

SCO INTERNATIONAL CODING OLYMPIAD

COMPILED SYLLABUS

Grade-wise global syllabus pathway for computational thinking, coding, AI readiness, and digital responsibility

A structured syllabus from early logic and visual algorithms to advanced programming concepts, data, AI awareness, cybersecurity, and ethical computing.

- grade-band learning outcomes for primary, middle, and senior school students
- coding plus logical reasoning, data, cyber safety, AI readiness, and communication skills
- prepared for website download, school planning, learning-material mapping, and assessment blueprinting

Logic	Coding	Algorithms	Data	AI
Safety	Debug	Projects	Ethics	Future

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1. Syllabus Vision

The SCO International Coding Olympiad syllabus is designed to help students grow from simple logical sequencing to advanced computational problem-solving. It encourages students to understand why a solution works, how to test it, and how computing affects people and society.

The syllabus is intentionally grade-fit: younger learners use pictures, patterns, and block-style logic, while senior learners engage with text-based pseudo-code, algorithms, data structures, debugging, AI concepts, and ethical technology decisions.

2. Core Syllabus Domains

Domain	Subtopics	Expected Learning Evidence
Computational Thinking	Decomposition, patterns, abstraction, algorithm design	Student can break a task into steps and select an efficient process.
Algorithms	Sequencing, branching, loops, recursion awareness, sorting/searching basics	Student can trace, compare, and improve algorithm steps.
Programming Concepts	Variables, data types, operators, input/output, functions, scope, debugging	Student can predict output and identify logical or syntax-like errors.
Data and Representation	Lists, arrays, tables, charts, binary basics, data interpretation	Student can organize, read, and use information in a computational task.
Cyber Safety	Passwords, privacy, phishing, digital footprints, safe communication	Student can choose safe and responsible online actions.
AI Readiness	Human-centred AI, classification, prompts, bias, limitations, responsible use	Student can recognise AI use cases and judge risks responsibly.
Digital Impact	Accessibility, fairness, environment, collaboration, communication	Student can explain how computing choices affect people.

3. Grade-Wise Compiled Syllabus

Grade	Core Topics	Olympiad Task Style
Grade 1	Step-by-step thinking, directions, object grouping, simple patterns, safe device use.	Picture algorithms, choose next step, match input-output, safety choices.
Grade 2	Sequences, repeated actions, sorting objects, simple conditions, digital kindness.	Order steps, identify repeat patterns, simple yes/no decisions.
Grade 3	Loops, events, block logic, debugging simple mistakes, passwords and privacy.	Trace a simple block program, find missing instruction, choose safer password.
Grade 4	Nested patterns, condition-based choices, simple variables, flowcharts, responsible sharing.	Complete flowchart, predict output, correct a logic error.
Grade 5	Variables, operators, inputs/outputs, loops, functions as reusable steps, data tables.	Trace pseudo-code, calculate output, interpret a small table.
Grade 6	Conditional logic, loop counters, lists, simple functions, cyber safety scenarios.	Debug code, choose algorithm, evaluate online behaviour.

Grade 7	Arrays/lists, string logic, modular design, algorithm comparison, networks basics.	Predict output from loops/lists, identify more efficient steps.
Grade 8	Searching/sorting basics, functions, edge cases, data interpretation, digital ethics.	Compare algorithms, test cases, analyze data-driven scenarios.
Grade 9	Text-based pseudo-code, functions, arrays, complexity awareness, debugging, security.	Trace nested loops, identify boundary errors, solve algorithmic tasks.
Grade 10	Data structures foundations, recursion awareness, modular coding, AI/cyber ethics.	Select data structure, evaluate algorithm, reason about AI limitations.
Grade 11	Advanced algorithms, abstraction, data analysis, problem modelling, responsible automation.	Solve multi-step programming logic and explain decisions.
Grade 12	Competitive problem solving, systems thinking, AI/system design ethics, optimization.	Analyze constraints, choose strategies, evaluate scalable and ethical solutions.

4. Assessment Blueprint

Section	Approx. Weight	Question Focus
Logic and computational thinking	25%	Patterns, sequencing, decomposition, abstraction, flow of control.
Algorithms and programming	35%	Pseudo-code, output prediction, loops, conditions, functions, debugging.
Data, representation, and problem solving	15%	Tables, lists, arrays, simple charts, data-based decisions.
Cyber safety and digital responsibility	10%	Privacy, security, safe communication, fair use, academic integrity.
AI readiness and technology impact	10%	AI basics, responsible use, bias/limitations, human-centred thinking.
Communication of reasoning	5%	Choosing the best explanation, interpreting instructions, clarity of logic.

Blueprint flexibility

Question distribution may vary by grade and cycle. The final live paper instruction is the authoritative exam blueprint for that official attempt.

5. Suggested Preparation Units

Unit	Preparation Goal	Practice Activity
Unit 1: Logic Foundations	Develop careful reading, pattern recognition, and step-by-step thinking.	Unplugged puzzles, sequence cards, simple flowcharts.
Unit 2: Algorithms	Understand repeated steps, conditions, and solution efficiency.	Trace algorithms, compare two approaches, fix missing step.
Unit 3: Programming Concepts	Build confidence with variables, loops, functions, and outputs.	Pseudo-code worksheets, output prediction, debugging drills.
Unit 4: Data Thinking	Use tables/lists and interpret data accurately.	List/array tasks, chart questions, data-cleaning examples.
Unit 5: Safe and Ethical Computing	Connect coding with responsibility and real-world digital citizenship.	Privacy scenarios, phishing identification, fair-use questions.
Unit 6: AI Readiness	Introduce AI as a tool that needs human judgement and ethical use.	Classify examples, discuss bias, choose responsible AI actions.

6. Linked Subject Support

The uploaded plan snapshot shows SCO ICO configured across Coding, with selected linked/support subjects such as Mental Ability and English for certain senior grades. These support domains strengthen reasoning, comprehension, and problem interpretation for coding exams.

Support Domain	Why It Matters in Coding Olympiad
Mental Ability	Improves logic, sequencing, pattern recognition, and analytical speed.
English/Reading Skill	Improves instruction reading, scenario interpretation, and answer accuracy.
Mathematical Reasoning	Supports loops, variables, data, patterns, and algorithmic constraints.

Global Alignment References

This SCO document is written as a practical public-facing guide and uses international computer science education references for structure, progression, and responsible AI framing.

Reference area	How it supports this SCO document
K-12 Computer Science Framework	Supports computational thinking, algorithms, abstractions, artifacts, testing, and communication.
CSTA K-12 Computer Science Standards	Supports grade-band learning objectives across computing systems, networks, data, algorithms/programming, and impacts of computing.
UNESCO AI Competency Framework for Students	Supports responsible AI literacy, ethics, human-centred design, and progression from understanding to applying and creating.