – Floppy discs – Programmable logic devices.

UNIT - V MICROPROCESSOR

Major functions of Microprocessor – Timing and control section – Arithmetic logic unit – Microprocessor architecture – 8085 microprocessor – characteristics – Instruction set – Microprocessor organization – Bus organization – Microprocessor assembly language – Simple programming for addition, subtraction, choosing biggest number and writing numbers in descending and ascending orders – Microcontrollers.

Books for study:

1. Digital Fundamentals, B.Basavaraj – Vikas publishing House private limited – 1998.
2. Digital principles and application – Malvino,Leach – TMH – 1994.
3. Digital Computer Electronics - Albert P.Malvino – TMH – 1995.
4. Microprocessor Architecture, Programming and Applications – Gaonker – Wiley Eastern – 1995.
5. Microprocessor - B.Ram

CC14 : WAVE MECHANICS AND NUCLEAR PHYSICS

SUB.CODE: JSPHL6

UNIT - I DUAL NATURE OF MATTER

Introduction of matter waves – Wave velocity and group velocity - group velocity for de Broglie waves –relation between particle velocity and group velocity – de Broglie wavelength of electron –Davisson and Germer experiment –G.P. Thomson's experiment –Heisenberg's uncertainity principle - Wave mechanical atom model.

UNIT - II WAVE MECHANICS

Basic postulates of wave mechanics – Deviation of time dependent Schrodinger wave equation –Properties of the wave function –Orthogonal and normalized wave functions – Eigen functions and eigen values –Application of Schrodinger wave equation –Particle in a box – Simple harmonic oscillator –Barrier penetration problem – The rigid rotator.

UNIT - III NUCLEAR SPECTROSCOPY

Properties of nuclei – Nuclear spin – Nuclear magnetic moment – Nuclear quadrupole moment.

Introduction to NMR – Quantum description of NMR –Instrumentation –Chemical shift – Spin – Spin coupling – Introduction to NQR spectroscopy – Theory of NQR –Instrumentation – Sample requirements –Applications of NQR.

UNIT - IV ACCELERATORS, DETECTORS AND NUCLEAR REACTIONS

Betatron – Proton synchrotron – Ionisation chamber –Wilson cloud chamber – Bubble chamber –Spark chamber –Phtographic emulsion technique – Scintillation counter.

Nuclear reactions –Main type of Nuclear reaction –Energy balance in nuclear reactions and the Q value –Examples – Threshold energy of an endogeric reaction – Nuclear transmutations – Transmutations by alpha particles , protons , deutrons and neutrons.

UNIT - V NUCLEAR FORCES – NUCLEAR AND ELEMENTARY PARTICLES

Introduction to nucleus – Nuclear forces –Meson theory of nuclear forces – Nuclear models – Shell model and liquid drop model – collective model.

Comparison between fission and fusion – Nuclear fusion –Source of stellar energy – Thermo nuclear reaction – Plasma –Magnetic bottle and uses.

Introduction to elementary particles –Antiparticles –Conservation laws and symmetry – Conservation of parity –Charge conjugation symmetry –Time reversal symmetry –Lee –Young experiment –CPT theorem.

Books for study:

1. Modern Physics : R.Murugesan – S. Chand
2. Modern Physics : N.K.Seighal Chopra.

ELECTIVE II : COMPUTATIONAL PHYSICS

SUB.CODE: JSPHEC2

UNIT – I : DATA TYPES, OPERATORS AND EXPRESSIONS IN C

Introduction to C – Structure of a C Program – Character Set – Keywords and identifiers – Data Types – constants and variables – declaration – symbolic constants – operators – expressions – hierarchy of operators – i/o statements – formtted i/o- simple C programs : g for simple pendulum – focal length of a lens by uv method – decimal to binary and octal conversions

UNIT – II : INPUT, OUTPUT AND CONTROL STATEMENTS IN C

If and if else statements – nesting if..else statements – switch and break statements –goto statements – while, do-while statements – for statements – C programs to calculate Young's modulus and Rigidity modulus, frequency of an oscillator and transistor parameters

UNIT – III : FUNCTIONS AND STRINGS IN C

Functions – library functions- passing arguments of a function – recursion –strings – string functions – storage classes – automatic variables – global and external variables – static variables – C programs for field along the axis, projectiles, center of gravity of different objects

UNIT – IV : ARRAYS, STRUCTURES AND UNIONS IN C

Defining arrays of one and two dimensions – multidimensional arrays- structures – definition and manipulation – user defined structures – unions – definition – C programs for matrix addition, subtraction and multiplication – sorting of a data list in ascending and descending order – searching.

UNIT – V : POINTERS AND FILES

Pointers – definition – declarations – operation on pointers – files – opening and closing a data file – creating a data file – processing a data file- simple file manipulation programs.

Books for Study :

1. E. Balagursamy, Programming in ANSI C, Tata McGraw Hill, New Delhi, 2002
2. Schaum's outline of theory and problems of Programming with C
3. Byron's Gottfried – TMH – New Delhi – 2003.

ELECTIVE III – MOBILE COMMUNICATION

SUB.CODE: JSPHEC3

UNIT – I : WIRELESS TRANSMISSION

Frequencies for radio transmission – signals – antennas – signal propagation – path loss of radio signals – multipath propagation – multiplexing – space division multiplexing – time division multiplexing – frequency division multiplexing – code division multiplexing – modulation and demodulation of digital data – amplitude, frequency and phase shift keying – cellular systems.

UNIT – II : MEDIUM ACCESS CONTROL

Hidden and exposed terminals – near and far terminals – concept of space division multiple access – time division multiple access – frequency division multiple access – code division multiple access – spread aloha multiple access

UNIT – III : TELECOMMUNICATION SYSTEMS

GSM – Mobile services – system architecture – radio subsystem – radio interface – logical channels and frame hierarchy – Protocols – Localisation and calling – Handover – authentication – encryption – GPRS – architecture

UNIT – IV : SATELLITE SYSTEMS

Fundamentals – satellite channels – uplink and downlink frequencies – earthstations – GEO – LEO and MEO – Routing, localization and hand over – applications

UNIT – V : BROADCAST SYSTEMS

Cyclic repetition of data – Digital audio broadcasting – multimedia object – transfer protocol – digital video broadcasting.

Books for Study:

1. John Schiller, Mobile Communications, Addisson Wesley

2. Frenzel, Communication Electronics Principles and Applications, TMH

PAPER I –ALLIED PHYSICS

(For B.Sc Maths and Chemistry)

SUB.CODE: JSPHYC4

UNIT - I DYNAMICS AND PROPERTIES OF MATTER

Impact – Direct and oblique impact of two spheres – Moment of Inertia of a solid sphere and solid cylinder – Gravitation – Determination of G by Boy's method.

Elasticity – Three modulii of Elasticity – Poisson's ratio – Relation between three modulii – Surface tension – Excess of pressure inside a bubble and drop weight method – Coefficient of viscosity – Determination of viscosity by variable pressure head method.

UNIT - II SOUND AND HEAT

Laws of vibration in stretched strings – Sono meter – Verification of laws – Acoustics of buildings – Reverberation – Sabine formula – Ultrasonics – Production and applications.

Newton's law of cooling – Specific heat capacity of a liquid – Thermal conductivity – Coefficient of thermal conductivity of bad conductor by Lee's disc method.

UNIT - III OPTICS, ELECTRO STATICS AND CURRENT ELECTRICITY

Aberration – Spherical aberration, chromatic aberration – Interference of light in thin films – Air wedge – Newton's rings – Diffraction of single slit – Grating – Determination of wave length of spectral lines – Normal incidence method.

Gauss theorem – Applications – Intensity of field at a point due to a line charge, charged sphere – Capacitor – Capacity of spherical and cylindrical capacitor – Effect of dielectrics – Energy of charged conductor – Sharing of charges between two charged conductor – Potentiometer – Measurement of current, calibration of low range voltmeter and low range ammeter.

UNIT - IV ATOMIC PHYSICS AND NUCLEAR PHYSICS

Atom models – Vector atom model – Pauli's exclusion principle – quantum numbers and quantization of orbits – Stern and Gerlach experiment – X-rays – continuous and characteristics X-rays – Continuous and characteristics X-rays – Mosley's law and its importance.

Binding energy – General properties of nucleus – Nuclear forces and their characteristics – Nuclear models – liquid drop model – Shell model - Nuclear fission – fusion reactions – Nuclear reactors.

UNIT - V ANALOG AND DIGITAL ELECTRONICS

P.N.Junction diode – Characteristics – Zener diode – Characteristics – Rectifiers – using junction diodes (Half,Full and bridge rectifiers) – Zener diode as voltage regulator – Transistors – Characteristics in CE mode – Common emitter single stage amplifier – Frequency response.

Binary arithmetics – Basic logic gates – Boolean algebra – Demorgan's theorem – Verification using truth tables.

Books for study

1. A text book of sound – Brijilal and Subramanian,vikas publishing house New Delhi.
2. Heat and thermodynamics – Brijlal and Subramanian S.K.chandand Co New Delhi.
3. Optics – Brijlal and Subramanian,S.Chand and Co New Delhi.
4. Allied physics – A. Sundaravelusamy, Priya publications , Karur.
5. Modern Physics – R.Muruguesan, S.Chand & Co.
6. Electricity and Magnetism - Brijlal and Subramanian S.K.chand and Co New Delhi.
7. Digital Principles and Applications – Malvino , Leech, TMH -1994

ALLIED PHYSICS COURSE-II: PRACTICAL

(For B.sc Mathematics and Chemistry)

SUB.CODE: JSPHYD4P

LIST OF EXPERIMENTS

(Any 15 Experiments)

1.Determination of young's modulus by non uniform bending (pin and microscope
2. Determination of surface tension and interfacial surface tension by drop weight method
3. Verification of law of transverse vibrations in a stretched string using sonometer.
4. Determination of viscosity by graduated burrette method.
5.Determination of specific heat capacity of liquid by Newton's cooling method.
6.Determination of thermal conductivity of bad conductor by Lee's disc method.
7.Determination of refractive index of material of the prism by spectrometer.
8.Study of VI characteristics of a junction diode.
9.Determination of radius of curvature of a convex lens by forming Newton's ring.
10.Determine the resistance using potentiometer.
11.Determination of g and k using compound pendulum.
12.Construction of full wave rectifier with filters.
13.Determine the figure of merit of a mirror galvanometer.
14.Determine the emf of a thermocouple by the direct deflection method.
15.Determine the prominent lines mercury spectrum by placing a grating in normal incidence position.
16.Determine the specific resistance of a wire using Carey Foster bridge.
17.Determine the focal length of a long focal convex lens.

ALLIED PAPER 1: APPLIED PHYSICS

(For B.Sc Computer Science)

SUB.CODE: JSPHCYC4

UNIT - I ELECTROSTATICS AND MAGNETOSTATICS

Electric potential – Potential at a point due to a point charge – Relation between potential and field – Equipotential surface – Action of points – Capacitors – Principle – Spherical and Cylindrical capacitors – types of capactor.

Magnetic potential at a point due to an isolated pole and potential due to a dipole – Radiation between magnetic potential and intensity – Magnetic shell – Potential at any point due to a magnetic shell – Dia ,para and ferro magnetic substances and their properties – Hysterisis.

UNIT - II CURRENT ELECTRICITY & ELECTROMAGNETIC INDUCTION

Ohm's law – Kirchoff's law – Wheatstone's bridge - Condition for balance – Carey Foster's bridge and measurement of resistance – Potentiometer Measurement of current and resistance.

Laws of electromagnetic induction – Eddy currents and its application – Transformer theory and energy losses- AC circuit containing only R,only C – Ac circuit having L and R – AC circuit having C and R – Power in a pure resistive circuit – Power factor – Wattless currents - Choke - AC circuits having L,C and R in series and parallel.

UNIT -III SEMI CONDUCTOR PHYSICS

Theory of energy bands in crystals – Distinction between conductors, insulators and semiconductors – Intrinsic and extrinsic semiconductors – Hall effect in semi conductors – Zener diode – Tunnel diode - Breakdown voltage – Avalanche breakdown.

PNP,NPN transistors – DC characteristics of CE and CB configurations – Hybrid parameters – Functions of a transistor as an amplifier and oscillator – FET – n channel and p channel FET – Performance and characteristics.

The basic operational amplifier – Inverting and non inverting operational amplifier –– Basic uses of operational amplifier as sign and scale changer, phase shifter, differentiator, integrator, adder and sub tractor.

UNIT - IV LASERS AND MASERS

Basic concepts of stimulated emission – Distinction between stimulated and induced emission – Population inversion and meta stable state – Ammonia maser – Ruby laser – He-Ne laser – Semi conductor laser and dye laser – Uses of laser.

UNIT - V OPTO ELECTRONIC DEVICES

LED – Radiation transition – Emission spectra – Methods of excitation visible materials for LED – LED configuration and performance – photo conduction – Photo diode – Photo transistors – Seven segment displays – LCD.

Books for Study:

1.Electricity and Magnetism - Brijilal , Subramanian.
2. Electricity and Magnetism - D.N.Vasudeva.
3. Micro electronics -Jacob Millman
4. The Fundamentals of Solid state physics -Theraja
5. Electronic devices and Circuits -Millman,Halkias
6. Pulse and Digital Electronics -G.K.Mithall.
7. K.Thyagarajan, A.K.Ghatak – Laser theory and applications, Cambridge university press.

ALLIED PHYSICS COURSE –II : APPLIED PHYSICS PRACTICAL

(For B.sc computer science)

SUB.CODE: JSPHCYD4P

LIST OF EXPERIMENTS

(Any 15 Experiments)

1.Specific resistance by potentiometer.
2.Calibration of ammeter using potentiometer.
3.Specific resistance by Carey Foster bridge.
4.Field along the axis of a coil-M.
5.Figure of merit of a mirror galvanometer.
6.Series resonance circuit.
7.Characteristics of a junction diode.
8.Characteristics of a zener diode.
9.Transistor characteristics –CE configuration.
10.Full wave rectifier construction with filters.
11.Voltage regulator using zener diode.
12.Transistor-single stage RC amplifier.
13.Operational amplifier –adder and subtractor.
14.Astable multivibrator using transistors.
15.LDR characteristics.
16.Hartley Oscillator.
17.Characteristics of a photo voltaic cell.
18.FET characteristics.

NON MAJOR ELECTIVE COURSE : COMMUNICATION ELECTRONICS

(For Mathematics and Chemistry Students)

SUB.CODE: JSPHNMEC1

UNIT - I RADIO COMMUNICATION

Modulation – theory of AM and FM Modulation – Ionosphere – Radio transmitter – Detector.

UNIT - II MICROWAVE COMMUNICATION

Television – Basic principles – Scanning – Synchronization – Three color theory – Color TV: Transmission and reception.

UNIT - III ANTENNAS

Antennas – Equivalent circuit – Radiation fields – Radiation resistance – Effective parameters of antenna – Dipole arrayed antennas – VHF, UHF and microwave antennas.

UNIT - IV OPTICAL FIBER COMMUNICATION

Light spectrum – Total internal reflection – Optical fiber – Types – Numerical aperture – Fiber optic communication system – Advantages – Optical sources – LED and Laser diodes – Photo detectors – Pin photo detector – Avalanche photo diodes – Losses in optical fiber.

UNIT - V LANDLINE AND MOBILE COMMUNICATION

Telephone –Block diagram – Telephone exchange –FAX – Facsimile transmitter – Receiver –Mobile Phone : Cell phone architecture – Cellular telephone unit - Types of cellular telephones systems - Internet : Function – Application.

Books for study:

1. Electronic Communication – Dennis Roddy & John Coolean
2. Principles of Communication Engineering – Anokh Singh.
3. Optical Fiber Communication – Dr. M. Arumugam
4. Optics – Ajay Ghatak
5. Communication Electronics – Frenzel
6. Communication Electronics – Despande.