

SAURASHTRA UNIVERSITY

RAJKOT, 360 005.



T.Y.B.Sc. (Physics)

SYLLABUS

(Under Choice Based Credit System)

In force from June – 2012.

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RAJKOT, 360 005

B.Sc. (Physics)

Syllabus

(Under Choice Based Credit System)

In force from June – 2012.

There will be two semesters in T.Y.B.Sc and in each semester there will be three theory papers of Physics. The content of the syllabus is prepared assuming that 75 hours of teaching hours will be available per Semester. For Practicals, 15(fifteen) hours per week are required.

Credit for each theory paper = 6

Credit for theory in each semester = $3 \times 6 = 18$

Credit for practicals in each semester = 9

Credit for project = 6

Total Credit for the year = $27+27+6 = 60$

Semester-V :- Physics Paper- 501 (theory)
 Physics Paper- 502 (theory)
 Physics Paper- 503 (theory)

Practicals: Each student will have to perform two experiments in the University Examination.

Semester-VI :- Physics Paper- 601 (theory)
 Physics Paper- 602 (theory)
 Physics Paper- 603 (theory)

Practicals: Each student will have to perform two experiments in the University Examination.

Project: Each student has to prepare one model (preferably working model) based on the principles of Physics. The model, along with a detailed write up (dissertation), explaining the principle, working and applications, should be submitted to the Practical-in-charge at the end of VIth semester. The distribution of marks is as follows:

Model making	: 70
Viva voce	: 30
Total	: 100

Students can use Calculator (Scientific) in Theory and Practical Examinations.

Semester-V

PAPER P-501

(MATHEMATICAL PHYSICS, CLASSICAL MECHANICS & QUANTUM MECHANICS)

Mathematical Physics

- (i) Fourier Series
Definition and derivation of the co-efficients of Fourier Series[7.1], Cosine & Sine Series[7.1], Solved problems on Fourier Series, Applications of Fourier analysis(square wave & full wave rectifier)[7.9], Problems.

Basic reference book : Mathematical Physics by Rajput, (Pragati Prakashan), Meerut, India.

Classical Mechanics

- (i) Lagrangian Formulation
Constraints[8.1], Generalised coordinates[8.2], D'Alembert's principle[8.3], Lagrange' equations[8.4], A general expression for kinetic energy[8.5], Symmetries and laws of conservation[8.6], Cyclic or ignorable coordinates[8.7], Velocity-dependent potential of electromagnetic field[8.8], Rayleigh's dissipation function[8.9], Problems.
- (ii) Variational Principle: Lagrange's and Hamilton's Equations
Configuration space[11.1], Hamilton's principle[11.4], Equivalence of Lagrange's and Newton's equations[11.5], Advantages of the Lagrangian formulation-electro-mechanical analogies[11.6], Lagrange's undetermined multipliers[11.7], Applications of the Lagrangian method of undetermined multipliers[11.9], Hamilton's equations of motion[11.10], Some applications of the Hamiltonian formulation[11.11], Phase space[11.12], Problems.

Basic reference book for (i) & (ii) : Introduction to Classical Mechanics by Takwale and Puranik. (Tata McGraw Hill Pub Comp. Delhi).

Quantum Mechanics

- (i) The Schrodinger equation and Stationary States
Schrodinger equation: A Free Particle in One Dimension[2.1], generalization to Three Dimensions[2.2], The Operator Correspondence and the Schrodinger equation for a Particle subject to forces[2.3], Physical interpretation on ψ , Normalization and Probability interpretation[2.4], Non-Normalizable Wave Functions and Box Normalization[2.5], Conservation of Probability[2.6], Expectation Values, Ehrenfest's Theorem[2.7], Admissibility Conditions on the wave function[2.8], Stationary states: The Time-Independent Schrodinger equation[2.9], A particle in a Square Well potential, Bound states in a Square Well($E < 0$)[2.11]; (a) Admissible solutions of Wave equation (b) The Energy Eigenvalues-Discrete Spectrum (c) The Energy Eigen functions:Parity (d) Penetration into Classically Forbidden Regions, The Square Well:Non-localized States ($E > 0$)[2.12].
- (ii) General Formalism of Wave Mechanics
Schrodinger Equation and the Probability Interpretation for an N-Particle System[3.1], The Fundamental Postulates of Wave Mechanics: (a) Representation of States (b) Representation of Dynamical Variables[3.2], The Adjoint of an Operator, and Self-Adjointness[3.3], The Eigen value Problem; Degeneracy[3.4], Eigen values and Eigen functions of Self-Adjoint Operators[3.5], The Dirac-Delta function[3.6].

Basic Reference Book for (i) & (ii) : Text Book of Quantum Mechanics by Mathews and Venkateshan, (Tata McGraw Hill Pub. Comp.)

Reference Books:

1. Mathematical Physics - P.K.Chattopadhyay
2. Mathematical methods in Physical Science - M.L.Bose, John Willy & Sons
3. Classical Mechanics - Gupta, Kumar and Sharma. Pragati Prakashan, Meerut, India
4. Classical Mechanics - Goldstein
5. Quantum Mechanics - Ghatak and Loknathan, Macmillan India Ltd., Delhi
6. Quantum Mechanics - Ajoy Ghatak
7. Elements of Quantum Mechanics - Kamal Singh and S.P.Singh, S.Chand Co.

PAPER P-502
(ELECTRICITY, MAGNETISM AND SOLID STATE ELECTRONICS)

Electricity and Magnetism

- (i) Electrostatics :
Electric flux and Gauss law (differential form) [2.2.1], Divergence of \mathbf{E} [2.2.2], Curl of \mathbf{E} [2.2.4], Introduction to Potential [2.3.1], Poisson's and Laplace's equation [2.3.3], the work done on a moving charge [2.4.1]
- (ii) Magnetostatics
Electric Current and current density [5.1.3], Magnetic field of steady current [5.2.1], Divergence of \mathbf{B} [5.3.2], Curl of \mathbf{B} [5.3.3], Ampere's law [5.3.4], Comparison of Magnetostatics and Electrostatics [5.3.5], Vector potential [5.4.4]
- (iii) Electrodynamics
Faraday's law [7.2.1], Maxwell's equations [7.3.1], Scalar and vector potentials of electrodynamics fields [7.4.1], Poynting theorem [7.5.2]

Basic reference book for (i), (ii) and (iii) : Introduction to Electrodynamics by D.J.Griffiths [Prentice Hall of India Pvt. Ltd, Delhi]

- (iv) Motion of Charged Particles
Charged particle in a uniform magnetic field B [8.1], Force on a current in Magnetic field [8.4], Charged particle in Electric and magnetic fields [8.8]

Basic reference book for (iv) : Electricity and Magnetism by A.S.Mahajan and A.A.Rangwala, [Tata McGraw Hill]

- (v) Power Systems
Generation of Electrical energy [1.2], Sources of Energy [1.3], Fuels [1.8 to 1.10], Power stations [2.1], Thermal Power station [2.2, 2.3], Hydro power station [2.7, 2.8, 2.10], Diesel power station [2.11], Nuclear Power station [2.13], Gas power plant [2.13]

Basic reference book for (v) : Principles of Power Systems by V.K.Mehta and Rohit Mehta, (S.Chand & Company Ltd.)

Reference Books :

- 1 Electricity and Magnetism - Mahajan and Rangwala
- 2 Classical Electrodynamics – J.D.Jackson
- 3 Electricity and Magnetism – R. Murugesan
- 4 Electromagnetics – B.B.Laud
- 5 Electricity and Magnetism – K.K.Tiwari
- 6 Electricity and Magnetism – Berkeley Physics Course, Vol. II

Solid State Electronics

- (i) Multi-stage Transistor Amplifiers
Multistage Transistor Amplifier[14.1], RC coupled Transistor Amplifier[14.3], Transformer coupled Amplifier[14.4], Direct coupled Amplifier[14.5], Comparison of Different types of coupling[14.6].
- (ii) Transistor Audio Power Amplifiers
Transistor Audio Power Amplifier[15.1], Difference between Voltage and Power amplifier[15.2], Performance Quantities of power amplifier[15.3], Classification of Power amplifier[15.4], Expression for Collector Efficiency[15.5], Efficiency of Class A Amplifier[15.6], Maximum Efficiency of Transformer Coupled Class A Power amplifier[15.7], thermal Runaway[15.9], Heat sinks[15.10], Mathematical Analysis[15.11], Push pull Amplifier[15.15], Complementary Symmetry Amplifier[15.16].
- (iii) Regulated D.C. Power Supply
Ordinary D.C. power supply[20.1], Important terms[20.2], Regulated Power supply[20.3], Types of voltage regulators[20.4], Transistor series voltage regulator[20.6], Series feedback voltage regulator[20.7], Short-circuit protection[20.8], Transistor shunt voltage Regulator[20.9]

Basic Reference book for (i), (ii) & (iii) : Principles of Electronics by V.K.Mehta & Rohit Mehta. (S.Chand & Company Ltd.)

- (iv) Electronic Instruments
Laboratory Instrument: Analog and Digital Instruments[37.2], Functions of Instruments[37.3], Electronic versus Electrical Instruments[37.4], Essentials of an Electronic Instrument[37.5], Digital voltmeter[37.24], Cathode Ray Oscilloscope[37.25-26], Frequency Determination[37.36], Application of CRO[37.37].

Basic Reference book for (iv) : Basic Electronics by B.L.Theraja
(S.Chand & Company Ltd.)

Reference Books

1. Electronic Devices & Circuits by Allen Mottershad, Prentice-Hall of India Pvt. Ltd. Delhi
2. Electronic Devices & Circuits Theory by Boylestead & Nashelsky
3. Handbook of Electronics by Kumar & Gupta, Pragati Prakashan, Meerut, India
4. Principal of Electronics by Malvino, McGraw Hill International Editions

PAPER P-503
(OPTICS AND SPECTROSCOPY)

Optics

- (i) Interferometer :
Michelson's interferometer [15.7.1 - 15.7.7], Applications of Michelson interferometer [15.8.1 - 15.8.4], Multiple beam interference [15.11.1 - 15.11.4], Fabry Perot Interferometer and Etalon [15.12.1 - 15.12.3], Lummer Gehreke Plate [15.13].
- (ii) Polarization :
Polarization by Double refraction[20.5.5], Nicol Prism[20.6.1], Anisotropic Crystals[20.7], Calcite Crystal[20.8.1 -20.8.3], Huygen's explanation of Double Refraction[20.9.1 - 20.9.2], Phase Difference between e-ray and o-ray[20.13], Superposition of waves linearly polarized at right angles[20.14], Types of polarized light[20.15], Retarders or wave plates[20.17.1 - 20.17.2], Analysis of polarized light[20.20], Babinet compensator(only construction)[20.21], Artificial double refraction[20.29.1 - 20.29.4], LCDs[20.30].

Basic reference book for (i) and (ii) : A textbook of Optics by N.Subrahmanyam, Brij Lal & M.N.Avadhanulu (S.Chand & Company Ltd.)

- (iii) Electron Microscopy
Principles and Applications of SEM, TEM and AFM (from reference book).

Reference Books:

- 1 Principles of Optics – Mathur & Pandya
- 2 Interferometry – Tolanski
- 3 Fundamentals of Optics – D.R.Khanna & H.R.Gulati
- 4 A Textbook of light – D.N.Vasudeva
- 5 Fundamentals of Optics – Jenkins & White
- 6 Optical Electronics – A.K.Ghatak & K. Thyagarajan
- 7 Modern Physical Techniques in Material Technology – Mulvey & Webster

Spectroscopy

(i) Atomic Spectroscopy

The spinning electron [3.1], Space quantization[3.2], Quantum numbers and their physical interpretations[3.3], Zeeman effect and experimental study of Zeeman effect[9.1 and the introduction before it], Classical interpretation of Normal Zeeman effect[9.2], Vector atom model and Normal Zeeman effect[9.3], Vector atom model and Anomalous Zeeman effect[9.4 note: *in the equations may be overlooked for convenience], Paschen-Back effect[9.5], Stark effect[9.11].

Basic Reference Book for (i) : Elements of Spectroscopy by Gupta, Kumar, Sharma (Pragati Prakashan)

(ii) Molecular Spectroscopy

Introduction [Pg 764 to second paragraph of page 765], Theory of pure rotational Spectra [769 to second para of 770], Theory of rotational vibrational Spectra[771 to second para of 772], Theory of electronic band Spectra[773 to second para 774].

Basic Reference Book for (ii) : Atomic Physics by J.B.Rajam. (S.Chand & Company Ltd.)

(iii) Raman Spectra

Raman effect and its Salient features[4.0], Observation of Raman Spectra[4.1], Classical theory of Raman effect[4.2], Quantum theory of Raman effect[4.3], Applications and its Importance.

Basic Reference Book for (iii) : Elements of Spectroscopy: Gupta, Kumar & Sharma, (Pragati Prakashan)

Reference Books:

1. Atomic Physics - J.B.Rajam. (S.Chand & Company Ltd.)
2. Optics and Spectroscopy - R.Murugesan & Kiruthiga Sivaprashatha. (S.Chand & Company Ltd.)
3. Optical Electronics - A.K.Ghatak and K. Thyagarajan. Cambridge Uni. Press.

Semester-VI

PAPER P-601 (NUCLEAR PHYSICS AND SPACE PHYSICS)

Nuclear Physics

- (i) Accelerators (Construction and working of these)
Synchrocyclotron, Proton Synchrotron [11.7], Alternating gradient accelerator[11.9], Betatron.

Basic Reference Book for (i) : Nuclear Physics by D.C.Tayal,
(Himalaya Publishing House)

- (ii) Detector of Nuclear radiations
Interaction between Energetic Particle and matter [29.2], Ionization Chamber[29.3], Solid state Detector[29.6], GM Counter[29.6], Scintillation Counters[29.12].

- (iii) Nuclear Reaction
Rutherford experiment[34.1], Q-value of Nuclear reaction[34.3], Nuclear reaction[34.4], Energy balance in Nuclear reaction[34.5], Threshold energy of Endoergic reaction[35.1], Nuclear Transmutation[34.7].

- (iv) Nuclear Fission and Fusion
Nuclear fission[35.2], Energy released in fission[35.3], Bohr & Wheeler's theory of fission, Chain reaction[35.4], Atom bomb[35.5], Nuclear Reactors[35.6], Nuclear fusion[35.7], Source of stellar energy[35.8], Thermonuclear reactions[35.9], Pressurized Water Reactor[36.1], Boiling Water Reactor[36.2], Fast Breeder Reactor[36.3], Fusion Reactor[36.5], Plasma Confinement[36.6].

- (v) Elementary Particles
Introduction [38.1], Particles & Antiparticles[38.2], Antimatter[38.3], The fundamental Interactions[38.4], Elementary particle Quantum numbers[38.5], Conservation laws and symmetry[38.6], Quark model[38.7].

Basic Reference Book for (ii), (iii), (iv) & (v) : Modern Physics by R.Murugeshaan & Kiruthinga Sivaprasatha, (S.Chand & Company Ltd.)

Space Physics

(i) The Universe (description only)

Stars: Brightness, Colour, Temperature, Spectra, Size, HR diagram, Birth of stars, Red giant stars, White dwarfs, Neutron stars, Black holes, Supernova, Types of Galaxies, Our Galaxy and External Galaxies.

(ii) Concepts and foundations of Remote Sensing

Energy resources and Radiation principles, Energy interactions in the atmosphere, energy interactions with earth surface features, Data acquisition and interpretations, Reference data, The Global Positioning System, An idea of remote sensing systems, Practical applications of remote sensing, Land and Geographic information system(in brief).

Basic Reference Book : Remote Sensing and Image Interpretation by Lillesand and Kiefer, John Wiley & Sons, 4th Edi.

Reference books:

1. Nuclear Physics by D.C.Tayal
2. Nuclear Physics by Roy and Nigam
3. Nuclear Physics by Irving Kaplan
4. Nuclear Physics by S.N.Ghoshal, S.Chand & Co.
5. Atomic Physics by J.B.Rajam, S.Chand & Co.
6. Solar System by N.C.Rana
7. Structure of the Universe by Narlikar
8. Source Book on Space Science by Glasston.

PAPER P-602
(STATISTICAL MECHANICS, SOLID STATE PHYSICS & PLASMA PHYSICS)

Statistical Mechanics

- (i) Classical Distribution Law
Phase Space(till the derivation of $d\tau \geq h^3$)[1.1], Volume in Phase Space[1.2], Micro States and Macro States(number of microstates accessible to a macroscopic system onwards not included)[2.1], Stirling's approximation[2.2], Thermodynamic Probability[2.3], Division of Phase Space into Cells[2.6], Classical Maxwell Boltzmann Distribution law[2.7].
- (ii) Bose-Einstein and Fermi Dirac Statistics
Derivation of the distribution law of Bose-Einstein Statistics[6.2], Derivation of the distribution law of Fermi Dirac Statistics[6.3], Comparison of the Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics[6.6], Blackbody radiation and the Planck's radiation law[6.10], Specific heat of Solids[7.2], Dulong and Petit law[7.2.1], Einstein's theory of Specific heat of Solids[7.2.2], Debye's theory of Specific heat of Solids[7.2.3], Free electron model and Electronic emission[9.3].

Basic Reference Book for (i) & (ii) : Elementary Statistical Mechanics by Gupta and Kumar, (Pragati Prakashan)

Solid State Physics

- (i) X-Ray Diffraction
Determination of Crystal Structure[2.1], Laue Method[2.4], Rotating Crystal Method[2.5], Powder Method[2.6].
- (ii) Superconductivity
Experimental Aspects[16.1], Influence of external agents on Superconductivity[16.2], Meissner effect[16.3], Critical field of Small Specimens[16.6], Thermodynamic of Superconducting transition[16.7], Alloys & Compounds[16.10], London's theory[16.14], Josephson effects[16.17], BCS theory[16.18.1 to 4], Applications of Superconductivity(in brief from reference book).

- (iii) Photoconductivity and Luminiscence
History[17.1], Photoconducting materials[17.2], Electronic transitions in Photo conductors[17.3], Photo sensitivity[17.6], Trapping and its effects[17.11], Luminiscence effect[17.12], Models of Luminiscence in Sulphide Phosphors[17.13], Electro luminescence[17.17].

Basic Reference Book for (i), (ii) & (iii) : Fundamentals of Solid state Physics by Saxena, Gupta and Saxena, (Pragati Prakashan)

- (iv) Liquid Crystals
Liquid Crystals[43.1], Thermotropic Liquid Crystals[43.2], Lyotropic Liquid Crystals[43.3], Applications [43.4]

Basic Reference Book for (iv) : Modern Physics by R.Murugesan and Kiruthiga Sivaprasath (S.Chand & Company Ltd.)

Plasma Physics

Introduction[19.1], Interaction of Particles[19.2], Concept of Collisions[19.3], Excitation of Atoms and Molecules[19.7], Dissociation of Molecules[19.7.1], Ionization of Atoms and Molecules[19.7.2], Recombination[19.7.3] and Photo Ionization[19.7.4], Excitation and Ionization by stages[19.7.5], Production of Plasma[19.11], Plasma Oscillations[19.13], Properties of Plasma[19.14], Plasma Radiation, Applications of Plasma(from reference book).

Basic Reference book : Fundamental of Solid State Physics by Saxena, Gupta, Saxena, (Pragati Prakashan)

Reference books:

1. Statistical Mechanics by Mayor and Mayor
2. Statistical Mechanics by Agrawal and Eisner
3. Introduction to Solid State Physics by Charles Kittel (7th edition), John Wiley & Sons
4. Solid State Physics by A.J.Dekker, Macmillan India Ltd.
5. Introduction to Solid by L.V.Azaroff, Tata McGraw Hill Pub.
6. Solid State Physics by Puri and Babbar, S.Chand Comp. Ltd.
7. Introduction to Plasma Physics by Chen
8. Superconductivity & Superconducting Materials by Narlikar and Ekbote.

PAPER P-603
(SOLID STATE ELECTRONICS)

- (i) Solid State Switching Circuits
Switch[21.1], Mechanical switch[21.3], Electronic switches[21.5], Advantages of electronic switches[21.6], Switching transistors[21.8], Switching action of Transistor[21.9], Multivibrators[21.10], Types of Multivibrators[21.11], Transistor Astable Multivibrators[21.12], Transistor Monostable Multivibrators[21.13], Transistor Bistable Multivibrators[21.14], Differentiating circuit[21.15], Integrating circuit[21.16], Clipping circuits[21.18], Application of Clippers[21.19], Clamping circuits[21.20], Basic idea of a clamper[21.21].

Basic Reference book for (i) : Principles of Electronics by V.K.Mehta & Rohit Mehta, (S.Chand & Company Ltd.)

- (ii) Thyristor and their applications
Introduction[4.1], Applications[4.2], Symbolic representation[4.3], Principle and operation of SCR[4.7], Two transistor analogy of SCR[4.8], Comparison between Thyristor and Transistor[4.10], Methods of triggering a thyristor[4.11], DIAC[4.14], TRIAC[4.15], Rectifier circuits using SCR[4.17<1,2 and 3>], Solid State Switching Circuits using Thyristor[4.18,<1,2,3and 4>], Choppers(in brief)[5.2].

- (iii) Thyristor Control Circuit
Temperature Control[7.2], Illumination Control using DIAC & TRIAC[7.3.2], Light active Turn off Circuit using DIAC, TRIAC & LDR[7.5], Off at Dark Circuit[7.6], Automatic Street Light Circuit Using LDR & SCR[7.7], Emergency light[7.8], Automatic Water Level Indicator[7.9], Automatic Battery Charger[7.10], Light Operated alarm[7.11], Burglar Alarm[7.12], Battery Operated Inverter[7.15].

Basic Reference Book for (ii) & (iii) : Industrial Electronics and Control by S.K.Bhattacharya & S.Chatterjee. (Tata McGraw Hill Pub).

- (iv) Integrated Circuits
Integrated Circuits[31.2], Advantages & Drawbacks of ICs[31.3 & 4], Scale of Integration[31.5], Classification of ICs by Structure[31.6], Comparison between different ICs[31.7], Classification of ICs by Function[31.8], Linear Integrated Circuits[31.9], Digital Integrated Circuits[31.10], Monolithic ICs are

Made[31.12], Fabrication of IC Components[31.14 & 15], Popular Applications of ICs[31.16], OP-AMP[31.18], OP-AMP Symbol[31.19], Ideal Operational Amplifier[31.20], OP-AMP Applications[31.24], Linear Amplifier[31.25], Adder[31.27], Subtractor[31.28], Integrator[31.29], Differentiator[31.30], Comparator[31.31].

(v) Transducer

Transducer[36.1], Classification of Transducers[36.2 & 3], Resistive Position Transducer[36.4], Resistive Pressure Transducer[36.5], Inductive Pressure Transducer[36.6], Capacitive Pressure Transducer[36.7], Self-generating Inductive Transducers[36.8], Linear Variable Differential Transformer(LVDT)[36.9], Piezoelectric Transducer[36.10], Strain Gauge[36.11], Temperature Transducer[36.12], Resistance temperature detectors[36.13], Thermistor[36.14], Thermocouples[36.15], Photoelectric Transducer[36.17], Various Types of Microphones[36.18].

Basic Reference Book for (iv) & (v) : Basic Electronics by B.L.Theraja, (S.Chand & Company Ltd.)

(vi) Digital Logic Modules

Combinational and Sequential logic circuits. Multiplexer and Demultiplexer, Memory element, RS flip-flop, Clocked RS flip-flop, D flip-flop, JK flip-flop, Clocked and 555 Timers (in brief)

Basic Reference Book : Digital Electronics by Malvino, McGraw Hill International Edition.

Reference Books:

1. Electronic Devices & Circuits by Allen Mottershad, Prentice-Hall of India Pvt. Ltd., Delhi
2. Electronic Devices & Circuits Theory by Boylestead & Nashelsky
3. Handbook of Electronics by Kumar & Gupta, Pragati Prakashan, Meerut, India
4. Principal of Electronics by Malvino, McGraw Hill International Editions
5. Modern Digital Electronics by R.P.Jain
6. A Text book of Digital Electronics by R.S.Sedha, S.Chand
7. Principles of Control Systems by Eugene Xavier and Joseph Cyril Babu, S.Chand

B.Sc. Semester – V

LIST OF EXPERIMENTS

1. Determine the "g" using Kater's Pendulum
2. Study of Damped Simple Harmonic Motion
3. Study of Fabry-Perot Etalon
4. Study of Lloyd's Mirror
5. Study of Double Refraction in Calcite Prism
6. Study of Babinet Compensator
7. Study of Absorption spectra of Iodine
8. Comparison of Capacities by Mixture Method
9. Determine the constant of Ballistic Galvanometer
10. Determine the Self Induction of coils using Owen's Bridge
11. Determine the Mutual Induction of coils using Ballistic Galvanometer
12. Study of Transformer's coils using Bridge rectifier
13. Determine e/m using Magnetron/Helical Method
14. Study of h-Parameter of CE-Transistor using PCB
15. Study of Single stage Transformer coupled Amplifier
16. Study of Complementary-Symmetry Power Amplifier
17. Study of Series Voltage Regulator using Transistor
18. Electronic voltmeter using FET
19. Study of Hartley/RC phase shift Oscillator using Transistors
20. Study of Hysteresis loop of Ferromagnetic Material
21. Study of Hall Effect
22. Measurement of frequency and phase using CRO

- ***A minimum of 75% experiments shall be done by each student.***

B.Sc. Semester – VI

LIST OF EXPERIMENTS

1. Study of Resonance Pendulum
2. Determine the Young's Modulus by Koeing Method
3. Determine the Elastic constants using Flat Spiral Spring
4. Study of Platinum Resistance Thermometer
5. Study of Searle's Goniometer
6. Study of Edser-Butler Plate
7. Resolving power of Diffraction Grating
8. Study of the Output Wave form Clipping and Clamping circuit
9. Study of Astable Multivibrator
10. Study of Planck's constant using Photocell
11. Photo Conductivity of Selenium cell
12. Characteristics of SCR using PCB
13. Study of UJT as Relaxation Oscillator
14. Study of RS, D & JK Flip-flop
15. Study of OP-AMP using IC 741.(inverter, noninverter, adder and subtractor)
16. Study of IC 555 Timer circuit using PCB
17. Study of Multiplexer(4-1 line) and Demultiplexer(1-4 line) using IC 74153 and 74155 respectively
18. Study of Encoder & Decoder Circuit
19. Study of 4-bit Ripple Counter
20. Study of Modulation and Demodulation using IC 723
21. Study of Temperature ON-OFF Controller with Thermistor
22. Study of Linear Variable Differential Transformer(LVDT)
Trainer
23. Study of Lamp Dimmer Circuit using DIAC and TRIAC

- ***A minimum of 75% experiments shall be done by each student.***

Basic Reference:

1. Practical Physics by C.L.Arora (S.Chand)
2. Advanced Practical Physics by Chauhan & Singh. (Pragati Prakashan)
3. B.Saraf et al-Physics through experiments Vol.I & II
4. Electronic Laboratory Primer by Poorna Chandra & Sasikala, (S.Chand)
5. Practical Physics by Chattopadhyay, Rakshit & Saha.

Useful CD Rom for e-learning:

1. Hyper Physics
2. Encyclopedia of Science (D.K. Multimedia)
3. Physics Encyclopedia
4. Virtual Physics Junior (Original PC CD Rom)
5. Encyclopedia Britannica-2008

Useful Website for e-learning:

1. www.wikipedia.org
2. www.physic.about.com
3. www.physic.org
4. www.physicsclassroom.com
5. www.howstuffworks.com
6. www.colorado.edu/physics/2000
7. www.idrs.org/physic.com
8. www.physlink.com