

Artificial Intelligence & Machine Learning

A job-ready, fully online program that takes you from Python foundations to deploying real AI models — machine learning, deep learning, NLP & LLMs, computer vision, and MLOps. Build a portfolio and get interview-ready.

Total: 60–65 Hours

Free Foundation: 15 Hours

Job-Ready Program: 45–50 Hours

Online & Live

Certificate

Free Foundation — 15 Hours

Start learning for free. Build your core Python, math, and data foundations.

Module 1: Programming Foundations with Python for AI

Estimated Time: 5 Hours**Learning Objectives**

- Write and run Python programs confidently
- Use core programming logic to prepare for data science

Topics

- Python setup, syntax, variables, and data types
- Conditionals, loops, functions, and modules
- Lists, dictionaries, and file handling for data

Hands-on

- Build Python scripts that read, clean, and summarize data

Assessment: Quiz + Coding Exercises

Module 2: Math & Statistics for Machine Learning

Estimated Time: 4 Hours**Learning Objectives**

- Understand the math that powers ML algorithms
- Apply statistics to reason about data

Topics

- Linear algebra essentials (vectors, matrices)
- Probability and descriptive statistics
- Derivatives and gradients intuition for optimization

Hands-on

- Compute statistics and visualize distributions in Python

Assessment: Quiz

Module 3: Data Handling with NumPy & Pandas

Estimated Time: 4 Hours

Learning Objectives

- Manipulate numerical data efficiently with NumPy
- Load, clean, and transform datasets with Pandas

Topics

- NumPy arrays and vectorized operations
- Pandas Series, DataFrames, indexing, and grouping
- Handling missing data and merging datasets

Hands-on

- Clean and analyze a real CSV dataset with Pandas

Assessment: Quiz + Lab

Module 4: Version Control with Git & GitHub

Estimated Time: 2 Hours

Learning Objectives

- Track code and notebooks with Git
- Collaborate and showcase work on GitHub

Topics

- Repositories, commits, and branches
- Merging, pull requests, and conflict resolution
- Building a professional data science GitHub profile

Hands-on

- Push your first notebooks and projects to GitHub

Assessment: Quiz + Lab

Paid Job-Ready Program — 45–50 Hours

Go from foundations to fully employable across ML, deep learning, NLP/LLMs, computer vision, and MLOps.

Module 5: Data Wrangling & Exploratory Data Analysis

Estimated Time: 5 Hours

Learning Objectives

- Turn raw, messy data into analysis-ready datasets
- Uncover patterns through exploratory data analysis

Topics

- Data cleaning, encoding, and outlier handling
- Feature scaling and transformation
- Exploratory data analysis (EDA) techniques

Hands-on

- Produce a full EDA report on a real-world dataset

Assessment: Project Milestone

Module 6: Data Visualization & Storytelling

Estimated Time: 4 Hours

Learning Objectives

- Communicate insights with clear visualizations
- Build dashboards that tell a data story

Topics

- Matplotlib and Seaborn plotting
- Choosing the right chart for the message
- Interactive dashboards and reporting

Hands-on

- Build a visual data-story dashboard from a dataset

Assessment: Lab

Module 7: Supervised Machine Learning

Estimated Time: 6 Hours

Learning Objectives

- Build classification and regression models
- Understand how core ML algorithms work

Topics

- Linear & logistic regression
- Decision trees, random forests, and gradient boosting
- k-NN, SVMs, and the scikit-learn workflow

Hands-on

- Train and compare predictive models on real data

Assessment: Project Milestone

Module 8: Unsupervised Learning & Dimensionality Reduction

Estimated Time: 4 Hours

Learning Objectives

- Discover structure in unlabeled data
- Reduce dimensionality for better models

Topics

- K-Means and hierarchical clustering
- Principal Component Analysis (PCA)
- Anomaly detection and customer segmentation

Hands-on

- Segment customers with clustering and PCA

Assessment: Lab

Module 9: Model Evaluation, Tuning & Feature Engineering

Estimated Time: 5 Hours

Learning Objectives

- Measure and improve model performance
- Engineer features that boost accuracy

Topics

- Train/test splits, cross-validation, and metrics
- Bias-variance, overfitting, and regularization
- Hyperparameter tuning and feature engineering pipelines

Hands-on

- Tune and validate a model to production quality

Assessment: Lab

Module 10: Deep Learning with TensorFlow & Keras

Estimated Time: 7 Hours

Learning Objectives

- Design and train deep neural networks
- Apply deep learning to real problems

Topics

- Neurons, activation functions, and backpropagation
- Building networks with TensorFlow and Keras
- CNNs, RNNs, and training best practices

Hands-on

- Build and train a deep learning image classifier

Assessment: Project Milestone

Module 11: Natural Language Processing & LLMs

Estimated Time: 5 Hours

Learning Objectives

- Process and model human language
- Build applications with modern LLMs

Topics

- Text preprocessing, embeddings, and sentiment analysis
- Transformers and how large language models (LLMs) work
- Prompting and building LLM-powered apps

Hands-on

- Build an NLP/LLM-powered text application

Assessment: Project Milestone

Module 12: Computer Vision

Estimated Time: 4 Hours

Learning Objectives

- Build models that understand images
- Apply transfer learning to vision tasks

Topics

- Image data, convolutions, and CNN architectures
- Image classification and object detection basics
- Transfer learning with pre-trained models

Hands-on

- Build an image classifier using transfer learning

Assessment: Lab

Module 13: MLOps & Model Deployment

Estimated Time: 4 Hours

Learning Objectives

- Deploy machine learning models to production
- Serve and monitor models reliably

Topics

- Packaging models and building prediction APIs (Flask/FastAPI)
- Containerizing with Docker and cloud deployment
- Model versioning, monitoring, and CI/CD basics

Hands-on

- Deploy a trained model as a live API

Assessment: Lab

Module 14: Capstone Project, Portfolio & Job Readiness

Estimated Time: 4 Hours

Learning Objectives

- Ship a complete, portfolio-ready AI/ML project
- Prepare for the AI/ML job search

Topics

- End-to-end capstone project planning and build
- Portfolio, GitHub, and resume optimization
- ML interview, case-study, and coding prep

Hands-on

- Build and deploy an end-to-end capstone ML project; mock interviews and resume review

Assessment: Capstone Project + Mock Interview

Total Course Duration: 60–65 Hours

Free Foundation (15h) + Paid Job-Ready Program (48h). Includes portfolio projects, resume & interview prep, mock interviews, and a Progmatrix Certificate of Completion. Enroll at www.progmatrix.com