



Bosco public school
Sunder Vihar, Paschim Vihar, New Delhi
www.boscoschool.com
CLASS XI SCIENCE
SYLLABUS 2023-2024



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ENGLISH

General Objectives :

- To listen and comprehend live as well as record in writing oral presentations on a variety of topics.
- To develop greater confidence and proficiency in the use of language skills necessary for social and academic purpose.
- To participate in group discussions, interviews by making short oral presentations on given topics.
- To perceive the overall meaning and organisation of the text (i.e. the relationships of the different 'chunks' in the text to each other).
- To identify the central/main point and supporting details etc. to build communicative competence in various skills of English.
- To promote advanced language skills with an aim to develop the skills of reasoning, drawing inferences, etc. through meaningful activities.
- To develop ability and knowledge required in order to engage in independent reflection and enquiry.
- To familiarize students with the use of basic imagery and figurative language.

Marks Division

Section	Marks
Reading Comprehension	26
Creative Writing Skills and Grammar	16 + 7
Textbooks and Supplementary Reading Text	31
	80
ASL and Project File	10 + 10
Total	100

MAY

- Reading : Unseen Passage
Writing : Classified Advertisements
Grammar : Integrated Exercises – Reordering Sentences
Literature : Hornbill
- Chapter - 1 The Portrait of a Lady
 - A Photograph (Poem)

JULY

- Reading : Unseen Passage
Writing : Speech
Grammar : Integrated Exercises – Reordering Sentences
Literature : Hornbill
- Chapter - 3 Discovering Tut
Snapshots
 - Chapter - 1 The Summer of the Beautiful White Horse

AUGUST

- Reading : Unseen Passage, Note Making & Summary
Writing : Posters
Grammar : Integrated Exercises – Tenses
Literature : Hornbill
- Chapter -7 Adventure
 - Chapter -2 We're Not Afraid to Die...
 - The Laburnum Top (Poem)
- Assessment of Listening and Speaking Skills*

SEPTEMBER : Revision and Half Yearly Examination

OCTOBER

- Reading : Unseen Passage, Note Making & Summary
Writing : Debate
Grammar : Integrated Exercises – Clauses
Literature : Hornbill
- Father to Son (Poem)
 Snapshots
 - Chapter - 5 Mother's Day

NOVEMBER

- Reading : Unseen Passage
Writing : Posters (Revision)
Grammar : MCQs on Gap Filling and Transformation of Sentences
Literature : Hornbill
- The Voice of the Rain (Poem)
 - Childhood (Poem)

DECEMBER

- Reading : Unseen Passage
Writing : Debate (Revision)
Grammar : Integrated Exercises - Transformation of Sentences
Literature : Snapshots
- Chapter -7 Birth
 Hornbill
 - Chapter - 8 Silk Road

JANUARY

- Literature : Snapshots
- Chapter - 8 The Tale of Melon City
 Revision
 Assessment of Listening and Speaking Skills
 Project Work

FEBRUARY- MARCH

Revision and Final Examination

SYLLABUS FOR EXAMINATION

Unit Test 1	<p>Reading : Unseen Passage Writing : Classified Advertisements Grammar: Integrated Exercises – Sentence Reordering Literature: <ul style="list-style-type: none"> ● Ch- 3 Discovering Tut ● Ch -1 The Portrait of a Lady ● A Photograph (Poem) </p>
Half Yearly Examination	<p>Reading : Unseen Passage, Note Making & Summary Writing : Classified Advertisements, Speech, Posters Grammar :Integrated Exercises - Reordering Sentences , Tenses Literature: Hornbill <ul style="list-style-type: none"> ● Ch-3 Discovering Tut ● Ch-1 The Portrait of a Lady ● A Photograph (Poem) ● Ch -7 Adventure ● Ch -2 We're Not Afraid to Die... ● The Laburnum Top (Poem) Snapshots <ul style="list-style-type: none"> ● Ch- 2 The Address ● Ch -1 The Summer of the Beautiful White Horse </p>
Unit Test 2	<p>Reading : Unseen Passage, Note Making and Summarisation Writing : Poster Making , Debate Grammar: Integrated Exercises - Tenses Literature: <ul style="list-style-type: none"> ● Father to Son (Poem) ● Ch- 5 Mother's Day </p>
Final Term Examination	Complete syllabus

MATHEMATICS

General Objectives:

- To acquire a precise knowledge and critical understanding of the basic concepts
- To develop a positive attitude towards thinking
- To articulate and analyse logically
- To become precise and logical.

Marks Distribution

S.No	UNITS	MARKS
1	Sets and Function	23
2	Algebra	25
3	Coordinate Geometry	12
4	Calculus	8
5	Statistics and Probability	12
Total		80
Internal Assessment		20

MAY

• Chapter 1: Sets

Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets, Subsets of a set of real numbers especially intervals (with notations). Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of Complement

• Chapter 2: Relations and functions

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (upto $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. Sum, difference, product and quotients of functions.

• Chapter 4: Complex numbers and Quadratic Equations

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane

JULY

• Chapter-3: Trigonometric functions

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2x + \cos^2x = 1$, for all x . Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing $\sin(x \pm y)$ and $\cos(x \pm y)$ in terms of $\sin x$, $\sin y$, $\cos x$ & $\cos y$ and their simple applications.

• Chapter 8: Sequence and series

Sequence and Series. Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.

AUGUST

- **Chapter 8: Sequence and series (Continued)**
Sequence and Series. Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.
- **Chapter 9: Straight lines**
Brief recall of two-dimensional geometry from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form, two-point form, intercept form, Distance of a point from a line.

SEPTEMBER

Revision and Half Yearly Examination

OCTOBER

- **Chapter 13: Statistics**
Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data.

NOVEMBER

- **Chapter 5: Linear inequalities**
Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.
- **Chapter 6: Permutation and Combination**
Fundamental principle of counting. Factorial n . ($n!$) Permutations and combinations, derivation of Formulae for ${}^n P_r$ and ${}^n C_r$ and their connections, simple applications.
- **Chapter 7: Binomial theorem**
Historical perspective, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, simple applications.

DECEMBER

- **Chapter 10: Conic section**
Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.
- **Chapter 11: Introduction to three-dimensional geometry**
Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points.
- **Chapter 12: Limits and Derivatives**
Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

JANUARY

- **Chapter 14: Probability**
Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

FEBRUARY- MARCH

Revision and Final examination

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test-1	<ul style="list-style-type: none">● Ch.1.Sets● Ch.2 : Relation and Function● Ch.3: Trigonometric functions
Half-Yearly Examination	<ul style="list-style-type: none">● Ch.1: Sets● Ch.2: Relation and Function● Ch.3 : Trigonometric functions● Ch.4: Complex numbers and Quadratic Equations● Ch.8: Sequence and series● Ch.9 : Straight lines
Unit Test-2	<ul style="list-style-type: none">● Ch.13 : Statistics● Ch.6: Permutation and combination
Final Examination	<ul style="list-style-type: none">● Complete Syllabus

PHYSICS

General Objectives:

- To emphasize on basic conceptual understanding of the content.
- To emphasis on use of SI units, symbols, nomenclature of physical quantities and formulations as per international standards.
- To provide logical sequencing of units of the subject matter and proper placement of concepts with their linkage for better learning.
- To reduce curriculum load, by eliminating overlapping of concepts/content within the discipline and other disciplines.
- To Promote process-skills, problem-solving abilities and applications of Physics concepts

Marks Distribution (Theory)

S. No.	Unit		Marks
1.	Unit 1	Physical World and Measurement Chapter–1: Units and Measurements	23
2.	Unit 2	Kinematics Chapter–2: Motion in a Straight Line Chapter–3: Motion in a Plane	
3.	Unit 3	Laws of Motion Chapter–4: Laws of Motion	
4.	Unit 4	Work, Energy and Power Chapter–5: Work, Energy and Power	17
5.	Unit 5	Motion of System of Particles and Rigid Body Chapter–6: System of Particles and Rotational Motion	
6.	Unit 6	Gravitation Chapter–7: Gravitation	
7.	Unit 7	Properties of Bulk Matter Chapter–8: Mechanical Properties of Solids Chapter–9: Mechanical Properties of Fluids Chapter–10: Thermal Properties of Matter	20
8.	Unit 8	Thermodynamics Chapter–11: Thermodynamics	
9.	Unit 9	Behaviour of Perfect Gases and Kinetic Theory of Gases Chapter–12: Kinetic Theory	
10.	Unit 10	Oscillations and Waves Chapter–13: Oscillations Chapter–14: Waves	10
TOTAL			70

Marks Distribution (Practical)

S.No.	Evaluation scheme	Marks
1	Two experiments one from each section	7+7
2	Practical record (experiments & activities)	5
3	Activity	3
4	Project	3
5	Viva on experiments & project	5
TOTAL		30

MAY

UNIT 1: PHYSICAL WORLD AND MEASUREMENT

- **Chapter 1: Units and Measurements**

Need for measurement: Units of measurement, systems of units, SI units, fundamental and derived units, significant figures. Dimensions of physical quantities, dimensional analysis and its applications, Supplementary unit: Radian

UNIT 2: KINEMATICS

- **Chapter 2: Motion in a Straight Line**

Frame of reference, Motion in a straight line, Elementary concepts of differentiation and integration for describing motion, uniform and non- uniform motion, and instantaneous velocity, uniformly accelerated motion, velocity - time and position-time graphs. Relations for uniformly accelerated motion (graphical and calculus treatment).

JULY

- **Chapter 3: Motion in a Plane**

Scalar and vector quantities, position and displacement vectors, general vectors and their notations, equality of vectors, multiplication of vectors by a real number, addition and subtraction of vectors, Unit vector, resolution of a vector in a plane, rectangular components, Scalar and Vector product of vectors. Motion in a plane, cases of uniform velocity and uniform acceleration. Projectile motion, uniform circular motion.

PRACTICALS

- To measure diameter of a small spherical/cylindrical body and to measure internal diameter and depth of a given beaker/calorimeter using Vernier Calipers and hence find its volume.
- To measure diameter of a given wire and thickness of a given sheet using screw gauge.

UNIT 3: LAWS OF MOTION

- **Chapter 4: Laws of Motion**

Intuitive concept of force, Inertia, Newton's first law of motion, momentum and Newton's second law of motion, impulse, Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on a level circular road, vehicle on a banked road).

AUGUST

UNIT 4: WORK, ENERGY AND POWER

- **Chapter 5: Work, Energy and Power**

Work done by a constant force and a variable force, kinetic energy, work energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces: non- conservative forces, motion in a vertical circle, elastic and inelastic collisions in one and two dimensions.

UNIT 5: MOTION OF SYSTEM OF PARTICLES AND RIGID BODY

- **Chapter 6: System of Particles and Rotational Motion**

Centre of mass of a two-particle system, momentum conservation and Centre of mass motion. Centre of mass of a rigid body; center of mass of a uniform rod. Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions. Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation).

PRACTICALS

- To find the weight of a given body using parallelogram law of vectors.
- Using a simple pendulum, plot its $L-T^2$ graph and use it to find the effective length of second's pendulum.

Activities

- To make a paper scale of given least count, e.g., 0.2cm, 0.5 cm.
- To study the variation in range of a projectile with angle of projection.
- To measure the force of limiting friction for rolling of a roller on a horizontal plane.

SEPTEMBER

Revision and Half-yearly Examination

OCTOBER

Unit 6: GRAVITATION

- **Chapter 7: Gravitation**

The universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy and gravitational potential. Escape velocity. Orbital velocity of a satellite. Kepler's laws of planetary motion, Geo-stationary satellites.

UNIT 7: PROPERTIES OF BULK MATTER

- **Chapter 8: Mechanical Properties of Solids**

Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity (qualitative idea only), Poisson's ratio, elastic energy

PRACTICALS

- To find the force constant of a helical spring by plotting a graph between load and extension.
- To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body

NOVEMBER

UNIT 7: PROPERTIES OF BULK MATTER

- **Chapter 9: Mechanical Properties of Fluids**

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure.

Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity. Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

- **Chapter 10: Thermal Properties of Matter**

Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; C_p , C_v - calorimetry; change of state - latent heat capacity.

Heat transfer-conduction, convection and radiation, thermal conductivity, Qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law.

PRACTICALS

- To study the relation between frequency and length of a given wire under constant tension using sonometer.
- To find the speed of sound in air at room temperature using a resonance tube by two resonance positions.

DECEMBER

UNIT 8: THERMODYNAMICS

- **Chapter 11: Thermodynamics**

Thermal equilibrium and definition of temperature (zeroth law of thermodynamics). Heat, work and internal energy. First law of thermodynamics.

Second law of thermodynamics: gaseous state of matter, change of condition of gaseous state -isothermal, adiabatic, reversible, irreversible, and cyclic processes.

UNIT 9: BEHAVIOUR OF PERFECT GASES AND KINETIC THEORY OF GASES

- **Chapter 12: Kinetic Theory**

Equation of state of a perfect gas, work done in compressing a gas. Kinetic theory of gases - assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equi-partition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

UNIT 10: MECHANICAL WAVES

- **Chapter 13: Oscillations**

Periodic motion - time period, frequency, displacement as a function of time. Periodic functions.

Simple harmonic motion (S.H.M) and its equation, phase, oscillations of a spring-restoring force and force constant, energy in S.H.M. Kinetic and potential energies, simple pendulum derivation of expression for its time period.

Activities

- To observe and explain the effect of heating on a bi-metallic strip.
- To observe the decrease in pressure with increase in velocity of a fluid.
- To study the effect of detergent on surface tension of water by observing capillary rise.

JANUARY

UNIT 10: MECHANICAL WAVES

- **Chapter 14: Waves**

Wave motion. Transverse and longitudinal waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats.

FEBRUARY- MARCH

Revision and Final examination

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test-1	Ch 1: Units and Measurements Ch 2: Motion in a Straight Line Ch 3: Motion in a Plane
Half-Yearly Examination	Ch 1: Units and Measurements Ch 2: Motion in a Straight Line Ch 3: Motion in a Plane Ch 4: Laws of Motion Ch 5: Work, Energy and Power Ch 6: System of Particles and Rotational Motion
Unit Test-2	Ch 7: Gravitation Ch 9: Mechanical Properties of Fluids
Final Examination	Complete Syllabus

CHEMISTRY

General Objectives:

- To promote understanding of basic facts and concepts in Chemistry.
- To make students capable of studying Chemistry in academic and professional courses.
- To develop problem solving skills in students.
- To expose students to different processes used in industries and their technological applications.
- To acquaint students with different aspects of chemistry in daily life.
- To develop an interest in students to study chemistry as a discipline.

Marks Distribution (Theory)

S. No.	Unit	Chapter Name	Marks
1.	Unit 1	Some Basic Concepts of Chemistry	7
2.	Unit 2	Structure of Atom	9
3.	Unit 3	Classification of elements	6
4.	Unit 4	Chemical Bonding and Molecular Structure	7
5.	Unit 5	Chemical Thermodynamics	9
6.	Unit 6	Equilibrium	7
7.	Unit 7	Redox Reactions	4
8.	Unit 8	Organic Chemistry	11
9.	Unit 9	Hydrocarbons	10
TOTAL			70

Marks Distribution (Practical)

S. No.	Experiment	Marks
1.	Volumetric analysis	8
2.	Salt Analysis	8
3.	Content based experiments	6
4.	Project	4
5.	Class record and viva	4
TOTAL		30

MAY

- **Chapter 1: Some Basic Concepts of Chemistry** - Particulate nature of matter, laws of chemical combination, Dalton's atomic theory, atomic and molecular masses, mole concept percentage composition, empirical and molecular formula, stoichiometry.
- **Chapter 2: Structure of Atom** - Atomic number, isotopes, isobars. Various models of atom, shells sub-shells, dual nature of light and matter, de-Broglie's relationship, Heisenberg's uncertainty principle, quantum numbers, shapes of s-, p- and d- orbitals. Aufbau's principle, Pauli's exclusion principle and Hund's rule, stability of half and completely filled orbitals.

JULY

- **Chapter 7: Redox Reactions** - Oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, application of redox reactions.
- **Chapter 3: Periodic Classification of Elements** - Periodic table-various forms periodic trends in properties-atomic radii, ionic radii, Ionization enthalpy, electron gain enthalpy, electro-negativity, inert gas radii, Nomenclature of elements with atomic numbers greater than 100

PRACTICALS

- Preparation of standard solution of oxalic acid and sodium carbonate.
- To determine molarity and strength of NaOH by titrating against oxalic acid solution.

AUGUST

- **Chapter 4: Chemical Bonding and Molecular Structure** - Valence electrons, ionic bond, covalent bond, bond parameters, lewis structure, polar nature of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, Concept of hybridisation, Involving s-, p-, d- orbital and shapes of some simple molecules, MOT of diatomic molecules, hydrogen bond.

PRACTICALS

- To determine molarity and strength of HCl by titrating against Na_2CO_3 Solution.
- Extra elements – N, S, Cl, Br, I in an organic compound.
- Crystallisation of an impure sample of CuSO_4 , benzoic acid.

SEPTEMBER

Revision and Half-yearly Examination

OCTOBER

- **Chapter 8: Organic Chemistry (Some Basic Principles and Techniques)**- IUPAC nomenclature, electronic displacements: inductive effect, electromeric effect, resonance and hyperconjugation. Homolytic and heterolytic fission, free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions preparation, physical and chemical properties, mechanism, name reactions.

PRACTICAL

- Qualitative analysis

NOVEMBER

- **Chapter 9: Hydrocarbons** - Preparation, physical and chemical properties of alkanes, alkenes. Preparation, physical and chemical properties of alkynes and benzene.

PRACTICAL

- Qualitative analysis

DECEMBER

- **Chapter 5: Thermodynamics** - System and types of system, surrounding, work, heat, energy, extensive and Intensive properties, state functions. First law of thermodynamics-internal energy, Enthalpy, heat capacity and specific heat, measurement of ΔU and ΔH . Hess's law of constant heat summation, enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transformation, ionization and solution entropy, Gibbs free energy. Second law of Thermodynamics
- **Chapter 6: Equilibrium** - Physical and chemical equilibria, dynamic nature, law of mass action, factors affecting equilibrium-le-chatelier's principle.

PRACTICAL

- Qualitative analysis

JANUARY

- **Chapter 6: Ionic Equilibrium** – strong and weak electrolytes, acids and bases, degree of ionization, concept of pH, hydrolysis of salts, buffer solution, solubility product, common ion effect, Henderson equation.

PRACTICAL

- Qualitative analysis

FEBRUARY- MARCH

Revision and Final examination

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test-1	Ch-1: Some Basic Concepts of Chemistry Ch-2: Structure of Atom
Half-Yearly Examination	Ch-1: Some Basic Concepts of Chemistry Ch-2: Structure of Atom Ch-3: Periodic Classification of Elements Ch-4: Chemical Bonding and Molecular Structure Ch-7: Redox Reactions
Unit Test-2	Ch-8: Organic Chemistry Ch-9: Hydrocarbons
Final Examination	Complete Syllabus

BIOLOGY

General Objectives:

- To promote understanding of basic principles of Biology.
- To encourage learning of emerging knowledge and its relevance to individuals and society.
- To promote rational/specific attitude to issues related to population, environment and development.
- To enhance awareness about environmental issues and problems and the appropriate solutions.
- To create awareness amongst the learners about variations/diversity amongst the living organisms and developing respect for other living beings.
- To appreciate that the most complex biological phenomena are also built on essentially simple processes.

Theory

S. No.	Unit	Title	Marks
1.	I	Diversity of Living Organisms	15
2.	II	Structural Organization in Plants and Animals	10
3.	III	Cell: Structure and Function	15
4.	IV	Plant Physiology	12
5.	V	Human Physiology	18
TOTAL			70

Practical

S. No.	Evaluation Scheme	Marks
1.	One Major Experiment	5
2.	One Minor Experiment	4
3.	Slide Preparation	5
4.	Spotting	7
5.	Practical Record + Viva Voce	4
6.	Project Record + Viva Voce	5
TOTAL		30

MAY

Unit-I: Diversity of Living Organisms

- **Chapter-1: The Living World** - What is living? Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomic hierarchy; binomial nomenclature.
- **Chapter-2: Biological Classification** - Five kingdom classification; Salient features and classification of Monera, salient features and classification of Protista and Fungi into major groups: Lichens, Viruses and Viroids.
- **Chapter-3: Plant Kingdom** - Salient features and classification of plants into major groups - Algae, Bryophyta, Pteridophyta and Gymnospermae. (Salient and distinguishing features and a few examples of each category).
- **Chapter-4: Animal Kingdom** - Salient features and classification of animals- non-chordates up to phyla level and chordates up to class level (three to five salient features and at least two examples of each category). (No live animals or specimens should be displayed.)

PRACTICALS:

- Study of the parts of a compound microscope.
- Study of the specimens/slides/models and identification with reasons - Bacteria, Oscillatoria, Spirogyra, Rhizopus, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.
- Study of virtual specimens/slides/models and identification with reasons - Amoeba, Hydra, Liver fluke, Ascaris, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.

JULY

Unit-II: Structural Organization in Plants and Animals

- **Chapter-5: Morphology of Flowering Plants-** Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, Flower, fruit and seed. Description of family Solanaceae.
- **Chapter-6: Anatomy of Flowering Plants-** Anatomy and functions of tissue systems in dicots and monocots.
- **Chapter-7: Structural Organisation in Animals-** Morphology, Anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of a frog.

PRACTICALS:

- Study and describe locally available common flowering plants, from family Solanaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams), type of root (tap and adventitious); type of stem (herbaceous and woody); leaf (arrangement, shape, venation, simple and compound).
- Different types of inflorescences (cymose and racemose).
- Preparation and study of T.S. of dicot and monocot roots and stems (primary).

AUGUST

Unit-III Cell: Structure and Function

- **Chapter-8: Cell-The Unit of Life-** Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system- endoplasmic reticulum, ribosomes, golgi bodies, lysosomes, vacuoles; mitochondria, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus.
- **Chapter-9: Biomolecules** - Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzyme - types, properties, enzyme action.
- **Chapter-10: Cell Cycle and Cell Division** - Cell cycle, mitosis, meiosis and their significance.

PRACTICAL:

- Study of mitosis in onion root tip cells and animal cells (grasshopper) from permanent slides.

SEPTEMBER

Revision and Half-yearly Examination

OCTOBER

Unit-IV: Plant Physiology

- **Chapter-11: Photosynthesis in Higher Plants** - Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis. Cyclic and non- cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C₃ and C₄ pathways; factors affecting photosynthesis.
- **Chapter-12: Respiration in Plants** - Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient.

PRACTICALS:

- Study of osmosis by potato osmometer.
- Separation of plant pigments through paper chromatography.
- Study of plasmolysis in epidermal peels (e.g. Rhoeo / lily leaves or fleshy scale leaves of onion bulb)
- Study of distribution of stomata in the upper and lower surface of leaves.

NOVEMBER

Unit-IV: Plant Physiology

- **Chapter-13: Plant - Growth and Development** - Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA.

Unit-V: Human Physiology

- **Chapter-14: Breathing and Exchange of Gases** - Respiratory organs in animals (recall only); Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volume; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.
- **Chapter-15: Body Fluids and Circulation** - Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

PRACTICALS:

- Study of the rate of respiration in flower buds/leaf tissue and germinating seeds.
- Comparative study of the rates of transpiration in the upper and lower surfaces of leaves.

DECEMBER

Unit-V: Human Physiology

- **Chapter-16: Excretory Products and Their Elimination** - Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system – structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH and diabetes insipidus; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney.
- **Chapter-17: Locomotion and Movement** – Types of movement - ciliary, flagellar, muscular; skeletal muscle, contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal systems - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.
- **Chapter-18: Neural Control and Coordination** - Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral nervous system; generation and conduction of nerve impulse.

PRACTICALS:

- Test for the presence of sugar, starch, proteins and fats in suitable plant and animal materials.
- Test for presence of urea, sugar, albumin and bile in urine.
- Human skeleton and different types of joints with the help of virtual images/models only.

JANUARY

Unit-V: Human Physiology

- **Chapter-19: Chemical Coordination and Integration** - Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, gonads; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.

Note: Diseases related to all the human physiological systems to be taught in brief.

FEBRUARY- MARCH

Revision and Final Examination

Syllabus for Examination

EXAMINATION	CHAPTERS
Unit Test - 1	<ul style="list-style-type: none">● Chapter-2: Biological Classification● Chapter-3: Plant Kingdom● Chapter-4: Animal Kingdom
Half-Yearly Examination	<ul style="list-style-type: none">● Chapter-1: The Living World● Chapter-2: Biological Classification● Chapter-3: Plant Kingdom● Chapter-4: Animal Kingdom● Chapter-5: Morphology of Flowering Plants● Chapter-6: Anatomy of Flowering Plants● Chapter-7: Structural Organisation in Animals● Chapter-8: Cell-The Unit of Life● Chapter-9: Biomolecules
Unit Test - 2	<ul style="list-style-type: none">● Chapter-10: Cell Cycle and Cell Division● Chapter-11: Photosynthesis in Higher Plants● Chapter-12: Respiration in Plants
Final Examination	Complete syllabus

COMPUTER SCIENCE

General Objectives:

- Ability to understand and apply basic computational thinking.
- Ability to understand the notion of data types and data structures and apply in different situations.
- Ability to appreciate the notion of an algorithm and apply its structure including how algorithms handle corner cases.
- Ability to develop a basic understanding of computer systems - architecture, operating system and cloud computing.
- Ability to work in the cyber world with understanding of cyber ethics, cyber safety and cybercrime
- Ability to make use the value of technology in societies, gender and disability issues.

Marks Distribution (Theory)

Unit No.	Unit Name	Marks
1	Computer Systems and Organisation	10
2	Computational Thinking and Programming	45
3	Society, Law and Ethics	15
	Total	70

MAY

Unit 1: Computer Systems and Organisation

- **Computer system**
 - Basic Computer Organisation: Introduction to computer system, hardware, software, input device, output device, CPU, memory (primary, cache and secondary), units of memory (Bit, Byte, KB, MB, GB, TB, PB)
 - Types of software: system software (operating systems, system utilities, device drivers), programming tools and language translators (assembler, compiler & interpreter), application software
 - Operating system (OS): functions of operating system, OS user interface
- **Encoding Schemes and Number System**
 - Number System
 - Type of number system
 - Various conversions
 - Arithmetic operations on Binary system
 - Internal storage encoding of characters

Unit 2: Computational Thinking and Programming

- **Introduction to Problem Solving**
 - Introduction
 - Steps for Problem Solving
 - Algorithm
 - Representation of Algorithms

JULY

- **Introduction to Problem Solving (contd..)**
 - Flow of Control
 - Verifying Algorithms
 - Coding

- Decomposition
- **Getting started with Python**
 - Features of Python
 - Advantages of Python
 - Interacting with Python (Python IDLE)
 - Variables and types
 - Keywords
 - Expressions
 - Operators
 - User defined functions
 - Indentation, Tokens and Comments

PRACTICAL:

- Programs based on Basics of Python Programming, Python operators and Conditional constructs

AUGUST

- **Flow of control**
 - Program flow control
 - Selection / Decision Constructs
 - Iterations – For and while
 - Nested loops
 - Jump statements- break, continue and pass
- **Strings in Python**
 - Creation and traversing a String
 - Various String operations- concatenation, repetition, membership; functions/methods–len(), capitalize(), title(), upper(), lower(), count(), find(), index(), isalnum(), islower(), isupper(), isspace(), isalpha(), isdigit(), split(), partition(), strip(), lstrip(), rstrip(), replace();
 - String Slicing.

PRACTICAL:

- Programs based on Python looping constructs, Strings and Lists.

SEPTEMBER

- Revision for Half Yearly Exam

OCTOBER

- **Lists in Python**
 - Declaring, Accessing, Traversing and comparing lists
 - Various operation on Lists
 - Various built-in Functions - len(), list(),append(), extend(), insert(), count(), index(), remove(), pop(), reverse(), sort(), min(), max(), sum();
 - Deleting operation
 - Nested lists; finding the maximum, minimum, mean of numeric values stored in a list
 - Linear search on list of numbers and counting the frequency of elements in a list.
- **Tuples**
 - Definition, Creation of a Tuple, Traversal of a tuple.
 - Operations on a tuple - concatenation, repetition, membership;

- functions/methods – len(), tuple(), count(), index(), sorted(), min(), max(), sum()
- Nested tuples
- Tuple slicing
- Finding the minimum, maximum, mean of values stored in a tuple
- linear search on a tuple of numbers, counting the frequency of elements in a tuple.

PRACTICAL:

- Programs based on Python tuples and dictionary

NOVEMBER

- **Dictionary**
 - Definition and Creation.
 - Accessing elements of a dictionary, add an item, modify an item in a dictionary
 - Traversal, functions/methods – len(), dict(), keys(), values(), items(), get(), update(), del(), del, clear(), fromkeys(), copy(), pop(), popitem(), setdefault(), max(), min(), count(), sorted().
 - Suggested programs: count the number of times a character appears in a given string using a dictionary, create a dictionary with names of employees, their salary and access them.

PRACTICAL:

- Programs based on Python tuples, dictionary and Python modules.

DECEMBER

- **Introduction to Python modules**
 - Introduction to functions – Declaring a function, passing an argument to a function, User Defined Functions, Scope of a Variable, Python Standard Library.
 - Importing module using 'import ' and using from statement, importing math module (sqrt, ceil, floor, pow, fabs, sin, cos, tan); random module (random, randint, randrange), statistics module (mean, median, mode)

PRACTICAL:

- Programs based on Python tuples, dictionary and Python modules.

JANUARY

Unit 3: Society, Law and Ethics

- **Societal Impacts**
 - Safely browsing the web
 - Protection while using networks
 - Cybercrime
 - Network security threats
 - Safely communicating Data-secure Connection
 - Identity Verification
 - Gender and disability issues while teaching and using computers
 - Technology and society: understanding of societal issues and cultural changes induced by technology.
 - E-waste management: proper disposal of used electronic gadgets.
 - Identity theft, unique ids and biometrics.
 - Gender and disability issues while teaching and using computers.

PRACTICAL:

- Create a Power Point presentation on any topic from Cyber safety and programming from Python.

FEBRUARY- MARCH

Revision and Final Examination

Syllabus for Examination

Unit Test I	Ch 1: Computer system Ch 2: Encoding Schemes and Number System Ch 4: Introduction to problem solving
Half Yearly (Theory)	Ch 1: Computer system Ch 2: Encoding Schemes and Number System Ch 4: Introduction to problem solving Ch 5: Getting started with Python Ch 6: Flow of control Ch 8: Strings
Practical (30)	Programming from Python
Unit Test II	Ch 9: Lists in Python Ch 10: Tuples and Dictionaries
Final Examination (Theory)	Ch 1: Computer system Ch 2: Encoding Schemes and Number System Ch 4: Introduction to problem solving Ch 5: Getting started with Python Ch 6: Flow of control Ch 7: Functions Ch 8: Strings Ch 9: Lists in Python Ch 10: Tuples and Dictionaries Ch 11: Societal Impacts
Practical (30)	Programming from Python

PHYSICAL EDUCATION

General Objectives:

- Awareness regarding the importance of physical fitness in individual and social life including life skills.
- Bring the overall awareness of values with regards to personal health and fitness and to inculcate among students the desired habit and attitude toward health to raise their health status.
- To make the pupil physically, mentally and emotionally fit and to develop such person and social qualities that will help them to be good human being.
- Individually and collectively to protect and promote (own health)(health of family member)and (health of the surrounding communities and seeking help when required from available community resources..
- To develop interest in exercise sports and games for self satisfaction and make it a part of a life
- Will an individual to enhance in a qualities self must re discipline courage confidence and efficiency
- To Enable and individual to display a sense of responsibility, patriotism, self sacrifice and services to the community.

Marks Distribution (Practical)

S.No.	Practical	Marks
1.	Physical Fitness Test: SAI Khelo India Test, Brockport Physical Fitness Test (BPFT)	6
2.	Proficiency in Games and Sports - (Skill of any one IOA recognised Sport/Game of Choice)	7
3.	Yogic Practices	7
4.	Record File	5
5.	Viva Voce (Health/ Games & Sports/ Yoga	5

MAY

Unit I Changing Trends & Career in Physical Education

- Concept, Aims & Objectives of Physical Education
- Changing Trends in Sports- playing surface, wearable gears and sports equipment, technological advancements
- Career Options in Physical Education
- Khelo-India and Fit-India Program

Unit II Olympis

- Ancient and Modern Olympics
- Olympism – Concept and Olympics Values (Excellence, Friendship & Respect)
- Olympics - Symbols, Motto, Flag, Oath, and Anthem
- Olympic Movement Structure - IOC, NOC, IFS, Other members

JULY

Unit III Yoga

- Meaning & Importance of Yoga
- Introduction to Ashtanga Yoga

- Introduction to Yogic Kriyas (Shat Karma)

AUGUST

Unit IV Physical Education & Sports for CWSN (Children with Special Needs - Divyang)

- Concept of Disability and Disorder
- Types of Disability, its causes & nature (Intellectual disability, Physical disability)
- Aim & Objective of Adaptive Physical Education

- Role of various professionals for children with special needs (Counsellor, Occupational Therapist, Physiotherapist, Physical Education Teacher, Speech Therapist & Special Educator)

Unit V Physical Fitness, Health and Wellness

- Meaning and Importance of Wellness, Health and Physical Fitness
- Components/Dimensions of Wellness, Health and Physical Fitness
- Traditional Sports & Regional Games for promoting wellness

SEPTEMBER

Revision and Half-yearly Examination

OCTOBER

Unit VI Test, Measurement & Evaluation

- Concept of Test, Measurement & Evaluation in Physical Education & sports.
- Classification of Test in Physical Education and Sports.
- Test administration guidelines in physical education and sports

NOVEMBER

Unit VII Fundamentals of Anatomy, Physiology in Sport

- Definition and Importance of Anatomy and Physiology in exercise and sports
- Functions of Skeletal system, classification of bone and types of joints.
- Function and Structure of Circulatory system and heart.
- Function and Structure of Respiratory system.

Unit VIII Fundamentals of Kinesiology and Biomechanics in Sports

- Definition and Importance of Kinesiology and Biomechanics in sports
- Principles of Biomechanics
- Types of Body Movements - Flexion, Extension, Abduction, Adduction, Rotation, Circumduction, Supination & Pronation
- Axis and Planes – Concept and its application in body movements

DECEMBER

Unit IX Psychology & Sports

- Definition & Importance of Psychology in Physical Education & Sports
- Adolescent Problems & Their Management
- Team Cohesion and Sports

JANUARY

Unit X Training and Doping in Sports

- Concept and Principles of Sports Training
- Training Load: Over Load, Adaptation, and Recovery
- Concept of Doping and its disadvantages

FEBRUARY – MARCH

Revision and Final Examination

Syllabus for Examination

EXAMINATION	CHAPTERS
Unit Test- 1	Unit I Changing Trends & Career in Physical Education Unit II Olympism
Half- Yearly Examination	Unit I Changing Trends & Career in Physical Education Unit II Olympism Unit III Yoga Unit IV Physical Education & Sports for CWSN (Children with Special Needs - Divyang) Unit V Physical Fitness, Health and Wellness
Unit Test- 2	Unit VI Test, Measurement & Evaluation Unit VII Fundamentals of Anatomy, Physiology in Sports
Final Examination	Complete Syllabus

