Bosco public school
Sunder Vihar, Paschim Vihar, New Delhi
www.boscoschool.com
CLASS XII SCIENCE
SYLLABUS 2024-2025

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 presentation 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.

Marks Division

Section	Marks
Reading Comprehension	20
Creative Writing Skills	20
Textbooks and Supplementary Reading Text	40
	80
ASL and Project File	**10 + 10**
Total	**100**

APRIL

Reading : Unseen Passage

Writing : Notice Writing

Literature : Flamingo

- Chapter 1 - The Last Lesson
- My Mother at Sixty-six (Poem)

Vistas

- Chapter 1 - The Third Level

MAY

Reading : Unseen Passage

Writing : Letter to the Editor, Article

Literature : Flamingo

- Chapter 3 - Deep Water
- Keeping Quiet (Poem)

Vistas

- Chapter 6 - On the Face of It

JULY

Reading : Unseen Passage

Writing : Job Application, Report Writing

Literature : Flamingo

- Chapter 5 - Indigo
- Chapter 4 - The Rattrap
- Roadside Stand (Poem)

Vistas

- Chapter 4 - The Enemy

AUGUST

Reading : Unseen Passage

Writing : Formal & Informal Invites and Replies

Literature : Flamingo

- A Thing of Beauty (Poem)
- Chapter 2 - Lost Spring

Vistas

- Chapter 2 - Tiger King
- Chapter 3 - Journey to the End of the Earth

Assessment of Listening and Speaking Skills

SEPTEMBER **:** Revision and Half Yearly Examination

OCTOBER

Reading : Unseen Passage

Literature : Flamingo

- Aunt Jennifer's Tiger (Poem)
- Chapter 7 - The Interview
- Chapter 6 - Poets and Pancakes
- Chapter 8 - Going Places

Vistas

- Chapter 8 - Memories of Childhood

NOVEMBER **:** Revision

Assessment of Listening and Speaking Skills

Project Work

DECEMBER **:** Revision and Pre - Board Examination I

JANUARY **:** Pre-Board Examination II

Syllabus for Examination

Unit Test 1 **Half Yearly Examination**	**Reading**: Unseen Passage **Writing:** Notice Writing **Literature:** ● Ch - 1 The Last Lesson ● My Mother at Sixty-six (Poem) **Reading**: Unseen Passage **Writing**: Notice Writing, Letter to the Editor, Article, Job Application, Report, Formal & Informal Invites and Replies **Literature:** Flamingo ● Ch - 1 The Last Lesson ● Ch - 2 Lost Spring ● My Mother at Sixty-six (Poem) ● Ch - 3 Deep Water ● Roadside Stand (Poem) ● Ch - 5 Indigo ● Ch - 4 The Rattrap ● Keeping Quiet (Poem) ● A Thing of Beauty (Poem) ● Roadside Stand (Poem) Vistas ● Ch - 1 The Third Level ● Ch - 2 Tiger King ● Ch - 3 Journey to the End of the Earth ● Ch - 4 The Enemy ● Ch - 6 On the Face of It
Pre- Board Examination 1	Complete Syllabus
Pre- Board Examination 2	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.

S. No	UNITS	MARKS
1	Relation and Function	8
2	Algebra	10
3	Calculus	35
4	Vector and Three-Dimensional Geometry	14
5	Linear Programming	5
6	Probability	8
	Total	80
	Internal Assessment	20

APRIL

- **Chapter 2 : Inverse trigonometric functions**

  Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions

- **Chapter-3: Matrices**

  Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. On- commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries

MAY

- **Chapter-4: Determinants**

  Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

- **Chapter-5: Continuity and differentiability**

  Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, $like\ \sin^{-1}$, $\cos^{-1} x$ and $\tan^{-1} x$, derivative of implicit functions. Concept of exponential and logarithmic functions.

  Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

JULY

- **Chapter-5: Continuity and Differentiability(continued)**

- **Chapter-6: Application of Derivatives**
  Applications of derivatives: rate of change of bodies, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as reallife situations).
- **Chapter-1 : Relation and Function**
  Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

AUGUST

- **Chapter-12: Linear Programming**
  Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).
- **Chapter-7: Integrals**
  Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

SEPTEMBER

Revision and Half Yearly Examination

OCTOBER

- **Chapter-7: Integrals (continued)**
- **Chapter-8: Application of Integrals**
  Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)
- **Chapter-9: Differential equation**
  Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

NOVEMBER

- **Chapter-10: Vectors**
  Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

- **Chapter-11: Three- Dimensional Geometry**
  Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between two lines.

- **Chapter-13: Probability**
  Conditional probability, multiplication theorem on probability, independent events, total probability,

Bayes' theorem, Random variable and its probability distribution, mean of random variable.

DECEMBER

Revision and pre-board -1 examination

JANUARY

Pre-board- 2 examination

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test-1	● Ch.2. Inverse Trigonometric Functions ● Ch.3: Matrices ● Ch.4: Determinants
Half-Yearly Exam	● Ch.1: Relation and functions ● Ch.2 Inverse Trigonometric Functions ● Ch.3: Matrices ● Ch.4: Determinants ● Ch.5: Continuity and Differentiability ● Ch.6 : Application of Derivatives ● Ch.12: Linear Programming
Pre-board 1	● Complete Syllabus
Pre-board 2	● 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	Chapter Name	Marks
1.	Unit 1	Electrostatics Chapter–1: Electric Charges and Fields Chapter–2: Electrostatic Potential and Capacitance	23
2.	Unit 2	Current Electricity Chapter–3: Current Electricity	
3.	Unit 3	Magnetic effect of current & Magnetism Chapter–4: Moving Charges and Magnetism Chapter–5: Magnetism and Matter	
4.	Unit 4	Electromagnetic Induction and Alternating current Chapter–6: Electromagnetic Induction Chapter–7: Alternating Current	17
5.	Unit 5	Electromagnetic Waves Chapter–8: Electromagnetic Waves	
6.	Unit 6	Optics Chapter–9: Ray Optics and Optical Instruments Chapter–10: Wave Optics	
7.	Unit 7	Dual Nature of Matter Chapter–11: Dual Nature of Radiation and Matter	20
8.	Unit 8	Atoms and Nuclei Chapter–12: Atoms Chapter–13: Nuclei	
9.	Unit 9	Electronic Devices Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits	
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**

APRIL

UNIT 1: ELECTROSTATICS

- **Chapter 1: Electric Charges and Fields**
  Electric charges, Conservation of charge, Coulomb's law-force between two-point charges, forces between multiple charges; superposition principle and continuous charge distribution. Electric field, electric field due to a point charge, electric field lines, electric dipole, electric field due to a dipole, torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

MAY

UNIT 1: ELECTROSTATICS

- **Chapter 2: Electrostatic Potential and Capacitance**
  Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two-point charges and of electric dipole in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor (no derivation, formulae only).

UNIT 2: CURRENT ELECTRICITY

- **Chapter 3: Current Electricity**
  Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance, Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's rules, Wheatstone bridge

PRACTICALS

- To determine resistivity of two / three wires by plotting a graph for potential difference versus current.
- To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.

JULY

UNIT 3: MAGNETIC EFFECTS OF CURRENT AND MAGNETISM

- **Chapter 4: Moving Charges and Magnetism**
  Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long straight wire. Straight solenoid (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields. Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere, torque experienced by a current loop in uniform magnetic field; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer, its current sensitivity and conversion to ammeter and voltmeter

- **Chapter 5: Magnetism and Matter**
  Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis

(qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines. Magnetic properties of materials- Para-, dia- and ferro - magnetic substances with examples, Magnetization of materials, effect of temperature on magnetic properties.

Unit 4: Electromagnetic Induction and Alternating Currents

- **Chapter 6: Electromagnetic Induction**
  Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Self and mutual induction.

PRACTICALS

- To find the frequency of AC mains with a sonometer.
- To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

Activities

- To assemble the components of a given electrical circuit.
- To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
- To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

AUGUST

Unit 4: Electromagnetic Induction and Alternating Currents

- **Chapter 7: Alternating Current**
  Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattless current. AC generator, Transformer.

UNIT 5: Electromagnetic waves

- **Chapter 8: Electromagnetic Waves**
  Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

UNIT 6: OPTICS

- **Chapter 9: Ray Optics and Optical Instruments**
  Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism. Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

PRACTICALS

- To find the value of v for different values of u in case of a concave mirror and to find the focal length.
- To find the focal length of a convex mirror, using a convex lens.

SEPTEMBER

Revision for Half-Yearly examinations

OCTOBER

UNIT 6: OPTICS

- **Chapter 10: Wave optics**
  Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygens's principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).

Unit 7: Dual Nature of Radiation and Matter

- **Chapter 11:** Dual Nature of Radiation and Matter
  Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light. Experimental study of photoelectric effect Matter waves-wave nature of particles, de-Broglie relation.

Unit 8: Atoms and Nuclei

- **Chapter 12: Atoms**
  Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity, and energy of electron in his orbit, of hydrogen line spectra (qualitative treatment only)

PRACTICALS

- To draw the I-V characteristic curve for a p-n junction diode in forward and reverse bias.
- To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.

Activities

- To observe diffraction of light due to a thin slit.
- To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.
- To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.

NOVEMBER

- **Chapter 13: Nuclei**
  Composition and size of nucleus, nuclear force Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

Unit 9: Electronic Devices

- **Chapter 14: Semiconductor Electronics: Materials, Devices and Simple Circuits**
  Energy bands in conductors, semiconductors, and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier

DECEMBER

Pre - Board Examination I

JANUARY

Pre - Board Examination II

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test-1	Ch–1: Electric Charges and Fields Ch-2: Electrostatic Potential and Capacitance
Half-Yearly Examination	Ch–1: Electric Charges and Fields. Ch–2: Electrostatic Potential and Capacitance Ch–3: Current Electricity Ch–4: Moving Charges and Magnetism Ch–5: Magnetism and Matter Ch–6: Electromagnetic Induction Ch–7: Alternating Current Ch-8: Electromagnetic Waves Ch-9: Ray Optics and Optical Instruments
Pre-Board Examination 1	Complete Syllabus
Pre-Board Examination 2	Complete Syllabus

CHEMISTRY

General objectives:

- To promote understanding of the 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 the different processes used in industries and their technological applications.
- To acquaint students with the different aspects of Chemistry in daily life.
- To develop an interest in students towards studying chemistry as a discipline.

Marks Distribution (Theory)

S. No.	Unit	Chapter Name	Marks
1.	Unit 1	Solutions	7
2.	Unit 2	Electrochemistry	9
3.	Unit 3	Chemical Kinetics	7
4.	Unit 4	d and f block elements	7
5.	Unit 5	Coordination compounds	7
6.	Unit 6	Haloalkanes and Haloarenes	6
7.	Unit 7	Alcohols, Phenols and Ethers	6
8.	Unit 8	Aldehydes, Ketones and Carboxylic Acids	8
9.	Unit 9	Amines	6
10.	Unit 10	Biomolecules	7
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**

APRIL

THEORY

- **Chapter 6: Haloalkanes and Haloarenes**
  Nomenclature, nature of c-x bond, physical and chemical properties, mechanism of substitution reactions, uses and environmental effects of chloroform tetrachloromethane, iodoform.
- **Chapter 1: Solutions**
  Types of solutions, expressions of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses, abnormal molecular masses, Van't Hoff factor.

PRACTICALS

- To prepare lyophilic and lyophobic sol of starch and ferric hydroxide respectively.
- Effect of concentration and temperature on rate of reaction between sodium thiosulphate

and hydrochloric acid.

MAY

THEORY

- **Chapter 7: Alcohols, Phenols and Ethers**
  Nomenclature, preparation, physical and chemical properties; identification of 1°, 2° and 3° alcohols, mechanism of Acidic nature of phenol electrophilic substitution reactions, uses of phenol and ethers.
- **Chapter 3: Chemical kinetics**
  Rate of a reaction, factors affecting rate of reaction: concentration, temperature, catalyst. Order and molecularity of a reaction. Rate law and specific rate constant, integrated rate equation (zero and first order), collision theory, activation energy, Arrhenius equation.

PRACTICALS

- Preparation of standard solution of oxalic acid and mohr's salt.
- Preparation of Mohr's salt or potash alum.
- To determine molarity and strength of given $KMnO_4$ solution by titrating it against M/20 Oxalic acid solution.
- To determine the molarity and strength of given $KMnO_4$ solution by titrating it against M/50 Mohr salt solution.

JULY

THEORY

- **Chapter 2: Electrochemistry**
  Redox reactions, conductance in electrolytic solutions, specific and molar conductivity, variation of conductivity with concentration, Kohlrausch's law, electrolysis and laws of electrolysis, dry cell and galvanic cells, lead accumulator EMF of cell, Nernst equation, fuel cell, corrosion.
- **Chapter 8: Aldehydes, Ketones and Carboxylic Acids**
  Nomenclature, preparation, physical and chemical properties, uses Mechanism of nucleophilic addition, reactivity of Hydrogen in aldehydes, reactivity in ketones and carboxylic acids.

PRACTICALS

- Separation of constituents of flowers using paper chromatography.
- Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given food stuffs.

AUGUST

THEORY

- **Chapter 9: Organic Compounds containing Nitrogen**
  Amines and Diazonuim salts: Nomenclature, preparation, physical and chemical properties, uses. Identification of 1°, 2°and 3° amines.
- **Chapter 4: d- and f- block elements**
  General introduction, electronic configuration, occurence and characteristics of TM's, General characteristics, ionization enthalpy, oxidation states ionic radii, colour catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

PRACTICALS

- Test for functional groups present in organic compounds.
- Qualitative analysis.

- Preparation of Di-benzal acetone and p-Nitroacetanilide.

SEPTEMBER

Revision and Half yearly examinations

OCTOBER

THEORY

- **Chapter 5: Co-ordination compounds**
  Introduction, Werner's theory, Some important terms-(ligands, co-ordination number, etc), colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear co-ordination compounds. Bonding, isomerism, importance of co-ordination compounds.

PRACTICALS

- Test for functional groups present in organic compounds.
- Qualitative analysis.

NOVEMBER

THEORY

- **Chapter 10: Biomolecules**
  Carbohydrates: classification, Monosaccharides (glucose and fructose), Oligosaccharides (sucrose, lactose, maltose), importance Proteins: Elementary idea of amino acids, peptide bond, polypeptides, proteins, Structure of 1°, 2°, 3° and quarternary amines (qualitative idea only), denaturation of proteins. Vitamins: Classification and functions Nucleic Acids: DNA and RNA.

PRACTICAL

- Qualitative analysis

DECEMBER

Revision and Pre-Board Examination I

JANUARY

Pre-Board Examination II

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test-1	● Ch-1: Solutions ● Ch-6: Haloalkanes and Haloarenes
Half-Yearly Exam	● Ch-1: Solutions ● Ch-6: Haloalkanes and Haloarenes ● Ch-7: Alcohols, Phenols and Ethers ● Ch-3: Chemical Kinetics ● Ch-2: Electrochemistry ● Ch-8: Aldehydes, Ketones and Carboxylic Acids ● Ch-4: d- and f- block elements
Pre-Board 1	● Complete Syllabus
Pre-Board 2	● 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.	VI	Reproduction	16
2.	VII	Genetics and Evolution	20
3.	VIII	Biology and Human Welfare	12
4.	IX	Biotechnology and its Applications	12
5.	X	Ecology and Environment	10
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**

APRIL

THEORY

Unit-VI: Reproduction

- **Chapter-1: Sexual reproduction in flowering plants**: Flower structure; Development of male and female gametophytes; Pollination-types, agencies and examples; Outbreeding devices; Pollen-Pistil interaction; Double fertilization; Post fertilization events-Development of endosperm and embryo, Development of seed and formation of fruit; Special modes-apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation.
- **Chapter-2: Human Reproduction**: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis - spermatogenesis & oogenesis; Menstrual cycle; Fertilisation embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).
- **Chapter-3: Reproductive Health**: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control- Need and methods, Contraception

and medical termination of pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies- IVF, ZIFT, GIFT (Elementary idea for general awareness)

PRACTICALS:

- Prepare a temporary mount to observe pollen germination.
- Pollen germination on stigma through a permanent slide or scanning electron micrograph.
- Controlled pollination - emasculation, tagging and bagging.
- Flowers adapted to pollination by different agencies (wind, insect).
- Identification of stages of gamete development i.e. T.S. testis and T.S. ovary through permanent slides (from any mammal).
- T.S. of blastula through permanent slides.

MAY

THEORY

Unit-VII: Genetics and Evolution

- **Chapter-4: Principles of Inheritance and Variation**: Heredity and variation, Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; linkage and crossing over; Sex determination - in human being, birds, grasshopper and honey bee; Mutation, Pedigree analysis, sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans –sickle cell anaemia, Phenylketonuria, thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.
- **Chapter-5: Molecular Basis of Inheritance**: Structure of DNA and RNA; DNA packaging; Search for genetic material and DNA as genetic material; DNA replication; Central Dogma; transcription, genetic code, translation.

PRACTICALS:

- Mendelian inheritance using seeds of different colour/sizes of any plant.
- Prepared pedigree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, colour blindness.
- Meiosis in onion bud cell or grasshopper testis through permanent slides.

JULY

THEORY

Unit-VII: Genetics and Evolution

- **Chapter-5: Molecular Basis of Inheritance**: Gene expression and regulation - lac operon; Human genome project; DNA fingerprinting.
- **Chapter-6: Evolution:** Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; adaptive radiation; human evolution.

PRACTICALS:

- To isolate DNA from pea seeds / palak.
- Flash cards models showing examples of homologous and analogous organs.

AUGUST

THEORY

Unit-VIII: Biology and Human Welfare

- **Chapter-7: Human Health and Diseases:** Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia,

common cold, amoebiasis, ringworm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

- **Chapter-8: Microbes in Human Welfare:** Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as biocontrol agents and bio-fertilizers. Antibiotics; production and judicious use.

Unit-IX: Biotechnology and its Applications

- **Chapter-9: Biotechnology - Principles and Processes:** Genetic Engineering (Recombinant DNA Technology).

PRACTICAL:

- Identification of common disease- causing organisms like Ascaris, Entamoeba, Plasmodium, ringworm through permanent slides or specimens. Comment on symptoms of disease that they cause.

SEPTEMBER

Revision and Mid Term Examination

OCTOBER

THEORY

Unit-IX: Biotechnology and its Applications

- **Chapter-10: Biotechnology and its Application**: Application of biotechnology in health and agriculture: genetically modified organisms - Bt crops; RNA interference, Human insulin, gene therapy; molecular diagnosis; transgenic animals; biosafety issues, biopiracy and patents.

Unit-X: Ecology and Environment

- **Chapter-11: Organisms and Populations:** Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution.

PRACTICALS:

- Prepare a temporary mount of onion root tip to study mitosis.
- Study the plant population density by quadrat method.
- Study the plant population frequency by quadrat method.

NOVEMBER

THEORY

Unit-X: Ecology and Environment

- **Chapter-12: Ecosystem-** Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy.
- **Chapter-13: Biodiversity and Conservation:** Biodiversity - Concept, levels, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

PRACTICAL:

- Models/ specimens showing symbiotic association in root nodules of leguminous plants, Cuscuta on host, lichens.

DECEMBER

Revision and Pre-Board Examination I

JANUARY

Pre-Board Examination II

Syllabus for examination

EXAMINATION	CHAPTERS
Unit Test – 1	● Chapter-1: Sexual reproduction in flowering plants ● Chapter-2: Human Reproduction ● Chapter-3: Reproductive Health
Mid Term Examination	● Chapter-1: Sexual reproduction in flowering plants ● Chapter-2: Human Reproduction ● Chapter-3: Reproductive Health ● Chapter-4: Principles of Inheritance and Variation ● Chapter-5: Molecular Basis of Inheritance ● Chapter-6: Evolution ● Chapter-7: Human Health and Diseases ● Chapter-8: Microbes in Human Welfare
Pre- Board 1	Complete syllabus
Pre- Board 2	Complete syllabus

COMPUTER SCIENCE

General Objectives:

- Understand the concept of functions.
- Learn file handling.
- Learn basic data structures: lists and stacks
- Get a basic understanding of computer networks: network stack, basic network hardware, basic protocols, and basic tools.
- Connect a Python program with an SQL database, and learn aggregation functions in SQL.
- SQL along with connectivity between Python and SQL

Marks Distribution (Theory)

Unit No.	Unit Name	Marks
1	Computational Thinking and Programming-2	40
2	Computer Networks	10
3	Database Management	20

APRIL

- **Revision of the basics of Python:**
  Revision of syllabus for class XI
- **Functions:**
  Types of function (built-in functions, functions defined in module, user defined functions)

Practical:

Programs based on List, Strings, Tuples, Dictionaries, Functions, Modules in Python and standard Python Libraries.

MAY

- **Functions (Contd..)**
  Creating user defined function, arguments and parameters, default parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)
- **Data File Handling:**
  File handling: Need for a data file, Types of file: Text files, Binary files and CSV (Comma separated values) files.
  - Text File: Basic operations on a text file: Open (filename – absolute or relative path, mode) / Close a text file, Reading and Manipulation of data from a text file, Appending data into a text file, standard input / output and error streams, relative and absolute paths.
  - Binary File: Basic operations on a binary file: Open (filename – absolute or relative path, mode) / Close a binary file, Pickle Module – methods load and dump; Reading from file.

Practical:

Programs based on Data file handling.

JULY

- **Data File Handling (contd.)**
    - Binary File: Write/Create, Search, Append and Update operations in a binary file
    - CSV File: Import csv module, functions – Open / Close a csv file, Read from a csv file and Write into a csv file using csv.reader( ) and csv.writerow( ).

Practical:

Programs based on Data file handling.
Allocation and working on CBSE Project

AUGUST

- **Data-Structures in Python:**
  Implementation of Stacks using list. (creating, adding elements, checking, deleting and traversing in Stacks)

Practical:

Programs based on Data file handling and Data Structures in Python.

SEPTEMBER

- **Revision for Half Yearly Exam**

OCTOBER

- **Database Management:**
    - Database Concepts: Introduction to database concepts and its need.
      Relational data model: Concept of domain, relation, tuple, attribute, degree, cardinality, key, primary key, candidate key, alternate key and foreign key;
    - Structured Query Language:
      General Concepts: Advantages of using SQL, Data Definition Language and Data Manipulation Language; Data Types: number / decimal/ character / varchar / date;
    - SQL commands: CREATE TABLE, DROP TABLE, ALTER TABLE, UPDATE SET...., INSERT, DELETE; SELECT, DISTINCT, FROM, WHERE, IN, BETWEEN, LIKE, NULL / IS NULL, ORDER BY, GROUP BY, HAVING;
      SQL functions: SUM ( ), AVG ( ), COUNT ( ), MAX ( ) and MIN ( );
      Joins: equi-join and natural join

- **Interface of Python with an SQL database**
    - Connecting SQL with Python
    - Creating Database connectivity Applications
    - Performing Insert, Update, Delete queries
    - Display data by using fetchone(), fetchall(), rowcount()

Practical:

Connectivity of Python with MySQL and working with MySQL.

NOVEMBER

- **Computer Networks:**
  Evolution of networking: introduction to computer networks, evolution of networking (ARPANET, NSFNET, INTERNET)
  Data communication terminologies: concept of communication, components of data

communication (sender, receiver, message, communication media, protocols), measuring capacity of communication media (bandwidth, data transfer rate), IP address, switching techniques (Circuit switching, Packet switching)
Transmission media: Wired communication media (Twisted pair cable, Co-axial cable, Fiber-optic cable), Wireless media (Radio waves, Micro waves, Infrared waves
Network devices (Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, Gateway, WIFI card)
Network topologies and Network types: types of networks (PAN, LAN, MAN, WAN), networking topologies (Bus, Star, Tree)
Network protocol: HTTP, FTP, PPP, SMTP, TCP/IP, POP3, HTTPS, TELNET, VoIP
Introduction to web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup

DECEMBER

Revision and Pre-Board - I Examination

JANUARY

Pre-Board - II Examination

Syllabus for Examination

Unit Test I	Ch 1: Revision of the basics of Python Ch 2: Functions Ch 4: Data File handling (Text files)
Half Yearly Examination	Ch 1: Revision of the basics of Python Ch 2: Functions Ch 4: Data File Handling (Text Files, Binary Files and CSV Files) Ch 6: Data Structures
Preboard I and II Examination	Ch 1: Revision of the basics of Python Ch 2: Functions Ch 4: Data File Handling (Text Files, Binary Files and CSV Files) Ch 6: Data Structures Ch 7: Database Concepts and SQL Commands Ch 8: Computer Networks
Practical Examination Half Yearly Preboard	Revision of the basics of Python Data File Handling Functions Data Structures Viva, File & Project Complete Practical part Viva, File & Project

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 members) and (heath of the surrounding communities and seek 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 an 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 Spos - (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

APRIL

Unit I Management of Sporting Events

- Functions of Sports Events Management (Planning, Organising, Staffing, Directing & Controlling)
- Various Committees & their Responsibilities (pre; during & post)
- Fixtures and its Procedures – Knock-Out (Bye & Seeding) & League (Staircase & Cyclic)

MAY

Unit II Children & Women in Sports

- Common Postural Deformities - Knock Knee; Bow Legs; Flat Foot; Round Shoulders; Lordosis, Kyphosis, and Scoliosis and their corrective measures
- Special consideration (Menarche & Menstrual Dysfunction)
- Female Athletes Triad (Osteoporosis, Amenorrhea, Eating Disorders)

Unit III Yoga as Preventive measure for Lifestyle Disease

- Obesity: Procedure, Benefits & Contraindications for Tadasana, Katichakrasana, Pavanmuktasana, Matsayasana, Halasana, Pachimottansana, Ardha – Matsyendrasana, Dhanurasana, Ushtrasana, Suryabedhan pranayama.
- Diabetes: Procedure, Benefits & Contraindications for Katichakrasana, Pavanmuktasana,Bhujangasana, Shalabhasana, Dhanurasana, Supta-vajarasana, Paschimottanasana, Ardha-Mastendrasana, Mandukasana, Gomukasana, Yogmudra, Ushtrasana, Kapalabhati.
- Asthma: Procedure, Benefits & Contraindications for Tadasana, Urdhwahastottansana, UttanMandukasana, Bhujangasana, Dhanurasana, Ushtrasana, Vakrasana, Kapalbhati, Gomukhasana Matsyaasana, Anuloma-Viloma.
- Hypertension: Procedure, Benefits & Contraindications for Tadasana, Katichakransan,
  Uttanpadasana, Ardha Halasana, Sarala Matyasana, Gomukhasana, UttanMandukasana, Vakrasana, Bhujangasana, Makarasana, Shavasana, Nadi-shodhanapranayam, Sitlipranayam.

JULY

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

- Organizations promoting Disability Sports (Special Olympics; Paralympics; Deaflympics)
- Advantages of Physical Activities for children with special needs.
- Strategies to make Physical Activities assessable for children with special needs.

Unit V Sports & Nutrition

- Concept of balance diet and nutrition
- Macro and Micro Nutrients: Food sources & functions
- Nutritive & Non-Nutritive Components of Diet

AUGUST

Unit VI Test & Measurement in Sports

- Fitness Test – SAI Khelo India Fitness Test in school:

  Age group 5-8 yrs/ class 1-3: BMI, Flamingo Balance Test, Plate Tapping Test

  Age group 9-18yrs/class 4-12: BMI, 50mt Speed test, 600mt Run/Walk, Sit & Reach flexibility test, Strength Test (Abdominal Partial Curl Up, Push-Ups for boys, Modified Push-Ups for girls).
- Computing Basal Metabolic Rate (BMR)
- Rikli & Jones - Senior Citizen Fitness Test

  I. Chair Stand Test for lower body strength
  II. Arm Curl Test for upper body strength
  III. Chair Sit & Reach Test for lower body flexibility
  V. Eight Foot Up & Go Test for agility
  VI. Six Minute Walk Test for Aerobic Endurance

OCTOBER

Unit VII Physiology & Injuries in Sports

- Physiological factors determining components of physical fitness
- Effect of exercise on Muscular System
- Effect of exercise on Cardio-Respiratory System

- Sports injuries: Classification (Soft Tissue Injuries -Abrasion, Contusion, Laceration, Incision, Sprain & Strain; Bone & Joint Injuries - Dislocation, Fractures - Green Stick, Comminuted, Transverse Oblique & Impacted)

Unit VIII Biomechanics & Sports

- Newton's Law of Motion & its application in sports
- Equilibrium – Dynamic & Static and Centre of Gravity and its application in sports
- Friction & Sports
- Projectile in Sports
- Personality; its definition & types (Jung Classification & Big Five Theory)
- Meaning, Concept & Types of Aggressions in Sports
- Psychological Attributes in Sports – Self Esteem, Mental Imagery, Self Talk, Goal Setting

NOVEMBER

Unit X Training in Sports

- Concept of Talent Identification and Talent Development in Sports
- Introduction to Sports Training Cycle – Micro, Meso, Macro Cycle.
- Types & Method to Develop – Strength, Endurance and Speed
- Types & Method to Develop – Flexibility and Coordinative Ability

DECEMBER

Revision and Pre-Board - 1 Examination

JANUARY

Pre-Board - 2 Examination

Syllabus for Examination

EXAMINATION	CHAPTERS
Unit Test- 1	Unit I Management of Sporting Events Unit II Children & Women in Sports
Half- Yearly Exam	Unit I Management of Sporting Events Unit II Children & Women in Sports Unit III Yoga as Preventive measure for Lifestyle Disease Unit IV Physical Education & Sports for CWSN (Unit V Sports & Nutrition
Pre-Board Examination 1	Unit VI Test & Measurement in Sports Unit VII Physiology & Injuries in Sports
Pre-Board Examination 2	Complete Syllabus

PSYCHOLOGY

General Objectives:

- To understand human differences in functioning and psychological attributes, analyse psychometric theories of intelligence and examine special abilities' nature and measurement.
- Understanding the concept of self-concept, describing personality and its major approaches and assessment techniques.
- To understand the nature of stress, various coping strategies and exploring positive health promotion.
- To understand the concept of Abnormality, its causes, and the nature of various psychological disorders.
- Understanding the process of psychotherapy and its types, and rehabilitation of mentally ill.
- To understand attitude formation and the concept of prejudice and discrimination and ways to handle prejudice.
- Understanding the group formation, the types of groups and how group influences the behaviour.

APRIL
Unit 1: Variations in

UNITS	CLASS XI	MARKS
1.	Variations in Psychological Attributes	13
2.	Self and Personality	13
3.	Meeting Life Challenges	9
4.	Psychological Disorders	12
5.	Therapeutic Approaches	9
6.	Attitude and Social Cognition	8
7.	Social Influence and Group Processes	6
	Total (Theory)	**70**
	Practical & Project work	**30**
	Total (Theory+ Practical)	**100**

Psychological Attributes

- Introduction
- Individual Differences in Human Functioning
- Assessment of Psychological Attributes
- Intelligence
- Psychometric Theories of Intelligence, Information Processing Theory: Planning, Attention-arousal and Simultaneous successive Model of Intelligence, Triarchic Theory of Intelligence; Theory of Multiple Intelligences.
- Individual Differences in Intelligence
- Culture and Intelligence
- Emotional Intelligence
- Special Abilities: Aptitude: Nature and Measurement
- Creativity

Unit 2: Self and Personality

- Introduction
- Self and Personality

- Concept of Self
- Cognitive and Behavioral aspects of Self
- Culture and Self
- Concept of Personality
- Major Approaches to the Study of Personality
    1. Type Approaches
    2. Trait Approaches
    3. Psychodynamic Approach and Post Freudian Approaches
    4. Behavioral Approach
    5. Cultural Approach
    6. Humanistic Approach
- Assessment of Personality
    1. Self-report Measures
    2. Projective Techniques
    3. Behavioral Analysis

MAY

Unit 3: Meeting Life Challenges

- Introduction
- Nature, Types and Sources of Stress
- Effects of Stress on Psychological Functioning and Health
    1. Stress and Health
    2. General Adaptation Syndrome
    3. Stress and Immune System
    4. Lifestyle
- Coping with Stress
    1. Stress Management Techniques
- Promoting Positive Health and Well-being
    1. Life Skills
    2. Positive Health

JULY

Unit 4: Psychological Disorders

- Introduction
- Concepts of Abnormality and Psychological Disorders
    1. Historical Background
- Classification of Psychological Disorders
- Factors Underlying Abnormal Behavior
- Major Psychological Disorders
    1. Anxiety Disorders
    2. Obsessive-Compulsive and Related Disorders
    3. Trauma-and Stressor-Related Disorders
    4. Somatic Symptom and Related Disorders
    5. Dissociative Disorders
    6. Depressive Disorder
    7. Bipolar and Related Disorders
    8. Schizophrenia Spectrum and Other Psychotic Disorders
    9. Neurodevelopmental Disorders
    10. Disruptive, Impulse-Control and Conduct Disorders
    11. Feeding and Eating Disorders
    12. Substance Related and Addictive Disorders

AUGUST

Unit 5: Therapeutic Approaches

- Nature and Process of psychotherapy
    1. Therapeutic relationship
- Types of Therapies
    1. Behavior Therapy
    2. Cognitive Therapy
    3. Humanistic-Existential Therapy
    4. Alternative Therapies
    5. Factors contributing to healing in Psychotherapy
    6. Ethics in Psychotherapy
- Rehabilitation of the Mentally Ill

SEPTEMBER

Revision and Half-Yearly Examination

OCTOBER

Unit 6: Attitude and Social Cognition

- Introduction
- Explaining Social Behavior
- Nature and Components of Attitudes
- Attitude Formation and Change
    1. Attitude Formation
    2. Attitude Change
    3. Attitude-Behavior Relationship
- Prejudice and Discrimination
- Strategies for Handling Prejudice

NOVEMBER

Unit 7: Social Influence and Group Processes

- Introduction
- Nature and Formation of Groups
- Type of Groups
- Influence of Group on Individual Behavior
    1. Social Loafing
    2. Group Polarization

DECEMBER

Revision and Pre-Board Examination I

JANUARY

Pre-Board Examination II

Syllabus for Examination

Unit Test - 1	Unit 1: Variations in Psychological Attributes Unit 2: Self and Personality (Half Unit)
Half-Yearly Examination	Unit 1: Variations in Psychological Attributes Unit 2: Self and Personality Unit 3: Meeting Life Challenges Unit 4: Psychological Disorders

Pre-Board Examination- I	Complete Syllabus
Pre-Board Examination- II	Complete syllabus