

B.Sc. - Physics (semester system - I)
(Revised Syllabus with effect from the academic year 2021-2022)

Paper – I – Mechanics and Properties of Matter UPHYCS1

Credits: 4

Teaching Hours: 2 hrs / Week

Unit – I

Newton's law of motion – Force – Mass - Momentum and Impulse, Law of Conservation of Linear Momentum – Collision - Elastic and Inelastic collision-Newton's law of impact. Coefficient of restitution-Impact of moving sphere on a fixed plane-Direct and Oblique impact of moving two smooth spheres - Calculation of final velocities - Laws of Kinetic energy - Projectile motion - Frictional forces-Center of mass of solid objects-Conservation of Momentum in a system of particles.

Unit –II

Uniform circular motion - The dynamics of uniform circular motion - Moment of inertia of circular disc about an axis passing through its center and perpendicular to its plane, through its diameter, through its tangent - Moment of inertia of a solid sphere about all axes - Angular momentum and angular velocity and torque - Relation between angular momentum and torque-Kinetic energy of rotation and the work energy theorem-Conservation of angular momentum - Work done by constant force-work done by variable force - work and kinetic energy in rotational motion – Expression for the acceleration of a body rolling down an inclined plane

Unit – III

Gravitation – Newton's law of gravitation – Kepler's law of planetary motion – mass of earth Gravitational field and potential at a point inside and outside a spherical of earth– Mass and density of earth – Determination of G (Boy's method) – Variation of 'g' with altitude, depth and latitude – Earthquake – seismograph – modern application of seismology - Satellites – Orbital velocity – Escape velocity – Stationary satellite – Jet plane – Rocket – Principle, theory _ Velocity of rocket at any instant – Rocket Propulsion – specific impulse – multistage rocket – Shape of the rocket.

Unit – IV

Elasticity – Stress, strain – Poisson's ratio – Hooke's Law – Moduli of Elasticity – Young's modulus, Bulk modulus, rigidity modulus – Bending of a beam – Bending moment – Uniform and Non-uniform bending – Theory and experiment – Determination of Poisson's ratio – Torsional Pendulum – Determination of co-efficient of rigidity (η) for a wire I – section grids.

Unit V

Fluids – Flow of a fluid – Rate of flow – Viscosity – Coefficient of Viscosity – Critical velocity – Laminar and Vortex flow – Poiseuille equation for flow of liquid through a tube – Experimental determination of 'n' – Poiseuille's method and Stoke's method – Ostwald Viscometer – Determination of gases – Rankine's method for the determination for the viscosity of a gas – Surface tension – Free energy of a surface and surface tension – Excess pressure inside a liquid drop and inside a soap bubble – Work done in blowing a

bubble – Angle of contact – Capillary rise – Pilot tube and Venturi meter – Bernoulli's theorem.

Text Books:

1. Mechanics and Properties of Matter by R. Murugesan – Retd. Prof., Vivekananda College, Thiruvudagam West.
2. David Halliday, Robert Resnick, Kenneth S. Kran 2002 , fifth edition, volume 1, physics, John Wiley and Sons, INC.

PAPER PROGRAMMING IN C – UPHYSEC1

Credits: 4

Teaching Hours: 2 hrs / Week

Objective:

The purpose of this course is to introduce students about the key features and implementation of C , which is a powerful general purpose programming language available in all platforms and provide an in depth knowledge and skill in it.

Unit I

Introduction to Computer and C Programming: Evolution of computers – computer generations – classification of computers – basic computer organization – computer software. Introduction to C – History of C Characters of C – character set and tokens – key words and Identifiers – constants and variables – Data types – declaration of variables – declaration of storage class – operators and expressions – decision making, branching and looping statements.

Unit II

Arrays, Functions and Pointers: Arrays – one, two and multi dimensional arrays – declaring and initializing string variables. Functions – Library functions – user defined functions – nesting of functions – Recursion – passing arrays to functions – passing strings to functions. Structures – defining a structure – declaring structure variables – accessing structure members – structure initialization – arrays of structures – arrays within structures and functions – unions.

Unit III:

Operators, Expressions & I/O functions Types of operators – Arithmetic operators - Relational, logical, and assignment operators - Increment and decrement operators – Conditional operators – Bit wise and special operators – arithmetic expressions – Mathematical functions – priority of operators- Data input and output – getchar(), putchar() , gets() , puts() - scanf() , printf() - escape sequence

UnitI IV:

Control Statements Simple IF statement – Simple IF- ELSE statement – Block IF Statement – Block IFELSE statement – looping operation using while statement – for statement – Break statement – continue statement - Switch statement – Goto statement – Simple programs. (To find the solution of quadratic equation - Fibonacci series – To find the biggest of three nos, factorial of a no, odd or even.)

Unit V

Pointers – declaring pointer variables – Initialization of pointer variables – accessing a variable through its Pointers – pointers to pointers – pointer expressions – pointers and arrays – array of pointers – pointers to functions – pointers and structures – preprocessor derivatives. Simple programs in arrays, functions, pointers, structures and union.

Text Books:

1. Fundamentals of computing and Programming by E. Unit V: Balagurusamy , TMH Private Ltd. New Delhi, Second Edition (2012).

Text Book

1. Theory and problems of programming with C – By Byron Gottfried Second edition – Tata Megraw Hill, 2004.
2. Programming in C – Pradip Dey and Manas Ghosh, Oxford University Press, Second Edition.

Reference Books

1. Programming in C – By E. Balagurusamy – Third Edition – Tata Megraw Hill, 2004.
2. Programming in C by S. Ramasamy and P. Radhaganesan, Scitech Publications (India) Private Limited, Chennai and Hyderabad, 2006
3. Programming with C by Schaum Series

**NON MAJOR ELECTIVE – 1 CREDIT – 2
FUNDAMENTALS OF PHYSICS – UPHYEC1**

Credits: 4

Teaching Hours: 2 hrs / Week

Objective:

To introduce some basic concept of Physics like measurement of physical quantities, states of matter, kinds of energies and energy sources to students studying other than Physics.

Unit I

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

Unit II

Matter – Solid, Liquid, Gas and Plasma – Application of Plasma – change of state – specific heat capacity – specific latent heat of ice and steam.

Unit III

Kinds of energy – Mechanical energy, Thermal energy, Optical energy, Sound energy, Electrical energy, Atomic and Nuclear energy, (Examples) – Conservation of energy.

Unit IV

Renewable and non – renewable energy – Fossil fuel – coal Oil – Solar – Wind – Biomass – OTEC

Unit V

Mirror – Laws of reflection – Image formation (Concave and Convex mirror) Lens – Law's of refraction – Image formation (Concave and Convex lens) – Defects of eye and rectification.

Book for Study

1. First Year B. Sc Physics – B.V. Narayan Rao, New Age International (P) Lt, 1998.

Reference Books

1. Mechanics – D.S. Mathur – S.Chand & Co., 2002.
2. Properties of matter – D.S. Mathur – S. Chand & Co., 2002.
3. Properties of matter – Brijlal Subramanian – S. Chand & Co., 2006.

**ANCILLERY
MATHEMATICS – UPHYAS1**

Credits: 4

Teaching Hours: 2 hrs / Week

Objectives

We are going to discuss

Unit –i- how to find the correlation between two variables and then to find the relationship between two variables

Unit II- $m \times n$ matrices and represented linear transformations

Unit –III- basics algebraic structures are known as groups and sub groups

Unit –IV- Fourier series the following basic definitions and related functions

Unit – V- basics of Operation research or operational research

UNIT – I

STATISTICS: Correlation Coefficient – Rank Correlation coefficient – Interpolation – Lagrange and Newton's Methods – Attributes – Index numbers

UNIT – II

ALGEBRA: Matrices – Rank –Consistency of Equations – Solutions of Equations- Characteristic equation – Eigen values and Eigen vectors

UNIT –III

MORDEN ALGEBRA: Groups – subgroups – permutations groups – Homomorphism and Isomorphism

UNIT – IV

CALCULUS: Fourier series – Trigonometric series – Even and odd functions – Half Range Fourier series.

UNIT –V

LINEAR PROGRAMMING: Definition of Standard Linear Programming Problem – Feasible solutions – optimum solutions – Basic feasible solutions – optimum basic feasible solution – degenerate solution of a linear programming problem.

**ANCILLERY
ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY – UPHYAS2**

Credits: 4

Teaching Hours: 2 hrs / Week

Max. Marks 100

UNIT I

a. Hydrogen: Isotopes of hydrogen, preparation, properties and uses of heavy hydrogen – ortho and para hydrogen – hydrides – definition – classification – examples. b. Oxides: Definition, classification – examples.

c. Water: Hardness of water – types of hardness – removal of hardness – industrial implications of hardness in water – estimation of EDTA method (outline only) units of hardness of water.

d. Hydrogen peroxide: Manufacture, properties, structure and uses – estimation by permanganometry method – strength of hydrogen peroxide.

UNIT II

- a. Nature of valency of carbon in organic compounds – tetrahedral arrangement of valency of carbon – bond-breaking and bond forming in organic reactions – homolytic cleavage – heterolytic cleavage – reaction intermediates – formation, stability and reaction of carbocation and free radical.
- b. Nucleophiles - Electrophiles : Definition, types and examples – specific reactions involving these
- c. Types of reaction: Mechanism of Substitution SN1, SN2 – addition – elimination – rearrangement and polymerization – illustration with examples.
- d. Empirical formula, Molecular formula, calculation of EF and MF from percentage composition

UNIT III

- a. Normality, Molarity, Molality, Mole fraction, mole concept.
- b. Primary and secondary standards - Preparation of standard solutions
- c. Principle of volumetric analysis (with simple problems)
- d. Detection of elements Nitrogen, Sulphur and halogens, Preparation of Lassaigne's extract- Test - aromatic or aliphatic compounds-Saturated or Unsaturated-Test-Functional groups-carbohydrates, Phenols, aromatic acids, carbonyl compounds, amides, amines etc.,

UNIT IV

- a. V.B theory – postulates of V.B. theory - application to the formation of simple molecules like H₂ and O₂ - overlap of atomic orbitals – s – s ,s-p and p-p overlap – principle of hybridization – sp , sp² and sp³ hybridization –examples and geometry – VSEPR theory .
- b. M.O. theory: Formation of MO's – bonding and antibonding and non bonding. M.O's-M.O diagram for H₂, He and F₂.

UNIT V

- a. Colloidal state of matter – various types – classification
- b. Sols –dialysis –electro osmosis – electrophoresis – stability of colloids – protective action – Hardy Schulze law – gold number.
- c. Emulsion: Types of emulsions – emulsifier with examples
- d. Gels- classification, preparation-swelling – syneresis- thixotropy
- e. Applications of colloids.

REFERENCE BOOKS

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, 31st Edition, Milestone Publishers and Distributors, New Delhi, 2013.
2. A. Bahl and B.S. Bahl, Advanced Organic Chemistry, 1st Multicolour Edition, S. Chand &Company, New Delhi, 2010.
3. B.R. Puri, L.R. Sharma and M.S. Pathania, Principles of Physical Chemistry, 46th Edition, Vishal Publishing Company, New Delhi, 2013.