

# Intermediate (Senior Secondary) – MPC (Mathematics, Physics, Chemistry)

Based on: Board of Open Schooling and Skill Education (BOSSE), Sikkim

## Mathematics — Syllabus Outline

### Unit I: Algebra & Theory of Equations

- Complex Numbers: Definitions, Algebraic operations
- Polynomials, Roots & Coefficients
- Theory of Equations: Relation between roots & coefficients
- Inequalities, Binomial theorem

### Unit II: Calculus

- Limits, Continuity, Differentiability
- Differentiation: Rules, Applications
- Integration: Techniques, Definite & Indefinite Integrals
- Applications of Integration

### Unit III: Vectors, 3D Geometry & Linear Algebra

- Vectors, Dot & Cross Product
- 3D Geometry: Planes, Lines in space
- Matrices: Types, Operations, Determinants
- System of Linear Equations, Rank, Inverse

### Unit IV: Differential Equations & Applications

- Ordinary Differential Equations: First order, Second order
- Applications to growth/decay, mechanical vibrations
- Partial Differential Equations (introductory)

### Unit V: Probability, Statistics & Miscellany

- Probability: Definitions, Conditional Probability, Bayes' Theorem
- Statistics: Mean, Median, Mode, Dispersion
- Distributions: Binomial, Poisson, Normal (introductory)
- Sequence & Series (some topics)

## Physics — Syllabus Outline

### Unit I: Mechanics and Properties of Matter

- Laws of motion, Work, Energy, Power

- Gravitation, Rotational Dynamics
- Elasticity, Fluid Mechanics

## **Unit II: Thermodynamics & Heat**

- Laws of Thermodynamics
- Heat Transfer, Kinetic Theory of Gases
- Thermal Equilibrium, Specific Heat

## **Unit III: Electromagnetism & Waves**

- Electrostatics, Gauss' Law
- Current, Resistivity, Ohm's Law
- Magnetic Fields, Ampere's Law, Induction
- Wave Motion, Sound

## **Unit IV: Optics, Modern Physics & Elementary Electronics**

- Reflection, Refraction, Lenses, Optical Instruments
- Photoelectric effect, Dual Nature of Light
- Atomic Models, Nuclear Physics basics
- Semiconductors, Diodes, Transistors (basic)

## **Unit V: Electromagnetic Waves, Radiation & Advanced Topics**

- Maxwell's Equations (qualitative)
- Electromagnetic Spectrum
- Radioactivity, Half-life, Decay law
- Lasers, Fibre optics (intro)

## **Chemistry — Syllabus Outline**

### **Unit I: Basic Concepts & Inorganic Chemistry**

- Mole concept, Stoichiometry
- Atomic Structure, Periodic Table, Periodicity
- Chemical Bonding, Ionic, Covalent, Metallic
- Coordination Compounds (intro)

### **Unit II: Physical Chemistry**

- States of Matter: Gas laws, Kinetic Theory
- Thermodynamics: Enthalpy, Entropy, Free Energy
- Chemical Equilibrium, Le Chatelier's Principle
- Electrochemistry, Ionic equilibria

### **Unit III: Organic Chemistry – Structure & Mechanisms**

- Hybridization, Resonance, Electronegativity
- Reaction Mechanisms: Substitution, Addition, Elimination
- Alkanes, Alkenes, Alkynes, Aromatics
- Stereochemistry, Isomerism

### **Unit IV: Organic Chemistry – Functional Groups & Biomolecules**

- Alcohols, Phenols, Ethers
- Aldehydes, Ketones, Carboxylic Acids & Derivatives
- Amines, Amino Acids, Proteins, Carbohydrates
- Polymers, Biomolecules

### **Unit V: Chemical Kinetics, Surface Chemistry, Environmental Chemistry**

- Rate Laws, Order, Molecularity
- Catalysis, Activation Energy
- Surface Chemistry, Adsorption
- Pollution, Green Chemistry, Water and Air quality

### **Notes:**

- This syllabus is based on the BOSSE (Board of Open Schooling and Skill Education, Sikkim) Senior Secondary curriculum.
- Each paper generally carries 100 marks, with a 70:30 ratio between external and internal assessment.
- Students are encouraged to participate in laboratory experiments and projects for Physics and Chemistry.
- Skill-based and computational learning approaches are integral to the BOSSE MPC stream curriculum.

Prepared by: ChatGPT — Common Inter (MPC) Syllabus Template (BOSSE, Sikkim)

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