



click to campus

## BCECE 2025 Syllabus with Subjects

The BCECE 2025 syllabus will cover Classes 11 and 12 Physics, Chemistry, Mathematics, Biology, and Agriculture. The complete syllabus is listed below.

### BCECE 2025 Physics Syllabus

#### Physical world and measurement

**Physics:** scope and excitement, nature of physical laws; Physics, technology and society. Need for  
**Measurement:** Units of measurement, systems of units. S.I. units, fundamental and derived units, length, mass and time measurements, accuracy and precision of measuring instruments, errors in measurement, significant figures, regular and irregular errors, Dimensions of physical quantities, dimensional analysis, and its applications.

#### Kinematics

**Topics:** Frame of reference, Motion in straight line, position time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity, uniformly accelerated motion, velocity time and position time graphs, relations for uniformly accelerated motion (graphical treatment), Elementary concepts of differentiation and integration for describing motion. Scalar and vector quantities : Position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number, addition and subtraction of vectors, relative velocity. Unit vector Resolution of a vector in plane-rectangular components, Motion in a plane, Cases of uniform velocity, and uniform acceleration - projectile motion, uniform circular motion.

Download more BCECE Previous Year Question Papers: [Click Here](#)

## **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 level circular road, vehicle on banked road).

## **Work, Energy and Power**

Scalar product of vector 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; conservation of mechanical energy (Kinetic and potential energies), non conservative forces, elastic and inelastic collisions in one and two dimension.

## **Motion of System of Particles and Rigid body**

Centre of mass of two-particle system, momentum, conservation and centre of mass motion, centre of mass of a rigid body, centre of mass of circular ring, disc, rod and sphere. Vector product of vectors: momentum of a force, torque angular momentum, conservation of angular momentum with some examples - Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motion, moment of inertia, radius of gyration, Values of M.I. for simple geometrical objects (no derivation), statement of parallel and perpendicular axes theorems and their applications.

## **Gravitation**

Keplar's laws of planetary motion, the universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy, gravitational potential, escape velocity, orbital velocity of satellite, geo-stationary satellites

## **Properties of Bulk Matter**

Topics: Elastic behavior, stress-strain relationship, Hooke's law, Young's modulus, Bulk modulus, Deformation, Shear modulus of rigidity, pressure due to fluid column, pascal's law and its applications / hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure. Viscosity, stoke's law terminal velocity, Reynold's number, Streamline and turbulent flow, Bernoulli's theorem and its applications, Surface energy and surface tension, angle of contact, application of surface tension, ideas to drop bubbles and capillary rise.

## Heat and Thermodynamics

Heat, temperature, thermal expansion, specific heat capacity, Calorimetry, change of state, latent heat, Heat transfer - conduction, convection and radiation, thermal conductivity, Newton's law of cooling, Thermal equilibrium and definition of temperature (Zeroth law of thermodynamics), Heat, work and Internal energy, First law of thermodynamics, Second law of thermodynamics, Reversible and irreversible processes, Heat engines and refrigerator

## Behavior of Perfect Gas and Kinetic Theory

Topics: Equation of state of a perfect gas, work done on compressing a gas. Kinetic theory of gases: Assumptions, concept of pressure, Kinetic energy and temperature, rms speed of gas molecules, degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases, concept of mean free path, Avogadro's number.

## Oscillations and Waves

Periodic motion - period, frequency, displacement as a function of time, periodic functions, simple harmonic motion (SHM) and its equation, phase, oscillation of a spring - restoring force and force constant energy in SHM - Kinetic and potential energies, simple pendulum - derivation of expression for its time period) free, forced and damped oscillations (qualitative ideas only), resonance. Wave motion, Longitudinal and transverse waves, speed of wave motion, Displacement relation for progressive waves, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effect.

## Electrostatics

Electric Charge; 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). 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 polarisation, 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, Van de Graaff generator.

## Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors, 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 laws and simple applications. Wheatstone bridge, Metre Bridge, Potentiometer - principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell.

## Magnetic effects of current & 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 and toroidal solenoids. Force on a moving charge in uniform magnetic and electric fields, Cyclotron. 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, moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter, Current loop as a magnetic dipole and its magnetic dipole moment, Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in an uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements, Para-, dia- and ferro- magnetic substances, with examples, Electromagnets and factors affecting their strengths, Permanent magnets.

## Electromagnetic Induction and Alternating currents

Electromagnetic induction: Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and Mutual inductance, Need for displacement current, Alternating currents, peak and rms value of alternating current/ voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current, AC generator and transformer.

## Electromagnetic Waves

Electromagnetic waves and their characteristics (qualitative ideas only), Transverse nature of electromagnetic waves, Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays gamma rays) including elementary facts about their uses.

## Optics

Reflection of light, spherical mirrors, mirror formula, Refraction of light, total internal reflection and its Applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula, magnification, power of a lens, combination of thin lenses in contact, Refraction and dispersion of light through a prism, Scattering of light-blue colour of the sky and reddish appearance of the sun at sunrise and sunset. Optical instruments; Human eye, image formation and accommodation, correction of eye defects (myopia, hypermetropia, presbyopia and astigmatism) using lenses, Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers. Wave optics: wave front and Huygens 'Principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygens 'Principle, Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light. Diffraction due to a single slit, width of central maximum, Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarised light; Brewster's law, uses of plane polarised light and Polaroids.

## Dual Nature of Matter and Radiation

Photoelectric effect Hertz and Lenard's observations: Einstein's photoelectric equation-particle nature of light, Matter waves-wave nature of particles, de Broglie relation. Davission-Germer experiment. Atoms and Nuclei. Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones, Radioactivity-alpha, beta and gamma particles/rays and their properties; radioactive decay law, Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission and fusion.

## Electronic Devices

Semiconductors; semiconductor diode - I-V characteristics in forward and reverse bias, diode as a rectifier; I-V characteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator, Logic gates (OR, AND, NOT, NAND and NOR), Transistor as a switch.

## **Communication Systems**

Elements of a communication system (block diagram nobly); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium, Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation, Need for modulation. Production and detection of an Amplitude-modulated wave.

## **BCECE 2025 Chemistry Syllabus**

### **Chapter- Some basic concepts of Chemistry:**

General Introduction: Importance and scope of chemistry. Historical approach to particulate nature of matter, laws of chemical combination, Dalton's atomic theory, the concept of elements, atoms and molecules, Atomic and molecular masses, Mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry

### **Chapter- States of Matter:**

Gases and liquids: Three states of matter, Intermolecular interactions, type of bonding, melting and boiling points, Role of gas laws in elucidating the concept of the molecule, Boyle's law, Charle's law, Gay Lussac's law Avogadro's law, Ideal behaviour, empirical derivation of gas equation, Avogadro's number. Ideal gas equation, Derivation from ideal behaviour, liquification of gases, critical temperature, Liquid State - Vapour pressure, viscosity and surface tension

### **Chapter- Structure of Atom:**

Discovery of electron, proton and neutron and their characteristics, atomic number, Isotopes & Isobars, Thomson's model and its limitation, Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, De Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals,

Quantum numbers, shapes of S.P. and D orbitals, rules, for filling electrons in orbitals Aufbau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atoms, the stability of half-filled and completely filled orbitals

### **Chapter- Chemical Bonding and Molecular Structure:**

Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, the polar character of the covalent bond, Covalent characters of Ionic bond, valence bond theory, resonance, the geometry of covalent molecules, VSEPR theory, the concept of hybridization involving s, p and d orbitals and shapes of some simple molecules, molecular orbital, the theory of homo nuclear diatomic molecules (qualitative idea only) Hydrogen bonding

### **Chapter- Classification of Elements and Periodicity in Properties:**

Significance of classification, a brief history of the development of periodic table, modern periodic law and the present form of the periodic table, periodic trends in properties of elements - atomic radii, ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, valence

### **Chapter- Equilibrium:**

Equilibrium in physical and chemical processes dynamic nature of equilibrium, the law of mass action, equilibrium constant, factors affecting equilibrium - Le Chatelier's principle, ionic equilibrium - ionization of acids and bases, strong and weak electrolytes, degree of ionization, the concept of pH. Hydrolysis of salts (elementary idea), buffer solutions, solubility product, common ion effect (with illustrative examples)

### **Chapter- Thermodynamics:**

Concepts of system, types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions, First law of thermodynamics - internal energy and enthalpy, heat capacity and specific heat, Hess's law of constant heat summation enthalpy of bond dissociation, combustion, formation, atomization, Sublimation, phase transformation, ionization and solution.

Download more BCECE Previous Year Question Papers: [Click Here](#)

Introduction of entropy as a state function, free energy change for the spontaneous and non-spontaneous process, criteria for equilibrium

## **Chapter- s-Block Elements (Alkali and Alkaline earth metals):**

Group 1 and Group 2 elements: General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii) trends in chemical reactivity with oxygen, water, hydrogen and halogens, uses Preparation and properties of some important compounds

## **Chapter - Some p-Block Elements:**

General Introduction pBlock Elements: Group 3 elements: General introduction, electronic configuration, occurrence, Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group, Boron-physical and chemical properties, some important compounds: borax, boric acids, boron hydrides, Aluminium: uses, reactions with acids and alkalis. Group 4 elements: General introduction, electronic configuration, occurrence, a variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first element, Carbon - catenation, allotropic forms, physical and chemical properties, uses of some important compounds Important compounds of Silicon and a few uses: Silicon tetrachloride, silicones, silicates and zeolite.

## **Chapter - p-Block Elements:**

Group 5 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties, nitrogen - preparation, properties and uses, compounds of nitrogen: preparation, properties and uses, compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only), Phosphorous-allotropic forms, compounds of phosphorous: preparation and properties of phosphine, halides ( $\text{PCl}_3$ ,  $\text{PCl}_5$ ) and oxoacids Group 6 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties,



dioxygen: preparation, properties and uses, simple oxides, Ozone, Sulphur-allotropic forms, compounds of sulphur: preparation, properties and uses of sulphur dioxide, sulphuric acid: industrial process of manufacture, properties and uses, oxoacids of sulphur Group 7 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties, compounds of halogens, preparation, properties and uses of chlorine and hydrochloric acid, inter-halogen compounds, oxoacids of halogens (structures only) Group 8 elements: General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses

### **Chapter- d- and f- Block Elements:**

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals - metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation preparation and properties of  $K_2Cr_2O_7$  and  $KMnO_4$  Lanthanides: electronic configuration, oxidation states, chemical reactivity and lanthanide contraction. Actinides: Electronic configuration, oxidation states Coordination Compounds: Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding, isomerism, importance of coordination Compounds (in qualitative analysis, extraction of metals and biological systems)

### **Chapter- Redox Reactions:**

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, applications of redox reactions

### **Chapter- Hydrogen:**

Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen, hydrides- ionic, covalent and interstitial, physical and chemical properties of water, heavy water, hydrogen peroxide - preparation, reactions and structure, hydrogen as a fuel

## **Chapter- Organic Chemistry- Some Basic Principles and Techniques:**

General introduction, methods of qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds Electronic displacements in a covalent bond, inductive effect, electrometric effect, resonance and hyper conjugation Haemolytic and heterolysis fission of a covalent bond: free radicals, carbocation's, carbanions, electrophiles and nucleophiles, types of organic reactions

## **Chapter- Hydrocarbons:**

Classification of hydrocarbons: Alkanes: Nomenclature, isomerism, conformations (ethane only), methods of preparation, physical properties, chemical reactions including halogenation, free radical mechanism, combustion and pyrolysis Alkenes: Nomenclature, the structure of the double bond (ethane), geometrical isomerism, methods of preparation, physical properties, chemical reaction: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition Alkynes: Nomenclature, the structure of triple bond (ethyne), methods of preparation, physical properties, chemical reactions, the acidic character of alkynes, addition reactions of hydrogen, halogens, hydrogen halides and water Aromatic hydrocarbons: Introduction, IUPAC nomenclature, Benzene: resonance, aromaticity: methods of preparation, chemical properties Mechanism of electrophilic substitution: nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of the functional group in mono-substituted benzene, carcinogenicity and toxicity

## **Chapter- Environmental Chemistry:**

Environmental pollution - Air, water and soil pollution, chemical reactions in atmosphere smogs, major atmospheric pollutants: acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming - pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategy for control of environmental pollution Solid State: Classification of solids based on different binding forces: molecular, ionic covalent and metallic solids, amorphous and crystalline solids (elementary idea).

unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties Solutions: Types of solutions, expression 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 using colligative properties, abnormal molecular mass Electrochemistry: Redox reactions, conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's law, electrolysis and laws of electrolysis (elementary idea), dry cell electrolytic cells and Galvanic cells, lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, fuel cells, corrosion Chemical Kinetics: Rate of a reaction (average and instantaneous), factors affecting rates of reaction, concentration, temperature, catalyst, order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half, concept of collision theory (elementary idea, no mathematical treatment) Surface Chemistry: Adsorption- physisorption and chemisorption, factors affecting adsorption of gases on solids, catalysis: homogenous and heterogeneous, activity and selectivity: enzyme catalysis, colloidal state: distinction between true solutions, colloids and suspensions, lyophilic, lyophobic, multi-molecular and macromolecular colloids: properties of colloids, Tyndall effect, Brownian movement, electrophoresis, coagulation, emulsion - types of emulsions

### **Chapter- General Principles and Processes of Isolation of Elements:**

Principles and methods of extraction - Concentration, oxidation, reduction electrolytic method and refining, occurrence and principles of extraction of aluminium, copper, zinc and Iron

### **Chapter- Haloalkanes and Haloarenes:**

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions Haloarenes: Nature of C-X bond, substitution reactions (directive influence of halogen for mono substituted compounds only) Uses and environmental effects of - dichloromethane, tri-chloromethane, tetra-chloro methane, iodoform, freons, DDT

### **Chapter- Alcohols, Phenols and Ethers:**

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses of methanol and ethanol Phenols:

Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses

### **Chapter- Aldehydes, Ketones and Carboxylic acids:**

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties, uses

### **Chapter- Organic compounds containing Nitrogen:**

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines Cyanides and Isocyanides will be mentioned at relevant places in context Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry

### **Chapter- Biomolecules: Carbohydrates:**

Classification (aldoses and ketoses), monosaccharides (glucose and fructose), oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen), the importance Proteins: Elementary idea of a-amino acids, peptide bond, polypeptides proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins, enzymes Vitamins: Classification and functions Nucleic Acids: DNA & RNA

### **Chapter: Polymers: Classification:**

Natural and synthetic, methods of polymerization (addition and condensation), copolymerization, Some important polymers: Natural and synthetic like polythene, nylon, polyesters, bakelite, rubber

## **Chapter: Chemistry in Everyday life:**

Chemicals in medicines - analgesics, tranquillizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines, Chemicals in food - preservatives, artificial sweetening agents, Cleansing agents - soaps and detergents, cleansing action

## **BCECE 2025 Biology Syllabus**

The BCECE biology syllabus consists of topics that are included in the 10th and 12th standards. The following are the topics included in the biology syllabus:

### **Diversity in the Living World**

- Diversity of Living Organisms.
- Classification Of the Living Organisms
- Systematic and Binomial System of Nomenclature.
- Salient Features of Animal and Plant Classification.
- Botanical Garden, Herbaria, Zoological Parks Museums

### **Structural Organisation in Animals and Plant**

- Tissues In Animals and Plants.
- Morphology, Anatomy, And Functions of Different Parts of Flowering Plants: Root, Stem, Leaf, Inflorescence, Flower, Fruit and Seed.
- Morphology, Anatomy, And Functions of Different Systems of An Annelid (Earthworm), An Insect (Cockroach) And an Amphibian (Frog.)

### **Cell: Structure and Function**

- Cell: Cell Wall, Cell Membrane and Cell Organelles and Nuclear Organisation
- Mitosis, Meiosis, Cell Cycle. Basis Chemical Constituents of Living Bodies
- Structure And Functions of Carbohydrates, Proteins, Lipids and Nucleic Acids
- Enzymes: Types, Properties, And Function
- Plant Physiology
- Movement Of Water, Food, Nutrients, And Gases
- Plants and Water: Mineral Nutrition Respiration Photosynthesis Plant Growth and Development

Download more BCECE Previous Year Question Papers: [Click Here](#)

## **Human Physiology**

- **Digestion And Absorption**
- **Breathing And Respiration**
- **Body Fluids and Circulation**
- **Excretory Products and Elimination**
- **Locomotion And Movement**
- **Control And Coordination**

## **Sexual Reproduction in Plants**

- **Pollination And Fertilisation in Flowering Plants.**
- **Development Of Seeds and Fruits.**
- **Human Reproduction: Reproductive System in Male and Female, Menstrual Cycle.**
- **Production Of Gametes, Fertilisation, Implantation, Embryo Development, Pregnancy, And Parturition.**
- **Reproductive Health-Birth Control, Contraception, And Sexually Transmitted Diseases.**

## **Genetics and Evolution**

- **Mendelian Inheritance**
- **Chromosome Theory of Inheritance, Deviations from Mendelian Ratio**
- **Sex Determination in Human Beings: XX, XY, Linkage and Crossing Over**
- **Inheritance Pattern of Haemophilia and Blood Groups in Human Beings.**
- **DNA: Replication, Transcription, Translation**
- **Gene Expression and Regulation**
- **Genome and Human Genome Project.**
- **DNA Fingerprinting.**
- **Evolution: Theories and Evidence.**

## **Biology and Human Welfare**

- **Animal Husbandry**
- **Basic Concepts of Immunology, Vaccines**
- **Pathogens, Parasites**
- **Plant Breeding, Tissue Culture, Food Production**

- Microbes In Household Food Processing
- Industrial Production, Sewage Treatment, And Energy Generation
- Cancer And Aids
- Adolescence And Drug/Alcohol Abuse

### **Biotechnology and Its Applications**

- Recombinant DNA Technology
- Applications In Health, Agriculture, And Industry
- Genetically Modified Organism; Biosafety Issues
- Insulin And Cotton

### **Ecology and Environment**

- Ecosystems: Components, Types, And Energy Flow.
- Species, Population, And Community.
- Ecological Adaptations.
- Centres of diversity and conservation of biodiversity, national parks, and sanctuaries.  
Environmental issues.

## **BCECE 2025 Mathematics Syllabus**

### **Sets and Functions**

- Empty set, Finite and Infinite sets
- Equal sets
- Subsets
- Subsets of the set of real numbers, especially intervals (with notations)
- Power set
- Universal set
- Venn diagrams
- Union and Intersection of sets
- Difference of sets
- Complement of a set

## **Algebra**

- Principle of Mathematical Induction
- Complex Numbers and Quadratic Equations
- Linear inequalities
- Matrices
- Determinants
- Permutation and Combination
- Binomial Theorem
- Sequence and Series

## **Coordinate Geometry**

- Straight Lines
- Conic Section
- Introduction to Three-dimensional Geometry

## **Calculus**

- Limits and Derivatives
- Applications of the Integrals
- Integrals
- Applications of the Integrals
- Differential Equations
- Continuity and Differentiability
- Applications of Derivatives
- Integrals

## **Mathematical Reasoning**

- Mathematically acceptable statements.
- Consolidating the understanding of 'if and only if condition', 'and', 'or', 'implies', 'implied by', 'there exists' and their use through a variety of examples related to real life and Mathematics



## Statistics and Probability

- Statistics
- Probability

## Relations and Functions

- Relations and Functions
- Inverse Trigonometric Functions

## Vectors

- Vectors and scalars,
- Magnitude and direction of a vector
- Direction cosines/ratios of vectors
- Types of vectors (equal unit zero parallel and collinear vectors)
- Position vector of a point
- Negative of a vector
- Components of a vector
- The addition of vectors
- Multiplication of a vector by a scalar
- Position vector of a point dividing a line segment in a given ratio
- Scalar product of vectors, projection of a vector on a line
- Product of vectors
- Three-Dimensional Geometry
- Direction cosines/ratios of a line joining two points
- Cartesian and vector equation of a line
- Coplanar and skew lines
- The shortest distance between two lines
- Cartesian and vector equation of a plane
- The angle between two lines, two planes, and a line & a plane
- A distance of a point from a plane

## **Linear Programming**

- **Constraints**
- **Objective function**
- **Optimization**
- **Different types of linear programming (L.P.) problems**
- **The Mathematical formulation of L.P. problems**
- **Graphical method of solution for problems in two variables**
- **Feasible and infeasible regions**
- **Feasible and infeasible solutions**
- **Optimal feasible solutions (up to three non-trivial constraints)**

## **Probability**

- **Multiplication theorem on probability**
- **Conditional probability**
- **Independent events**
- **Total probability**
- **Baye's theorem**
- **Random variable and its probability distribution**
- **Mean and variance of haphazard variables**
- **Repeated independent (Bernoulli) trials and Binomial distribution**