Syllabus

PHYSICS
(UG courses)
Admitted Batch 2008 -2009

May 2008
A.P. State Council of Higher Education

Subject Committee

1. Prof.T.Bhaskar Rao, Coordinator
   Dept. of Physics, Kakatiya University
2. Prof.M.Laxmipathi Rao,
   Dept. of Physics, Osmania University
3. Prof.V.V.R.Narsimha Rao,
   Dept. of Physics, S.V. University
4. Prof.N.Veeraiah,
   Dept. of Physics, Acharya Nagarjuna University
5. Prof.R.Ramakrishna Reddy,
   Dept. of Physics, Srikrishnadevaraya University
6. Prof.N.Gopi Krishna,
   Dept. of Physics, Kakatiya University
7. Dr.K.Krishna Kumar,
   Pingle Govt. College for Women, Warangal
8. Dr.Y.Gowri Sankar,
   Dept. of Physics, Hindu College, Guntur
9. Dr.B.Nagaiah,
   Dept. of Physics, LB College, Warangal

B.Sc. Courses (Structure)

First year:

S.no.	Subject	Hrs per week
1.	English language including communication skills	6
2.	Second language	4
3.	Core1-I	4
4.	Core2-I	4
5.	Core3-I	4
6.	Core1-lab I	3
7.	Core2-lab I	3
8.	Core3-lab I	3
9.	Foundation course	3
10.	Computer skills	2
	Total	**36**

Second year:

S.no.	Subject	Hrs per week
1.	English language including communication skills	6
2.	Second language	4
3.	Core1-II	4
4.	Core2-II	4
5.	Core3-II	4
6.	Core1-lab II	3
7.	Core2-lab II	3
8.	Core3-lab II	3
9.	Environmental studies	4
10.	Computer skills	2
	Total	**37**

Third year:

S.no.	Subject	Hrs per week
1.	Core1-III	3
2.	Core1-IV	3
3.	Core2-III	3
4.	Core2-IV	3
5.	Core3-III	3
6.	Core3-IV	3
7.	Core1-lab III	3
8.	Core1-lab IV	3
9.	Core2-lab III	3
10.	Core2-lab IV	3
11.	Core3-lab III	3
12.	Core3-lab IV	3
13.	Foundation course	3
	Total	**39**

STRUCTURE - CURRICULUM

PHYSICS

YEAR	THEORY/ PRACTICAL	TITLE	WORKLOAD HRS/ WEEK
FIRST	Theory – I	Mechanics and Waves and Oscillations	4
	Practical - I	---	3
SECOND	Theory - II	Thermodynamics and Optics	4
	Practical - II	---	3
THIRD	Theory – III	Electricity, Magnetism and Electronics	3
	Theory - IV	Modern Physics	3
	Practical - III	---	3
	Practical - IV	---	3

ANDHRA UNIVERSITY
PHYSICS SYLLABUS ADMITTED BATCH W.E.F. 2008-09

B.Sc. (Physics)

Theory Paper – I

Mechanics and Waves and Oscillations **120 hrs (4 hrs / week)**

Unit – I **30 hrs**

1. **Vector Analysis (10):**

   Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field and related problems. Vector integration, line, surface and volume integrals. Stokes, Gauss and Greens theorems- simple applications.

   .

2. **Mechanics of Particles(10)**

   Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section, Rutherford scattering

3. **Mechanics of rigid bodies(10)**

   Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor. Eulers equation, precession of a top, Gyroscope, precession of the equinoxes

Unit – II **30 hrs**

4 **Mechanics of continuous media(8)**

Elastic constants of isotropic solids and their relation, Poisson's ratio and expression for Poisson's ratio in terms of y, n, k. Classification of beams, types of bending, point load, distributed load, shearing force and bending moment, sign conventions, simple supported beam carrying a concentrated load at mid span, cantilever with an end load

5 **Central forces(12)**

Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws, Coriolis force and its expressions.

6 **Special theory of relativity (10)**

Galilean relativity, absolute frames, Michelson-Morley experiment, Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four vector formalism.

Unit – III **30 hrs**

7 Fundamentals of vibrations(12)

Simple harmonic oscillator, and solution of the differential equation– Physical characteristics of SHM, torsion pendulum, - measurements of rigidity modulus , compound pendulum, measurement of 'g', combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies, Lissajous figures

8 Damped and forced oscillations(12)

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with undamped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance, velocity resonance

9 Complex vibrations(6)

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw-tooth wave

Unit – IV **30 hrs**

10 Vibrations of bars(12)

Longitudinal vibrations in bars- wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the mid point iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar- wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

11 Vibrating Strings (12)

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at both ends, overtones, energy transport, transverse impedance

12. Ultrasonics(6)

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods, detection of ultrasonics, determination of wavelength of ultrasonic waves. Velocity of ultrasonics in liquids by Sear's method. Applications of ultrasonic waves.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008.*
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007*.
3. **Waves and Oscillations**. S. Badami, V. Balasubramanian and K. Rama Reddy *Orient Longman*.
4. **First Year Physics** - *Telugu Academy*.
5. **Mechanics of Particles, Waves and Oscillations**. Anwar Kamal, *New Age International*.
6. **College Physics-I**. T. Bhimasankaram and G. Prasad. *Himalaya Publishing House*.
7. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
8. **Waves and Oscillations**. N. Subramaniyam and Brijlal *Vikas Publishing House Private Limited*.

Reference Books

1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
3. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition.*
4. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
5. **Mechanics**. Hans & Puri. *TMH Publications*.
6. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.

ANDHRA UNIVERSITY
PHYSICS SYLLABUS ACADEMIC YEAR 2009-10

B.Sc. (Physics)
Theory Paper – II
Thermodynamics and Optics

120 hrs
(4 hrs / week)

Unit – I **30 hrs**

1. **Kinetic theory of gases: (8)**

   Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Experimental verification Toothed Wheel Experiment, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

2. **Thermodynamics: (12)**

   Introduction – Reversible and irreversible processes – Carnot's engine and its efficiency – Carnot's theorem – Second law of thermodynamics, Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature- Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

3. **Thermodynamic potentials and Maxwell's equations: (10)**

   Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

Unit – II **30 hrs**

4. **Low temperature Physics: (10)**

   Introduction – Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type. Working of refrigerator and Air conditioning machines. Effects of Chloro and Fluro Carbons on Ozone layer; applications of substances at low- temperature.

5. **Quantum theory of radiation: (10)**

   Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law, Rayleigh-Jeans law,

from Planck's law - Measurement of radiation – Types of pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

6. Statistical Mechanics: (10)

Introduction to statistical mechanics, concept of ensembles, Phase space, Maxwell-Boltzmann's distribution law, Molecular energies in an ideal gas, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Black Body Radiation, Rayleigh-Jean's formula, Planck's radiation law, Weins Displacement, Stefan's Boltzmann's law from Plancks formula. Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

Unit III **30 hrs**

7 The Matrix methods in paraxial optics: (8)

Introduction, the matrix method, effect of translation, effect of refraction, imaging by a spherical refracting surface. Imaging by a co-axial optical system. Unit planes. Nodal planes. A system of two thin lenses.

8 Aberrations: (7)

Introduction – Monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration – the achromatic doublet – Removal of chromatic aberration of a separated doublet.

9 Interference: (15)

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light

Interference by division of wave front: Fresnel's biprism – determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes) – Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1,D_2 lines and thickness of a thin transparent plate.

Unit IV: **30 hrs**

10 Diffraction: (10)

Introduction – Distinction between Fresnel and Fraunhoffer diffraction Fraunhoffer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhoffer diffraction due to double slit – Fraunhoffer diffraction pattern with N slits (diffraction grating)

Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction:-

Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

11 Polarization (10)

Polarized light : Methods of Polarization, Polarizatioin by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewsters law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

12 Laser, Fiber Optics and Holography: (10)

Lasers: Introduction – Spontaneous emission – Stimulated emission – Population inversion . Laser principle – Einstein coefficients – Types of Lasers – He-Ne laser – Ruby laser – Applications of lasers.

Fiber Optics : Introduction – Optical fibers – Types of optical fibers – Step and graded index fibers – Rays and modes in an optical fiber – Fiber material – Principles of fiber communication (qualitative treatment only) and advantages of fiber communication.

Holography: Basic Principle of Holography – Gabor hologram and its limitations, Holography applications.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. **Optics** by Ajoy Ghatak. *The McGraw-Hill companies*.
2. **Optics** by Subramaniyam and Brijlal. *S. Chand & Co*.
3. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
4. **Optics and Spectroscopy**. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co*.
5. **Second Year Physics** – *Telugu Academy.*
6. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co*.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education*.
2. Berkeley Physics Course. Volume-5. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies*.
3. **An Introduction to Thermal Physics** by Daniel V. Schroeder.*Pearson Education Low Price Edition*.
4. **Thermodynamics** by R.C. Srivastava, Subit K. Saha & Abhay K. *Jain Eastern Economy Edition*.
5. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications*.
6. **Feyman's Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications*.
7. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*

ANDHRA UNIVERSITY
PHYSICS SYLLABUS ACADEMIC YEAR 2010-11

B.Sc (Physics)
Theory Paper – III
Electricity, Magnetism and Electronics

90 hrs
(3 hrs / week)

Unit – I **23 hrs**

1. **Electrostatics (10 periods)**

   Gauss law and its applications-Uniformly charged sphere, charged cylindrical conductor and an infinite conducting sheet of charge. Deduction of Coulmb's law from Gauss law Mechanical force on a charged conductor Electric potential – Potential due to a charged spherical conductor, , electric field strength from the electric dipole and an infinite line of charge. Potential of a uniformly charged circular disc.

2. **Dielectrics (5 periods)**

   An atomic view of dielectrics, potential energy of a dipole in an electric field. Polarization and charge density, Gauss's law for dielectric medium– Relation between D,E, and P. Dielectric constant, susceptibility and relation between them. Boundary conditions at the dielectric surface. Electric fields in cavities of a dielectric-needle shaped cavity and disc shaped cavity.

3. **Capacitance (8 periods)**

   Capacitance of concentric spheres and cylindrical condenser, capacitance of parallel plate condenser with and without dielectric. Electric energy stored in a charged condenser – force between plates of condenser, construction and working of attracted disc electrometer, measurement of dielectric constant and potential difference.

Unit – II **24 hrs**

1. **Magnetostatics (6 periods)**

   Magnetic shell – potential due to magnetic shell – field due to magnetic shell – equivalent of electric circuit and magnetic shell – Magnetic induction (B) and field (H) – permeability and susceptibility – Hysteresis loop.

2. **Moving charge in electric and magnetic field (8 periods)**

   Hall effect, cyclotron, synchrocyclotron and synchrotron – force on a current carrying conductor placed in a magnetic field, force and torque on a current loop, Biot –Savart's law and calculation of B due to long straight wire, a circular current loop and solenoid.

3. Electromagnetic induction (10 periods)

Faraday's law –Lenz's law – expression for induced emf – time varying magnetic fields – Betatron –Ballistic galvanometer – theory – damping correction – self and mutual inductance, coefficient of coupling, calculation of self inductance of a long solenoid – toroid – energy stored in magnetic field – transformer – Construction, working, energy losses and efficiency.

Unit – III **20 hrs**

1. Varying and alternating currents (10 periods)

Growth and decay of currents in LR, CR and LCR circuits – Critical damping. Alternating current relation between current and voltage in pure R,C and L-vector diagrams – Power in ac circuits. LCR series and parallel resonant circuit – Q-factor. AC & DC motors-single phase, three phase (basics only).

2. Maxwell's equations and electromagnetic waves (10 periods)

A review of basic laws of electricity and magnetism – displacement current – Maxwell's equations in differential form – Maxwell's wave equation, plane electromagnetic waves – Transverse nature of electromagnetic waves, Poynting theorem, production of electromagnetic waves (Hertz experiment)

Unit – IV **23 hrs**

1. Basic Electronics (15 periods)

Formation of electron energy bands in solids, classification of solids in terms of forbidden energy gap. Intrinsic and extrinsic semiconductors, Fermi level, continuity equation – p-n junction diode, Zener diode characteristics and its application as voltage regulator. Half wave and full wave rectifiers and filters, ripple factor (quantitative) – p n p and n p n transistors, current components in transistors, CB,CE and CC configurations – transistor hybrid parameters – determination of hybrid parameters from transistor characteristics – transistor as an amplifier — concept of negative feed back and positive feed back – Barkhausen criterion, RC coupled amplifier and phase shift oscillator (qualitative).

2. Digital Principles (8 periods)

Binary number system, converting Binary to Decimal and vice versa. Binary addition and subtraction (1's and 2's complement methods). Hexadecimal number system. Conversion from Binary to Hexadecimal – vice versa and Decimal to Hexadecimal vice versa.

Logic gates: OR,AND,NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive – OR gate,
De Morgan's Laws – statement and proof, Half and Full adders. Parallel adder circuits.

NOTE: Problems should be solved from every chapter of all units.

Textbooks

1. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath – *S. Chand & Co.* for semi conductor & Digital Principles)
2. **Fundamentals of Physics**- Halliday/Resnick/Walker - *Wiley India Edition 2007.*
3. Berkeley Physics Course – Vol. II - **Electricity and Magnetism** – Edward M Purcell –*The McGraw-Hill Companies.*
4. **Electricity and Magnetism** – D.N. Vasudeva. *S. Chand & Co.*
5. **Electronic devices and circuits** – Millman and Halkias. *Mc.Graw-Hill Education.*
6. **Electricity and Magnetism** Brijlal and Subramanyam. *Ratan Prakashan Mandir.*
7. **Digital Principles and Applications** by A.P. Malvino and D.P. Leach. *McGraw Hill Education.*

Reference Books

1. **Electricity and Electronics** – D.C. Tayal. *Himalaya Publishing House.*
2. **Electricity and Magnetism** – C.J.Smith. *Edward Arnold Ltd.*
3. **Electricity, Magnetism with Electronics** – K K Tewari. *R.Chand & Co.*
4. **Third year Physics** – *Telugu Akademy*
5. **Principles of Electronics** by V.K. Mehta – *S. Chand & Co.*

ANDHRA UNIVERSITY
PHYSICS SYLLABUS ACADEMIC YEAR 2010-11

B.Sc. (Physics)
Paper IV
Modern Physics

90 hrs
(3 hrs / week)

Unit – I **25 hrs**

Atomic Spectra

Introduction – Drawbacks of Bohr's atomic model - Sommerfeld's elliptical orbits – relativistic correction (no derivation). Stern & Gerlach experiment Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules. Spectra of alkali atoms, doublet fine structure. Alkaline earth spectra, singlet and triplet fine structure. Zeeman Effect, Paschen-Back Effect and Stark Effect (basic idea).

Molecular Spectroscopy:

Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule, determination of internuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman effect, Classical theory of Raman effect. Experimental arrangement for Raman effect and its applications.

Unit – II: **25 hrs**

Quantum Mechanics

Inadequacy of classical Physics: (Discussion only)

Spectral radiation – Planck's law. Photoelectric effect – Einstien's photoelectric equation. Compton's effect (quantitative) experimental verification. Stability of an atom – Bohr's atomic theory. Limitations of old quantum theory.

Matter Waves:

de Broglie's hypothesis – wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing de Brogile waves of electron in Bohr orbits.

Uncertainty Principle:

Heisenberg's uncertainty principle for position and momentum (x and p_x), Energy and time (E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Particle in a box. Complementary principle of Bohr.

Schrodinger Wave Equation:

Schrodinger time independent and time dependent wave equations. Wave function properties – Significance. Basic postulates of quantum mechanics. Operators, eigen functions and eigen values, expectation values. Application of Schrodinger wave equation to particle in one and three dimensional boxes, potential step and potential barrier.

Unit – III **15 hrs**

Nuclear Physics

Nuclear Structure:

Basic properties of nucleus – size, charge, mass, spin, magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p and n-p scattering (concepts), nuclear forces. Nuclear models – liquid drop model, shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger – Nuttal law. Gammow's theory of alpha decay. Geiger – Nuttal law from Gammow's theory. Beta spectrum – neutrino hypothesis, Fermi's theory of β-decay (qualitative).

Nuclear Reactions: Types of nuclear reactions, channels, nuclear reaction kinematics. Compound nucleus, direct reactions (concepts).

Nuclear Detectors – GM counter, proportional counter, scintillation counter, Wilson cloud chamber and solid state detector

Unit – IV **25 hrs**

Solid State Physics

Crystal Structure: Crystalline nature of matter. Cystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, CsCl, FCC, NaCl diamond and Zinc Blends)
X-ray Diffraction: Diffraction of X –rays by crystals, Bragg's law, Experimental techniques - Laue's method and powder method.

Nanomaterials: Introduction, nanoparticles, metal nanoclusters, semiconductor nanoparticles, carbon clusters, carbon nanotubes, quantum nanostructures – nanodot, nanowire and quantum well. Fabrication of quantum nanostructures.

Bonding in Crystals: Types of bonding in crystals – characteristics of crystals with different bindings. Lattice energy of ionic crystals – determination of Medelung constant for NaCl crystal, calculation of Born coefficient and repulsive exponent. Born – Haber cycle.

Magnetism: Magnetic properties of dia, para and ferromagnetic materials. Langevin's theory of paramagnetism. Weiss' theory of ferromagnetism –Concepts of magnetic domains, antiferromagnetism and ferrimagnetism ferrites and their applications.

Superconductivity:

Basic experimental facts – zero resistance, effect of magnetic field, Meissner effect, persistent current, Isotope effect Thermodynamic properties, specific heat, entropy. Type I and Type II superconductors.

Elements of BCS theory-Cooper pairs. Applications. High temperature superconductors (general information)

NOTE: Problems should be solved from every chapter of all units.

Textbooks

1. **Modern Physics** by G. Aruldhas & P. Rajagopal. *Eastern Economy Edition.*
2. **Concepts of Modern Physics** by Arthur Beiser. *Tata McGraw-Hill Edition*.
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co.*
4. **Nuclear Physics** by D.C. Tayal, *Himalaya Publishing House.*
5. **Molecular Structure and Spectroscopy** by G. Aruldhas. *Prentice Hall of India, New Delhi.*
6. **Spectroscopy –Atomic and Molecular** by Gurdeep R Chatwal and Shyam Anand – *Himalaya Publishing House.*
7. **Third Year Physics** - *Telugu Academy*.
8. **Elements of Solid State Physics** by J.P. Srivastava. (for chapter on nanomaterials)- *Prentice-hall of India Pvt. Ltd.*

Reference Books

1. **University Physics with Modern Physics** by Young & Freedman. *A. Lewis Ford. Low Price Edition (Eleventh Edition).*
2. **Quantum Physics** by Eyvind H. Wichman. Volume.4. *The McGraw-Hill Companies.*
3. **Quantum Mechanics** by Mahesh C. Jani. *Eastern Economy Edition.*
4. **Nuclear Physics** Irving Kaplan – *Narosa Publishing House.*
5. **Introduction to Solid State Physics** by Charles Kittel. *John Wiley and Sons.*
6. **Solid State Physics** by A.J. Dekker. *Mac Millan India*

Practical Paper – I

90 hrs
(3 hrs / week)

FIRST YEAR PRACTICALS

1. Study of a compound pendulum determination of ‘g’ and ‘k’.
2. Study of damping of an oscillating disc in Air and Water logarithmic decrement.
3. Study of Oscillations under Bifilar suspension.
4. Study of oscillations of a mass under different combination of springs.
5. ‘Y’ by uniform Bending (or) Non-uniform Bending.
6. Verification of Laws of a stretched string (Three Laws).
7. Moment of Inertia of a fly wheel.
8. Measurement of errors –simple Pendulum.
9. Determination of frequency of a Bar-Melde’s experiment.
10. ‘n’ by torsion Pendulum.
11. Observation of Lissajous figures from CRO.
12. Study of flow of liquids through capillaries.
13. Determination of Surface Tension of a liquid by different methods.
14. Study of Viscosity of a fluid by different methods.
15. Volume Resonator –determination of frequency of a tuning fork.
16. Velocity of Transverse wave along a stretched string.

Practical Paper – II

90 hrs
(3 hrs / week)

SECOND YEAR PRACTICALS

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Thickness of a wire-wedge method.
6. Determination of wavelength of light –Biprism.
7. Determination of Radius of curvature of a given convex lens- Newton's rings.
8. Resolving power of grating.
9. Study of optical rotation-polarimeter.
10. Dispersive power of a prism
11. Determination of wavelength of light using diffraction grating minimum deviation method.
12. Wavelength of light using diffraction grating – normal incidence method.
13. Resolving power of a telescope.
14. Refractive index of a liquid and glass (Boys Method).
15. Pulfrich refractometer – determination of refractive index of liquid.
16. Wavelength of Laser light using diffraction grating.

Practical Paper - III

90hrs
(3 hrs / week)

THIRD YEAR PRACTICALS

1. Carey Foster's Bridge – comparison of resistances.
2. Internal resistance of a cell by potentiometer.
3. Figure of merit of a moving coil galvanometer.
4. Voltage sensitivity of a moving coil galvanometer.
5. RC circuit (Frequency response)
6. LR circuit (Frequency response)
7. LCR circuit series/parallel resonance, Q-factor
8. Power factor of an A.C. circuit
9. Determination of ac-frequency-sonometer.
10. Design and construction of multimeter.
11. Construction of a model D.C. power supply.
12. Characteristics of a Junction diode
13. Characteristics of Transistor
14. Characteristics of Zener diode
15. Verification of Kirchoff's laws.

Practical Paper - IV

90 hrs
(3 hrs / week)

THIRD YEAR PRACTICALS

1. e/m of an electron by Thomson method.
2. Energy gap of semiconductor using a junction diode
3. Temperature characteristics of thermistor
4. R.C. coupled amplifier
5. Verification of Logic gates AND, OR NOT, X-OR gates
6. Verification of De Morgan's theorems
7. Construction and verification of truth tables for half and full adders.
8. Phase shift Oscillator
9. Hysteresis curve of transformer core
10. Determination of Planck's constant (photocell)
11. Study of spectra of hydrogen spectrum (Rydberg constant)
12. Study of absorption of α and β rays.
13. Hall-probe method for measurement of magnetic field.
14. Absorption spectrum of iodine vapour.
15. Study of alkaline earth spectra using a concave grating.

Not for examination:

Servicing of domestic appliances – Electric Iron, immersion heater, fan, hot plate grinder, emergency lamp, battery charger, micro-oven, loud speaker, eliminator, cell-phones, servicing of refrigerator.

Suggested Books for Practicals

1. **A textbook of Practical Physics** by M.N. Srinivasan. *S. Chand & Co.*
2. **Practical Physics** by M. Arul Thakpathi by *Comptek Publishers.*
3. **A. Laboratory manual for Physics Course** by B.P. Khandelwal.
4. **B.Sc. Practical Physics** – C.L. Arora – *S. Chand & Co.*
5. **Viva-voce in Advanced Physics** – R.C. Gupta and Saxena P.N. – *Pragathi Prakashan, Meerut.*
6. **Viva-Voce in Physics – R.C. Gupta*, Pragathi Prakashan, Meerut.***

Minutes:

After going through the Model Curriculum – Physics (UG Courses) – May 2008 received from A.P. State Council of Higher Education, all the members unanimously felt that the design of both theory and practical syllabi is based on 30 weeks of instruction (180 days). But affiliated colleges are hardly getting 150 instruction days in an academic year due to high temperature in the early days of June, heavy rains/cyclones, various bandhs, Half Yearly and Prefinal exams due to early commencement of various Practical examinations. Moreover conduct of supplementary examination in the middle of the academic year creates another havoc to complete the syllabus in time.

Syllabus needs 120 hours to complete the instruction for average students and there is no scope for extra activities like problem solving, discussions with student participation, conduct of unit tests, analyzing the previous Question papers, student lecturers etc.

NO prescription of minimum no, of practices to be arranged (or) to be completed. For some experiments, aim is specifically mentioned where as for some other experiments, it is left in vague.

Vagueness creates no, of problems in maintaining standards, Some centre try to dilute and some examiners may argue all the different aims are in syllabus.

Servicing of Micro ovens, cell phones, refrigerators require extra knowledge and hence may not be possible to take up their repair work.

Model paper for theory examinations is good.

Our scheme of valuation (practical examinations) which is in practice for the last two years is more clear and appropriate.

Resolutions:

1. Resolved to recommend for implementation of Model Curriculum regarding Physics theory papers starting from 2008-09 admitted batch of students.
2. Resolved to fix the minimum number of practical to be completed by students as 12 for Practical, I, II, III & IV.
3. Resolved to authorize the Chairman, BOS in Physics(UG) to clear the vagueness in aims of certain experiments and to make necessary arrangements to circulate the corrected syllabus for Practical, I, II, III & IV.
4. Resolved to follow the scheme of valuation with respect to Physics Practical Examinations which is in practice for the last two years (copy enclosed)
5. Resolved to request the authorities to extend the last date for instruction from 6^{th} February at least upto 28^{th} February, so as to complete the syllabus satisfactorily.
6. Resolved to approve the with of practices for I, II, III & IV as proposed by the chairman in the meeting.

B.SC. (Physics)
Practical Paper – I

1. Compound Pendulum – determination of 'G' and 'K'.
2. Damping of an oscillating disc – Logarithmic decrement.
3. Oscillations under Bifilar suspension – Moment of Inertia.
4. Combinations of springs – Verification of equations (Series & parallel)
5. Young's Modulus – Uniform (or) non uniform bending.
6. Sonometer – Verification of laws of a stretched string.
7. Sonometer – Velocity of transverse wave along a stretched string.
8. Simple pendulum – Estimation of standard error
9. Melde's experiment – determination of frequency.
10. Fly wheel – Moment of Inertia
11. Study of flow of liquids through Capillaries.
12. Viscosity of a fluid by any one method.
13. Surface tension of a liquid by any one method.
14. Digidity Modulus – Torsion pendulum.
15. Volume resonator – frequency a unity fork using V-i/n2 graph.
16. Lissajous figures using CRO (demonstration expt.)

*Minimum 12 experiments one to be completed by the student out of 15 experiments arranged.

B.Sc. (Physics) – Practical – II

1. Lee's method – Co-efficient of thermal conductivity of a bad conductor.
2. Determination of stefan's constant.
3. Specific heat of a liquid by applying Newton's Law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltage.
5. Diameter of athinwire-Wedge method.
6. Ware length of light – Biprison
7. Newton's rings – Radius of given corexlens.
8. Resolving power of grating.
9. Polarimeter – specific optic rotation.
10. Dispersive power of a prism.
11. Grating – Ware length determination – normal incidence method.
12. Grating – Ware length determination – min. deviation method.
13. Resolving power of a telescope.
14. Pulpich refract meter – M of a liquid.
15. Ware length of laser light using diffraction grating.
16. Boy's Method – Radius of curvature of a given convex lens and determination of M of glass and water.

- Minimum 12 experiments are to be completed by the student out of 15 experiments arranged.

B.Sc. (Physics)

Practical – III

1. Potent meter – calibration of a Volt meter (high range)
2. Potations meter – Internal resistance of a cell.
3. Carry Foster's Bridge – Comparison of resistances.
4. Carry Foster's Bridge – Temperature coefficient of resistance.
5. Figure of merit of a moving coil galvanometer.
6. Constant of Ballistic galvanometer – capacitor method.
7. Ballistic galvanometer – Charging / discharging of a capacitor through high resistance – Time constant determination.
8. Ballistic galvanometer – Self/Mutual inductance determination.
9. Frequency response of a RC circuit – cut off frequency.
10. Frequency response of a RL Circuit – cut off frequency.
11. LCR – Series/parallel resonance, Q-factor.
12. Power factor of an A..C. Circuit.
13. Determination of A..C. Frequency – Sonometer
14. Temperature characteristics of thermistor
15. Verification of Kickoff's Laws.
16. Study of magnetic field along the axis of a current carrying circular coil.

- Minimum 12 experiments are to be completed by the student out of 15 experiments arranged.

B.Sc. (Physics)
Practical – IV

1. Characteristics of Junction Diode.
2. Characterstics of Zener Diode.
3. Construction of model power supply – study of its load characteristics.
4. Characterstics of a Transition in CE configuration – 5
5. R.C. coupled amplifier – frequency determination.
6. Phase shift oscillator – frequency determination.
7. Energy gap of Semiconductor using a Junction Diode.
8. Hysteretic curve – estimate of energy loss per cycle.
9. AND, OR, X-OR, NOT, NOR, N XOR gates – Truth table Verification
10. AND, OR, NOT – gates – using universal gates – Verification of truth tables.
11. Verification of DeMorgan's Therms.
12. Construction of half and full address – Trugh table Verification.
13. Photo Cell – Determination of plank's consonant.
14. e/m of an electron by Thomson meter/Helical method.
15. Hydrogen spectrum – Determination of Rydberg constant.
16. Measurement of magnetic field – Hall probe method.
17. Absorption spectrum of iodine vapour.
18. Study of alkaline earth specific using concave grating.

Not for examination:

Servicing of domestic appliances – Electric Iron, immension heater, fan, hot plate grinder, emergency lamp, battery charger, micro – ovel, loud speaker, eliminator, cell-phones, servicing of refrigerator.

Suggested Books for Practicals:

1. A text book of practical Physics by M.N. Srinivasan, S.Chand & Co.
2. Practical Physics by M.ARul Thakpathi by Comptex Publishers.
3. A. Laboratory manual for Physics Course by B.P. Khandelwal.
4. B.Sc. Practical Physics – C.L. Arora – S.Chand & Co.
5. Viva-voce in Advanced Physics – R.C. Gupta and Saxena P.N. Pragathi, Prakashan, Meerut.
6. Viva-voce in Physics – R.C. Gupta, Pragathi Prakashan, Meerut.

Practical Examination – Scheme of Valuation and other guidelines.

Max: Marks: 50 (For Record 10: For Practical Exam: 40)
Record valuation is to be divided into two parts.

i) Basing on No. of experiments recorded award a maximum of 4 marks, as per the following table.

No. of expts. Recorded out of 12	Marks to be awarded
11, 12	4
9, 10	3
7,8	2
Less than 7	0

ii) Basing on Quality of practical Work recorded i.e. by considering procedure adopted, sketch of apparatus, correctness of observations and result, quality of graphs drawn and neatness of the record – Award 6 marks.

For practical examination – 40 marks:

Circuit diagram and formula with explanation of symbols used	-5 marks
Circuit connections / arrangement of apparatus	-5 marks
Tabular form and procedure adopted	-5 marks
Observations	-10 marks
Calculations and graphs	-6 marks
Result and units	-4 marks
Viva voce	-5 marks
Total marks	-40 marks

- One or two questions are to be assigned to each candidate taking the duration of practical exam into consideration.,
- Four or five question are to be arranged for each batch basing on available number of sets of equipment.
- All the 12 experiments are to be covered at any centre for any class.
- Non-programmable calculations are allowed for calculation work.
- Viva-Voice is to be conducted for every candidate pertaining to the question allotted.
- Examiner is entitled to reject any number of recorded practical's under valued reasons.
- Penalty for change of experiment in practical examinations.

i) In case of not recorded one - No Penalty
ii) In case of recorded one - 1/3 marks of candidate's score Out of 40 marks are to deducted.