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SCO INTERNATIONAL ARTIFICIAL INTELLIGENCE OLYMPIAD

CLASS 9 SYLLABUS

A comprehensive document for schools, teachers, parents, and students

Designed from Class 9 AI syllabus pathways and aligned with SCO's platform flow for guided preparation, practice, reporting, and responsible AI literacy.

- chapter-wise learning guidance for Class 9 learners globally
- focus on machine learning workflow, NLP, Python mini-projects, AI applications, bias, fairness, privacy, and capstone practice
- useful for students, teachers, schools, and parents as a clear preparation and implementation roadmap

AI	ML	NLP	Python	Privacy
Data	Fairness	Healthcare	Education	Capstone

Syllabus Overview

The SCO International Artificial Intelligence Olympiad Class 9 syllabus introduces learners to practical AI literacy, machine learning foundations, natural language processing, Python-based text projects, ethical decision-making, and socially responsible applications. It is designed to help students understand how AI systems work, how data shapes outcomes, and how responsible design can support people, schools, society, and the environment.

Exam and Learning Structure

Olympiad	SCO International Artificial Intelligence Olympiad
Class / Grade	Class 9 / Grade 9
Subject	Artificial Intelligence
Question Type	Objective type, concept reasoning, code interpretation, ethical case analysis, and mini-capstone scenarios
Preparation Focus	AI concepts, ML workflow, NLP basics, Python practice, AI applications, privacy, fairness, and responsible innovation

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Chapter-wise Syllabus with Notes and Learning Outcomes

Chapter 1: Machine Learning Foundations and Workflow

Small note: Understand how an AI project moves from problem definition to data collection, model training, evaluation, and responsible deployment.

Learning outcome: Explain supervised/unsupervised learning, identify workflow stages, and connect AI models to real-world decision support.

Chapter 2: Supervised Learning - Classification

Small note: Classification teaches computers to assign known labels such as spam/not spam, positive/negative, or disease/no disease using labeled examples.

Learning outcome: Recognize classification tasks, understand labels and features, and interpret basic performance ideas such as correct and incorrect predictions.

Chapter 3: Unsupervised Learning - Clustering and Pattern Discovery

Small note: Clustering groups similar data without predefined labels and helps discover patterns in learners, users, documents, images, or behavior.

Learning outcome: Differentiate clustering from classification and explain how patterns can support exploration without replacing human judgment.

Chapter 4: Decision Trees and Explainable Logic

Small note: Decision trees use rule-like splits to make predictions in a form that students can read and explain.

Learning outcome: Trace a decision path, understand impurity/splitting in simple terms, and appreciate interpretability in AI systems.

Chapter 5: Data Collection, Quality, and Documentation in AI

Small note: Good AI depends on relevant, accurate, complete, and well-documented data.

Learning outcome: Identify missing values, noisy data, poor labels, and documentation needs before using data in an AI project.

Chapter 6: Data Privacy, Consent, Security, and Responsible Use in AI

Small note: Students learn why personal data must be collected with permission, protected securely, and used only for fair and appropriate purposes.

Learning outcome: Explain consent, anonymization, data minimization, and why privacy matters in school and public AI systems.

Chapter 7: NLP Fundamentals - How AI Works with Language

Small note: Natural Language Processing helps computers work with text, speech, words, meaning, and context.

Learning outcome: Describe tokenization, stop words, stemming/lemmatization, word representations, and challenges of ambiguity.

Chapter 8: Python Basics for Small NLP Projects

Small note: Students practice simple Python logic used in text handling, counting, filtering, string methods, dictionaries, and small NLP tasks.

Learning outcome: Read and reason through short Python snippets for cleaning text, counting words, extracting patterns, and interpreting output.

Chapter 9: AI Applications in Healthcare (Age Appropriate and Simulated)

Small note: Healthcare examples show how AI can support screening, triage, image analysis, and decision support while requiring human supervision.

Learning outcome: Recognize benefits and risks of healthcare AI, especially accuracy, recall, safety, privacy, and human oversight.

Chapter 10: AI Applications in Education and Learning Support

Small note: AI in education may personalize learning, provide practice, detect learning gaps, and support teachers without replacing them.

Learning outcome: Evaluate how AI tools can assist learning fairly, safely, and transparently in school contexts.

Chapter 11: AI Applications in Environment and Sustainability

Small note: AI can support climate monitoring, waste sorting, biodiversity protection, energy efficiency, and smart resource use.

Learning outcome: Connect AI applications to sustainability goals and explain how efficient AI design can reduce environmental impact.

Chapter 12: AI Bias, Fairness, and Ethical Case Discussions

Small note: Bias can arise from unbalanced data, flawed assumptions, historical inequality, or poor evaluation.

Learning outcome: Identify bias in scenarios, propose fairness audits, and explain responsible mitigation steps.

Chapter 13: Advanced Logical Puzzles for AI Reasoning

Small note: Logical puzzles build pattern recognition, rule-following, sequencing, abstraction, and structured reasoning used in AI problem solving.

Learning outcome: Solve AI-style reasoning tasks involving rules, conditions, sequences, code logic, and decision pathways.

Chapter 14: Achievers Section - Integrated Mini Capstones and Olympiad Practice

Small note: The Achievers Section combines data, ML, NLP, ethics, applications, and Python reasoning in more complex integrated scenarios.

Learning outcome: Apply multiple concepts in case-based questions and justify the most responsible or technically correct answer.

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Skill Map for Students

Core Skill Outcomes

Conceptual AI literacy	Understand what AI can and cannot do; distinguish learning types and model workflows.
Data and documentation	Check data quality, labels, missing values, privacy, and consent before model use.
NLP and Python practice	Read short Python snippets, tokenize text, count patterns, and interpret output.
Responsible AI judgment	Identify bias, privacy risks, fairness concerns, and sustainability trade-offs.
Application reasoning	Apply AI ideas to education, healthcare, environment, and student-friendly capstone cases.

Suggested Assessment Blueprint

Exam Weightage Guide

Machine Learning Foundations and Workflow	15-20%
Classification, Clustering, and Decision Trees	18-22%
Data Quality, Privacy, and Responsible Use	15-18%
NLP and Python Mini Projects	18-22%
AI Applications in Healthcare, Education, and Environment	12-15%
Bias, Fairness, Ethics, and Achievers Capstones	15-20%

Preparation Roadmap

- Start with the AI workflow: problem, data, model, evaluation, deployment, and monitoring.
- Practice classification vs. clustering examples from school, health, environment, and language scenarios.
- Revise basic Python strings, lists, dictionaries, loops, functions, and simple regular expressions used in NLP tasks.
- Build a mini glossary of AI ethics terms: bias, fairness, consent, transparency, privacy, accountability, and sustainability.
- Attempt mixed practice questions where technical reasoning and responsible decision-making appear together.

Guidance for Teachers and Schools

Teachers and schools may use this syllabus for weekly AI literacy classes, project-based discussions, ethics debates, coding demonstrations, and Olympiad preparation. Activities should emphasize safe experimentation, age-appropriate datasets, respectful use of personal information, and clear explanation of AI outputs rather than blind dependence on tools.

Glossary

Key Terms

Algorithm	A step-by-step method used to solve a problem or make a decision.
Bias	A systematic unfair pattern in data, design, or model outcomes.
Classification	Predicting a predefined category or label for new data.
Clustering	Grouping similar items without predefined labels.
Tokenization	Splitting text into smaller units such as words or punctuation marks.
Privacy	Protecting personal information and using it only with permission and care.
Fairness Audit	A structured check to see whether an AI system treats different groups equitably.
Capstone	An integrated project or scenario that combines many concepts in one task.