



AGI Training Program Curriculum

Enroll Start Date : 01-05-2026 Class Start Date: 11th May 2026

Format: 100% Offline | Basic Computer Knowledge + Scratch Coding + Projects

Levels: Beginner → Intermediate → Advanced → Expert

Target: Classes 9th -12th

Duration: 6 Months (24 Weeks)

Frequency: 90 min/Session

Standard: CSTA, ISTE, UNESCO AI

Program Goal

Transform students from intermediate coders into AI-ready developers capable of building data-driven applications, training machine learning models, programming robots/drones, and completing a portfolio-ready capstone project.

Certificate Levels :

- AI Programming Associate (Month 2)
- Data Science & ML Practitioner (Month 4)
- Young AI Engineer (Month 6) – with portfolio & capstone

Month 1: Python Proficiency & Software Engineering Basics

Focus: Python review, OOP, Git, debugging

Week 1 – Python Refresher

Day	Topic	Activity
1	Variables, data types, input/output, f-strings	Build a tip calculator
2	Conditionals, loops (for, while), range(), break/continue	FizzBuzz with twist (print "FizzBuzz" for multiples of 3 & 5)
3	Lists, tuples, slicing, list comprehensions	Extract even numbers from a list in one line
4	Dictionaries, sets, dictionary comprehensions	Word frequency counter from a paragraph
5	Project: Hangman game (using lists, loops, conditionals)	Add scoring and replay

Week 2 – Functions & Modules

Day	Topic	Activity
1	Defining functions, parameters, return values, docstrings	Write a function to check prime numbers
2	Scope, global vs local, nonlocal	Debug a script with variable shadowing
3	Lambda functions, map(), filter(), reduce()	Use lambda to filter words longer than 5 letters
4	Importing modules, creating custom modules	Create a math_utils.py with area/perimeter functions
5	Project: Modular calculator (add, subtract, multiply, divide in separate functions)	Import and use in main script

Week 3 – File Handling & Error Handling

Day	Topic	Activity
1	Reading/writing text files (open, with statement)	Read a log file and count errors
2	CSV module – read, write, append	Process a student grade CSV → calculate average
3	Exception handling (try, except, finally)	Add error handling to calculator (division by zero)
4	JSON module – load, dump	Store user preferences in JSON
5	Project: Student data manager (add, view, search, delete using CSV)	Command-line interface with menus

Week 4 – Object-Oriented Programming (OOP)

Day	Topic	Activity
1	Classes and objects, __init__, self	Create a Student class with name, age, grades
2	Methods, attributes, property decorators	Add average_grade() method
3	Inheritance, super(), method overriding	Create Teacher and Staff subclasses
4	Encapsulation (private attributes _), getters/setters	Protect sensitive data (e.g., SSN)
5	Project: Library management system (Book, Member, Library classes)	Borrow/return, track due dates

Month 2: Data Science & Visualization

Focus: NumPy, Pandas, Matplotlib, Seaborn

Week 5 – NumPy Basics

Day	Topic	Activity
1	Installing NumPy, creating arrays (np.array(), np.zeros(), np.arange())	Create a 3×3 matrix of random numbers
2	Array operations (+, -, *, /, broadcasting)	Element-wise multiplication of two arrays
3	Indexing, slicing, boolean indexing	Extract all values > 5 from an array
4	Statistical functions (mean, median, std, min, max)	Calculate stats on a dataset of heights
5	Project: Weather data analysis (temperature array: min, max, average, variance)	Visualize with print statements

Week 6 – Pandas for Data Manipulation

Day	Topic	Activity
1	Series and DataFrames, reading CSV	Load a built-in dataset (iris, tips)
2	Selecting columns, filtering rows, loc, iloc	Filter rows where total_bill > 20
3	Handling missing data (isnull(), dropna(), fillna())	Clean a messy dataset
4	Groupby, aggregation (mean, sum, count)	Group tips by day and calculate average tip
5	Project: Analyze student exam scores (CSV) – find top 10, average by subject	Export cleaned DataFrame to new CSV

Week 7 – Data Visualization with Matplotlib & Seaborn

Day	Topic	Activity
1	Line plots (plt.plot())	Plot a simple function ($y = x^2$)
2	Bar charts, histograms	Show distribution of test scores
3	Scatter plots, customization (labels, titles, legends)	Plot height vs weight
4	Seaborn: heatmaps, pairplots, boxplots	Visualize correlation matrix
5	Project: Exploratory Data Analysis (EDA) on a real dataset (e.g., Titanic, Housing)	Generate 3 insightful graphs + summary

Week 8 – Case Study: Data Storytelling

Day	Topic	Activity
1	Formulating a question, data cleaning recap	Choose a dataset from Kaggle (small)
2	Feature engineering (creating new columns)	Extract month from date, categorize age groups
3	Visual storytelling – combining multiple plots	Create a dashboard of 4 subplots
4	Writing conclusions from data	Prepare a 2-slide presentation
5	Presentation: Share findings with class	Peer Q&A

Month 3: Machine Learning Fundamentals

Focus: Scikit-Learn, regression, classification, evaluation

Week 9 – Introduction to ML & Scikit-Learn

Day	Topic	Activity
1	Supervised vs unsupervised learning	Label examples (spam detection → supervised)
2	Features, labels, train-test split	Split iris dataset (80/20)
3	Scikit-Learn API: fit, predict, score	Train a k-NN classifier (k=3) on iris
4	Evaluation metrics: accuracy, confusion matrix	Print confusion matrix for predictions
5	Project: Classify flowers (iris) – compare k=1,3,5	Report which k works best

Week 10 – Linear Regression

Day	Topic	Activity
1	Simple linear regression ($y = mx + b$)	Predict house price based on square feet
2	Using Linear Regression from sklearn	Fit model, get coefficients
3	Mean Squared Error (MSE), R^2 score	Evaluate model performance
4	Multiple linear regression (multiple features)	Predict fuel efficiency (mpg) using cylinders, horsepower, etc.
5	Project: Boston Housing (or similar) – predict MEDV	Compare single vs multiple features

Week 11 – Classification Algorithms

Day	Topic	Activity
1	Logistic Regression (not for regression)	Predict if a student passes (binary)
2	Decision Trees, visualising tree	Classify iris with depth=3
3	Random Forest (ensemble)	Compare accuracy with single decision tree
4	Naïve Bayes (text classification)	Classify SMS messages as spam/ham
5	Project: Titanic survival prediction (use gender, age, class)	Achieve >75% accuracy on test set

Week 12 – Unsupervised Learning & Clustering

Day	Topic	Activity
1	K-Means clustering intuition (elbow method)	Cluster iris dataset into 3 groups
2	PCA (Principal Component Analysis) for visualisation	Reduce iris to 2D and scatter plot
3	Clustering evaluation (silhouette score)	Find optimal k for a customer dataset
4	Real-world application: customer segmentation	Segment mall customers by spending score
5	Project: Image compression using K-Means (reduce colours)	Compress an image and display before/after

Month 4: Advanced AI – Deep Learning & NLP

Focus: Neural networks, TensorFlow/Keras, NLP

Week 13 – Neural Networks Basics

Day	Topic	Activity
1	Perceptron, activation functions (ReLU, sigmoid)	Build a single neuron with numpy
2	Multi-layer perceptron (MLP) using Keras	Simple MLP for iris classification
3	Forward propagation, backpropagation intuition	Animate (slides) how weights update
4	Training, epochs, batch size, overfitting	Train MLP on MNIST (small subset)
5	Project: Handwritten digit recognition (MNIST) with >90% accuracy	Show confusion matrix

Week 14 – Convolutional Neural Networks (CNN)

Day	Topic	Activity
1	Convolution, pooling, filters	Visualise filters on a sample image
2	Build a simple CNN with Keras (Conv2D, MaxPooling2D)	Train on fashion MNIST
3	Data augmentation (rotation, zoom, flip)	Improve model with augmentation
4	Transfer learning (using MobileNet, ResNet)	Classify custom images (cats vs dogs)
5	Project: Face mask detector using CNN (from images)	Deploy using Gradio web app

Week 15 – Natural Language Processing (NLP)

Day	Topic	Activity
1	Text preprocessing: tokenisation, stopwords, stemming	Use NLTK to clean a sentence
2	Bag-of-words, TF-IDF	Convert text documents to vectors
3	Sentiment analysis using Naïve Bayes / logistic regression	Classify movie reviews (positive/negative)
4	Word embeddings (Word2Vec, GloVe)	Visualise similar words
5	Project: Spam classifier (SMS) using TF-IDF + classifier	Compare with previous Naïve Bayes

Week 16 – Generative AI & LLMs

Day	Topic	Activity
1	What are LLMs (GPT, BERT)? Transformers intro	Use a free API (e.g., Hugging Face) to generate text
2	Prompt engineering basics	Write prompts to summarise a paragraph
3	Fine-tuning (concept) vs zero-shot	Try zero-shot classification with a model
4	Ethical AI: hallucinations, bias in LLMs	Case study: biased text generation
5	Project: Build a simple Q&A bot using OpenAI API (with API key) or Hugging Face free model	Ask questions about a document

Month 5: Robotics & Drone Programming

Focus: Physical computing, ROS basics, drone autonomy

Week 17 – Robotics with Micro:bit / Arduino

Day	Topic	Activity
1	Robot components: microcontrollers, sensors, motors	Identify on a real or simulated robot
2	Digital input/output (LED, button)	Tinkercad: blink LED with button press
3	Analog sensors (potentiometer, light sensor)	Read light level and turn on LED when dark
4	Servo motors (angle control)	Sweep servo 0° to 180°
5	Project: Smart night light (light sensor + LED + servo to move)	Simulate or with real hardware

Week 18 – Robot Programming (Python with micro:bit or simulated robot)

Day	Topic	Activity
1	Using MicroPython on micro:bit	Display scrolling text on LED matrix
2	Ultrasonic sensor (distance)	Measure distance and print to serial
3	Obstacle avoidance algorithm	Simulate robot that turns when too close
4	Line following using IR sensors	Program line follower logic
5	Project: Autonomous maze solver (simulated)	Use right-hand rule or PID basics

Week 19 – Drone Technology & Programming

Day	Topic	Activity
1	Quadcopter mechanics, flight dynamics, safety	Label parts, safety rules quiz
2	Tello EDU drone – SDK, command protocol	Connect via Python (simulated or real)
3	Basic commands: takeoff, land, move up/down/left/right	Fly a simple square pattern (simulator)
4	Flying with external control (keyboard or Python script)	Fly through waypoints
5	Project: Drone photo mission (takeoff → fly forward → take photo → land)	Use simulator's camera

Week 20 – Integrating AI with Robotics & Drones

Day	Topic	Activity
1	Computer vision on drone (object detection from top view)	Simulate detecting a coloured circle
2	Face detection on video stream	Use OpenCV to detect faces from drone camera
3	Autonomous landing on a target (ArUco marker)	Simulate marker detection and landing
4	AI-driven obstacle avoidance using depth camera	Simulate simple avoidance
5	Project: AI drone surveillance (detect a person and hover)	Present simulation demo

Month 6: Capstone Project & Career Prep

Focus: Live project development, deployment, portfolio, presentation

Week 21 – Capstone Planning & Design

Day	Topic	Activity
1	Brainstorming, project selection (individual or team of 2)	Review project options (see below)
2	Requirement analysis, user stories	Write a one-page specification
3	Technology stack decision (Python, Flask, Streamlit, TensorFlow, etc.)	Create architecture diagram
4	Data collection (if ML) or API research	Gather dataset or sign up for APIs
5	Milestone: Submit project proposal with timeline	Teacher feedback

Week 22 – Development Sprint 1 (Core Functionality)

Day	Topic	Activity
1	Set up GitHub repository, project structure	First commit: README, environment setup
2	Implement core algorithm / model training	Train baseline model
3	Build backend / data processing pipeline	Ensure data flow works
4	Create basic UI (CLI or simple web interface)	Test with dummy data
5	Milestone: Code review – demonstrate core feature works	Peer feedback

Week 23 – Development Sprint 2 (Polish & Deployment)

Day	Topic	Activity
1	Improve model accuracy / add features	Hyperparameter tuning
2	Build frontend (Streamlit, Gradio, or Flask)	User-friendly interface
3	Testing (unit tests, edge cases)	Write at least 3 test cases
4	Deployment on free platform (Hugging Face Spaces, Render, PythonAnywhere)	Make project accessible online
5	Milestone: Final code freeze, draft presentation slides	Screencast demo video

Week 24 – Final Showcase & Career Guidance

Day	Topic	Activity
1	Presentation practice, elevator pitch	2-minute pitch to partner
2	Internal showcase – present to class, peer evaluation	Use rubric
3	Prepare poster / one-pager for parents	Canva design
4	Parent Demo Day & Certificate Ceremony	Live demos, Q&A
5	Career guidance session – AI/CS pathways, internships, college prep	Guest speaker + resume workshop

Capstone Project Options (Individual or Team of 2)

Project	Technologies	Difficulty
AI Chatbot for a Domain (Health, Education)	Python, Transformers, Gradio	★ ★ ★
Stock Price Predictor	LSTM / Linear Regression, Yahoo Finance API, Streamlit	★ ★ ★
Object Detection App (YOLO or Teachable Machine + Web)	TensorFlow, OpenCV, Flask	★ ★ ★
Real-time Face Recognition Attendance	Face recognition library, CSV, GUI	★ ★
Recommendation System (Movies / Books)	Pandas, cosine similarity, Flask	★ ★
Drone Autonomous Mission (Simulator)	Tello SDK, Python, path planning	★ ★ ★
Robotic Arm Control (Sim or real)	Arduino/Python, inverse kinematics	★ ★ ★ ★
Fake News Detector	NLP, TF-IDF, Logistic Regression, web interface	★ ★ ★
Hand Gesture Controlled Presentation	MediaPipe, OpenCV, pyautogui	★ ★
AI Study Planner (LLM-powered)	OpenAI API or Hugging Face, calendar integration	★ ★ ★

Weekly Structure (90 min sessions)

Day	Focus	Activities
Monday	New concept / lecture	25 min theory, 40 min guided coding, 15 min Q&A, 10 min exit ticket
Tuesday	Deep dive & pair programming	10 min quiz, 60 min hands-on lab, 20 min code walkthrough
Wednesday	Project / case study	15 min problem intro, 60 min building, 15 min checkpoint
Thursday	Advanced topic / extension	20 min advanced concept, 50 min exploration, 20 min discussion
Friday	Assessment & review	20 min weekly quiz, 40 min group work / debugging, 30 min showcase of best work

Assessment & Certification

Component	Weight	Details
Weekly quizzes (Fri)	15%	10-15 MCQs + short answer
Coding assignments (weekly)	20%	Auto-graded + manual review
Monthly mini-projects	25%	Rubric: functionality, code quality, documentation
Capstone final project	30%	Presentation (10%), code (10%), demo (5%), report (5%)
Participation & peer review	10%	Contributions, GitHub activity

Certificates (cumulative score):

- 70%+ → AI Programming Associate
- 85%+ → Data Science & ML Practitioner
- 95%+ → Young AI Engineer

Tools & Platforms (All free)

Category	Tools
Python IDE	VS Code, PyCharm Edu, Replit, Google Colab
Data Science	NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn
Deep Learning	TensorFlow, Keras, PyTorch (optional)
NLP	NLTK, spaCy, Transformers (Hugging Face)
Robotics simulation	Tinkercad, Webots, mBlock
Drone simulation	Tello EDU simulator (free)
Deployment	Streamlit, Gradio, Hugging Face Spaces, Render
Version control	GitHub Classroom
Collaboration	Google Classroom, Discord/Slack

Bonus Activities

Activity	Timing	Description
Kaggle Competition	Month 4	Entry-level competition
Guest Lecture	Month 5	Industry AI engineer (Zoom)
Hackathon	Month 6 (weekend)	8-hour team challenge with prizes
College/Career Panel	Month 6	Alumni or professionals talk about AI paths
GitHub Portfolio Workshop	Month 6	Build a professional portfolio site

Final Outcomes

By the end of the program, each student will have:

- Proficiency in Python OOP, data science, and machine learning
- Trained and evaluated multiple ML models (regression, classification, clustering, CNN)
- Experience with robotics/drone programming (simulation)
- A deployed capstone project (web app or API) – portfolio ready
- Certificate and a GitHub repository with clean code and documentation