

SHRI GOVIND GURU UNIVERSITY, GODHRA

B.Sc. PHYSICS- SEMESTER-V

MAJOR COURSE - 1 (THEORY)

BS23MJ5PH1(IKS –PHYSICS)

Total Credit - 04

Lectures/Week

UNIT	TOPICS	CREDIT	HOURS
Unit-I	SOLID STATE PHYSICS 1. Theory of Dielectrics • Polarization • Dielectric Constant • Local Electric Field • Dielectric Polarizability • Sources of Polarizability A) Theory of Electronic Polarizability and Optical Absorption b) Ionic Polarization C) Polarization from Dipole Orientation 10.6 Dielectric Losses • Applications to Optical Phonon Modes in Ionic Crystals a) The Longitudinal Optical Mode b) The Transverse Optical Mode Dielectric Losses • The Interaction of Electromagnetic Waves with Optical Modes • Application to the Motion of Electrons in Polar Crystals	1	15
Unit-II	OPTICS 1 Interference • Conditions for Interference • Techniques of Obtaining Interference • Fresnel Biprism • Experimental Arrangement • Determination of Wavelength of Light • c) Interference Fringes with White Light • Lateral Displacement of Fringes • Fresnel's Double Mirror 2. Interference in Thin Films • Michelson's Interferometer • Principle	1	15

	• Construction • Working • Circular Fringes • Localized Fringes • White Light Fringes • Visibility of Fringes 3 .Applications of Michelson Interferometer • Measurement of Wavelength • Determination of the Difference in the Wavelength of Two Waves • Thickness of A Thin Transparent Sheet • Determination of The Refractive Index of Gases 4.Fabry-Perot Interferometer and Etalon • Formation of Fringes • Determination of Wavelength • Measurement of Difference in Wavelength		
Unit-III	DIGITAL ELECTRONICS Numbers Systems and Codes • Why Binary Numbers are Used • Binary-To-Decimal Conversion • Decimal-To-Binary Conversion • Octal Numbers • Hexadecimal Numbers • The ASCII Code • The EXCESS-3 Code • The GRAY Code Flip-Flops • RS Flip-Flop • Clocked RS Flip-Flop • D Flip-Flop • JK Flip-Flop	1	15
Unit-IV	ELECTRONICS □ Transistor Oscillators and Multivibrators • Introduction • Effect of Positive Feedback • Requirements for Oscillation • The Phase-Shift Oscillator	1	15

	● Another version of the Phase-Shift Oscillator ● Wien Bridge Oscillator ● Resonant Circuit Oscillators ● The Maximum Frequency of Oscillation of a Transistor ● The Transistor as A Switch ● Switching Times in a Transistor ● Multivibrators		
References: Text Book: 1. Elements of Solid State Physics by J. P. Srivastava, Prentie-Hall of India Private Limited, New Delhi 2. A Textbook of OPTICS by Dr. N. Subrahmanyam, Brijlal and Dr. M. N. Avadhanulu, S. Chand & Compan Pvt. Ltd., New Delhi.(Revised Edition) 3. Digital Principles and Applications by Albert Paul Malvino and Donald P. Leach, Fourth Edition, McGRAW-HILL Book Company 4. Electronic Devices and Circuits- An Introduction by Allen Mottershead, Prentice- Hall of India Pvt. Ltd. (Eastern Economic Edition) Reference Book: 5. The Knowledge Book: Introduction to Solid State Physics, C. Kittel, (Eight Edition) John Wiley and Sons.			

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.Sc. PHYSICS- SEMESTER-V
MAJOR COURSE - 2 (THEORY)
BS23MJ5PH2(IKS –PHYSICS)

Total Credit - 04

04 Lectures/Week

UNIT	TOPICS	CREDIT	HOURS
Unit-I	INFLUENCE OF INDIAN THOUGHT ON MODERN MATHEMATICS AND THEORETICAL PHYSICS 1. Mathematics and Theoretical Physics • Numerical System and Algebra • The Decimal Place-Value Notation and the Use of Zero • Advanced Mathematical Concepts and Techniques • Concepts in Theoretical Physics • The Brahmanda and the Big Band Theory • The Hierarchical and Combinatorial Nature of Matter • Influence on Modern Mathematics and Theoretical Physics • The impact of the Indian Numerical System • The influence of Indian Philosophical and Cosmological Perspectives • Towards a Pluralistic and Inclusive Approach to Science Numerical Techniques • Curve Fitting: Introduction • Least squares method • Fitting a straight line • Fitting a Parabola Fitting a Curve of the form $y = ax^b$ • Fitting an exponential curve • Integration: • Integration by Trapezoidal Rule • Simpson's (1/3) rule • Eigenvalue and its problems	1	15

	3. Differential Equations • Some partial differential equations in physics • The method of Separation of variables • Separation of Helmholtz Equation in Cartesian Coordinates • Separation of Helmholtz Equation in Spherical Polar Coordinates • Separation of Helmholtz Equation in Cylindrical Coordinates • Laplace's Equation in Various Coordinates • Choice of Coordinate System and Separability of a partial Differential Equation		
Unit-II	ANCIENT INDIAN KNOWLEDGE SYSTEM OF CLASSICAL MECHANICS 1. Mechanical Force and Newton's Laws of Motion 11.1 Motion 11.2 The causes of Motion 11.3 Velocity 11.4 Newton's Equations of Motion (11.4.1 to 11.4.3) 12.1 Force 12.2 Laws of Motion (12.2.1 to 12.2.4) 2. Motion of a Rigid Body and Variational Principle 10.1 Introduction, Euler's Theorem 10.2 Angular Momentum and Kinetic Energy, 10.3 The Inertia Tensor 10.4 Euler's Equations of Motion 10.5 Torque Free Motion 10.6 Euler's Angles 10.7 Motion of a Symmetric Top 11.1 Introduction, Configuration Space 11.2 Some Techniques of Calculus of Variation, The δ-Notation 11.3 Applications of the Variational Principle	1	15
Unit-III	Quantum Physics and Consciousness 8.1 Quantum Entanglement and Non-Locality (8.1.1 & 8.1.2) 8.2 Consciousness and the Physical World (8.2.1 & 8.2.2) 8.3 Influence on Contemporary Quantum Physics and Consciousness Studies (8.3.1 to 8.3.3) 2. Exactly Soluble Eigen Value Problems Introduction A. The Simple Harmonic Oscillator 4.1 The Schrödinger Equation and Energy Eigenvalues 4.2 The Energy Eigen Functions 4.3 Properties of Stationary States 4.4 The Abstract Operator Method 4.5 Coherent States B. Angular Momentum and Parity 4.6 The Angular Momentum Operators	1	15

	4.7 The Eigenvalue Equation for L^2 , Separation of Variables 4.8 Admissibility Conditions on Solutions, Eigenvalues 4.9 The Eigenfunctions: Spherical Harmonics 4.10 Physical Interpretation 4.11 Parity 4.12 Angular Momentum in Stationary States of Systems with Spherical Symmetry		
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Unit-IV	VEDIC KNOWLEDGE SYSTEM OF NUCLEAR PHYSICS 1. Electron, Proton and Neutron 11.1 Varuna 11.2 Ahuramazda 11.3 Mitra 11.4 Rise and Fall of Mithraism 11.5 Aryama 2. The Nucleus I: Constituents of the Nucleus and Some of Their Properties 4.I.1 Introduction 4.I.2 Rutherford Scattering and Estimation of the Nuclear Size 4.I.3 Measurement of Nuclear Radius 4.I.4 Constituents of the Nucleus and Their Properties 4.I.5 Nuclear Spin, Moments and Statistics II: Alpha Rays: Spectra and Decay 4.II.1 Range of α -particles 4.II.2 Disintegration Energy of Spontaneous α -Decay 4.II.3 Alpha Decay Paradox - Barrier Penetration	1	15
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References

Mathematical Physics by B. D. Gupta, 2nd revised Edition, Vikas Publishing House Pvt. Ltd.

Text Book:

1. Ancient Indian Knowledge System of Physics by Dr. Anil Tiwari, Yajur Publication House, Mumbai, Maharashtra.
2. Mathematical Methods in the Physical Sciences by Mary L. Boad, 2nd edition, John Wiley & Sons.
3. Mathematical Physics by P.K. Chattopadhyay, New Age International Publishers (2006)
4. Prachin Bharatiya Gyan Parampara mein Bhotikshastra (Hindi) by Dr. Narayan Gopal Dongre and Dr. Shankar Gopal Nene, National Book Trust, New Delhi, India
5. Introduction to Classical Mechanics by R. G. Takawale and P. S. Puranik, Tata McGraw-Hill Publishing Co. Ltd

6. Ancient Indian Knowledge System of Physics by Dr. Anil Tiwari, Yajur Publication House, Mumbai, Maharashtra.
7. A Text Book of Quantum Mechanics by P. M. Mathews and K. Venkatesan, Tata McGraw-Hill Publishing Co. Ltd.
8. Vedic Physics by Raja Ram Mohan Roy, Motilal Banarsidass
9. Nuclear Physics- An Introduction by S. B. Patel, New Age International Publishers, New Delhi.

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.Sc. PHYSICS- SEMESTER-V
MAJOR COURSE - (PRACTICALS)
BS23MJ5PH1(IKS –PHYSICS)

Total Credit - 04

LIST OF PRACTICALS

1. Acceleration due to gravity by Kater's pendulum (fixed knife edges).
2. Hall Effect
3. Fabry-Perot etalon. Determination of the thickness of air film and wavelength of light using spectrometer.
4. Use of Excel for data analysis and graph plotting.
5. Hartley Oscillator. Measurement of frequency by C.R.O. (Transisterised).
6. Colpitts Oscillator.
7. Series Resonance. To find the band width and Q value of a coil.
8. Study of voltage regulated circuit using IC7805
9. Gonio Meter
10. Michelson interferometer. To determine the wavelength of monochromatic light.
11. Michelson interferometer - To determine the thickness "d" .
12. Fresnel's Biprism
13. An optical method of determining dielectric constant, dipole moment and polarizability of a polar liquid using Hollow prism

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.Sc. PHYSICS- SEMESTER-V
MINOR COURSE - 2 (THEORY)
BS23MN5PH1

Total Credit - 02

04 Lectures/Week

UNIT	TOPICS	CREDIT	HOURS
Unit-I	CLASSICAL MECHANICS 1. Central Force 5.1 Equivalent One-Body Problem 5.2 Motion in a Central Force Field 5.3 General Features of the Motion 5.4 Motion in an Inverse-Square Law Force Field 2. Oscillations and Collisions 6.1 Simple Harmonic Oscillator 6.2 Damped Harmonic Oscillator 7.1 Elastic and Inelastic Scattering 7.2 Laboratory and Centre of Mass System 7.3 Kinematics of Elastic Scattering in Lab. System	1	15
Unit-II	OPTICS Resolving Power of Optical Instrument 19.1 Resolving power 19.3 Limit of resolution of eye 19.5 Resolving power of optical instruments 19.6 Rayleigh's criterion of resolution 19.7 Resolving power of a telescope 19.7.1 Relation between magnifying power and resolving power of telescope 19.11 Resolving power of a prism 19.12 Resolving power of a plane transmission grating	1	15

Unit-III	SOLID STATE PHYSICS 1. Crystal Binding Crystal of Inert Gases 2. Van der Waals - London Interaction Repulsive Interaction Equilibrium Lattice Constant Cohesive Energy Ionic Crystals Electrostatic of Madelung Energy Evaluation of the Madelung Constant Covalent Crystals Metals Hydrogen Bonds	0.5	7.5
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Unit-I V	ELECTRONICS 1. Solid State Electronic Devices 6.1 Zener Diodes 6.2 Zener Diodes Specification 6.3 The Voltage Regulator Circuit 6.6 Zener diode Breakdown Mechanism 21.2 Basic Construction of the JFET 21.3 Characteristics curves of the JFET 21.7 Characteristic Parameters of the JFET 28.1 The Silicon Controlled Rectifier 28.5 The Uni Junction Transistor	0.5	7.5
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References:

1. Text Book: Classical Mechanics by R. G. Takewale & P. S. Puranik, Tata McGraw Hill.
2. A Textbook of Optics by Dr. N. Subrahmanyam, Brijlal, Dr. M.N. Avadhanulu (Revised Edition), S. Chand Publication.
3. Introduction to Solid State Physics by C. Kittel, 8th Edition (Chapter-3)
4. Electronic Devices and Circuits by Allen Mottershead. PHI.

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.Sc. PHYSICS- SEMESTER-V
MINOR COURSE (Practical)
BS23MN5PH1

Total Credit – 04

LIST OF PRACTICALS

1. Resolving Power of Prism
2. Resolving Power of Grating
3. Resolving Power of Telescope
4. Wavelength of light by Adser's A - Pattern
5. Wavelength of Prominent Spectral Line by Diffraction Grating (Mercury -Spectrum)
6. Resonance Pendulum
7. Characteristics of SCR
8. Zener Diode Characteristics
9. UJT Characteristics
10. FET Characteristic

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.ScPHYSICS - SEMESTER-V

SKILL ENHANCEMENT COURSE
Nanoscience and Nanotechnology

Total Credit – 02

UNIT	TOPICS	CREDIT	HOURS
Unit-I	THE BIG WORLD OF NANOMATERIALS AND ITS PROPERTIES 1.1 History and Scope 1.2 Can Small Things Make a Big Difference? 1.3 Classification of Nanostructured Materials 1.4 Fascinating Nanostructures 1.5 Applications of Nanomaterials 1.6 Nature: The Best Nanotechnologist 2.1 Microstructure and Defects in Nanocrystalline Materials	1	15
Unit-II	TOOLS TO CHARACTERIZE NANOMATERIALS 5.1 X-Ray Diffraction (XRD) 5.2 Small Angle X-Ray Scattering (SAXS) 5.3 Scanning Electron Microscopy (SEM) 5.4 Transmission Electron Microscopy (TEM) 5.5 Atomic Force Microscopy 5.6 Scanning Tunneling Microscope (STM) 5.7 Field Ion Microscope (FIM)	1	15

References:

Text Book: Text Book of Nanoscience and Nanotechnology by B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath & James Murday, Springer Universities Press.

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.ScPHYSICS - SEMESTER-VI
MAJOR COURSE-1 (Theory) PHYSICS PAPER 1

TOTAL Credit-4

Lectures /Week

UNIT	TOPICS	CREDIT	HOURS
Unit-I	SOLID STATE PHYSICS 1. Free Electron Fermi Gas 6.1 Introduction 6.2 Energy levels in one dimension 6.3 Effect of temperature on the Fermi-Dirac distribution 6.4 Free electron gas in three dimensions and density of states 6.5 Heat capacity of the electron gas and experimental heat capacity of metals 6.6 Electrical conductivity and ohm's law 6.7 Experimental electrical resistivity of metals 6.8 Thermal conductivity of metals 6.9 Ratio of thermal to electrical conductivity.	1	15
Unit-II	ATOMIC PHYSICS 1.4 Resume of atomic models 1.4.1 Spectrum of Hydrogen atom and spectral series 1.4.2 Observation of Hydrogen spectrum 1.5 Failure of electromagnetic theory 1.6 Bohr's theory and spectrum of Hydrogen atom 1.11.2 Franck-Hertz Experiment 3.7 Stern-Gerlach Experiment 3.8 Fine structure of Hydrogen lines 3.10 Positronium 6.1 Different series in Alkali spectra 6.10 Alkali-like spectra 6.11 Atoms of Alkaline elements 6.12 Spectra of Alkaline earths, Related Numericals.	1	15

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.ScPHYSICS - SEMESTER-VI
MAJOR COURSE-1 (Theory) PHYSICS PAPER 1

Unit-III	ASTROPHYSICS Stars and Stellar evolution 2.2 Astronomical distance 3.1 The birth of a star 3.2 The Hertzsprung-Russell diagram 3.3 Evolution of massive stars post-main sequence 2. Atmosphere of Stars 6.1 Introduction 6.2 Some important definitions 6.3 The Equation of Transfer 6.4 The solution of the equation of transfer 6.5 Processes of absorption in stellar atmospheres 6.6 Continuous absorption by the Negative hydrogen Ion in cooler stars 6.7 Analysis of spectral line broadening 6.8 The curve of Growth 6.9 Stellar Temperatures 6.10 The chemical composition of Stars	1	15
Unit-IV	STATISTICAL MECHANICS 7.1 Density matrix 7.2 Liouville's theorem in Quantum Statistical Mechanics 7.3 Condition for Statistical equilibrium 7.4 Ensemble in Quantum Mechanics, Problems 8.1 Symmetry of wave functions 8.2 The Quantum Distribution functions 8.3 The Boltzmann limit of Boson and Fermions Gases 8.4 Evaluation of the Partition function 8.5 Partition function for Diatomic Molecules (a) translation partition function (b) rotational partition function (c) vibration partition function (d) electronic partition function 8.6 Equation of state for an Ideal gas 8.7 The quantum mechanical Paramagnetic susceptibility, problems	1	15

References:

1. Text Book: Introduction to Solid State Physics by C. Kittel, (Eight Edition) John Wiley and Sons. Article Nos.: Chapters 6
2. Reference book: 1. Elements of Solid State Physics by J. P. Srivastava, Prentice-Hall of India Private Limited, New Delhi
3. Molecular structure and Spectroscopy by G. Aruldas, Prentice-Hall of India Pvt. Ltd.
4. Elements of Spectroscopy by S. L. Gupta, V. Kumar, R. C. Sharma, Pragati Prakashan
5. Physics Astrophysics AQA A-Level Year 2 By Chris Bishop. Harper Collins Publishers. (From Chap 2 & 3)
6. An introduction to Astropysics by Baidyanath Basu, Tanuka Chattopadhyay and Sudhindra Nath Biswas, PHI learning pvt. Ltd. Chapter 6: Article Nos: 6.1 to 6.10
7. The Fundamentals of Stellar Astrophysics by George W. Collins, II, W H Freeman & Co.
8. Fundamentals of Statistical Mechanics by B. B. Laud, New Age International Publishers
9. Statistical Mechanics - Theory and Application by S K Sinha, TMH Publishing Company Limited New Delhi:
10. Statistical Mechanics - An introduction by Evelyn Guha, Narosa publication.
11. Statistical Mechanics by R.K. Patharia, Pergamon Press
12. Statistical Mechanics by B.K. Agarwal & Melvin Eisner, Wiley Eastern

SHRI GOVIND GURU UNIVERSITY, GODHRA

B.ScPHYSICS - SEMESTER-VI

MAJOR COURSE-2 (Theory) PHYSICS PAPER 2)

(Ancient Indian Knowledge System of Physics)

Total Credit - 04

Lectures/Week

UNIT	TOPICS	CREDI T	HOURS
Unit-I	PLASMA PHYSICS THROUGH THE LENS OF ANCIENT INDIAN KNOWLEDGE SYSTEMS 1. 2. Return of the Elements 8.1 Agni(Fire) 8.2 Apah (Water) 8.3 Rudra 8.4 Maruta (Wind) 8.5 Saraswti Motion of Charged Particles in Magnetic & Electric Field: 2.1 Microscopic & Macroscopic Description 2.2 Maxwell's Equations & Charge Conversation 2.3 Motion of a Charged Particle in Electric & Magnetic Fields 2.3.1 Uniform Magnetic Field 2.3.2 Constant Electric & Magnetic Fields 2.3.3 Rotating Plasmas 2.4 Uniform Magnetic Field & Oscillating Electric Field 2.5 Drift Velocity in a Gravitational Field 2.6 Magnetic Field Varying in Space &Time : Adiabatic Invariance of the Magnetic Moment 2.7 Inhomogeneous Magnetic Field : Gradient Drift & Curvature Drift 2.8 Peculiarity of Drift Motions 2.9 Converging Magnetic Field: Magnetic Mirror 2.9.1 Magnetic Trap & Double - Mirror 2.9.2 Loss Cone & Mirror Ratio 2.9.3 Van Allen Radiation Belt 2.9.4 Coefficient of Reflection of Particles 2.10Longitudinal Adiabatic Invariant	1	15

	2.11 Periodic Magnetic Field: Gyro – Relaxation Effect 2.12 Motion of Magnetic Lines of Force		
Unit-II	• FOUNDATIONS OF ELECTROMAGNETIC THEORY IN ANCIENT INDIAN SCIENTIFIC THOUGHT Faraday's Law and Energy Transfer Concepts Electromagnetic induction Flux changes, Lenz's law Fire altar rituals and energy transformations (symbolic comparisons) • Ancient Indian knowledge of fire, heat, and processes (Agni concept) Ancient Indian Philosophy and Modern Science by Pramod Kumar Agrawal 2 ELECTROMAGNETISM Electromagnetic Induction 5.1 Electromotive Force 5.2 Faraday's Law of Electromagnetic Induction 5.3 Induction Law for Moving Circuits 5.4 Integral and Differential Form of Faraday's Law 5.5 Self - Inductance and Mutual Inductance 5.6 Energy in Magnetic Fields 5.7 Hysteresis 5.8 Maxwell's Equations 5.9 Decay of Free Charge 5.10 Potentials of Electromagnetic Field 5.11 More About the Lorentz Gauge Condition 5.12 Field Energy and Field Momentum	1	15
Unit-III	"IKS-BASED INTERPRETATIONS OF MATTER, ENERGY, AND NUCLEAR PHENOMENA" 10. Matter and Energy 10.1: Savita 10.2 : Pusa 10.3: Lord of the animals 1. The Liquid Drop Model of Nucleus 5.1 Introduction 5.2 Binding Energies of Nuclei: Plot of B/A Against A 5.3 Weizsacher's Semi - Empirical Mass Formula 5.7 Nucleon Emission 2. Nuclear Energy 6.1 Introduction 6.2 Neutron Induced Fission 6.3 Asymmetrical Fission - Mass Yield 6.4 Emission of Delayed Neutrons by Fission Fragments 6.5 Energy Released in the Fission of ^{235}U	1	15

	6.6 Fission of Lighter Nuclei 6.7 Fission of Chain Reaction 6.8 Neutron Cycle in a Thermal Nuclear Reactor 6.9 Nuclear Reactors		
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Unit-IV	"IKS-BASED APPROACHES TO UNDERSTANDING ELECTRONIC SYSTEMS AND TECHNOLOGIES" 1.General amplifier characteristics (Distortion) 7.0 Introduction 7.1 Concept of amplification 7.2 Amplifier notations 7.3 Current gain 7.4 Voltage gain 7.5 Power gain 7.6 Amplifier input resistance 7.7 Amplifier output resistance 7.8 Maximum power transfer 7.9 Conversion efficiency 7.10 Conversion efficiency 7.11 Harmonic distortion 7.12 Three point method of calculating harmonic distortion 7.13 Five point method of calculating harmonic distortion 7.14 Oscilloscope display of an amplifier dynamic transfer curve 2 General amplifier characteristics (Decibels) 8.0 Introduction 8.1 Decibels 8.2 Other equations for decibel computation 8.3 Zero dB reference level 8.4 Use of voltmeter as dB indicator 8.5 Voltmeter range correction factor 8.6 Impedance correction factor	1	15
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References:

1. Vedic Physics by Raja Ram Mohan Roy Motilal Banarasidass
2. Text Book: Elements of Plasma Physics by S. N. Goswami, New Central book Agency
3. Electromagnetics by B. B. Laud (3rd Edition), New Age International Publishers
4. Vedic Physics by Raja Ram Mohan Roy Motilal Banarasidass
5. Nuclear Physics - An Introduction by S. B. Patel, New Age International.
6. Electronic Devices and circuits - An Introduction by Allen Mottershead, Printice- Hall of India Private Limited
7. Reference Books :7. Introduction to Nuclear Physics by H. Enge, Addison Wiley
8. Nuclear Physics by D. C. Tayal, Himalaya Publisher
9. Nuclear Physics by Irvin Kaplan
10. Modern Physics by Kenneth Krane, John Wiley and Sons

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.ScPHYSICS - SEMESTER-VI
MAJOR COURSE- (PRACTICAL)

Total Credit - 04

LIST OF PRACTICALS

1. Acceleration due to gravity by Kater's pendulum (variable knife edges).
2. Determination of dead time of G.M. tube.
3. Comparison of relative intensities of different sources using G.M. Tube
- 4 Use of Excel for data analysis.
5. Absorption spectrum of Iodine molecule.
6. Refractive index of liquid by total internal reflection.
7. To determine the charge on electron by Millikan's experiment.
8. Determination of capacity of Scherreing Bridge
9. A.C. Circuit analysis by C.R.O. Measurement of frequency and phase difference
10. 741 IC-OPAMP
11. Parallel resonance. To find the band width and Q value of a coil
12. Study of Hysterisis using C.R.O.

Reference Books:

1. Practical Physics by S.L.Gupta& V kumar
2. Advanced Practical Physics I & II by S.P.Singh, Pragati prakashan vol. 1 & 2.
3. B.Sc. Practical Physics by C.L.Arora, S Chand.
4. An advanced course in Practical Physics by D. Chattopadhyay &P.C.Rakshit, New central Book Agency (P), Kolka

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.Sc. PHYSICS- SEMESTER-VI
MINOR COURSE (THEORY)
BS23MN5PH1

Total Credit 02

02 Lectures/Week

Unit 1	QUANTUM MECHANICS The Schrodinger equation and stationary state • A free particle in one dimension • Generalization to three dimensions • The operator correspondence and the Schrodinger equation for a particle subject to forces • Normalization and probability interpretation • Non-Normalizable wave functions and box normalization • Conservation of probability • Expectation values, Ehrenfest's theorem • Admissibility conditions on the wave function • Stationary states: The time-independent Schrodinger equation • A particle in a square well potential	1	15
UNIT 2	ELECTRONICS 1. Basic Characteristics of the Transistor • Basic transistor amplifier • Two diode analogy for a transistor • Transistor input characteristics • Transistor collector characteristics • Collector cut-off current, I_{CEO} • Forward current transfer ratio, CE • Permissible operating area of a transistor, CE • The basic common- base amplifier • Forward current transfer ratio, CB • Relation between α and β • Transistor construction • Identifying the transistor lead 2. Hybrid Equivalent Circuits for a Transistor • General Black Box Theory • Hybrid parameters • Obtaining the Hybrid parameters	1	15

References:

1.Quantum Mechanics by P. M. Mathews & K. Venkatesan,
Tata McGraw Hill

2.Electronics Devices and Circuits by Allen Mottershed. PHI Publication

SHRI GOVIND GURU UNIVERSITY, GODHRA
B.Sc. PHYSICS- SEMESTER-VI
MINOR COURSE - 2 (Practical)

Total Credit -02

List of practical

1. Characteristics of Transistor
2. h-parameters of CE Transistor
3. e/m by Thomson's method
4. Solution of Problems related to Eigen function, Eigen values, Normalization and Expectation values from Quantum Mechanics
5. Use of EXCEL for data analysis
6. To identify the Transistor Leads with the help of Multimeter