

## **SEMESTER I & II**

### **Core Practical I**

**Instructional Hrs . : 90**

**Sub. Code: 17PHUCP01**

**Max. Marks: CIA - 40; ESE – 60**

**Credits: 3**

**Any SIXTEEN of the following:**

1. Young's Modulus – Non Uniform Bending – Pin and Microscope.
2. Young's Modulus – Uniform Bending – Optic Lever.
3. Young's Modulus – Cantilever – Static Method.
4. Young's Modulus – Cantilever – Dynamic Method.
5. Rigidity Modulus – Static Torsion.
6. Compound Pendulum – Acceleration Due to Gravity.
7. Surface Tension by Capillary Rise method
8. Coefficient of Thermal Conductivity – Lee's Disc.
9. Refractive Index of a Liquid – Hollow Prism – Spectrometer.
10. Refractive Index of the Material of a Solid Prism - Spectrometer.
11. Refractive Index of the Material of a Solid Prism i-d – Curve - Spectrometer.
12. Wavelength of Mercury Spectral Lines – Grating – Normal Incidence – Spectrometer.
13. Wavelength of Spectral Lines – Grating – Minimum Deviation – Spectrometer.
14. Calibration of Low Range Voltmeter — Potentiometer.
15. Calibration of Low Range Ammeter– Potentiometer.
16. Specific Resistance – Potentiometer.
17. Moment of a Magnet – Tan C position.
18. Characteristics of Junction Diode.
19. Sonometer – Frequency of A.C mains.
20. Temperature Coefficient of Resistance of a Thermistor – Post Office Box.

**B.Sc., Physics – 2017-2018 onwards**

## SEMESTER III& IV

### Core Practicals II

Instructional Hrs. : 60

Sub. Code: 16PHUCPO2

Max. Marks: CIA-40; ESE-60

Credits: 3

Any SIXTEEN of the Following:

1. Young's Modulus – Uniform Bending – Koenig's Method.
2. Young's Modulus – Non Uniform Bending – Koenig's Method.
3. Dispersive Power of Grating – Spectrometer.
4. Cauchy's Constants and Dispersive Power of a Prism – Spectrometer.
5.  $\mu$  of a Prism – Stoke's Formula.
6.  $\mu$  of a Lens – Newton's Rings.
7. Thickness of Insulation – Air Wedge.
8. Calibration of High Range Voltmeter – Potentiometer.
9. Temperature Coefficient Of Resistance – Carey Foster's Bridge.
10. Kater's Pendulum – Determination of Acceleration due to Gravity 'g'.
11. Spectrometer – i – i' Curve.
12. Characteristics of Zener Diode.
13. Figure of Merit of B.G.
14. Comparison of Mutual Inductance – B.G.
15. Transistor Characteristics – Common Emitter Configuration.
16. Transistor Characteristics – Common Base Configuration.
17. Verification of Truth Table of Logic Gates – AND, OR, NOT, NAND, NOR and EX-OR
18. Field Along The Axis of The Coil – Vibration of Magnetometer – Determination of Field.
19. Hysterisis – B.H. Curve.
20. Melting Point of Wax – Thermistor – Post Office Box

**B.Sc., Physics – 2016-2017 onwards**

**SEMESTER V & VI**

**Core Practical III**

**Instructional Hrs . : 90**

**Sub. Code: 15PHUCP03**

**Max. Marks: CIA - 40; ESE – 60**

**Credits: 3**

**Any SIXTEEN of the following**

1. Hartmann's Interpolation Formula – Spectrometer.
2. Solar Spectrum – Wavelength Determination – Spectrometer.
3. Velocity and Compressibility of the given Liquids – Ultrasonic Interferometer.
4. Determination of Thermo EMF – Potentiometer.
5. High Resistance by Leakage – BG.
6. High Resistance by Charging – BG.
7. Characteristics of LED & Photodiode.
8. Characteristics of FET.
9. Characteristics of UJT.
10. UJT Relaxation Oscillator.
11. Regulated Low Range Power Supply.
12. Voltage Doubler.
13. RC Coupled Amplifier- Single Stage.
14. FET Amplifier.
15. Emitter Follower.
16. Hartley Oscillator.
17. Colpit's Oscillator.
18. Astable Multivibrator.
19. MonostableMultivibrator.
20. BistableMultivibrator.

## SEMESTER V & VI

### Core Practical IV

**Instructional Hrs. : 60**

**Sub. Code: 15PHUCPO4**

**Max. Marks: CIA-40; ESE-60**

**Credits: 3**

#### **Any Twelve of the Following:**

1. Integrator and Differentiator- Discret Components.
2. Adder and Subtractor – Operational Amplifier.
3. Integrator and Differentiator – Operational Amplifier.
4. 4 bit Binary Adder
5. Amplitude Modulation and Demodulation.
6. Study of Logic Gates (AND, OR, NOT) Discrete Components.
7. Study of Logic Gates (NAND, NOR) – Discrete Components.
8. De-Morgan's Theorem – Verifications – Solving Problems Using Boolean Algebra.
9. Half and Full Adder – Verification of Truth Table.
10. Half and Full Subtractor – Verification of Truth Table.
11. NAND and NOR Gate as Universal Building Blocks.
12. S-R Flip Flop.
13. BCD to Seven Segment Display.
14. 8085 ALP for 8 Bit Addition, Subtraction.
15. 8085 ALP for one's Compliment Masking off Most Significant 4 Bits and Setting Bits
16. 8085 ALP for Two's Compliment Addition, Subtraction.
17. 8085 ALP for 8 Bit Multiplication and Division.
18. 8085 ALP for Multiplication, Addition and Sum of N Elements.

## SEMESTER V

### Elective I

#### PROGRAMMING IN 'C' AND 'C++'

**Instructional Hrs. : 60**

**Sub. Code: 15PHUE501**

**Max. Marks: CIA-25; ESE-75**

**Credits: 4**

**Objective:** The general purpose, block structured, procedural computer programming language 'C' is compatible to a number of operating systems. 'C' as an intermediate language has greatly influenced other popular language like java, java script, unix etc... Including C++, originally designed as extension to 'C'.

#### UNIT I

**12 Hrs.**

**Over View of C: Constants, Variables and Data Types:** Features of C Language – Keywords and Identifiers – Constants, Variables – Data Types – Declaration of Variables – Assigning Values to Variables.

**Operators and Expression:** Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bit-Wise Operators – Special Operators – *Arithmetic Expressions- Evaluation of Expression.*

**Managing Input and Output Operations:** Reading a Character – Writing a Character – Formatted Input – Formatted Output.

#### UNIT II

**12 Hrs.**

**Control Structures in C:** Decision Making - Branching - and Looping – If, If-Else, Switch Statement - Conditional Operator - Go To Statement – The WHILE, The DO and the FOR Statements.

**Object Oriented Programming With C++:** *Basic Concepts of OOP - Structure of C++ Program.*

**Tokens, Expressions and Control Structures:** Basic Data Types – Symbolic Constants – Operators in C++ - Manipulators – Type Casting – Expressions and Their Types.

**Functions in C++:** Functions Prototyping – Inline Functions – Default Arguments – Const Arguments.

### UNIT III

**12 Hrs.**

**Classes and Objects:** Specifying a Class – Defining Member Functions – Nesting of Member Functions – Private Member Functions – Arrays Within a Class – *Static Data Members* – *Static Member Functions* – Array of Objects – Objects as Function Arguments – Friend Functions – Returning objects – Const Member Functions – Pointers to Members.

### UNIT IV

**12 Hrs.**

**Constructors and Destructors:** Constructors – Parameterized Constructors – Copy Constructor – Dynamic Constructor – Destructors.

**Inheritance:** Single Inheritance – Multiple Inheritance – Hierarchical Inheritance – Multi Level Inheritance – *Hybrid Inheritance*.

### UNIT V

**12 Hrs.**

#### **Polymorphism:**

Operator Overloading – Function Overloading – Overloading Unary and Binary Operator – This Pointer – Static and Dynamic Binding – Virtual Functions.

#### **Working With Files:**

Classes for File Stream Operations – Opening and Closing a File – *Error Handling During File Operations*.

**Note:** *Italics* denotes Self study Topics

### TEXT BOOKS

1. **Balagurusamy E.**, “*Programming In ANSI C*”, Tata McGraw Hill, New Delhi, 3<sup>rd</sup> Edition, 2005.
2. **Balagurusamy E.**, “*Object – Oriented Programming With C++*”, Tata McGraw Hill, New Delhi, 3<sup>rd</sup> Edition, 2008.

## **REFERENCE BOOKS**

1. **Bjarne Stroustrup** ., “*The C++ Programming Language*”, Pearson Education, New Delhi, 3<sup>rd</sup> Edition, 2001.
2. **Grady Booch**., “*Object Oriented Analysis And Design*” , Pearson Education, New Delhi, 1<sup>st</sup> Edition, 2006.
3. **Khanitkar**., “*Let Us C++*”, BPB Publications, New Delhi, 5<sup>th</sup> Edition, 2005.

## SEMESTER V& VI

### Elective Practical

**Instructional Hrs. : 60**

**Sub. Code: 15PHUEPO1**

**Max. Marks: CIA-40; ESE-60**

**Credits: 3**

#### **Any Twelve of the Following:**

##### **C Programming**

1. Write a Program that Inputs three Integers from the Keyboard and Prints the sum, average, product, smallest, and largest of Three Numbers.
2. Roots of a Quadratic Equation.
3. Matrix Addition.
4. Matrix Multiplication.
5. Arranging a Set of Numbers in Ascending Order.
6. Converting Integer in the Range 1 to 100 into Words.
7. Program to Check a Palindrome.
8. Comparison of Two Strings. The Program Should State Whether the First String is Lesser Than, Equal or Greater than the Second String.

##### **C++ Programming**

9. An Electricity Board Charges the Following Rates to Domestic Users.  
For the First 100 Units : 40 Paise per Unit  
For Next 200 Units : 50 Paise per Unit  
Beyond 300 Units : 60 Paise Per Unit  
All Users are charged a Min I8mum of Rs.100. If the Total Cost is more Than Rs. 250.00 Then an Additional Surcharge of 15% is added. Write a Program to Read the Names of User and Number of Units Consumed and Display the Charge with Names.
10. Define a Class String. Using Overloaded == Operator to Compare two Strings.
11. Define a Class Complex to Represent a Complex Number. Use Overloaded + And – Operators to add and Subtract Tow Complex Objects. Two Matrices.
12. Calculate the volume of cube, cylinder and Rectangle using Function overloading concept



13. Operations using operator overloading concept
14. Smallest and Biggest of two numbers using Friend Function
- 15. Multiply two numbers using inheritance concept**

### **Computational Programming – Sci Lab**

16. Arithmetic Operations
17. Logical Operations
18. Draw lines joining the following Points in 2D plot
19. Logarithmic Plot
20. Capacitor Charging and Discharging Curve

**SEMESTER VI**  
**Core Paper X**  
**QUANTUM MECHANICS & RELATIVITY**

**Instructional Hrs. : 90**

**Sub. Code: 15PHUC610**

**Max. Marks: CIA-25; ESE-75**

**Credits: 6**

**Objective:** To provide an insight into the behavior of particles at micro level and the relativistic principles.

**UNIT I**

**18 Hrs.**

**Foundation of Quantum Mechanics:**Inadequacy of Classical Mechanics – Dual Nature of Matter – Expression for De-Broglie Wavelength – G.P. Thomson's Experiment – Wave Packet – Phase Velocity – Group Velocity –Relation Between Phase Velocity and Group Velocity.

**Heisenberg's Uncertainty Principle:**Statement of Uncertainty Principle – Physical Significance – Illustration of Uncertainty Principle – Gamma Ray Microscope - *Diffraction of Electron Through a Slit* – Application of Uncertainty Principle – *Size of The Hydrogen Atom and Energy in the Ground State.*

**UNIT II**

**18 Hrs.**

**Wave Function For a Free Particle:**Postulates of Quantum Mechanics – Physical Interpretation of the Wave Functions – Equation of Motion Of Matter Wave (I) Time – Independent Schroedinger Equation (Ii) *Time Dependent – Schroedinger Equation* – Normalized and Orthogonal Wave Function – Expectation Values of Dynamical Quantities – Probability Current Density: Particle Flux – Ehrenfest's Theorem – Eigen Value and Eigen Function.

**UNIT III**

**18 Hrs.**

**Applications of Schrödinger's Equation:** Particle in a Box: Infinite Square Well Potential – Finite Square Well Potential –Potential Step –Rectangular Potential Barrier – Application of Barrier Penetration – Linear Harmonic Oscillator – Rigid Rotator – Hydrogen atom.

**B.Sc. Physics – 2015-2016 onwards**

## UNIT IV

18 Hrs.

**Operators and Their Properties:**The Operator Formalism in Quantum Mechanics – Dynamical Variables as Operators – Operators for Momentum, Kinetic Energy and Total Energy – Hermitian Operators – Properties – *Simultaneous EigenFunctions and Commuting Operators*– The Parity Operator – *Commutation Algebra* – Commutation Relation Between Position and Momentum – Hamiltonian H and Momentum P – Commutation Rules for the Components of Orbital Angular Momentum – Commutation Relation of  $L^2$  With Components  $L_x$ ,  $L_y$  And  $L_z$  – Ladder Operators.

## UNIT V

18

**Hrs.Relativity:**Frames of Reference – Galilean Transformation Equations – The Ether Hypothesis – Michelson – Morley Experiment – Special Theory of Relativity – The Lorentz Transformation Equations – Length Contraction – Time Dilation – Illustration – Meson Decay – Addition of Velocities – *Variation of Mass with Velocity* – *Mass – Energy Equivalence* – *Unified Mass Unit*.

**Note:** *Italics* denotes Self study Topics

## TEXT BOOKS

1. **Murugesan R.**, “*Modern Physics*”, S.Chand & Company., New Delhi, 2005 Edition, 2005.
2. **SatyaPrakash, Singh C K.**, “*Quantum Mechanics*”, KedarNath Ram Nath Publications , Merrut – Tenth Edition, 1997.
3. **Singh S.P., Bagde M K, Kamal Singh**, “*Quantum Mechanics*”, S.Chand & Company., New Delhi, 2<sup>nd</sup> Edition, 1996.

## REFERNCE BOOKS

1. Mathews P M, Venkatesan K, “*A Text Book of Quantum Mechanics*”, Tata Mc Hill New Delhi, 1997.
2. **Ghatak A K, Loganathan S**, “*Quantum Mechanics*”, Tata Mc Hill New

Delhi, 1977.

3. **Rajput B S**, “ *Advanced Quantum Mechanics*”, Pragati Prakashen Publishers, Merrut ,5th Edition, 2001.

**B.Sc. Physics – 2015-2016 onwards**

## SEMESTER VI

### Elective II

## FUNDAMENTALS OF MICROPROCESSORS

**Instructional Hrs.: 60**

**Sub. Code: 15PHUE602**

**Max. Marks: CIA-25; ESE-75**

**Credits: 4**

**Objective:** The purpose is to understand the basics of 8085 Microprocessor and to provide an in-depth knowledge in programming.

### UNIT I

**12 Hrs.**

**Introduction to Microprocessors and Architecture of 8085 Microprocessor:** Evolution of Microprocessors – Microprocessor Based System (Micro computer) –8085 Microprocessor – Pin functions of 8085 Microprocessor – Architecture of 8085 Microprocessor – ALU – Registers – Accumulator – Flag register – program counter – Stack pointer – Bus: Address Bus – Data bus – Control bus.

### UNIT II

**12 Hrs.**

**Instruction set of 8085:** *Computer languages – Machine language – Assembly language – High level language* – Instruction format – Opcode – Operand – Classification of instruction based on length – Classification of instruction based on function: Data transfer instructions – Arithmetic instructions – Logic instructions – Branch instructions – Machine control instructions – Stack – Subroutines – Addressing Modes.

### UNIT III

**12 Hrs.**

**Microprocessor Timings:** Timing and Control Unit – Instruction Cycle – Machine Cycle – T-State – Fetch operation – Execute Cycle – Instruction and Data Flow – Timings of Intel 8085 – OP Code Fetch Cycle – Memory And I/O Read Cycle – *Memory And I/O – Write Cycles* – Programming Techniques using Looping, Counting and Indexing.

**B.Sc. Physics – 2015-2016 onwards**

## UNIT IV

12 Hrs.

**Interfacing Memory and I/O Devices:** Introduction – *Address Space Partitioning* – Memory mapped I/O scheme – I/O Mapped I/O scheme – *Address Map* – Address Decoding using 3 to 8 Decoder(74LS138) – Memory Interfacing(2K x 8 EPROM and RAM) – Data Transfer Schemes : Programmed Data Transfer – Synchronous, Asynchronous, Interrupt Driven Data Transfer – DMA Principles – 8255 Programmable Peripheral Interface – Programming the 8255.

## UNIT V

12 Hrs.

**Assembly language programs and Microprocessor Applications:** Assembly language programs for i) Addition of two 8 - bit numbers ii) Subtraction of two 8 - bit numbers iii) Multiplication and Division of 8 - bit numbers iv) Greatest and Smallest number in an array of 8 - bit numbers – Code Conversion: *BCD to Binary* – *Binary to BCD* – A temperature monitoring system – Microcontroller 8051(Block Diagram)

**Note:** *Italics denotes Self study Topics*

### TEXT BOOKS

**1. Aditya P Mathur.,** “*Introduction To Microprocessors*”, Tata McGraw –Hill Publishing Company Ltd., New Delhi, 3<sup>rd</sup> Edition.

**2. Ram B.,** “*Fundamentals of Microprocessors and Microcomputers*”, Dhanpat Rai Publications(p) Ltd., New Delhi, 6<sup>th</sup> Edition, 2005.

**3. Ramesh Gaonkar.,** “*Microprocessor, Architecture, Programming and Applications with the 8085*”, Penram International Publishing (India) Private Limited, Mumbai, 5<sup>th</sup> Edition.

### REFERENCE BOOKS

**1. Anokh Singh, Chhabra A.K.,** “*Fundamentals Of Microprocessor And Its Applications*” S.Chand & Company Ltd., New Delhi, First Edition, 2005.

**2. V.Vijayendran.,** “*Fundamentals Of Microprocessor-8085*”, Viswanathan Publication, Chennai, First Edition 2002.

**B.Sc. Physics – 2015-2016 onwards**

## SEMESTER VI

### Elective III

#### INSTRUMENTATION

**Instructional Hrs: 60**

**Sub. Code:15PHUE603**

**Max. Marks: CIA – 25: ESE - 75**

**Credits: 4**

**Objective:** To enable the students to understand all aspects of electronic instruments.

#### UNIT I

**12 Hrs.**

**Qualities of Measurements:** Classification of Instrument- Factors in making measurements - Errors in measurement, accuracy – precision - significant figures - statistical analysis - probability of error - limiting error,- Categories of Errors –Electrical standards.

#### UNIT II

**12 Hrs.**

**Bridges:** Wheatstone's bridge – Kelvin's bridge – AC bridges –Hay's bridge – Anderson Bridge – De Sauty Bridge-Carey Foster Bridge.

#### UNIT III

**12 Hrs.**

**Transducers:** Introduction -Resistive transducer- strain gauges: unbonded resistance wire strain gauge -Inductive transducer –LVDT -Capacitive transducer –Piezoelectric transducer – Photo electric transducer – Temperature transducer.

#### UNIT IV

**12Hrs.Digital**

**Instruments:** Digital multimeter- Digital voltmeter- Digital frequency meter- Measurement of pH- Digital tacometer – Digital phase meter- Digital measurement of time- Digital capacitance meter.

#### UNIT V

**12 Hrs.**

**Display and Recording Devices:**Cathode ray oscilloscope – Liquid Crystal Display (LCD)– Bar graph display-Segmental and dot matrix display – Null type recorders: Potentiometric recorders –(X-Y) Recorder, Magnetic tape recorders – Digital data recording – Data loggers.

**B.Sc. Physics – 2015-2016 onwards**

## **TEXT BOOK**

1. **Joseph J. Carr Pearson.**, “*Elements of Electronic Instrumentation and Measurements*”, III edition.
2. **Kalsi H.S.**, “*Electronic Instrumentation*”, Third Edition, Tata McGraw-Hill Company, New Delhi, 2010.
3. **Sawhney A.K.**, “A course in Electrical and Electronic Measurement and Instrumentation”, DhanpatRai and Sons, New Delhi, 2013

## **REFERENCES**

1. **Albert D. Herlfrick & William D. Cooper.**, “*Modern electronic Instrumentation & Measurement Techniques*” Prentice Hall of India, 2002.
2. **Bell, A.D.**, “*Electronic Instrumentation and Measurements*”, 2nd Edition, Prentice Hall of India, New Delhi, New Delhi, 2003



**SEMESTER III / I**

**Allied Physics Paper - I**

**MECHANICS, HEAT, SOUND, SOLAR PHYSICS, ELECTRICITY AND MAGNETISM**

**Instructional Hrs. :60**

**Sub. Code: 16PHUA303/17PHUA101**

**Max. Marks: CIA-20; ESE-55**

**Credits: 4**

**Objective:** To provide the basic knowledge of physical laws and principles to the students of other branches of science

**UNIT I**

**12 Hrs**

**Gravitation:** Newton's law of Gravitation – Definition of G – Determination of G by Boy's Method – *Mass and Density of Earth* – Acceleration due to Gravity – Determination of g by Compound Pendulum.

**Elasticity:** Bending of Beams – Bending Moment – Depression of Cantilever – Determination of Y by Uniform and *Non Uniform Bending Method* – Torsion in a wire – Determination of Rigidity Modulus by Torsional Pendulum – I section of Girders

**UNIT II**

**12 Hrs**

**Heat and Thermodynamics:** Vander Waal's Equation of State – *Critical Constants of a Gas* – Derivation of Critical Constants in terms of Vander Waals Constant – Joule - Thomson Effect – Theory of J-K Effect – Liquefaction of Hydrogen and Helium – Properties of Liquid - He I and II

**Sound:** Doppler Effect – Derivation and Applications – Frequency of A.C by Sonometer-Ultrasonics – Production, Properties and Applications

### UNIT III

12 Hrs

**Solar Physics:** Measurement of Solar Radiations by Pyroheliometer and Pyrometer – Solar Constants – *General Applications of Solar Energy* – Flat Plate Collector – Box Type Cooker Solar Water Heater – Solar Photovoltaic Cells- Applications of Solar Cells

B.Sc Mathematics 2016-17 onwards

B.Sc Chemistry 2017-18onwards

### UNIT IV

12 Hrs

**Electricity:** *Conversion of Galvanometer into Ammeter and Voltmeter* – Ballistic Galvanometer: Theory - Charge Sensitiveness - Measurement of Capacitance – Potentiometer – Theory – Measurement of Current, Voltage and Resistance –Electromagnetic Induction: Transformer and its Applications.

### UNIT V

12 Hrs

**Magnetism:** Basic Concepts of Magnetic Materials – *Magnetic Properties of Dia, Para and Ferro Magnetic Materials* – Area of (B-H) Loop – Curie Temperature – Applications of Ferities in Computer Memory

**Note: Italics denote Self Study Topics**

### TEXT BOOKS:

1. **Brijlal&Subramaniam**“ *Properties of Matter*”, Eurasia Publication House (Pvt) Ltd, New Delhi, 5<sup>th</sup> Edition, 1989.
2. **Brijlal&Subramaniam**, “ *Heat and Thernodynamics*”, S.Chand and Company Ltd, New Delhi, 2006 Edition.
3. **Murugesan R**, “ *Properties of Matter*”, S.Chand and Company Ltd, New Delhi Revised Edition, 2008.
4. **Murugesan R**,“ *Electricity and Magnetism*”, S.Chand and Company Ltd, New Delhi 2006 Edition.
5. **Subramaniam N &Brijlal**, “*Sound*”VikasPublising House, New Delhi, 2<sup>nd</sup> Revised Edition, 1978.

## REFERENCE BOOKS:

1. **Sukhatme S P**, “*Solar Energy Utilization*” Tata McGraw Hill, New Delhi, 2<sup>nd</sup> Edition, 1987.
2. **Subramanian N & Brijlal**, “*Sound*” Vikas Publishing House, New Delhi, 2<sup>nd</sup> Revised Edition, 1978.
3. **Murugesan R**, “*Properties of Matter*”, S Chand and Company Ltd, New Delhi Revised Edition, 2008.
4. **Jaya Prekash N**, “*Allied Physics I*”, JP Publications, Coimbatore, Edition 1993

B.Sc Mathematics 2016-17 onwards

B.Sc Chemistry 2017-18 onwards

## SEMESTER IV / II

### Allied Physics Paper - II

#### MODERN PHYSICS, ELECTRONICS AND DIGITAL ELECTRONICS

**Instructional Hrs. :60**

**Sub. Code: 16PHUA404/17PHUA202**

**Max. Marks: CIA-20; ESE-55**

**Credits: 4**

**Objective:** The paper gives concise ideas about various fields available in Physics and their application in day to day life.

#### UNIT I

**12 Hrs**

**Structure of the Atom:** The Vector Atom Model – *Pauli Exclusion Principle* – Coupling Schemes.

**Laser:** Induced Absorption, Spontaneous and Stimulated Emission – Principle of Laser – Population Inversion – Ruby Laser – Helium and Neon Laser – Semiconductor Laser – Properties and Applications.

## UNIT II

12 Hrs

**Nuclear Physics:** Characteristics of Nuclear Physics- Model of Nuclear Structure – Liquid Drop Model – Shell Model – Synchrocyclotron – Betatron - Discovery of Artificial Transmutation – Transmutations by Alpha Particles – Transmutation by Protons – *Elementary Particles – Leptons – Mesons – Baryons.*

## UNIT III

12 Hrs

**Electronics:** Construction and Characteristics of Zener Diode, Photo Diode, Light Emitting Diode (LED)- Transistor Characteristics (CE) – Qualitative Analysis of a Common Emitter Amplifier – *Phase Reversal of the output Voltage – Advantages of Common Emitter Amplification Circuit.*

## UNIT IV

12 Hrs

**Operational Amplifier:** Circuit, Symbol, Polarity Conventions and Virtual Ground or Summing Point of an Operational Amplifier- Characteristics of an Ideal Operational Amplifier- Amplifier as an Adder – *Subtractor – Differentiator and Intergrator*

B.Sc Mathematics 2016-17 onwards

B.Sc Chemistry 2017-18 onwards

**Communication Electronics:** Definition of Frequency Modulation – Modulation Index – Block Diagram of a Superheterodyne Receiver – Principle of Picture Transmission and Reception – Block Diagram of a Monochrome TV Receiver - Basic Principle and Applications of Radar.

## UNIT V

12 Hrs

**Digital Electronics:** Digital Computer – Organization of Digital Computers – *Number System – Binary Octal – Hexa Decimal – ASCII and EBCDIC – Basic Logic Design using Digital Integrated Circuits, Truth Tables, Boolean Algebra – Simple Arithmetic Circuits – Half Adder – Full Adder- Half Subtractor - Full Subtractor.*

NAND and NOR as an Universal Building Block – De Morgan's Theorems and Proof- Basic Ideas of Memory Elements.

**Note: Italics denote Self Study Topics**

### **TEXT BOOKS**

1. **Albert P.Malvino and Ronald P. Leach** “*Digital Principles and Applications*” Tata McGraw Hills, New Delhi, 6<sup>th</sup> Edition, 2006.
2. **MurugaesanR,** “*Modern Physics*”, S.Chand& Company Ltd., New Delhi, 2005
3. **Thereja B.L,** “*Basic Electronics-Solid State*”, S.Chand& Company Ltd., New Delhi, 2001
4. **Mehta V.K,** “*Principles of Electronics*”, S.Chand& Company Ltd., New Delhi, 8<sup>th</sup> Edition, 2005

### **REFERENCE BOOKS**

1. **Jayaprakash N,** “*Allied Physics- IP*”, J.P.Publications, Coimbatore, Edition 1993.
2. **William H.Gothmann,** “*Digital Electronics*” Prentice- Hall of India Pvt Ltd., New Delhi, 2<sup>nd</sup> Edition, 2006.

**B.Sc Mathematics 2016-17 onwards**

**B.Sc Chemistry 2017-18onwards**

**SEMESTER II /IV**  
**Allied Physics Practical**

**Instructional Hrs. : 90**

**Sub. Code: 16PHUAPO1/17PHUAPO1**

**Max. Marks: CIA-20; ESE-30**

**Credits: 2**

**Any SIXTEEN of the Following:**

1. Young's Modulus – Non Uniform Bending – Pin and Microscope.
2. Young's Modulus – Uniform Bending – Optic Lever.
3. Rigidity Modulus – Static Torsion.
4. Acceleration Due to Gravity – Compound Pendulum
5. Moment of Inertia – Torsional Pendulum
6. Surface Tension by Capillary Rise Method
7. A.C Frequency - Sonometer
8. Refractive Index of a Liquid – Hollow Prism – Spectrometer.
9. Refractive Index of a Solid Prism - Spectrometer.
10. Refractive Index of the Material of a Solid Prism (i-d) – Curve - Spectrometer.
11. Wavelength of Spectral Lines – Grating – Minimum Deviation – Spectrometer.
12. Radius of the Curvature – Newton's Experiment
13. Calibration of Voltmeter – Low Range – Potentiometer.
14. Calibration of Ammeter – Low Range – Potentiometer.
15. Specific Resistance – Potentiometer..
16. Moment of a Magnet – Tan C position.
17. Characteristics of Junction Diode.
18. Characteristics of Zener Diode.
19. Verification of Truth Tables of the gates OR, AND, NOT, NOR, NAND and EX-OR
20. Verification of De Morgan's Theorem

**B.Sc Mathematics 2016-17 onwards**

**B.Sc Chemistry 2017-18 onwards**