

HAJEE KARUTHA ROWTHER HOWDIA COLLEGE (AUTONOMOUS)

UTHAMAPALAYAM

Choice Based Credit System

B.Sc., Physics (Semester)

Course Scheme, Scheme of Examinations and Syllabus

(Effective from the academic year 2014 – 2015)

Qualification : Passed in H.Sc., with Physics, Chemistry and Mathematics or any other examination accepted by the Syndicate as equivalent with Physics, Chemistry and Mathematics as the subjects in higher secondary education level.

Duration of the Course : B.Sc.,-Physics - Three academic years (6 – Semesters)

Objectives of the course :

To enable the students.

1. To acquire knowledge of physics.
2. To understand the usage of physics in applied sectors.
3. To develop skills through Practicals in laboratories, lab visits in research institution and field visits in industries.
4. To become motivated for pursuing higher education & research.
5. To become skilled either to suit with employment opportunities or to make self employments

Subjects of study :

Part - I - Tamil

Part - II - English

Part - III i) Core Subjects – Physics.

ii) Allied Subjects – Maths and Chemistry

Part - IV i) Non-major subjects

ii) Skill based Subjects

iii) Environmental Studies

iv) Value Education

Part-V Extension Activities

Structure of the question papers:

Theory:

Internal - 25 marks
External - 75 marks
Total - 100 marks

Question Paper: Three Parts A, B and C (external)

Section - A - 10 questions (multiple choices)

Section - B - 5 questions (either a or b)

One problem is must (either a or b) in any unit

Section - C - 3 out 5 questions

1. For Internal Examination : 25 marks

1. Three Tests to be conducted - 15 marks (average of 2 tests to be taken)
 2. Group discussion / Seminar / Quiz - 5 marks
 3. Two Assignments - 5 marks each (average of 2 to be taken)
 4. I- Internal Examination - 25th working days
 5. II- Test will be conducted - 50th working days
 6. III- Test will be conducted - 75th working days
- Eligibility for the degree - passing minimum is 40%.

Question Papers in External Examination carrying 75 marks will be in the format below.

Type	No of questions to be answered	Marks
Section A	10	10
Section B	5	35
Section C	3	30

Note: The internal and external marks, Passing minimum and the question pattern will be decided at the Board of Studies meeting to be held shortly.

Practical

Internal - 40 marks (record-10 and model exam-30)

External - 60 marks

Total - 100 marks

Allocation of Papers and credits (semester wise) for UG programmes

(for those who joined in 2014-2015)

Sem	Part	Subject	Code	Title of the paper	Hours/ Week	Credits
I	I	Language	14UTAL11/ 14UARL11/ 14UMAL11	Tamil / Arabic / Malayalam	6	3
	II	Language	14UENL11	English Paper-1	6	3
	III	Core	14UPHC11	Mechanics and Relativity	4	4
	III	Core	14UPHC2P	Major Practical -1	2	-
	III	Allied	14UMAA11	Ancillary Maths-1	6	5
	IV	SBS	14UPHS11	Properties of matter	2	2
	IV	SBS	14UPHS12	Astrophysics-I	2	2
	IV	NME	14UPHN11	Basic Physics -1	2	2
Total					30	21
II	I	Language	14UTAL21/ 14UARL21/ 14UMAL21	Tamil / Arabic / Malayalam	6	3
	II	Language	14UENL21	English Paper-2	6	3
	III	Core	14UPHC22	Electricity	4	4
	III	Core	14UPHC2P	Major Practical -1	2	2
	III	Allied	14UMAA21	Ancillary Maths-2	6	5
	IV	SBS	14UPHS21	Thermal Physics	2	2
	IV	SBS	14UPHS22	Astrophysics-II	2	2
	IV	NME	14UPHN21	Basic physics -1	2	2
Total					30	23

Sem	Part	Subject	Code	Title of the paper	Hours/ Week	Credits
III	I	Language	14UTAL31/ 14UARL31/ 14UMAL31	Tamil / Arabic / Malayalam	6	3
	II	Language	14UENL31	English Paper-3	6	3
	III	Core	14UPHC31	Electromagnetism	4	4
	III	Core	14UPHC4P	Major practical -2	2	-
	III	Allied	14UMAA31	Ancillary Maths - 3	6	5
	III	Allied	14UCHA11	Ancillary Chemistry -1	4	4
	III	Allied	14UCHA2P	Ancillary Chemistry Practical -1	2	-
Total					30	19
IV	I	Language	14UTAL41/ 14UARL41/ 14UMAL41	Tamil / Arabic / Malayalam	6	3
	II	Language	14UENL41	English Paper-4	6	3
	III	Core	14UPHC41	Optics and Spectroscopy	4	4
	III	Core	14UPHC4P	Major practical -2	2	2
	III	Allied	14UMAA41	Ancillary Maths - 4	6	5
	III	Allied	14UCHA21	Ancillary Chemistry -2	4	4
	III	Allied	14UCHA2P	Ancillary Chemistry practical -1	2	1
Total					30	22

Sem	Part	Subject	Code	Title of the paper	Hours / Week	Credits
V	III	Core	14UPHC51	Modern Physics	4	4
	III	Core	14UPHC52	Nuclear physics	4	4
	III	Core	14UPHC53	Electronics - I	4	4
	III	Core	14UPHC6P	Major Practical - 3	3	-
	III	Core	14UPHC6Q	Major practical - 4	3	-
	III	Core	14UPHC6R	Major practical -5	2	-
	III	Allied	14UCHA31	Ancillary Chemistry - 3	4	4
	III	Allied	14UCHA4P	Ancillary Chemistry Practical - 2	2	-
	IV	SBS	14UPHS51	Applied Physics- I	2	2
	IV	EVS	14UEVS51	Environmental Studies	2	2
Total					30	20
VI	III	Core	14UPHC61	Theoretical Physics	4	4
	III	Core	14UPHC62	Solid state Physics	4	4
	III	Core	14UPHC63	Electronics - II	4	4
	III	Core	14UPHC6P	Major practical -3	3	4
	III	Core	14UPHC6Q	Major practical - 4	3	4
	III	Core	14UPHC6R	Major practical – 5	2	4
	III	Allied	14UCHA41	Ancillary Chemistry - 4	4	4
	III	Allied	14UCHA4P	Ancillary Chemistry Practical - 2	2	1
	IV	SBS	14UPHS61	Applied Physics- II	2	2
	IV	VED	14UVED61	Value Education	2	2
	V	EA	14UEAC61	Extension Activities	-	2
Total					30	35

SEMESTER- I

MECHANICS AND RELATIVITY

14UPHC11

CORE SUBJECT- 1

CREDIT-4

Unit I

Equation of motion – Newton’s law of motion, momentum and impulse- Law of conservation of linear momentum – collision – Elastic and inelastic collision – Newton’s law of impact, coefficient of restitution – Impact of moving sphere on a fixed plane – Direct and oblique impact of moving two spheres – Calculation of final velocity of spheres – Loss of kinetic energy.

Unit II

Moment of inertia – Parallel axes theorem – Perpendicular axes theorem - Moment of inertia of circular disc, about an axis passing through its centre and perpendicular to its own axis – Moment of inertia of solid sphere about all axis – Angular momentum and torque – Kinetic energy of rotation – Expression for the acceleration of a body rolling down on an inclined plane.

Unit III

Satellite –Orbital velocity – Stationary satellite – Escape velocity – Jet plane, Rocket – Principle –Theory of Rocket – Velocity of Rocket at any instant – Rocket propulsion systems – Specific impulse – Multistage Rocket – Shape of the Rocket.

Unit IV

Frames of reference – Inertial and non-inertial frame of reference – Galilean transformation, Newtonian relativity – Michelson-Morley experiment – Significance of negative result.

Unit V

Postulates of Special theory of relativity – Lorentz transformation – Lorentz Fitzgerald contraction – Time dilation – relativistic addition of velocities – Relativistic mass, relativistic momentum – Mass-Energy equivalence – relation between total energy and momentum.

Books for study:

1. Mechanics – D.S. Mathur, S. Chand & Co. Edition 2002

Reference Books:

1. Mechanics Part I and II, Narayanamoorthy, National publishing company, 2001.
2. Fundamental of physics D.Halliday, Resnick, Resnick and J.Walker, 6th Edition Wiley, New York 2001.

SEMESTER -1

PROPERTIES OF MATTER

14UPHS11

SKILL BASED SUBJECT- 1

CREDIT- 2

Unit I

Elasticity – Stress, Strain –Poisson’s ratio – Hook’s law – Young’s modulus – Bending of beam – Bending moment – Uniform and Non –uniform bending (Theory).

Unit II

Kepler’s law of planetary motion – Newton’s law of gravitation – Mass of Earth – Compound pendulum – Determination of g at the given place.

Unit III

Variation of g with latitude, altitude and depth – Structure of Earth (Mantle, crust and core).

Unit IV

Definition of surface tension – Angle of contact – Capillary rise - Excess of pressure inside a bubble and spherical drop – Experimental determination of Surface Tension by Capillary rise method.

Unit V

Viscosity –Coefficient of viscosity – Streamline and turbulent motion – Critical velocity – Capillary flow Bernoulli’s theorem – Coefficient of viscosity of a viscous liquid by Stokes’ method – Venturimeter – Pitot’s tube.

Books for study:

1. Elements of properties of matter – D.S. Mathur – S. Chand & Co., 2004.
2. Properties of matter – R. Murugesan, S. Chand & Co., 2004.

Reference Book;

1. Properties of matter – Brijlal and Subramanian S. Chand & Co., 2004.

SEMESTER-1

Astrophysics - 1

14UPHS12

SKILL BASED-2

CREDIT- 2

Unit I

Birth of Modern Astronomy – Geocentric and Heliocentric — Celestial sphere – Coordinate systems – Horizontal and equatorial systems – Kepler's law – postulates of General theory of relativity.

Unit II

Elements of the telescope - Properties of images - Aberrations of telescopes - Kinds of Optical telescopes.

Unit III

Refracting and Reflecting telescopes- Schmidt telescope - Magnification of telescope- Radio telescope-Spectrograph - Limitation.

Unit IV

The orientation of Earth in space- Seasons- Precession of the Earth- Arc and time units-Time keepers-Sidereal time- local time-Standard time.

Unit V

Planets-Terrestrial and Jovian planets (Planets individual description is not required in detail) - Satellites-Asteroids- Meteoroids- Comets.

TEXT BOOKS:

1. Nicololas.A.Pananides and Thomas Arny, 1979, Introductory Astronomy, Addison Wesley Publ. Co.

REFERENCES:

1. Abhyankar, K.D., Astrophysics, Universities Press.

BASIC PHYSICS-1

NON MAJOR ELECTIVE-1

14UPHN11

SEMESTER-1

CREDIT-2

Unit-I

S.I Units-measurements of length, mass, time and other physical quantities-Dimensional formula for area, volume, density and force-Uses of dimension.

Unit-II

Matter-solid, liquid, gas and plasma- change of state-specific heat capacity-specific latent heat of ice and steam.

Unit-III

Kinds of energy-mechanical energy, thermal energy, optical energy, sound energy, electrical energy, atomic energy -conservation of energy.

Unit-IV

Renewable and non-renewable energy - fossil fuel – coal – oil - solar – wind – biomass –OTEC.

Unit-V

Mirror-laws of reflection-image formation (concave and convex mirror)-lens-laws of refraction-image formation (concave and convex lens) – Defects of eye and rectification.

Books for study:

1. First year B.Sc physics - B.V. Narayan Rao, New Age International (P) Ltd,1998.

Reference Books:

1. Mechanics-D.S.Mathur-S.Chand & Co.,2002.

2. Properties of matter- D.S.Mathur-S.Chand&Co.,2002.

3. Properties of matter - Brijlal Subramanian-S. Chand & Co., 2006.

SEMESTER- II
CORE SUBJECT -2

ELECTRICITY

14UPHC21
CREDIT- 4

Unit I

Electric charges - Coulomb's law – Electric field – Flux of electric field - Gauss law and its proof –Applications of Gauss law – Electric field due to charged sphere (a) at a point outside (b) at a point inside (c) at a point on the surface of the sphere. Electric field due to infinite plane sheet of charges – Electric field near a conductor – Electric potential – Relation between electric field and potential – Potential due to charged spherical conductor at a point (a) outside (b) on the surface and (c) inside.

Unit II

Capacitance – Principle of capacitor – Expression for capacitance – Spherical capacitor – Cylindrical capacitor - Parallel plate capacitor with and without partially filled dielectric – Energy of a capacitor – Loss of energy, when two charged conductors share the charges – Types of capacitors, fixed capacitor, variable capacitor and sliding capacitor.

Unit III

Kirchoff's laws – Application of Kirchoff's laws to Wheatstone's networks – Carey Foster's bridge – Determination of the resistance of the given wire with the necessary theory – Principle of potentiometer – Determination of internal resistance of the cell using potentiometer – Calibration of ammeter and voltmeter – low range.

Unit IV

Biot-Savart's law – Its application – Long straight wire of infinite length – Ampere's theorem – Magnetic field at the centre of a circular coil carrying current – Magnetic field along the axis of a coil carrying current – Solenoid – Ballistic Galvanometer –Theory – Damping correction – Comparison between deadbeat and aperiodic galvanometer – Comparison of capacitance using B.G.(theory and experiment).

Unit V

Seebeck effect – Thermo e.m.f. – Neutral temperature – Temperature of inversion – Law of intermediate metals – Law of intermediate temperature – Measurement of e.m.f. of a thermocouple with a potentiometer – Peltier effect – Peltier coefficient – Thomson effect – Thomson coefficient – Thermoelectric power.

Books for study:

1. Electricity and Magnetism - Sehgal, Chopra & Sehgal – S.chand & Co., 1998.

Reference Books:

1. Electricity – R.Murugesan, S.Chand & Co., 2004.
2. Electricity and Magnetism – Dr.K.K.Tewari, S.chand & Co., 2002.
3. Electricity and Magnetism with Electronics – D.N.Vasudeva, S.Chand & Co., 2002.

4. Electricity and Magnetism 20th revised edition – Brijlal and Subramanian, S.chand & Co., 2007.

SEMESTER II

THERMAL PHYSICS

14UPHS21

Skill Based Subject - 3

CREDIT-2

Unit I

Postulates of Kinetic theory of gases – Mean free path – Transport phenomena – Conduction, Viscosity and Diffusion.

Unit II

C_p and C_v of a gas – Meyer's relation – Experiment to determine C_p by Regnault's method - Experiment to determine C_v by Joly's method.

Unit III

Black body radiation – Prevost's theory – Emissive and Absorptive power – Distribution of energy in black body – Wien's displacement law.

Unit IV

Stefan's law of radiation – Derivation of Newton's law from Stefan's law – Solar constant – Temperature of Sun – Angstrom's pyrhediometer – Solar spectrum.

Unit V

Thermodynamics – Zeroth law – I, II and III law of thermodynamics – Entropy – Change of entropy in reversible and irreversible process – Heat death – Change of entropy in converting ice into steam.

Books for study:

1. Heat, Thermodynamics and Statistical physics – Brijlal and Subramanian and P. S. Hemne, S. Chand & Co. 2004.
2. Heat and Thermodynamics – R. Murugesan, S. Chand & Co. 2004.

Reference Book:

1. Heat and Thermodynamics – D. S. Mathur, S. Chand & Co. 2002.

Semester II

ASTROPHYSICS- 2

14UPHS22

Skill Based subject - 4

CREDIT -2

Unit I

Physical properties- Composition - Photosphere – Chromosphere - Corona- Sunspots - Sunspot groups - Sunspot cycle - Solar Prominences - Solar Flares - Solar Wind - Communication disturbances - Auroras.

Unit II

Classification of spectra of stars – Hertzsprung-Russel diagram – luminosity of a star – Photon diffusion time – Mass-Luminosity relation for a star.

Unit III

Nuclear reactions – stellar evolution – White dwarfs – Chandrasekhar limit – Neutron stars - Black holes – Basic physics of Black hole.

Unit IV

Identifying Galaxies - Galaxy nomenclature - Types of Galaxies-Spiral - Elliptical-irregular galaxies.

Unit V

Milky Way and its structure - Properties of Galaxies - Mass of a binary system- Star clusters- Galaxy clusters-Pulsars.

TEXT BOOKS:

1. Nicololas.A.Pananides and Thomas Arny, 1979, Introductory Astronomy, Addison Wesley Publ. Co.

REFERENCES:

1. Abell, Morrison and Wolf, 1987, Exploration of the Universe, 5th ed., Saunders College Publ.
2. Carrol and Ostlie, 2007, Introduction to Modern Astrophysics, 2nd ed., Pearson International.
3. Krishnaswamy, K.S. 1996, Astrophysics, New Age International.
4. Kumaravelu and Susila Kumaravelu, 2004, Astronomy, Vishnu Arts, Sivakasi.
5. Abhyankar, K.D., Universities Press.

SEMESTER - II

BASIC PHYSICS-2

14UPHN21

NON MAJOR ELECTIVE-2

CREDIT-2

Unit-I

Electric current – Voltage and resistance – Ohm’s law and Kirchoff’s law – Resistance in series and parallel.

Unit-II

DC source – Primary cells – Leclanche and Daniel cell – Secondary cells – Acid Accumulator – DC generator.

Unit-III

Alternating current generating by hydro, thermal and atomic power station – RMS value – Peak value (Quantitative) – AC generator (no derivation).

Unit-IV

Measurement of Electric power by Wattmeter – simple calculations – Induction coil – Wattless current – Power factor.

Unit-V

Simple electrical circuits – resistor, capacitor and inductor connected to AC source (independently) – Relationship between emf and current in each case – Diode – Bridge Rectifier.

Reference Books:

1. Electricity and Magnetism – R. Murugesan – S. Chand & Co. 2004.

SEMESTER-III

ELECTROMAGNETISM

14UPHC31

CORE SUBJECT -3

CREDIT-4

Unit-I

Faraday's laws of Electromagnetic induction – Lenz's law – self inductance – energy stored in an inductance – Experiment to determine self inductance by Rayleigh method with theory – Mutual inductance – Determination of Mutual inductance using B.G. (with theory) – Coefficient of coupling – Eddy currents.

Unit-II

Growth and decay of current in LR circuit – Growth and decay charges in CR circuit – Growth and decay of charge in a circuit with inductance, capacitance and resistance in series – Determination of high resistance by leakage (B.G.).

Unit-III

Mean value of alternating e. m. f – RMS value of the alternating current/voltage – Alternating current applied to LR, CR and LCR circuits – Series Resonance Circuit – Parallel Resonance Circuit – Power in an A.C. Circuit – Wattless Current – Power factor – Q factor – Choke – Skin effect – A.C. bridges – Maxwell's bridge – Anderson's and Owen's bridge.

Unit-IV

Definition of B,H and M and magnetic susceptibility – Magnetic materials & magnetization – Hysterisis – Work done in taking unit volume of magnetic materials through complete cycle of magnetization – Area of Hysterisis loop – Ballistic method.

Unit-V

Derivations of Maxwell's equations – types of currents – displacement current – significance of displacement current – Maxwell's equation in material media and free space – Electromagnetic waves in free space – electromagnetic waves in isotropic non conducting media.

Book for Study:

1. Electricity and Magnetism by Seghal, Chopra & Seghal, S. Chand & Sons. 1998.

Reference Books:

1. Electricity and Magnetism by Brijlal & Subrahmaniyam, S. Chand & Sons
2. Electricity and Magnetism by R. Murugesan, S. Chand & Sons.
3. Electricity and Magnetism by Narayanmoorthy and Nagarathinam, S. Chand & Sons.

SEMESTER-IV

OPTICS AND SPECTROSCOPY

14UPHC41

CORE SUBJECT-4

CREDIT-4

Unit I

Equivalent focal length of the system of two thin lenses in contact and separated by a distance – Aberrations – Spherical and Chromatic aberrations - removal of spherical aberrations – Achromatic doublet – Achromatism of two lenses in contact and out of contact.

Unit II

Coherent sources-Interference in thin films- Michelson's interferometer- Applications- Determination of wavelength-Refractive index of a gas - Fabry-Perot interferometer.

Unit III

Zone plate -Theory-Comparison with convex lens Fresnel and Fraunhofer diffraction in straight edge - Rectangular aperture-Circular aperture- Cornu spiral - Resolving power of optical instruments-Telescope, grating and prism.

Unit IV

Polarization-Polarizer-Analyzer-Polaroid and its applications-Double refraction-Nicol prism - Huygen's explanation of double refraction-QWP and HWP-Production and analysis of plane, circularly and elliptically polarized light-Optical activity- Fresnel's explanation-Specific rotation-Lorentz half shade polarimeter.

Unit V

UV Spectroscopy-Sources - Detectors and applications - Infrared spectroscopy-Sources-Detectors and its applications - Raman effect-Theory, Experiment, Characteristics of Raman lines and its applications-Types of molecular spectra (Basic ideas) - Molecular spectra of diatomic molecule (Qualitative only).

Books for Study:

1. Optics and Spectroscopy by R. Murugesan, Vivekananda Press, Madurai – 2004.

Reference Books:

1.Optics & Spectroscopy - Kakani & Bhandari, Sultan Chand & Sons, New Delhi-2002.

2.Textbook of optics - Brijlal & N. Subramanian, S. Chand 2002.

3.Spectroscopy - B. K. Sharma, GOEL Publishing House, Meerut 2006.

**SEMESTER-V
CORE SUBJECT-5**

MODERN PHYSICS

**14UPHC51
CREDIT-4**

Unit-I

Introduction- Atom model-Excitation and ionization of atoms-Limitations of Bohr atom model. Sommerfield relativistic atom model- Elliptical orbits- Relativistic variation of atomic mass-application to the fine structure of spectral lines – Limitations of Sommerfield atom model. Vector atom model - spatial quantization and spinning electron hypothesis- Stern and Gerlach experiment – Quantum numbers-coupling schemes-Pauli's exclusion principle-electronic structure of atoms.

Unit-II

X-rays- production and properties - characteristics and continuous X-rays – Duane and Hunt law -Mosley's law and its importance. Compton effect – theory and experiment verification. Zeeman effect – theory and experiment –Anomalous zeeman effect – Stark effect and Paschen Beck effect(Qualitative only).

Unit-III

Introduction-Blackbody radiation- Planck's quantum theory of absorption and emission-Limitations of classical theory-Dual nature of matter and radiation-De Broglie's hypothesis of matter waves-de Broglie's wavelength-Davission's and Germer experiment-G.P.Thomson's experiment with relativistic correction. Concept of wave packets for a quantum particle- group velocity and wave velocity and their relations – Heisenberg's uncertainty principle thought experiment-illustration.Diffraction of electron through a single slit experiment-Applications of uncertainty principle.

Unit-IV

Inadequacy of classical mechanics-Basic postulates of wave mechanics-Derivation of time dependent and time independent- Schrodinger wave equation- wave function – physical significance of wave function – Probability density and expression for probability current density- Eigen function and Eigen value– Expectation value – Normalisation of wave function of simpler types- Orthogonal and Orthonormal properties of wave function.

Unit-V

Application of Schrodinger wave equation- Schrodinger equation for a free particle in one dimensional potential well–Particle in one dimensional box and 3D box – the barrier penetration problem(potential step) – Linear Harmonic oscillator – zero point energy.

Books for study:

1. Modern Physics - Seghal,chopra & seghal. Sultan chand 1998.
2. Modern Physics - R.Murugesan S.Chand & Co.

3. Quantum Mechanics - Schiff

Reference Books:

1. Quantum chemistry - R.K.Prasad.

SEMESTER-V

NUCLEAR PHYSICS

14UPHC52

CORE SUBJECT-6

CREDIT-4

Unit I

Isotopes – isotones – isobars - atomic mass unit - general properties of nucleus - mass defect and packing fraction - nuclear binding energy - nuclear forces - Yukawa's theory (no derivation) - proton-neutron theory of nuclear composition - nuclear models-the liquid drop model - shell model.

UNIT-II

Particle accelerators-cyclotron - synchro cyclotron – betatron - nuclear radiation detectors-ionisation chamber - Geiger-muller counter – Wilson cloud chamber - photographic emulsion technique - fundamental particles - particles and antiparticles - particles instability.

UNIT-III

Laws of radioactivity - half life period - mean life - range of α -rays - Geiger nuttal law - experimental determination by Geiger law - theory of disintegration energy - theory of α -decay - β rays - β rays spectra - neutrino theory of β decay.

UNIT-IV

Nuclear transmutations by α particles – protons – deuterons - neutrons and electrons - photo disintegration - explanation-C.N cycle and P.P cycle - controlled thermo nuclear reaction - cosmic rays-origin – primary – secondary - azimuthal effect - east-west effect - pair production and annihilation - Van Allen belt.

UNIT-V

Nuclear fission and fusion - energy release - chain reaction - Utilisation of nuclear energy - principle and action of Atom bomb - hydrogen bomb – nuclear reactors – general features of nuclear reactors – different types of nuclear reactors – pressurized water reactors – boiling water reactors – fast breeder reactors.

Books for study:

1. Modern Physics - Seghal,chopra & seghal. Sultan chand 1998.
2. Modern Physics - R.Murugesan S.Chand & Co.
3. Atomi and Nuclear physics – N.Subramanyam & Brij Lal,S.Chand & Co .2000

Reference Books:

- 1.Perspective of Modern Physics by Arthur Beiser.
- 2.Nuclear Physics by D.C.Thayal-Himalaya Publishing House,New Delhi.

ELECTRONICS - 1

SEMESTER-V

14UPHC53

CORE SUBJECT-7

CREDIT-4

Unit – I

Ideal voltage and current sources- voltage divider and current branching circuits- Thevenin's and Norton's theorem- maximum power transfer theorem- two port network analysis-three types.

Unit –II

Junction diodes(general theory)- diode as rectifier- voltage doubler, clippers and clampers- zener diodes- zener diode as voltage regulator- transistor- three types of configuration- relation between α , β , γ – load line and operating point- biasing circuits, fixed bias, emitter and collector feedback bias, voltage divider bias.

Unit –III

Small signal CE amplifier- expression for voltage gain, current gain, power gain, input and output impedances using h-parameters- frequency response- power amplifiers- simple classification - push pull amplifiers- OP amplifiers characteristics – inverting and non inverting amplifiers- application as adder, subtractor, integrator and differentiator.

Unit –IV

Feedback principles- positive and negative feedbacks- effects of negative feedback on gain of the amplifier - Barkhausen's criterion- transistor oscillators- Hartley, Colpitt's and phase shift oscillator with mathematical analysis.

Unit-V

Modulation – different kinds of modulation- amplitude modulation- modulation index- modulated power output-limitations- frequency modulation- advantages of frequency modulation- demodulation.

Books for Study:

- | | | |
|---------------------------------|---|---|
| 1.Principles of Electronics | - | V.K.Metha-S.Chand & Co.,2002. |
| 2.Basic Electronics | - | B.L.Theraja-S.Chand & Co.,2003. |
| 3.Electronic Devices & Circuits | - | Salivahanan,Sureshkumar,Vallavaraj,
Tata Mc Graw Hill – 2004 |

Reference Books:

- | | | |
|--|---|---|
| 1.Basic Electronics | - | A.Ubald Raj & G. Jose Robin 1998 |
| | - | Indira Publications |
| 2.Elements of Solid State
Electronics | - | Ambrose & Vincent Devaraj Indira publication. |

3. Basic Electronics

- J.J.Bophy, Fourth Edition 1983, Mc Graw Hill Book Company.

APPLIED PHYSICS-1

SEMESTER – V

SKILL BASED PAPER -5

14UPHS51

CREDIT -2

Unit- I

Introduction- p n junction as a light source- LED materials – advantages- LCD- characteristics and action of LCD– advantages

Unit –II

Introduction – principle of optical fibre- light transmission in a optical fibre - acceptance angle numerical aperture

Unit –III

Fibre index profiles - step index graded index fibre - advantages of fibre in optic communications - optical switching - logic gates.

Unit –IV

Laser – emission and absorption of light - spontaneous and stimulated emission - laser principle – Einstein’s co-efficients – applications - Construction, working and characteristics of ruby laser, He – Ne laser, Semiconductor laser.

Unit- V

Ultrasonics - Properties – Production – Piezo electric method – applications - Non Destructive testing.

Books for study:

1. Modern Physics by G. Aruldas and P. Rajagopal.
2. Optics by Satyaprakash.
3. Semiconductor physics and opto electronics, P.K. Palanisamy

Reference Books:

1. Solid state physics by R.K.Puri & V.K.Babbar – Chand & Co., I Edition ,1997.
2. Material Science by M. Arumugam - Anuradha Agencies Revised Edition, 1997.
3. Modern Physics R.Murugesan – Chand & Co ., XI Revised Edition 2003.
4. Fibre optical communication by B.P. Lathi.

SEMESTER-VI

Theoretical Physics

14UPHC61

CORE SUBJECT-8

CREDIT -4

Unit-I

Frames of reference-Mechanics of a particle-conservation of linear momentum-conservation of angular momentum- conservation of energy-Mechanics of a system of particles- conservation of linear momentum- conservation of angular momentum-conservation of energy- Work energy theorem-Conservative forces-examples-Constraints-Degrees of freedom under constraints-Forces of constraints-Generalized co-ordinates-Generalized velocities- Generalized momentum.

Unit-II

Principle of virtual work-D'Alembert's principle-Lagrangian equation of motion from D'Alembert's principle (Derivation)-Simple applications-(simple pendulum,compound pendulum,Atwood's machine)-Hamilton's principle- Lagrangian's equation of motion from Hamilton's principle-Superiority of lagrangian approach over Newton's approach.

Unit-III

Introduction-Cyclic coordinates-Hamiltonian function - Physical significance-Hamilton's equation of motion (derivation)-Simple applications(Linear harmonic oscillator, Simple pendulum, Atwood's machine, Motion of a particle in a central force field).

Unit-IV

Microscopic and Macroscopic systems-Ensembles-Phase space-Probability-Basic postulates of statistical mechanics-Definition of mathematical probability-Thermodynamic probability-Boltzmann's theorem on entropy and probability-Statistical equilibrium-Maxwell Boltzmann statistics- Maxwell Boltzmann energy distribution law- Maxwell Boltzmann velocity distribution law.

Unit-V

Bose-Einstein statistics- Bose-Einstein distribution law-Photon gas-Planck's law of Black body radiation(derivation)-Deduction of Wien's and Rayleigh Jean's law of black body radiation-Fermi Dirac statics- Fermi Dirac distribution law-Electron gas- Comparison between three statistics.

Books for study:

- 1.Gupta & Kumar,Elements of Statistical Mechanics,Macmillan Publication,Bombay.
- 2.Gupta,Kumar and Sharma,Classical Mechanics,Pragati prakashan publication,Meerut.

References:

1. Agarwal, Statistical physics and Thermodynamics, S. Chand and Co. Ltd., New Delhi.
2. Agarwal and Melvin Eisner, Statistical Mechanics, Wiley Eastern Ltd, New Delhi.
3. Goldstein, Classical Mechanics, Addition-Wesley Publishing company, New Delhi.
4. Satya Prakash, Classical Mechanics, S. Chand and Co. Ltd., New Delhi.
5. Takwale R.G and Puranik P.S, Classical Mechanics, Tata Mc Graw Hill Co., Ltd, New Delhi.

SOLID STATE PHYSICS

SEMESTER-VI

14UPHC62

CORE SUBJECT-9

CREDIT-4

Unit I

Bonding in solids - Classification of bonds in solids - ionic, covalent, metallic, molecular and hydrogen bonds. Crystal Geometry - Fundamental terms of crystallography - classifications of crystals – Bravais lattices – Unit cell - Miller indices - crystal structures of SC, BCC, FCC and hexagonal closed packed structure. Crystal imperfections - Point defect - line defect - surface defect and grain boundary.

Unit II

Electron theory of solids – Free electron – drift - mobility - mean free path - relaxation time. Expression for electrical and thermal conductivity - Wiedemann Franz law - Super conductivity - general properties of super conducting materials - types of superconductors – BCS theory - applications.

Unit III

Classification of solids on the basis of band theory - classification of semiconductors- application of semiconductors - Carrier concentration in an intrinsic semiconductor - Carrier concentration in an extrinsic semiconductor - Hall effect.

Unit IV

Magnetic materials - Different types of magnetism – dia – para - ferro - antiferro and ferrimagnetism. Langevin's theory of dia and para magnetism – weiss theory of ferromagnetism - Magnetic materials - properties and applications of soft and hard magnetic materials - magnetostriction materials - ferrites and concept of domain and hysteresis.

Unit V

Dielectrics - types of polarizations – electronic – ionic – orientational - space charge - local field(or)internal field - polar and non polar dielectrics - Clausius-Mosotti equation - experimental determination of dielectric constant - dielectric loss sources - dielectric strength and breakdown - properties and applications of dielectrics.

Books for study:

1. Modern Physics - R.Murugesan S.Chand & Co.
2. Fundamental of solid state physics by Saexena, gupta saexena, pragati prakashan-1991.

Reference Books:

1. Solid state physics by R.K.Puri & V.K Babbar-Chand & co.
2. Introduction to solids by Azaroff TMH, Reprint 1978
3. Material Science by Arumugam-Anuradha Agencies-1997

ELECTRONICS - 2

SEMESTER – VI
CORE SUBJECTS-10

14UPHC63
CREDIT -4

Unit – I

Number system – Binary, decimal, Octal, hexadecimal, - Conversion from one another – Binary addition, subtraction, multiplication, division – Binary subtraction by 1's and 2's complement – Basic laws of Boolean Algebra – Boolean Addition – Properties of Boolean Algebra – De Morgan's theorems - their proof.

Unit – II

Logic gates – OR, AND, NOT, NOR, NAND and EX-OR- Universal gates – Logic families – Diode Resistor logic (DRL) – OR gate, AND gate – RTL NOT gate – Sum of products(SOP) – Product of Sum (POS) - expression from a truth table Karnaugh map – 2variable , 3variable and 4 variable – simplification using K-map – pairs, quads and Octets

Unit – III

Half adder – Full adder – 4bit binary adder – Half Subtractor – Full Subtractor - 4 bit parallel subtractor – Multiplexer(MUX) – 4 to 1 MUX, D Multiplexer(DMUX) – 1 to 4 DMUX – Encoder - 8 to 3 Encoder – Decimal to BCD Encoder – Decoder – 3 to 8 decoder ,BCD to Decimal Decoder – BCD to 7 segment Decoder

Unit – IV

Timer – IC 555 mono and astable multi vibrator - Flip Flops - R-S flip flops - clocked R-S flip flops - J-K flip flop – J-K master Slave flip flop – D flip flop – application of flip flop.

Unit – V

Register – Shift register – Classification – Serial in – Serial out (SISO) shift register – Counters – 4 bit binary counter – Decoder, Ring counter - Binary ladder type – Analog to Decimal converter (A/D) –Digital to analog converter (D/A) - Successive Approximation type.

Books for Study:

1. Digital principles and applications 6th edition, Malvino, Leech, Tata Mc-Graw Hill , 1996.
2. Digital electronics, Jose robin,
3. Digital principles and applications by V. Vijayendiran.

APPLIED PHYSICS – 2

SEMESTER-VI

14UPHS61

SKILL BASED SUBJECT- 6

CREDIT-2

Unit-I

Transducers - characteristics of transducers – static and dynamic active transducers – magnetic induction type - -piezo electric type – photo voltaic type – thermo electric type.

Unit-II

Passive transducers – resistive type – effect and sensitivity of a bridge – capacitive transducer – linear variable differential transformer (LVDT).

Unit-III

Characteristics of basic recording system – Electro Cardio Graphy(ECG) – ECG leads – unipolar and bipolar – ECG recording setup.

Unit-IV

Electroencephalo graph(EEG) – origin – block diagram of EEG unit – Electro myograph (EMG) – block diagram of EMG recorders.

Unit-V

Digital thermometer – computer tomography (CT) principle – block diagram of CT scanner.

Books for study:

1.Biomedical Instrumentation,EDII,1994 by Dr.M.Arumugam

Reference Book:

1.Hand book of Biomedical instrumentation, R>S. Khanpur,1999, Tata-Mcgraw Hill.

ANCILLARY PHYSICS

MECHANICS, PROPERTIES OF MATTER AND SOUND

SEMESTER-I

14UPHA11

ALLIED PAPER-1

CREDIT-4

Unit-I

Newton's law of motion and their related terms – Types of forces in nature – Conservative and Non conservative forces - Inertial, Non-inertial frames - work done by a constant and varying force –Expression for kinetic energy – Expression for potential energy – Different forms of energy - Power - Friction- Angle of friction – Motion of bodies along an inclined plane

Unit-II

Angular velocity – Normal acceleration(no derivation) – Centrifugal and centripetal forces – Torque and angular acceleration – Work and power in rotational motion – Angular momentum – K.E of rotation – Moment of inertia – Laws of parallel and perpendicular axes theorems – M.I of ring, circular discs, solid cylinder and solid sphere.

Unit-III

Kepler's laws of planetary motion – Law of gravitation – Boy's method for G-Compound pendulum – expression for period – Experiment to find g – Variation of g with latitude, altitude and depth –Satellites – orbital and escape velocity – Period of revolution – Polar and Geo-stationary satellites.

Unit-IV

Elastic moduli – Poisson's ratio – beams – expression for bending moment - Determination of Young's modulus by uniform and non uniform bending – I section of girders. Torsion – Expression for couple per unit twist – work done in twisting – Torsional pendulum – Derivation of Poisson's formula (analytical method) – Bernoulli's theorem - proof applications – Venturimeter – Pitot tube.

Unit-V

Simple harmonic motions – Progressive waves properties – Composition of two S.H.M. and beats stationary waves – Properties – Melde's experiment for the frequency of electrical maintained tuning fork – Transverse and longitudinal modes – Acoustics – Ultrasonic – Properties and application.

Books for study:

- 1.Mechanics - D.S.Mathur S.Chand & Co.
- 2.Properties of matter - Brijilal & N.Subramanyan S.Chand
- 3.Ancillary physics I - R.Murugasen

Reference Books:

- 1.Fundamental of Physics – Resnik and Halliday Wiley publishers
- 2.University Physics - Sears Zemansky and Ground Naresa publishers

THERMAL PHYSICS

SEMESTER-II

14UPHA21

ALLIED PAPER-2

CREDIT-4

Unit-I

Expansion of crystals – Determination of linear expansivity of crystal by air wedge method – Expansion of anisotropic solids – solids of low expansivity and their uses – anomalous expansion of water – thermostats. Isothermal and adiabatic changes of a perfect gas – two specific heat capacities c_p and c_v of a gas – relation between them – experimental determination of c_v by Joly's method – determination of c_p by Regnault's method.

Unit-II

Lee's disc method for conductivity of bad conductor – air and cardboard – analogy between heat flow and electric current – Widemann Franz law – convection in atmosphere – lapse rate – Green house effect – atmospheric pollution.

Unit-III

Radiation – Stefan's law – determination of Stefan's constant by filament heating method – solar constant measurement water flow Pyroheliometer – temperature of the sun – solar spectrum – energy distribution in black body spectrum – Planck's law(no derivation) – derivation of Wien's and Rayleigh Jeans laws from Planck's law.

Unit-IV

Kinetic theory of gases – Mean free path – transport phenomena – diffusion, viscosity and thermal conductivity - Maxwell's law of distribution of molecular speed – experiment verification – degree of freedom – Boltzman's law of equipartition of energy – calculation of c_p & c_v for monoatomic and diatomic gases.

Unit-V

Thermodynamics – Carnot's theorem – derivation of efficiency – second law of thermodynamics - entropy – changes of entropy in Carnot's cycle – change of entropy in conversion of ice into steam – Joule-Kelvin effect – simple theory of porous – Plug experiment adiabatic – demagnetization – curie's law Giauque's method.

Books for study :

- 1.Ancillary Physics II - R.Murugasen
- 2.Ancillary Physics II - Ubal raj and Jose Robin
- 3.Thermal Physics - Brijilal & N.Subramanyan, S.Chand & Co.

Reference Books :

- 1.Fundamental of Physics – Resnik and Halliday, Wiley publishers
- 2.University Physics - Sears Zemansky and Ground, Naresa publishers

ELECTRICITY AND ELECTRONICS

SEMESTER-III

14UPHA31

ALLIED PAPER-3

CREDIT-4

UNIT – I

Gauss's law-proof-applications-Field due to a charged sphere and an infinite plane sheet-Field near a charged conducting cylinder-Coulomb's theorem-Electric potential-Relation between electric potential and electric field-Capacitors-Expression for C of a parallel plate ,Spherical(outer sphere earthed) and cylindrical capacitors-Energy of a charged capacitor-Loss of energy due to sharing of charges.

UNIT-II

Kirchoff's laws-application of Wheatstone's network-Carey Foster bridge-Measurement of resistance and temperature coefficient of resistance-Principle of potentiometer-Calibration of ammeter and voltmeter-low and high range-measurement of resistance using potentiometer.

UNIT-III

Torque on a current loop-mirror galvanometer,dead beat and ballistic- B.G theory-damping correction—experiments for charge sensitiveness-comparison of emf's-comparison of capacitors- e.m.f generated in a coil rotating in a uniform magnetic field-R.M.S and mean values-LCR circuit-impedances-Series and parallel resonant circuits-Power factor-Wattless current-Choke.

UNIT-IV

Junction diodes-Forward and Reverse bias-Diode characteristics-Types of diodes(LED and Zener)-Bridge rectifier using diodes(π filter)-Transistors-Characteristics(CE mode only)-Biasing and action of a single transistor (CE) amplifier-Frequency response-Hartley oscillator-Modulation (qualitative study).

UNIT-V

Binary number system-reason for using binary numbers-binary to decimal and decimal to binary conversions-addition and subtraction of binary numbers - Logic circuits-Boolean algebra-De Morgan's theorem-OR,AND,NOT,NOR and NAND gates-NOR and NAND gates as universal building blocks-XOR gates.

TEXT BOOK

- 1.Electricity and Electronics, R.Murugesan,I Ed, 2007

REFERENCE BOOKS

- 1.Solid state electronics, B.L.Theraja
- 2.Electricity and Magnetism, Brijlal and N.Subramaniyam

OPTICS, SPECTROSCOPY AND MODERN PHYSICS

SEMESTER IV

14UPHA41

ALLIED PAPER -4

CREDIT -4

Unit I

Deviation produced by thin lens-Focal length of two thin lenses in and out of contact-Refraction through a thin prism-Dispersion-Dispersive power-Combination of thin prisms to produce i) Deviation without dispersion and ii) Dispersion without deviation-Direct vision spectroscopy-Chromatic aberration in lenses and its removal-Spherical aberration and its removal.

Unit II

Interference in thin films-Air wedge- Newton's rings-Determination of wavelength-Jamin's Interferometer-principle and uses. Diffraction : Theory of plane transmission grating(normal incidence only)-Experiment to determine wavelength.

Unit III

Double refraction-Nicol prism, construction, action and uses-QWP and HWP optical activity-Biot's laws-Specific rotator power-Half shade polarimeter-Determination of specific rotatory power-Fiber optics-Light propagation in fibers-Fiber optic communication system.

Unit –IV

Infra red radiations, Production, properties and uses-Ultraviolet radiations,sources,properties and uses.**Quantum theory**:-Plank's quantum theory-Raman effect-simple theory experimental study (wood's Apparatus) Application. **Photo electricity**: Laws of photo electricity-Einstein's equation-Photocells and their uses, photoemissive, photoconductive and photovoltaic cells.

Unit V

De Broglie's theory-Electron diffraction-G.P Thomson's experiment. Michelson-Morley experiment-Significance of the negative results-Postulates of special theory of relativity-Lorentz transformation equations (no theory)-Length contraction-Time dilation-Variation of mass with velocity and mass energy equivalence.

Reference Books:

- 1.A textbook of optics by Brijlal & N.Subramanayan, S.Chand 2002.
- 2.Optics and Spectroscopy by R.Murugesan, Vivekananda Press, Madurai,2004.

Text Books:

Optics, Spectroscopy and Modern Physics – R. Murugesan.

PHYSICS MAJOR PRACTICALS

MAJOR PRACTICAL -1

14UPHC2P

FIRST YEAR

SEMESTER 1 AND 2

CREDIT-2

Any Twelve experiments

1. Compound pendulum-determination of g
2. Torsional pendulum-determination of I and G
3. Young's modulus –Uniform bending –pin and microscope
4. Young's modulus –Non Uniform bending –Optic lever
5. Young's modulus –Cantilever – Pin and microscope
6. Potentiometer- calibration of low range voltmeter
7. Potentiometer- calibration of low range ammeter
8. Potentiometer- internal resistance of a cell
9. Carey Foster bridge-determination of resistance and resistivity
10. Spectrometer – determination of wavelength- normal incidence
11. Thermal conductivity of card board- Lee's disc method
12. Coefficient of viscosity – Stoke's method.
13. Ballistic galvanometer comparison of capacitances
14. Melde's string apparatus – determination of frequency of vibrator
15. Carey Foster's bridge – determination of temperature coefficient of resistance.
16. Young's modulus –cantilever- Dynamic method

MAJOR PRACTICAL -2

14UPHC4P

SECOND YEAR

SEMESTER 3 AND 4

CREDIT-2

Any Twelve experiments

1. Air wedge- determination of thickness of a wire
2. Newton's rings- determination of Radius of curvature of a convex lens.
3. Spectrometer – determination of Dispersive power of a prism
4. Spectrometer- grating –minimum deviation method- determination of λ
5. Spectrometer –i-d curve- determination of μ
6. Sonometer – determination of A.C frequency mains
7. M.G – determination of figure of merit
8. B.G- determination of charge sensitiveness of BG
9. Table galvanometer- determination of Figure of merit.
10. B.G – comparison of emf
11. De Sauty's bridge- comparison of capacitances
12. Owen's bridge (AC) - comparison of capacitances
13. Determination of B_H - Axial coil method.
14. Potentiometer – determination of temperature coefficient of resistance.
15. Field along the axis of the coil.
16. Determination of M- Axial coil method.

MAJOR PRACTICAL -3

14UPHC6P

THIRD YEAR

SEMESTER 5 AND 6

CREDIT-4

Any Twelve experiments

1. Spectrometer- i - i' curve - determination of μ
2. Spectrometer- determination of Cauchy's constants
3. Spectrometer- Hartmann's interpolation formula
4. LCR Series resonance- determination of self inductance
5. LCR parallel resonance- determination of self inductance
6. BG –High resistance by leakage method
7. Maxwell's bridge-self inductance
8. Spectrometer – Small angled prism
9. Spectrometer – Biprism.
10. B.G. – Comparison of Mutual Inductance.
11. Anderson's Bridge – Self Inductance
12. Impedance and power factor – LR circuit
13. Impedance and power factor – CR circuit
14. B.G – Determination of mutual inductance.
15. Rayleigh's bridge – Self inductance.
16. B.G. – Internal resistance of a cell.

MAJOR PRACTICAL -4

14UPHC6Q

THIRD YEAR

SEMESTER 5 AND 6

CREDIT-4

Any Twelve Experiments

1. Bridge rectifier – π filter
2. Single stage amplifier – determination of gain and frequency response
3. Two stage amplifier- with feedback- determination of gain and frequency response
4. Two stage amplifier- without feedback- determination of gain and frequency response
5. Hartley oscillator-self inductance
6. Colpitt's oscillator-self inductance
7. Dual power supply using IC7805and IC7905
8. Transistor characteristics-CE mode
9. Astable multivibrator- discrete components.
10. Zener diode – Characteristics
11. FET – Characteristics in CE mode.
12. IC 7805 – Regulated power supply
13. Zener diode – voltage regulator.
14. Logic gates – discrete components
15. Full wave rectifier - π filter
16. Clipper and Clamper – discrete components.

MAJOR PRACTICAL -5

14UPHC6R

THIRD YEAR

SEMESTER 5 AND 6

CREDIT-4

Any Twelve Experiments

1. Logic gates- using IC
2. Universal gates-NAND gate - IC
3. Universal gate-NOR gate -IC
4. Astable multivibrator-IC 555
5. Astable multivibrator-IC 741
6. OP-amp –integrator & differentiator
7. OP-amp -adder and subtractor
8. Half and Full adder using IC
9. Four bit binary adder using IC
10. Four bit binary counter using IC
11. BCD counter using IC
12. Ring counter using IC
13. BCD to seven segment decoder using IC
14. Schmitt trigger- IC 555
15. Modulo- n-counter
16. 4 Bit binary subtractor

PHYSICS ANCILLARY PRACTICALS – 1
SEMESTER 1 & 2

14UPHA2P
CREDIT -1

Any Twelve Experiments

1. Compound pendulum-determination of g
2. Torsional pendulum-determination of I and G
3. Young's modulus –Uniform bending –pin and microscope
4. Young's modulus –Non Uniform bending –Optic lever
5. Potentiometer- calibration of low range voltmeter
6. Potentiometer- calibration of low range ammeter
7. Careyfooster's bridge-determination of resistance and resistivity
8. Thermal conductivity of card board- Lee's disc method
9. Ballastic galvanometer comparison of capacitances
10. Ballastic galvanometer comparison of emf of the two cells
11. Spectrometer –Determination of μ
12. Coefficient of viscosity – Stoke's method
13. Melde's string apparatus – determination of frequency of vibrator
14. Sonometer – verification of laws.
15. Potentiometer – Resistance and Resistivity.
16. Sonometer – A.C. Frequency.

PHYSICS ANCILLARY PRACTICALS – 2

14UPHA4P

SEMESTER 3 & 4

CREDIT -1

Any Twelve Experiments

1. Air wedge- determination of thickness of a wire
2. Newton's rings- determination of Radius of curvature
3. Spectrometer – determination of Dispersive power of a prism
4. Spectrometer- grating –Normal incidence method- determination of λ
5. LCR Series resonance- determination of self inductance
6. LCR parallel resonance- determination of self inductance
7. Bridge rectifier – π filter
8. Single stage amplifier – determination of gain and frequency response
9. Hartley oscillator-self inductance
10. Colpitt's oscillator-self inductance
11. Transistor characteristics-CE mode
12. Logic gates – AND, OR, NOT- discrete components
13. Logic gates – NAND, NOR - discrete components
14. OP amp- adder and subtractor
15. Zener diode characteristics
16. Owen's bridge (AC) - comparison of capacitances