SCO INTERNATIONAL PHYSICS OLYMPIAD

CLASS 11 OFFICIAL SYLLABUS

Academic syllabus, preparation pathway, and assessment blueprint

Designed for Class 11 learners following international physics foundations and SCO Olympiad preparation flow.

- Covers mathematical tools, measurement, kinematics, dynamics, energy, rotation, gravitation, matter, heat, thermodynamics, kinetic theory, oscillations, and waves.
- Focuses on conceptual understanding, numerical reasoning, scientific communication, and real-life application.
- Useful for schools, teachers, parents, mentors, and students preparing for SCO International Physics Olympiad.

Math Tools	Measurement	1-D Motion	2-D Motion	Forces	Energy
Rotation	Gravity	Solids	Fluids	Heat	Waves

SCO International Physics Olympiad - Class 11 Official Syllabus

Exam Overview

Field	Details
Exam Name	SCO International Physics Olympiad
Class/Grade	Class 11
Subject	Physics
Recommended Duration	60 minutes
Suggested Pattern	50 MCQs: General, Assertion-Reason, Case Study, Achievers
Suggested Marks	60 marks: Q1-Q40 one mark each; Q41-Q50 two marks each

Chapter-wise Syllabus and Learning Outcomes

Chapter 1: Mathematics in Physics

Core Scope	Vectors; trigonometry; basic calculus idea; graph interpretation; proportional reasoning; error propagation in simple expressions.
Learning Outcome	Students should solve concept and numerical problems from Mathematics in Physics, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 2: Physical and Measurement

Core Scope	Units; SI system; dimensional analysis; significant figures; accuracy, precision, least count, and measurement uncertainty.
Learning Outcome	Students should solve concept and numerical problems from Physical and Measurement, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 3: Motion in a Straight Line

Core Scope	Position, displacement, velocity, acceleration; graphs; uniformly accelerated motion; relative motion in one dimension.
Learning Outcome	Students should solve concept and numerical problems from Motion in a Straight Line, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 4: Motion in a Plane

Core Scope	Vectors in two dimensions; projectile motion; uniform circular motion; relative velocity; components of motion.
Learning Outcome	Students should solve concept and numerical problems from Motion in a Plane, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 5: Law of Motion

Core Scope	Newton’s laws; free-body diagrams; friction; tension; normal reaction; connected bodies; circular motion applications.
Learning Outcome	Students should solve concept and numerical problems from Law of Motion, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 6: Work Energy and Power

Core Scope	Work by constant and variable forces; kinetic energy; potential energy; conservation of energy; power; collisions.
Learning Outcome	Students should solve concept and numerical problems from Work Energy and Power, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 7: System of Particles and Rotational Motion

Core Scope	Centre of mass; torque; angular momentum; rotational kinematics; moment of inertia; rolling motion.
Learning Outcome	Students should solve concept and numerical problems from System of Particles and Rotational Motion, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 8: Gravitation

Core Scope	Newton’s law; gravitational field and potential; satellites; orbital speed; escape speed; variation of g; Kepler’s laws.
Learning Outcome	Students should solve concept and numerical problems from Gravitation, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 9: Mechanical Properties of Solids

Core Scope	Stress, strain, Hooke’s law; Young’s modulus; bulk modulus; shear modulus; elastic energy and material behaviour.
Learning Outcome	Students should solve concept and numerical problems from Mechanical Properties of Solids, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 10: Mechanical Properties of Fluids

Core Scope	Pressure; Pascal's law; buoyancy; surface tension; viscosity; continuity equation; Bernoulli principle.
Learning Outcome	Students should solve concept and numerical problems from Mechanical Properties of Fluids, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 11: Thermal Properties of Matter

Core Scope	Temperature scales; thermal expansion; calorimetry; latent heat; heat transfer; black-body radiation basics.
Learning Outcome	Students should solve concept and numerical problems from Thermal Properties of Matter, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 12: Thermodynamics

Core Scope	Zeroth and first laws; internal energy; work and heat; isothermal/adiabatic processes; heat engines; Carnot cycle.
Learning Outcome	Students should solve concept and numerical problems from Thermodynamics, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 13: Kinetic Theory

Core Scope	Molecular model of gas; pressure; rms speed; degrees of freedom; equipartition; mean free path; ideal gas assumptions.
Learning Outcome	Students should solve concept and numerical problems from Kinetic Theory, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 14: Oscillations

Core Scope	Periodic motion; SHM; spring-mass system; simple pendulum; energy in SHM; damping and resonance basics.
Learning Outcome	Students should solve concept and numerical problems from Oscillations, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Chapter 15: Waves

Core Scope	Wave speed; transverse and longitudinal waves; superposition; standing waves; sound waves; beats; Doppler effect basics.
Learning Outcome	Students should solve concept and numerical problems from Waves, explain the physical principle involved, interpret graphs/data, and connect the idea to real-world or experimental contexts.

Assessment Blueprint

Segment	Questions	Focus	Marks
General Questions	30	Concepts, formulas, graphs, numerical reasoning	1 mark each
Assertion-Reason	10	Scientific reasoning, law-concept relationship, misconception testing	1 mark each
Achievers Section	10	Case study, multi-step numerical, integrated physics applications	2 marks each

Preparation Roadmap

Foundation: Revise units, dimensions, vectors, graphs, and standard formulas before attempting mixed numerical questions.

Concept Building: For each chapter, write a one-page formula/concept sheet and solve direct concept questions.

Application Practice: Move to multi-step problems involving force diagrams, energy transformations, rotational analogies, fluids, and thermodynamic processes.

Olympiad Reasoning: Practise assertion-reason, case-based questions, data interpretation, approximation, and elimination of distractors.

Final Revision: Attempt full timed sample papers, review errors, and maintain a personal list of common mistakes.

Question Design Standard for Schools

- Use diagrams only where they improve conceptual clarity, not for decoration.
- Keep numerical data realistic and units consistent.
- Mix direct, reasoning, graphical, and case-study questions.
- Avoid university-level modern physics content unless explicitly marked as enrichment.
- Balance difficulty: 40% conceptual, 35% numerical, 15% assertion-reason, 10% achievers/high-order reasoning.