



GRADE 11 • AI OLYMPIAD HANDBOOK

AI Olympiad Handbook

A complete guide for Grade 11 students — the full syllabus, exam pattern, a 9-week preparation strategy, daily routine, exam-day tips, and the detailed curriculum for every section.

4

SECTIONS (A–D)

50

TOTAL QUESTIONS

60

TOTAL MARKS

60

MINUTES DURATION

1. Syllabus Overview

Sec	Title	Questions	Marks	Content Coverage
A	CT & Logical Reasoning	15 × 1 mark	15	Computational Thinking: breaking problems down, abstracting key details, spotting patterns and designing solutions. Algorithmic Thinking: algorithms, flowcharts, step sequencing, logical decisions and optimisation. Logical & Analytical Reasoning: deductive and inductive logic, cause-and-effect analysis, comparison and critical evaluation. Problem Solving: structured, step-by-step approaches to real-world problem analysis.
B	AI & Technology Concepts	15 × 1 mark	15	AI Fundamentals: core AI concepts, how AI has evolved, its applications, and its strengths and limits. AI Domains & Careers: Data Science, Machine Learning, NLP, Computer Vision and career paths in AI. AI Project Cycle: scoping a problem, acquiring and exploring data, modelling, evaluating and deploying. Capstone Project: building a working AI-based solution end to end. Data Literacy: collecting, checking, cleaning, analysing and visualising data. Machine Learning: supervised and unsupervised methods, classification, regression and clustering.
C	Everyday AI Around Us	10 × 1 mark	10	Natural Language Processing: how machines process text and speech, and understand and generate language. Linguistics & AI: the structure of language, syntax, semantics and recurring language patterns. AI Applications: smart assistants, recommendation engines, automation and AI at work across industries. Human-AI Interaction: how people and AI systems communicate and work together. Responsible AI: privacy, safe usage, digital responsibility and AI's impact on society.
D	Elite Thinkers Section	10 × 2 marks	20	CT-Based AI Problem Solving: breaking down problems, abstraction, pattern spotting and judging solutions. Data & AI Decision-Making: reading data, interpreting AI outputs, assessing data quality and deciding with evidence. AI Project Analysis: scoping problems, data choices, evaluating models and refining solutions. NLP Case Studies: chatbots, translation tools, voice assistants and human-AI interaction. Ethical AI: bias, fairness, transparency, accountability, privacy and wider social impact. Innovation & Future Thinking: responsible AI, AI for good, sustainability and challenges ahead.

2. Exam Pattern

Section	Title	Questions	Marks	Total
A	CT & Logical Reasoning	15	× 1	15
B	AI & Technology Concepts	15	× 1	15
C	Everyday AI Around Us	10	× 1	10
D	Elite Thinkers Section	10	× 2	20

Total	50	60 Marks
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60 MINUTES DURATION	No NEGATIVE MARKING
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3. Preparation Strategy

Phase 1: Build Concepts (Weeks 1–4)

Section	What to Do
A: CT & Logical Reasoning	- Practice Python basics daily (variables, loops, conditionals, functions). - Write small Python programs for pattern recognition problems. - Create decision trees for real-life scenarios. - Practice data analysis using sample datasets. - Solve analytical reasoning problems regularly. - Implement algorithms using Python pseudocode.
B: AI & Technology Concepts	- Study the AI Project Cycle in depth using real-world examples. - Research AI career pathways and identify the skills required. - Practice data cleaning and data visualisation techniques. - Compare classification, regression, and clustering algorithms. - Build a simple Machine Learning model using sample data. - Thoroughly understand supervised, unsupervised, and reinforcement learning.
C: Everyday AI Around Us	- Explore NLP tools such as chatbots, translation tools, and voice assistants. - Build a simple chatbot using no-code tools. - Analyse recommendation systems (Netflix, Amazon, etc.). - Research AI applications across different industries. - Discuss responsible AI usage and privacy concerns.
D: Elite Thinkers	- Analyse two AI case studies every week. - Evaluate Machine Learning model performance metrics. - Practice ethical decision-making scenarios. - Develop innovative AI solutions for societal problems. - Write detailed analysis reports.

Phase 2: Practice (Weeks 5–6)

Daily	Saturday
- Solve 5 MCQs and write 1 Python program. - Analyse 1 AI case study. - Design 1 algorithm. - Complete 1 data interpretation exercise.	- Take a section-wise test. (15 Questions each for Sections A & B, 10 Questions for Section C, and 10 Questions for Section D.)

Phase 3: Mock Drills (Weeks 7–9)

Week	Plan
7	Attempt 2 full mock tests (50 Questions, 60 Minutes) followed by deep error analysis.
8	Solve 3 previous years' papers and focus on Section D by writing detailed answers.
9	Take the final mock test, complete light revision, and relax the day before the exam.

4. Daily Routine (50–60 Minutes)

Time	Activity	Duration
Morning	Python coding practice (2–3 programs).	10 min
Afternoon	Learn one topic along with its real-world application.	15 min
Evening	Solve five practice questions and analyse one AI case study.	15 min
Night	Revise the AI Project Cycle and Machine Learning algorithms.	10 min

5. Exam Day Strategy

Section	Questions	Time	Strategy
A	15	14 min	Attempt Python and algorithm questions first; skip difficult ones initially.
B	15	14 min	Trust your understanding of the AI Project Cycle and Machine Learning concepts.
C	10	12 min	Think about real-world examples while answering.
D	10	15 min	Write detailed answers with proper reasoning (5–6 sentences).
Review	All	5 min	Check all answers carefully and correct any silly mistakes.

TIPS

- No negative marking – guess if unsure!
- Section D carries 2 marks per question – write complete, well-reasoned answers.
- Python Programming Fundamentals are a key focus area.
- AI Project Cycle is important for both Sections B and D.

6. Detailed Curriculum

A**CT & Logical Reasoning**

Computational thinking, logical reasoning, Python fundamentals & data handling

Content Coverage: Computational Thinking, Structured Problem-Solving, Algorithmic Thinking, Logical Reasoning, Python Programming Fundamentals, and Data Handling & Analysis

Computational Thinking

Students will build strong computational thinking skills for analysing problems, designing solutions and applying logical approaches to AI-based challenges, with a focus on structured reasoning, breaking problems apart and developing efficient solutions.

- **Problem Identification:** Reading real-world problems, pinning down requirements and setting clear goals for a solution.
- **Abstraction:** Keeping what matters, dropping unnecessary detail and building simplified views of complex problems.
- **Decomposition:** Splitting complex problems into smaller parts and examining each one to build an effective solution.
- **Pattern Recognition:** Spotting similarities, trends and relationships that help predict outcomes and shape solutions.
- **Algorithmic Thinking:** Building step-by-step procedures and logical sequences to solve problems systematically.

Logical Reasoning and Problem Solving

Students will sharpen their reasoning by examining information, weighing possibilities and applying logical methods to computational problems.

- **Analytical Reasoning:** Working through information systematically to find relationships and draw conclusions.
- **Logical Decision-Making:** Using conditions, rules and reasoning to choose the right solution.
- **Problem-Solving Strategies:** Building structured approaches for computational and AI-related problems.
- **Decision Trees:** Reading the logical structures used to map choices and outcomes.
- **Critical Analysis:** Judging solutions on accuracy, efficiency and effectiveness.

Python Programming Fundamentals

Students will see how programming powers AI development and pick up the core Python concepts used for computational problem-solving.

- **Python Basics:** Getting comfortable with Python syntax, structure and the programming environment.
- **Variables and Data Types:** Working with the different kinds of information stored and processed in a program.
- **Operators and Expressions:** Applying mathematical, logical and relational operations in code.
- **Conditional Statements:** Using decision-making structures to control how a program runs.
- **Loops and Iterations:** Repeating instructions efficiently through iteration.
- **Functions:** Writing reusable blocks of code for specific tasks.

Data Handling and Analytical Thinking

Students will build the skills to organise, analyse and interpret data — essential groundwork for AI systems and machine learning applications.

- **Data Representation:** Understanding the different formats used to store and present data.
- **Data Organisation:** Structuring information for efficient processing and analysis.
- **Data Analysis:** Finding patterns, relationships and useful insights in a dataset.
- **Logical Data Interpretation:** Using information to support reasoning and decision-making.
- **Data-Driven Problem Solving:** Applying evidence-based, analytical approaches to build solutions.

B

AI & Technology Concepts

AI fundamentals, career pathways, project cycle, data literacy & ML algorithms

Content Coverage: AI Fundamentals, Key AI Domains, AI Career Pathways, the AI Project Cycle, Capstone Project Development, Data Literacy, and Machine Learning Algorithms

Introduction to Artificial Intelligence

Students will get to grips with the core concepts of Artificial Intelligence, how it has evolved, its applications, and its role in solving real-world problems — including how AI systems use data, algorithms and computation to perform intelligent tasks.

- **Artificial Intelligence Fundamentals:** The core concepts, characteristics and principles behind AI systems.
- **AI Evolution:** How AI technologies have developed and progressed over time.
- **AI Applications:** How AI is applied across sectors such as healthcare, education, business, agriculture and technology.
- **AI Capabilities and Limitations:** The strengths, challenges and limits of AI-based systems.
- **AI Domains:** The different areas of AI and how they apply in real-world scenarios.

AI Domains and Career Pathways

Students will explore the different domains of Artificial Intelligence and the skills, roles and opportunities that come with AI careers.

- **Data Science:** How data is collected, analysed and interpreted to produce meaningful insights.
- **Machine Learning:** How machines learn from data to identify patterns and make predictions.
- **Natural Language Processing:** How AI systems process, understand and generate human language.
- **Computer Vision:** How AI systems analyse and interpret visual information.
- **AI Career Opportunities:** The roles, skills and career pathways available in Artificial Intelligence.

AI Project Cycle and Capstone Project

Students will learn how the AI Project Cycle turns real-world problems into AI-based projects.

- **Problem Scoping:** Identifying the problem, defining objectives and understanding what an AI solution needs.
- **Data Acquisition:** Gathering relevant, reliable data for building an AI model.
- **Data Exploration:** Analysing and making sense of collected data to find patterns and relationships.
- **Modelling:** Building AI models using suitable algorithms and techniques.
- **Evaluation:** Assessing AI models for performance, accuracy and effectiveness.
- **Deployment:** Understanding how AI solutions are put into practical use.
- **Capstone Project Development:** Applying AI concepts to design and build a complete AI-based solution.

Data Literacy

Students will build an understanding of data as the foundation of Artificial Intelligence — how it's collected, processed, analysed and used to support decisions.

- **Data Collection:** The methods used to gather relevant data.
- **Data Quality:** Why accurate, complete and reliable data matters.
- **Data Cleaning:** Preparing data so it's ready for analysis.
- **Data Analysis:** Reading data to identify patterns and pull out insights.
- **Data Visualisation:** Presenting data through charts, graphs and other visual formats.

Machine Learning Algorithms

Students will learn the basic concepts of machine learning and how algorithms let AI systems learn from data.

- **Machine Learning Concepts:** How machines learn patterns from data.

- **Supervised Learning:** Learning from labelled datasets to predict and classify.
- **Unsupervised Learning:** Finding hidden patterns in unlabelled data.
- **Classification Algorithms:** Methods used to sort data into categories.
- **Regression Algorithms:** Methods used to predict continuous values.
- **Clustering Algorithms:** Methods used to group similar data points together.

C

Everyday AI Around Us

NLP, linguistics, everyday AI applications & responsible AI usage

Content Coverage: Natural Language Processing, Linguistics in AI, Everyday AI Applications and Tools, Human-AI Interaction, Automation, and Responsible AI Use

Natural Language Processing (NLP)

Students will see how Artificial Intelligence lets machines process, understand and generate human language, and how linguistics and computer science come together in language-based AI systems.

- **Introduction to NLP:** How AI systems work with human language.
- **Text Processing:** How computers analyse and process written information.
- **Speech Processing:** How AI systems recognise and interpret spoken language.
- **Language Understanding:** How machines identify meaning, context and intent in human communication.
- **Language Generation:** How AI systems produce human-like responses and content.
- **NLP Applications:** Chatbots, translation systems, voice assistants and text analysis tools.

Linguistics and AI

Students will look at how language structure and communication patterns shape AI-based language technologies.

- **Human Language Structure:** The components and characteristics of human language.
- **Syntax and Semantics:** How AI analyses sentence structure and meaning.
- **Language Patterns:** The patterns AI systems rely on for language processing.
- **Communication Technologies:** The AI-powered tools that improve human-computer interaction.

AI Applications in Daily Life

Students will see how AI technologies show up in everyday activities and different industries, and understand AI's impact on society and human experience.

- **Smart Assistants:** AI-based systems that support communication and daily tasks.
- **Recommendation Systems:** AI systems that offer personalised suggestions.
- **Automation:** How AI boosts efficiency by automating tasks.
- **AI in Industries:** AI applications in healthcare, education, finance, transportation and business.
- **Human-AI Collaboration:** How humans and AI systems work together to solve problems.

Responsible AI Usage

Students will build awareness of how to use Artificial Intelligence technologies safely, ethically and responsibly.

- **Privacy Protection:** Why protecting personal and sensitive information matters.
- **Safe Use of AI Tools:** Responsible practices when interacting with AI systems.
- **Digital Responsibility:** Ethical behaviour in AI-enabled environments.
- **AI Impact on Society:** Weighing the benefits and challenges of AI adoption.

D

Elite Thinkers Section

Critical thinking, ML applications, AI ethics, innovation & responsible decision-making

Content Coverage: Critical Thinking, Applied Machine Learning, Real-World AI Case Studies, AI Ethics & Values, Innovation, and Responsible AI Decision-Making

AI Case Studies and Real-World Problem Solving

Students will analyse real-world AI applications and judge how well AI solutions tackle practical challenges, building the ability to assess AI systems from both a technical and a social angle.

- **AI Solution Analysis:** How AI systems solve real-world problems.
- **Case Study Evaluation:** Examining AI implementations and how effective they are.
- **Problem Identification:** Spotting challenges where AI solutions could apply.
- **Solution Assessment:** Weighing the success, limitations and impact of AI solutions.

Machine Learning Applications

Students will apply their machine learning knowledge to understand how AI systems are built and used in practical scenarios.

- **Model Selection:** How to choose the right machine learning approach.
- **Prediction and Classification:** How AI models turn data into outcomes.
- **Model Performance Analysis:** Judging how effective a machine learning system is.
- **Real-World ML Applications:** How machine learning is used across different domains.

AI Ethics and Values

Students will build critical thinking skills to weigh the ethical challenges of Artificial Intelligence and understand why responsible AI development matters.

- **Bias and Fairness:** How bias shapes AI decisions and outcomes.
- **Transparency:** Why AI decision-making needs to be understandable.
- **Accountability:** Recognising who is responsible in AI development and use.
- **Privacy and Security:** The ethical concerns around handling data.
- **Human Values in AI:** Making sure AI systems align with human needs and social values.

Innovation and Advanced AI Problem Solving

Students will apply AI concepts creatively to design solutions for complex problems, using computational thinking, data analysis and ethical reasoning to shape innovative approaches.

- **AI-Based Innovation:** Creative ways AI can solve real-world challenges.
- **Capstone Project Thinking:** Applying AI concepts to plan and improve AI projects.
- **Critical Evaluation:** Judging AI solutions on technical, ethical and social grounds.
- **Future of AI:** Emerging trends and possibilities in Artificial Intelligence.
- **Responsible AI Decision-Making:** Designing AI solutions that are effective, ethical and beneficial for society.

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