

PHYSICS - CLASS XI SYLLABUS

UNITS - CHAPTERS	TIME	ACHIEVEMENT
Unit 1: Physics: Scope and excitement		
- Nature of physical laws		
- Physics, technology and society		
• Need for measurement		
- Units of measurement		
- Systems of units		
- SI, Fundamental & Derived units		
- Length, Mass & Time measurements		
- Accuracy & precision of measuring instruments		
- Errors in measurement		
- Significant figures		
• Dimensions of physical quantities		
- Dimensional Analysis & its applications.		
Unit 2: Kinematics		
• Frame of reference		
- Motion in a straight line		
- Position-time graph, speed & Velocity		
- Uniform and non-uniform motion		
- Average speed & Instantaneous velocity		
- Uniformly accelerated motion		

- Velocity-time & position-time graphs for uniformly accelerated motion.		
• Elementary concepts of differentiation and integration for describing motion		
- Scalar and Vector quantities:		
Position and Displacement vectors		
General Vectors		
General Vectors & notation		
Equality of Vectors		
Multiplication of Vectors by a real number		
Addition & Subtraction of Vectors		
Relative Velocity		
• Unit Vectors		
- Resolution of a Vector in a plane - Rectangular Components		
• Scalar & Vector products of Vectors		
- Motion in a Plane		
- Cases of Uniform Velocity & Uniform Acceleration - Projectile Motion		
- Uniform Circular Motion		
Unit 3: Laws of Motion		
• Intuitive concept of Force		
- Inertia		
- Newton's First Law of Motion		
- Momentum and Newton's Second Law of Motion		
- Newton's Third Law of Motion		
- Law of Conservation of Linear Momentum & 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		
Unit 4: Work, Energy & Power		
• Work done by a constant force & 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 & Potential Energies)		
- Non-Conservative Forces		
- Motion in a Vertical Circle		
- Elastic & Inelastic Collisions in 1 & 2 Dimensions		
Unit 5: Motion of System of Particles and Rigid Body		
• Centre of Mass of a two-particle System		

- Momentum Conservation & Centre of Mass Motion		
- Centre of Mass of a Rigid Body		
- Centre of Mass of Uniform Rod		
- Moment of a Force - Torque, Angular Momentum		
- Conservation of Angular Momentum with some Examples		
• Equilibrium of Rigid Bodies		
- Rigid Body Rotation & Equation of Rotational Motion		
- Comparison of Linear and Rotational Motions		
- Moment of Inertia		
- Radius of Gyration		
- Values of MI for simple geometrical objects (No Derivation)		
- Statement of Parallel and Perpendicular Axes Theorems & their applications		
Unit 6: Gravitation		
• Kepler's Laws of Planetary Motion		
- The Universal Law of Gravitation		
- Acceleration due to Gravity & its variation with altitude & depth		
• Gravitational Potential Energy		
- Gravitational Potential		
- Escape Velocity		
- Orbital Velocity of a Satellite		
- Geostationary Satellites		
Unit 7: Properties of Bulk Matter		
• Elastic Behavior		
- Stress-Strain relationship		

- Hooke's Law		
- Young's Modulus		
- Bulk Modulus		
- Shear		
- Modulus of Rigidity		
- Poisson's Ratio		
- Elastic Energy		
• Viscosity		
- Stoke's Law		
- Terminal Velocity		
- Reynold's Number		
- Streamline & Turbulent Flow		
- Critical Velocity		
- Bernoulli's Theorem & its applications		
• Surface energy & Surface Tension		
- Angle of Contact		
- Excess of Pressure		
- Application of Surface Tension ideas to drops, bubbles & Capillary Rise		
• Heat		
- Temperature		
- Thermal Expansion		
- Thermal Expansion of Solids, Liquids & Gases		
- Anomalous expansion		

- Specific Heat Capacity: C_p , C_v - Calorimetry		
- Change of State - Latent Heat		
• Heat Transfer - Conduction & Thermal Conductivity		
- Convection & Radiation		
- Qualitative ideas of Black Body Radiation		
- Wein's Displacement Law		
- Green House Effect		
• Newton's Law of Cooling & Stefan's Law		
Unit 8: Thermodynamics		
• Thermal Equilibrium & Definition of Temperature (Zeroth Law of Thermodynamics)		
- Heat, Work & Internal Energy		
- First Law of Thermodynamics		
- Isothermal & Adiabatic Process		
• Second Law of Thermodynamics: Reversible & Irreversible processes		
- Heat Engines & Refrigerators		
Unit 9: Behavior of Perfect Gas & Kinetic Theory		
• Equation of State of a perfect gas		
- Work done on compressing a gas		
• Kinetic Theory of Gases		
- Assumptions		
- Concept of Pressure		
- Kinetic Energy & Temperature		

- Degrees of Freedom		
- Law of Equipartition of Energy (Statement) & application to specific Heat Capacities of Gases		
- Concept of Mean Free Path		
Unit 10: Oscillations & Waves		
• Periodic Motion - Period, Frequency, Displacement as a function of Time		
- Periodic Functions		
- Simple Harmonic Motion (SHM) & its Equation		
- Phase, Oscillations of a spring - restoring force & force constant		
- Energy in SHM - Kinetic & Potential Energies		
- Simple Pendulum - Derivation of Expression for its Time Period		
- Free, Forced & Damped Oscillations (Qualitative Ideas)		
- Resonance		
• Wave Motion		
- Longitudinal & Transverse Waves		
- Speed of Wave Motion		
- Displacement Relation for a Progressive Wave		
- Principle of Superposition of Waves		
- Reflection of Waves		
- Standing Waves in Strings & Organ Pipes		
- Fundamental Mode & Harmonics		
- Beats		
- Doppler Effect		
PHYSICS - CLASS XII SYLLABUS		

Unit 1: Electrostatics		
• Electric Charges & their Conservation		
- Coulomb's Law - Force between two point charges		
- Forces between Multiple Charges		
- Superposition Principle & 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 a Uniform Electric Field		
• Electric Flux		
- Statement of Gauss's Theorem & its applications to find field due to infinitely long straight wire		
- Uniformly charged infinite plane sheet & uniformly charged thin spherical shell (Field inside & outside)		
• Electric Potential		
- Potential Difference		
- Electric Potential due to a Point Charge		
- A Dipole & System of Charges		
- Equipotential Surfaces		
- Electric Potential Energy of a System of Two Point Charges & of Electric Dipoles in an Electrostatic Field		
• Conductors & Insulators		

- Free Charges & Bound Charges inside a Conductor		
- Dielectrics & Electric Polarization		
- Capacitors & Capacitance		
- Combinations of Capacitors in Series & Parallel		
- Capacitance of a Parallel Plate Capacitor with & without Dielectric Medium between the Plates		
- Energy stored in a Capacitor		
- Van de Graff Generator		
Unit 2: Current Electricity		
• Electric Current		
- Flow of Electric Charges in a Metallic Conductor		
- Drift Velocity & Mobility & their relation with Electric Current		
- Ohm's Law		
- Electric Resistance		
- V-I Characteristics (Linear & Non-Linear)		
- Electrical Energy & Power		
- Electrical Resistivity & Conductivity		
• Carbon Resistors		
- Color Code of Carbon Resistors		
- Series & Parallel Combinations of Resistors		
- Temperature Dependence of Resistance		
• Internal Resistance of a Cell		
- Potential Difference & EMF of a Cell		
- Combination of Cells in Series & in Parallel		

<ul style="list-style-type: none"> • Kirchhoff's Law & simple applications 		
<ul style="list-style-type: none"> - Wheatstone Bridge 		
<ul style="list-style-type: none"> - Metre Bridge 		
<ul style="list-style-type: none"> • Potentiometer - Principle & applications to measure Potential Difference & comparing EMFs of two cells 		
<ul style="list-style-type: none"> - Measurement of Internal Resistance of a Cell 		
Unit 3: Magnetic Effects of Current & Magnetism		
<ul style="list-style-type: none"> • Concept of Magnetic Field 		
<ul style="list-style-type: none"> - Oersted's Experiment 		
<ul style="list-style-type: none"> - Biot Savart Law & its application to Current carrying Circular Loop 		
<ul style="list-style-type: none"> - Ampere's Law & its applications to infinitely long straight wire, straight & toroidal solenoids 		
<ul style="list-style-type: none"> - Force on a moving Charge in uniform Magnetic & Electric Fields 		
<ul style="list-style-type: none"> - Cyclotron 		
<ul style="list-style-type: none"> • Force on a Current-carrying Conductor in a Uniform Magnetic Field 		
<ul style="list-style-type: none"> - Force between two parallel Current carrying Conductors - Definition of Ampere 		
<ul style="list-style-type: none"> - Torque experienced by a Current Loop in a Magnetic Field 		
<ul style="list-style-type: none"> - Moving Coil Galvanometer - its Current Sensitivity & Conversion to Ammeter & Voltmeter 		
<ul style="list-style-type: none"> • Current Loop as a Magnetic Dipole & its Magnetic Dipole Moment 		
<ul style="list-style-type: none"> - Magnetic Dipole Moment of a Revolving Electron 		
<ul style="list-style-type: none"> - Magnetic Field Intensity due to a Bar Magnet - along axis & perpendicular 		
<ul style="list-style-type: none"> - Torque on a Bar Magnet in a uniform Magnetic Field 		

- Bar Magnet as an Equivalent Solenoid		
- Magnetic Field Lines		
- Earth's Magnetic Field & Magnetic Elements		
• Para-, Dia- & Ferro- Magnetic substances with examples		
• Electromagnets & Factors affecting their strengths		
- Permanent Magnets		
Unit 4: Electromagnetic Induction & Alternating Currents		
• Electromagnetic Induction		
- Faraday's Law		
- Induced EMF & Current		
- Lenz's Law		
- Eddy Currents		
- Self & Mutual Inductance		
• Alternating Currents		
- Peak & RMS value of Alternating Current/Voltage		
- Reactance & Impedance		
- LC Oscillations (Qualitative)		
- LCR Series Circuit		
- Resonance		
- Power in AC Circuits		
- Wattle's Current		
• AC Generator & Transformer		
Unit 5: Electromagnetic Waves		

• Need for Displacement Current		
• Electromagnetic Waves & their Characteristics (Qualitative)		
- Transverse Nature of Electromagnetic Waves		
• Electromagnetic Spectrum - Radio Waves, Micro Waves, Infrared, Ultraviolet, X-Rays, Gamma Rays - elementary uses		
Unit 6: Optics		
• Reflection of Light		
- Spherical Mirrors		
- Mirror Formula		
- Refraction of Light		
- Total Internal Reflection & 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		
- Combination of a Lens & a Mirror		
- Refraction & Dispersion of Light through a Prism		
• Scattering of Light - Blue color of Sky		
- Reddish Appearance of Sun at Sunrise & Sunset		
• Optical Instruments		

- Human Eye		
- Image Formation & Accommodation		
- Correction of Eye Defects (Myopia & Hypermetropia) using Lenses		
• Microscopes & Astronomical Telescopes (Reflecting & Refracting) & their Magnifying Powers		
• Wave Optics		
- Wavefront & Huygen's Principle		
- Reflection & Refraction of Plane Wave at a Plane Surface using Wavefronts		
- Proof of Laws of Reflection & Refraction using Huygen's Principle		
- Interference		
- Young's Double Hole Experiment & 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 & Astronomical Telescopes		
- Polarization		
- Plane Polarized Light		
- Brewster's Law		
- Uses of Plane Polarized Light & Polaroids		
Unit 7: Dual Nature of Matter & Radiation		
• Photoelectric Effect		
- Hertz & Lenard's Observations		
- Einstein's Photoelectric Equation - Particle Nature of Light		
• Matter Waves - Wave Nature of Particles		

- de Broglie's Relation		
- Davisson - Germer Experiment (Conclusion Only)		
Unit 8: Atoms & Nuclei		
• Alpha -Particle scattering experiments		
- Rutherford's Model of Atom		
- Bohr Model		
- Energy levels		
- Hydrogen Spectrum		
- Composition & size of Nucleus		
- Atomic Masses		
- Isotopes		
- Isobars		
- Isotones		
• Radioactivity - Alpha, Beta & Gamma particles/rays & their properties		
- Decay Law		
- Mass - Energy Relation		
- Mass Defect		
- Binding Energy per Nucleon & its variation with Mass Number		
- Nuclear Fission & Fusion		
Unit 9: Electronic Devices		
• Energy Bands in Solids (Qualitative)		
- Conductors, Insulators & Semiconductors		
- Semiconductor Diode - I - V characteristics in forward & reverse bias		

- Diode as a Rectifier		
- <i>I-V</i> Characteristics of LED		
- Photodiode, Solar Cell & Zener Diode		
- Zener Diode as a Voltage Regulator		
- Junction Transistor, Transistor Action		
- Characteristics of a Transistor		
- Transistor as an Amplifier (Common Emitter Configuration) & Oscillator		
- Logic Gates (OR, AND, NOT, NAND & NOR)		
- Transistor as a Switch		

CHEMISTRY

CLASS XI SYLLABUS		
Unit 1: Some Basic Concepts of Chemistry		
• <i>General Introduction: Importance & Scope of Chemistry</i>		
• Laws of Chemical Combination		
- Dalton's Atomic Theory		
- Concept of Elements, Atoms & Molecules		
• Atomic & Molecular Masses		
- Mole Concept & Molar Mass		
- Percentage Composition & Empirical & Molecular Formula		
- Chemical Reactions		
- Stoichiometry & Calculations based on Stoichiometry		
Unit 2: Structure of Atom		

- Atomic Number, Isotopes & Isobars		
- Concept of Shells & Subshells		
- Dual nature of Matter & Light		
- de Broglie's Relationship		
- Heisenberg's Uncertainty Principle		
- Concept of Orbital		
- Quantum Numbers		
- Shapes of s, p & d Orbitals		
- Aufbau Principle		
- Pauli Exclusion Principle		
- Hund's Rule		
- Electronic Configuration of Atoms		
- Stability of half filled & completely filled Orbitals		
Unit 3: Classification of Elements & Periodicity in properties		
• Modern Periodic Law and Long Form of Periodic Table		
- Periodic Trends in properties of elements -		
Atomic Radii		
Ionic Radii		
Ionization Enthalpy		
Electron Gain Enthalpy		
Electronegativity		
Valence		
Unit 4: Chemical Bonding & Molecular Structure		

• Valence electrons		
- Ionic Bond		
- Covalent Bond		
- Bond Parameters		
- Lewis Structure		
- Polar Structure of Covalent Bond		
- Valence Bond Theory		
- Resonance		
- Geometry of Molecules		
- VSEPR Theory		
- Concept of Hybridization involving <i>s</i> , <i>p</i> & <i>d</i> orbitals		
- Shapes of some simple molecules		
- Molecular Orbital Theory of homonuclear diatomic molecules (Qualitative)		
- Hydrogen Bond		
Unit 5: States of Matter: Gases & Liquids		
- Three States of Matter		
- Intermolecular Interactions		
- Types of Bonding		
- Melting & Boiling Points		
- Role of Gas Laws elucidating the concept of the molecule		
- Boyle's Law		
- Charle's Law		
- Gay Lussac's Law		

- Avogadro's Law		
- Ideal Behavior of Gases		
- Empirical derivation of Gas Equation		
- Avogadro number		
- Ideal Gas Equation		
- Kinetic Energy & Molecular speeds (elementary idea)		
- Deviation from Ideal Behavior		
- Liquefaction of Gases		
- Critical Temperature		
• Liquid State		
- Vapour Pressure		
- Viscosity & Surface Tension (Qualitative)		
Unit 6: Thermodynamics		
• First Law of Thermodynamics		
- Internal Energy & Enthalpy		
- Heat Capacity & Specific Heat		
- Measurement of ΔU & ΔH		
- Hess's Law of Constant Heat Summation		
- Enthalpy of -		
Bond Dissociation		
Combustion		
Formation		
Atomization		

Sublimation		
Phase transition		
Ionization		
Solution		
Dilution		
<ul style="list-style-type: none"> • Introduction of Entropy as State Function 		
<ul style="list-style-type: none"> - Second Law of Thermodynamics 		
<ul style="list-style-type: none"> - Gibbs Energy change for spontaneous & non-spontaneous process 		
<ul style="list-style-type: none"> - Criteria for Equilibrium & Spontaneity 		
<ul style="list-style-type: none"> • Third Law of Thermodynamics 		
Unit 6: Equilibrium		
<ul style="list-style-type: none"> • Equilibrium in Physical & Chemical processes 		
<ul style="list-style-type: none"> - Dynamic nature of Equilibrium 		
<ul style="list-style-type: none"> - Law of Chemical Equilibrium 		
<ul style="list-style-type: none"> - Equilibrium Constant 		
<ul style="list-style-type: none"> - Factors affecting Equilibrium - Le Chatelier's Principle 		
<ul style="list-style-type: none"> - Ionic Equilibrium 		
Ionization of acids & bases		
Strong & weak Electrolytes		
<ul style="list-style-type: none"> - Degree of Ionization 		
<ul style="list-style-type: none"> - Ionization of Polybasic acids 		
<ul style="list-style-type: none"> - Acid Strength 		
<ul style="list-style-type: none"> - Concept of pH 		

- Hydrolysis of Salts (Elementary Idea)		
- Buffer Solutions		
- Henderson equation		
- Solubility Product		
- Common Ion Effect (with Illustrative Examples)		
Unit 7: Redox reactions		
• Concept of Oxidation & Reduction		
- Redox reactions		
- Oxidation Number		
- Balancing Redox reactions in terms of loss & gain of electrons		
- Change in Oxidation numbers		
Unit 9: Hydrogen		
• Occurrence, Isotopes, Preparation, Properties & Uses		
- Hydrides - Ionic, Covalent & Interstitial		
- Physical & Chemical properties of Water		
- Heavy Water		
- Hydrogen Peroxide - preparation, reactions, uses & structure		
Unit 10: s-Block Elements (Alkali & Alkaline Earth Metals)		
• Group I & 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 (s/as ionization Enthalpy, Atomic & Ionic Radii)		
- Trends in Chemical Reactivity with Oxygen, Water, Hydrogen & Halogens; uses		
• Preparation & properties of some important compounds		
• Sodium Carbonate, Sodium Chloride, Sodium Hydroxide & Sodium Hydrogen Carbonate		
- Biological importance of Sodium & Potassium		
• Industrial use of Lime & Limestone		
- Biological importance of Mg & Ca		
Unit 11: Some p-Block Elements		
• General introduction to p-Block Elements		
• Group 13 elements		
- General introduction		
- Electronic Configuration		
- Occurrence		
- Variation of properties		
- Oxidation States		
- Trends in Chemical reactivity		
- Anomalous properties of first element of the group		
- Boron - some imp. Comp. -		
Borax		
Boric acids		
Boron Hydrides		

- Aluminium - uses, reactions with acids & alkalies		
• Group 14 elements -		
- General introduction		
- Electronic configuration		
- Occurrence		
- Variation of properties		
- Oxidation states		
- Trends in Chemical reactivity		
- Anomalous behavior of first element		
- Carbon -		
Allotropic forms		
Physical & chemical properties		
Uses of some important compounds		
Oxides		
• Important compounds of Silicon & a few uses -		
- Silicon Tetrachloride		
- Silicones		
- Silicates		
- Zeolites		
Unit 12: Organic Chemistry - Some basic principles & techniques		
• General introduction		
- Methods of purification - qualitative & quantitative analysis		
- Classification & IUPAC nomenclature of Organic compounds		

• Electronic displacements in a Covalent Bond -		
- Inductive effect		
- Electrometric effect		
- Resonance & Hyper conjugation		
• Homolytic & Heterolytic Fission of a Covalent Bond -		
- Free Radicals		
- Carbocations		
- Carbanions		
- Electrophiles & Nucleophiles		
- Types of Organic reactions		
Unit 13: Hydrocarbons		
• Alkanes		
- Nomenclature		
- Isomerism		
- Conformations (Ethane only)		
- Physical properties		
- Chemical reactions including Free Radical mechanism of Halogenation		
- Combustion & Pyrolysis		
• Alkenes		
- Nomenclature		
- Structure of Double Bond (Ethene)		
- Geometrical Isomerism		
- Physical properties		

- Methods of preparation		
- Chemical reactions		
- Addition of Hydrogen, Halogen, Water, Hydrogen Halides (Markovnikov's addition & Peroxide effect)		
- Ozonolysis		
- Oxidation		
- Mech. Of Electrophilic addition		
• Aromatic Hydrocarbons		
- Introduction		
- IUPAC nomenclature		
- Benzene -		
Resonance		
Aromaticity		
- Chemical properties -		
Mech of Electrophilic substitution -		
Nitration		
Sulphonation		
Halogenation		
Friedel Craft's alkylation & acylation		
- Directive influence of functional group in Mono-substituted Benzene		
- Carcinogenicity & Toxicity		
Unit 14: Environmental Chemistry		
• Environmental pollution		
- Air, Water & Soil pollution		

- Chemical reactions in Atmosphere		
- Smog		
- Major atmospheric pollutants		
- Acid Rain		
- Ozone & its reactions		
- Effects of depletion of Ozone layer		
- Greenhouse effect & Global Warming		
- Pollution due to industrial wastes		
- Green Chemistry as an alternative tool for reducing pollution		
- Strategy for control of environmental pollution		

CHEMISTRY CLASS XII SYLLABUS

Unit 1: Solid State		
• Classification of Solids based on different binding forces		
- Molecular, Ionic, Covalent & Metallic solids		
- Amorphous & Crystalline solids (elementary idea)		
- Unit Cell in two dimensional & three dimensional lattices		
- Calculation of Density in Unit Cell		
- Packing in solids		
- Packing Efficiency, Voids		
- Number of Atoms per Unit Cell in a cubic Unit Cell		
- Point Defects		
- Electrical & magnetic properties		
- Band theory of metals		

- Conductors, Semiconductors & Insulators		
Unit 2: 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 Vapor Pressure		
- Raoult's Law		
- Elevation of Boiling Point		
- Depression of Freezing Point		
- Osmotic Pressures		
- Determination of Molecular Masses using Colligative properties		
- Abnormal Molecular Mas		
- Van Hoff factor		
Unit 3: Electrochemistry		
• Redox reactions		
- Conductance in electrolytic solutions		
- Specific & Molar conductivity with concentration		
- Kohlrausch's Law		
- Electrolysis & Laws of Electrolysis (elementary idea)		
- Dry cell		
- Electrolytic cells & Galvanic cells		
- Lead accumulator		

- EMF of a cell		
- Standard Electrode Potential		
- Relation between Gibbs energy change & EMF of a cell		
- Fuel cells		
- Corrosion		
Unit 4: Chemical Kinetics		
• Rate of a reaction (average & Instantaneous)		
- Factors affecting rates of reactions		
- Concentration, Temperature Catalyst		
- Order & Molecularity of a reaction		
- Rate Law & Specific Rate Constant		
- Integrated Rate Equations & Half Life (only for zero & first order reactions)		
- Concept of Collision Theory (elementary idea)		
- Activation Energy		
- Arrhenious Equation		
Unit 5: Surface Chemistry		
• Adsorption		
- Physiosorption & Chemisorption		
- Factors affecting adsorption of Gases on solids		
- Catalysis Homogeneous & Heterogeneous		
- Activity & Selectivity		
- Enzyme Catalysis		
- Colloidal State		

- Distinction between True Solutions, Colloids & Suspensions		
- Lyophilic, Lyophobic Multimolecular & Macromolecular Colloids		
- Properties of Colloids		
- Tyndall effect		
- Brownian movement		
- Electrophoresis		
- Coagulation		
- Emulsions & types of emulsions		
Unit 6: General Principles & Processes of Isolation of Elements		
• Principles & methods of Extraction -		
- Concentration, Oxidation, Reduction, Electrolytic method & Refining		
- Occurrence & principles of extraction of -		
Aluminium		
Copper		
Zinc		
Iron		
Unit 7: p-Block Elements		
• Group 15 elements		
- General introduction		
- Electronic Configuration		
- Occurrence		
- Oxidation states		
- Trends in Physical & Chemical properties		

- Preparation & properties of Ammonia & Nitric Acid		
- Oxides of Nitrogen (structure only)		
- Phosphorus -		
Allotropic forms		
Compounds of Phosphorus		
Preparation & properties of Phosphine		
Halides (PCl_3 , PCl_5)		
Oxoacids (elementary idea)		
• Group 16 elements		
- General introduction		
- Electronic configuration		
- Oxidation states		
- Occurrence		
- Trends in Physical & Chemical properties		
- Dioxygen		
Preparation		
Properties & uses		
Classification of Oxides		
- Ozone		
- Sulphur		
Allotropic forms		
Compounds of Sulphur		
Preparation		

Properties & uses of Sulphur dioxide		
- Sulphuric Acid		
Industrial process of manufacture		
Properties & uses		
Oxoacids of Sulphur (structures only)		
• Group 17 elements		
- General introduction		
- Electronic Configuration		
- Oxidation states		
- Occurrence		
- Trends in Physical & Chemical properties		
- Compounds of Halogens		
Preparation		
Properties & uses of Chlorine & Hydrochloric Acid		
Interhalogen compounds		
Oxoacids of Halogens (structures)		
• Group 18 elements		
- General introduction		
- Electronic Configuration		
- Occurrence		
- Trends in Physical & Chemical properties		
- Uses		
Unit 8: d & f Block elements		

• General introduction		
- Electronic Configuration		
- Characteristics of Transition Metals		
- General trends in properties of the first row transition metals -		
Metallic character		
Ionization Enthalpy		
Oxidation States		
Ionic Radii		
Color		
Catalytic property		
Magnetic properties		
Interstitial compounds		
Alloy formation		
- Preparation & properties of $K_2Cr_2O_7$ & $KMnO_4$		
• Lanthanides		
- Electronic Configuration		
- Oxidation states		
- Chemical Reactivity		
- Lanthanide Contraction & it's consequences		
• Actinides		
- Electronic Configuration		
- Oxidation states		
- Comparison with Lanthanides		

Unit 9: Coordination Compounds		
- Introduction		
- Ligands		
- Coordination number		
- Color		
- Magnetic properties & shapes		
- IUPAC nomenclature of Mononuclear Coordination Compounds		
- Isomerism (structural & stereo) bonding		
- Werner's theory VBT, CFT		
- Importance of coordination compounds (in qualitative analysis, biological systems)		
Unit 10: Haloalkanes & Haloarenes		
• Haloalkanes		
- Nomenclature		
- Nature of C - X bond		
- Physical & Chemical properties		
- Mechanism of Substitution reactions		
- Optical rotation		
• Haloarenes		
- Nature of C - X bond		
- Substitution reactions (directive influence of Halogen for monosubstituted compounds only)		
• Uses & environmental effects of		
- Dichloromethane		

- Trichloromethane		
- Iodoform		
- Freons		
- DDT		
Unit 11: Alcohols, Phenols & Ethers		
• Alcohols		
- Nomenclature		
- Methods of preparation		
- Physical & chemical properties (1 ^o alcohols only)		
- Identification of 1 ^o , 2 ^o & 3 ^o alcohols		
- Mechanism of Dehydration		
- Uses (specially Methanol & Ethanol)		
• Phenols		
- Nomenclature		
- Methods of preparation		
- Physical & chemical properties		
- Acidic nature of Phenol		
- Electrophilic Substitution reactions		
- Uses of Phenols		
• Ethers		
- Nomenclature		
- Methods of preparation		
- Physical & chemical properties		

- Uses		
Unit 12: Aldehydes, Ketones & Carboxylic Acids		
• Aldehydes & Ketones		
- Nomenclature		
- Nature of Carbonyl Group		
- Methods of preparation		
- Physical & chemical properties		
- Mechanism of Nucleophilic Addition		
- Reactivity of Alpha Hydrogen in Aldehydes		
- Uses		
• Carboxylic Acids		
- Nomenclature		
- Acidic nature		
- Methods of preparation		
- Physical & chemical properties		
- Uses		
Unit 13: Organic Compounds containing Nitrogen		
• Amines		
- Nomenclature		
- Classification		
- Structure & methods of preparation		
- Physical & chemical properties		
- Uses		

- Identification of 1 ⁰ , 2 ⁰ & 3 ⁰ Amines		
• Cyanides & Isocyanides		
• Diazonium salts		
- Preparation		
- Chemical reactions & importance in Synthetic Organic Chemistry		
Unit 16: Biomolecules		
• Carbohydrates		
- Classification		
Aldoses		
Ketoses		
- Monosaccharide		
Glucose		
Fructose		
- D-, L- Configuration		
- Oligosaccharides (Sucrose, Lactose, Maltose)		
- Polysaccharides (Starch, Cellulose, Glycogen)		
- Importance		
• Proteins		
- Elementary idea of		
Amino Acids		
Peptide Bond		
Polypeptides		
Proteins		

- 1 ⁰ structure		
- 2 ⁰ structure		
- 3 ⁰ structure		
- 4 ⁰ structure		
- Denaturation of Proteins		
- Enzymes		
• Hormones (elementary idea)		
• Vitamins-Classification & function		
• Nucleic Acids - DNA & RNA		
Unit 15: Polymers		
• Classification -		
- Natural & Synthetic		
- Methods of Polymerization (addition & condensation)		
- Copolymerization		
- Some important Polymers -		
Natural & Synthetic like-		
Polyesters		
Bakelite		
Rubber		
- Biodegradable & non-biodegradable Polymers		
Unit 16: Chemistry in Everyday Life		
• Chemistry in Medicines		

- Analgesics		
- Tranquilizers		
- Antiseptics		
- Disinfectants		
- Antimicrobials		
- Antifertility Drugs		
- Antibiotics		
- Antacids		
- Antihistamines		
• Chemicals in Food		
- Preservatives		
- Artificial Sweetening Agents		
- Elementary Idea of Antioxidants		
• Cleansing agents		
- Soaps & Detergents		
- Cleansing Action		

BIOLOGY CLASS XI SYLLABUS

Unit 1: Diversity in Living World		
• What is living?		
- Biodiversity		
- Need for Classification		
- Three Domains of Life		
- Taxonomy & Systematics		

- Concept of Species & Taxonomical Hierarchy		
- Binomial Nomenclature		
- Tools for study of Taxonomy -		
Museums, Zoos, Herbaria, Botanical Gardens		
• Five Kingdom Classification		
- Salient Features & Classification of Monera		
- Protista		
- Fungi		
- Lichens		
- Viruses		
- Viroids		
• Salient Features & Classification of Plants into Major Groups -		
Algae		
Bryophytes		
Pteridophytes		
Gymnosperms		
Angiosperms		
- Angiosperms- Classification up to Class		
Unit 2: Structural Organization in Animals & Plants		
• Morphology & Modifications		
• Tissues -		
- Anatomy & Functions of different parts of Flowering Plants -		
Root		

Stem		
Leaf		
Inflorescence -		
Cymose		
Recemose		
Flower, Fruit, Seed		
• Animal Tissues		
- Morphology, Anatomy & Functions of different systems of Cockroach		
Unit 3: Cell Structure & Function		
• Cell Theory & cell as the basic unit of Life		
- Structure of Prokaryotic & Eukaryotic cell		
- Plant cell & Animal cell		
- Cell envelope, Cell Membrane, Cell Wall		
• Cell Organelles		
- Structure & Function		
- Endomembrane System -		
Endoplasmic Reticulum		
Golgi Bodies		
Lysosomes		
Vacuoles		
Mitochondria		
Ribosomes		
Plastids		

Micro bodies		
- Cytoskeleton		
Cilia		
Flagella		
Centrioles (Ultrastructure, function)		
- Nucleus		
Nuclear Membrane		
Chromatin		
Nucleolus		
• Chemical constituents of living cells		
- Biomolecules		
Structure & Functions of -		
Proteins		
Carbohydrates		
Lipids		
Nucleic Acids		
Enzymes -		
Types, properties, Enzyme Action		
• Cell Division		
- Cell Cycle		
- Mitosis		
- Meiosis		
- Significance of both		

Unit 4: Plant Physiology		
• Transport in Plants		
- Movement of Water, Gases & Nutrients		
- Cell to Cell Transport		
Diffusion		
Facillitated Diffusion		
Active Transport		
- Plant-Water relations		
Imbibition		
Water Potential		
Osmosis		
Plasmolysis		
- Long Distance transport of Water-		
Absorption		
Apoplast		
Symplast		
Transpiration Pull		
Root Pressure		
Guttation		
- Transpiration		
Opening & Closing of Stomata		
- Uptake & Translocation of Mineral Nutrients -		

Transport of Food		
Phloem Transport		
- Mass Flow Hypothesis		
- Diffusion of Gases		
• Mineral Nutrition:		
- Essential Minerals		
- Macro & Micro Nutrients & their role		
- Deficiency Symptoms		
- Mineral Toxicity		
- Elementary idea of Hydroponics (as method to study Mineral Nutrition)		
- Nitrogen Metabolism -		
Nitrogen Cycle		
Biological Nitrogen Fixation		
• Photosynthesis -		
- Photosynthesis as a means of Autotrophic Nutrition		
- Site of Photosynthesis		
- Pigments involved (Elementary idea)		
- Photochemical & Biosynthetic phases of Photosynthesis		
- Cyclic & Non-cyclic Photophosphorylation		
- Chemiosmotic Hypothesis		
- Photorespiration - C3 & C4 Pathways		
- Factors affecting Photosynthesis		
• Respiration -		

- Exchange Gases		
- Cellular Respiration -		
Glycolysis		
Fermentation (Anaerobic)		
TCA Cycle & Electron Transport System (Aerobic)		
- Energy Relations -		
Number of ATP generated		
- Amphibolic Pathways		
- Respiratory Quotient		
• Plant Growth & Development -		
- Seed Germination		
- Phases of Plant Growth & Plant Growth Rate		
- Conditions of Growth		
- Differentiation -		
Dedifferentiation		
Redifferentiation		
- Sequence of developmental process in a Plant Cell		
- Growth Regulators -		
Auxin		
Gibberllin		
Cytokinin		
Ethylene		
ABA		

- Seed Dormancy		
- Vernalisation		
- Photoperiodism		
Unit 4: Human Physiology		
• Digestion & Absorption		
- Alimentary Canal & Digestive glands		
- Role of -		
Digestive Enzymes		
Gastrointestinal Hormones		
- Peristalsis		
- Digestion, Absorption, Assimilation of-		
Proteins		
Carbohydrates		
Fats		
- Caloric Value of Proteins, Carbohydrates & Fats		
- Egestion		
- Nutritional & Digestive disorders -		
PEM		
Indigestion		
Constipation		
Vomiting		
Jaundice		
Diarrhoea		

• Breathing & Respiration -		
- Respiratory Organs in Animals		
- Respiratory System in Humans		
- Mechanism of Breathing & Regulation		
- Exchange of Gases		
- Transport of Gases		
- Regulation of Respiration		
- Respiratory Volumes		
Disorders related to Respiration -		
Asthma		
Emphysema		
Occupational Respiratory Disorders		
• Body Fluids & Circulation -		
- Composition of Blood		
- Blood Groups		
- Coagulation of Blood		
- Composition of Lymph & its functions		
- Human Circulatory System		
Structure of Human Heart & 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		
• Excretory products & their elimination		
- Modes of Elimination -		
Ammonotelism		
Ureotelism		
Uricotelism		
- Human Excretory System		
Structure & Function		
Urine formation		
Osmoregulation		
- Regulation of Kidney Function		
Renin - Angiotensin		
Atrial Natriuretic Factor		
ADH & Diabetes Insipidus		
- Role of other organs in Excretion		
- Disorders		
Uraemia		

Renal Failure		
Renal Calculi		
Nephritis		
Dialysis		
Artificial Kidney		
• Locomotion & Movement		
- Types of Movement		
Ciliary		
Flagellar		
Muscular		
- Skeletal Muscle		
Contractile Proteins & Muscular Contraction		
Skeletal System & its Functions		
- Joints		
- Disorders of Muscular & Skeletal System		
Myasthenia gravis		
Tetany		
Muscular Dystrophy		
Arthritis		
Osteoporosis		
Gout		
• Neural Control & Coordination		
- Neuron & Nerves		

- Nervous System in Humans -		
Central Nervous System		
Peripheral Nervous System		
Visceral Nervous System		
- Generation & Conduction of Nerve Impulse		
Reflex Action		
Sense Organs		
- Elementary Structure & Function of -		
Eye		
Ear		
• Chemical Coordination & Regulation		
- Endocrine Glands & Hormones		
- Human Endocrine System -		
Hypothalamus		
Pituitary		
Pineal		
Thyroid		
Parathyroid		
Adrenal		
Pancreas		
Gonads		
- Mechanism of Hormone Action		
- Role of hormones as Messengers & Regulators		

- Related Disorders -		
Dwarfism		
Acromegaly		
Cretinism		
Goiter		
Exophthalmic Goiter		
Diabetes		
Addison's Disease		

Class XII Syllabus

Unit 1: Reproduction		
• Reproduction in Organisms		
- Reproduction, a characteristic feature of all Organisms		
- Modes of Reproduction -		
Asexual & Sexual		
- Asexual Reproduction Modes -		
Binary Fission		
Sporulation		
Budding		
Gemmule		
Fragmentation		
Vegetative Propagation (Plants)		
• Sexual Reproduction in Flowering Plants		
- Flower Structure		

- Development of Male & Female Gametophytes		
- Pollination -		
Types, Agencies & Examples		
- Outbreeding devices		
- Pollen-Pistil interaction		
- Double Fertilization		
- Post-Fertilization events -		
Development of Endosperm & Embryo		
Development of Seed & Fruit		
- Special Modes -		
Apomixis		
Parthenocarpy		
Polyembryony		
- Significance of Seed & Fruit Formation		
• Human Reproduction		
- Male & Female Reproductive Systems		
- Microscopic Anatomy of Testis & Ovary		
- Gametogenesis - Spermatogenesis & Oogenesis		
- Menstrual Cycle		
- Fertilization		
- Embryo Development up to Blastocyst formation		
- Implantation		
- Pregnancy & Placenta formation		

- Parturition		
- Lactation		
• Reproductive Health		
- Need for Reproductive Health & Prevention of Sexually Transmitted Diseases (STD)		
- Birth Control - Need & Methods		
- Contraception & Medical Termination of Pregnancy (MTP)		
- Amniocentesis		
- Infertility & assisted reproductive technologies -		
IVF		
ZIFT		
GIFT		
Unit 2: Genetics & Evolution		
- Heredity & Variation		
- Mendelian Inheritance		
- Deviations from Mendelism -		
Incomplete Dominance		
Codominance		
Multiple Alleles		
Inheritance of Blood Groups		
- Pleiotropy		
- Idea of Polygenic Inheritance		
- Chromosome Theory of Inheritance		
- Chromosomes & Genes		

- Sex Determination - Humans, Birds, Honey Bees		
- Linkage & Crossing Over		
- Sex Linked Inheritance -		
Haemophilia		
Colour blindness		
- Mendelian disorders in humans -		
Thalassemia		
- Chromosomal Disorders in Man -		
Down's Syndrome		
Turner's Syndrome		
Klinefelter's Syndrome		
- Molecular Basis of Inheritance		
- DNA as Genetic Material		
- Structure of DNA & RNA		
- DNA Packaging		
- DNA Replication		
- Central Dogma		
- Transcription		
- Genetic Code		
- Translation		
- Gene Expression & Regulation -		
Lac Operon		
- Genome & Human Genome Project		

- DNA Fingerprinting		
• Evolution		
- Origin of Life		
- Biological Evolution & Evidences from Paleontology		
Comparative Anatomy, Embryology & Molecular Evidence		
- Darwin's Contribution		
- Modern Synthetic Theory of evolution		
- Mechanism of Evolution -		
Variation (Mutation & Recombination)		
Natural Selection (with Examples)		
Types of Natural Selection		
- Gene Flow & Genetic Drift		
- Hardy-Weinberg's Principle		
- Adaptive Radiation		
- Human Evolution		
Unit 3: Biology & Human Welfare		
• Health & Disease		
- Pathogens - Parasites causing Human Diseases -		
Malaria		
Filariasis		
Ascariasis		
Typhoid		
Pneumonia		

Common Cold		
Amoebiasis		
Ringworm		
- Basic Concepts of Immunology -		
Vaccines		
Cancer		
HIV & AIDS		
- Adolescence		
- Drug & Alcohol Abuse		
• Improvement in Food Production		
- Plant Breeding		
- Tissue Culture		
- Single Cell Protein		
- Biofortification		
- Apiculture		
- Animal Husbandry		
• Microbes in Human Welfare		
- In Household Food Processing		
- Industrial Production		
- Sewage Treatment		
- Energy Generation		
- Biocontrol Agents & Biofertilizers		
Unit 4: Biotechnology & Its Application		

<ul style="list-style-type: none"> • Principles & Processes of Biotechnology: Genetic Engineering - Recombinant DNA Technology 		
<ul style="list-style-type: none"> • Application of Biotechnology in Health & Agriculture - 		
<ul style="list-style-type: none"> - Human Insulin & Vaccine Production 		
<ul style="list-style-type: none"> - Gene Therapy 		
<ul style="list-style-type: none"> - Genetically Modified Organisms - 		
<ul style="list-style-type: none"> Bt Crops 		
<ul style="list-style-type: none"> Transgenic Animals 		
<ul style="list-style-type: none"> - Biosafety Issues - 		
<ul style="list-style-type: none"> Biopiracy & Patents 		
Unit 5: Ecology & Environment		
<ul style="list-style-type: none"> • Organisms & Environment - 		
<ul style="list-style-type: none"> - Habitat & Niche 		
<ul style="list-style-type: none"> - Population & Ecological Adaptations 		
<ul style="list-style-type: none"> - Population Interactions - 		
<ul style="list-style-type: none"> Mutualism 		
<ul style="list-style-type: none"> Competition 		
<ul style="list-style-type: none"> Predation 		
<ul style="list-style-type: none"> Parasitism 		
<ul style="list-style-type: none"> - Population Attributes - 		
<ul style="list-style-type: none"> Growth 		
<ul style="list-style-type: none"> Birth Rate, Death Rate 		
<ul style="list-style-type: none"> Age Distribution 		
<ul style="list-style-type: none"> • Ecosystem 		

- Patterns & Components		
- Productivity & Decomposition		
- Energy Flow		
- Pyramids of Number, Biomass, Energy		
- Nutrient Cycling - Carbon & Phosphorus		
- Ecological Succession		
- Ecological Services -		
Carbon Fixation		
Pollination		
Oxygen Release		
• Biodiversity & its Conservation		
- Concept of Biodiversity		
- Patterns of Biodiversity		
- Importance of Biodiversity		
- Loss of Biodiversity		
- Biodiversity Conservation		
- Hotspots		
- Endangered Organisms		
- Extinction		
- Red Data Book		
- Biosphere Reserves		
- National Parks & Sanctuaries		
• Environmental Issues		

