ADITYA SIR

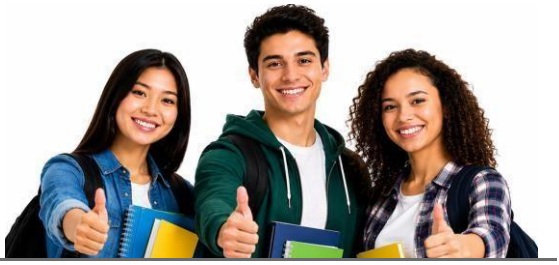
LN

Ai ACADEMY

LEARN | INNOVATE | AUTOMATE

10 Months

Agentic + Claude AI

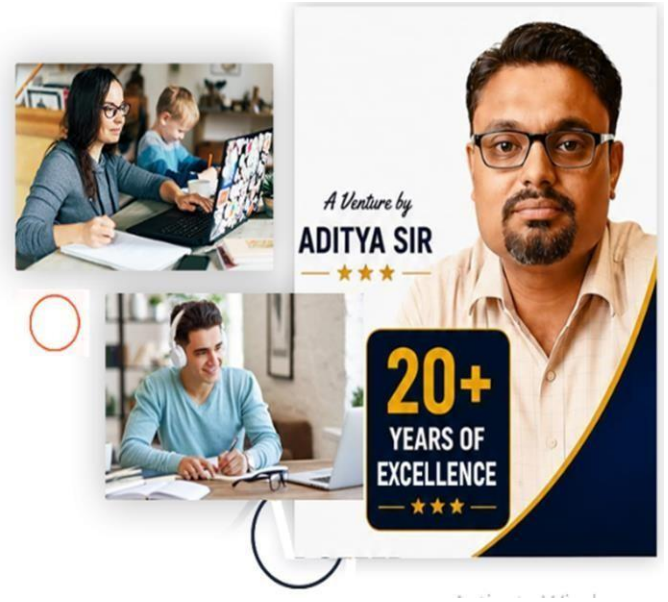


Become Job-Ready in
Agentic and Claude AI

Learn from Industry Experts | Live Projects | Placement Support

LN AI Academy is dedicated to providing industry-focused training that helps students build real skills for real jobs in Data Science, AI, Machine Learning, and modern development tools.

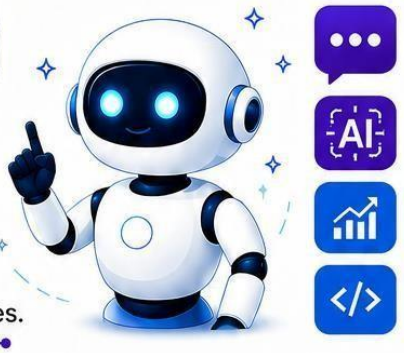
Our mission is to make high-quality tech education accessible for everyone. With expert mentors, practical projects, and job-oriented modules, we help learners build the confidence and expertise needed to succeed. Whether you're starting from scratch or upgrading your skills, LN AI Academy ensures you gain the knowledge required to succeed.



10K+	**250+**	**100%**
Student Trained	**Real-World Projects**	**Placement Assistant**

AGENTIC AND CLAUDE AI LEARNING ROADMAP

Step-by-step roadmap based on the provided courses.



STEP 1
PYTHON
- Basics
- OOP
- Functions
- File Handling

STEP 2
STATISTICS & ANALYSIS
- Probability
- Data Analysis
- Visualization

STEP 3
MACHINE LEARNING
- Supervised Learning
- Unsupervised Learning
- Model Evaluation

STEP 4
NLP
- Text Processing
- Tokenization
- Language Models

STEP 5
COMPUTER VISION
- Image Processing
- Object Detection
- Image Classification

STEP 6
DEEP LEARNING & NEURAL NETWORKS
- ANN
- CNN
- RNN
- Model Training

STEP 7
LLMs (GENERATIVE AI)
- Prompt Engineering
- LLM APIs
- Fine-Tuning Basics

STEP 8
LLMs (AGENTIC AI)
- Agents
- Tool Calling
- Workflow Automation

STEP 9
LANGSMITH
- Tracing
- Monitoring
- Evaluation

STEP 10
API DEVELOPMENT
- REST APIs
- FastAPI
- Integrations

STEP 11
DOCKER
- Containers
- Images
- Deployment

STEP 12
CLAUDE AI
- Claude Models
- Projects
- Advanced AI Applications

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Python

Introduction To Python

- Why Python
- Application Areas of Python
- Installing Python
- Python Interpreter Architecture +
  - Python Byte Code Compiler
  - Python Virtual Machine(PVM)

Writing and Executing First Python Program

- Using Interactive Mode
- Using Script Mode
  - General Text Editor and Command Window
  - IDLE Editor and IDLE Shell
- Understanding print() function
- How to compile python program explicitly

Python Language Fundamentals

- Character Set
- Keywords
- Comments
- Variables
- Literals
- Operators
- User input
- Datatypes & Conversion

Python Control Statements

- Conditional Statement
- Looping Statements
- Pass, break, continue

String Handling

- What is string
- String representations
- Unicode String
- String Functions, Methods
- String Repetition and concatenation
- String Indexing and Slicing
- String Formatting

Python List

- Creating and Accessing Lists
- Indexing and Slicing Lists
- List Methods
- Nested Lists
- List Comprehension

Python Tuple

- Creating Tuple
- Accessing Tuple
- Immutability of tuple

Python Set

- How to create a set
- Iteration Over Sets Python
- Set Methods Python
- Frozenset

Python Dictionary

- Creating a Dictionary
- Dictionary Methods
- Accessing values from Dictionary
- Updating dictionary
- Iterating dictionary
- Dictionary Comprehension

Python Functions

- Defining a Function
- Calling a Function
- Types of Functions
- Function v/s Method
- Function Arguments
    - Positional arguments , Keyword arguments ,
    - Default arguments , Non default arguments ,
    - Arbitrary arguments ,Keyword Arbitrary arguments Function Return Statement
- Nested Function
- Function as argument
- Function as return statement
- Decorator function
- Closure
- map(),filter() ,reduce(),any() functions
- Anonymous or lambda Function

Modules & Packages

- Why Modules
- Script v/s Module
- Importing Module
- Standard & Third Party Modules
- Why Packages
- Understanding pip utility

File I/O

- Introduction to File Handling
- File modes
- Functions and methods related to File Handling
- Understanding with block

Regular Expressions(Regex)

- Need of regular Expressions
- Re module
- Functions /Methods related to regex
- Meta Characters & Special Sequences

Object Oriented Programming

- Defining a Class & Object Creation
- Inheritance, Encapsulation
- Polymorphism, Abstraction

Exception Handling

- Difference Between Syntax Errors and Exceptions
- Keywords used in Exception Handling
- try , except , finally , raise , assert
- ypes of Except Blocks

GUI Programming

- Introduction to Tkinter Programming
- Tkinter Widgets
  - Tk , Label , Entry , TextBox , Buttons
- Frame , messagebox , filedialogetc
- Layout Managers
- Event handling
- Displaying image

Multi-Threading Programming

- Multi-processing v/s Multi-threading
- Need of threads
- Creating child threads
- Functions /methods related to threads
- Thread synchronization and locking

Statistics & Analysis

Introduction to Statistics

- Types of statistics
- Use of statistics
- Measures of Central Tendency
- Arithmetic Mean
- Harmonic Mean
- Geometric Mean
- Mode
- Quartile
- Standard Deviation
- Data Distributions
- Normal Distribution
- Uniform Distribution
- Right & Left Skewed Distribution
- Hypothesis Testing
- Normality Test

- Central Limit Theorem
- Mean Test
- T-test
- Z-test
- ANOVA test
- Chi Square Test
- Correlation and Covariance

Machine Learning

Introduction To Machine Learning

- Traditional v/s Machine Learning Programming
- Real life examples based on ML
- Steps of ML Programming
- Data Preprocessing revised
- Terminology related to ML

Supervised Learning

- Classification
- Regression

Unsupervised Learning

- Clustering

KNN Classification

- Math behind KNN
- KNN implementation
- Understanding hyper parameters

Performance metrics

- Confusion Matrix
- Accuracy Score
- Recall & Precision
- F-1 Score
- R2 Score

Regression

- Math behind Regression
- Simple Linear Regression
- Multiple Linear Regression
- Polynomial Regression
- Boston Price Prediction
- Cost or Loss Functions
  - Mean absolute error
  - Mean squared error
  - Root mean squared error
  - Least Square Error
- Regularization

Logistic Regression for classification

- Theory of Logistic Regression
- Binary and Multiclass classification
- Implementing titanic dataset
- Implementing iris dataset
- Sigmoid and softmax functions

Feature Selection & Dimensionality Reduction

- ANOVA Test
- Ridge/Lasso
- Decision Tree
- Principal Component Analysis (PCA)

Support Vector Machines

- Theory of SVM
- SVM Implementation
- kernel,gamma,alpha

Decision Tree Classification

- Theory of Decision Tree
- Node Splitting
- Implementation with iris dataset
- Visualizing Tree

Ensemble Learning

- Random Forest
- Bagging and Boosting
- Voting Classifier

Model Selection Techniques

- Cross Validation
- Grid and Random Search for hyper parameter tuning

Clustering

- K-means Clustering
- Hierarchical Clustering
- Elbow technique
- Silhouette coefficient

NLP

Text Analysis

- Install NLTK
- Tokenize words
- Tokenizing sentences
- Stop words customization
- Stemming and Lemmatization
- Feature Extraction
- Sentiment Analysis
- Count Vectorizer
- TfidfVectorizer
- Naive Bayes Algorithms

Recommendation System

- Content based technique
- Collaborative filtering technique
- Evaluating similarity based on correlation
- Classification-based recommendations

Computer Vision

Open CV

- Reading images
- Understanding Gray Scale Image
- Resizing image
- Understanding Haar Classifiers
- Face, eyes, smile, body classification
- How to use webcam in open cv
- Building image data set
- Capturing video
- Face classification in video

Mediapipe

- Simple Hand Tracking
- Finger Counting Logic
- Gestures You Can Detect
- Thumb up → only thumb open
- Victory → index & middle open
- Palm → all fingers open
- Fist → all fingers closed

Deep Learning & Neural Networks

Introduction To Artificial Neural Network

- What is Artificial Neural Network (ANN)?
- How Neural Network Works?
- Perceptron
- Multilayer Perceptron
- Feed Forward
- Back propagation

Introduction To Deep Learning

- What is Deep Learning?
- Deep Learning Packages
- Deep Learning Applications
- Building Deep Learning Environment
  - Installing Tensor Flow Locally
  - Understanding Google Colab

Tensor Flow Basics

- What is Tensorflow?
- Variables, Constants
- Scalar, Vector, Matrix

- Operations using tensorflow
- Difference between tensorflow and numpy operations

Optimizers

- What does optimizers do?
- Gradient Descent (full batch and min batch)
- Stochastic Gradient Descent
- Learning rate,epoch

Activation Functions

- What does Activation Functions do?
- Sigmoid Function,
- Hyperbolic Tangent Function (tanh)
- ReLU –Rectified Linear Unit
- Softmax Function
- Vanishing Gradient Problem

Building Artificial Neural Network

- Using scikit implementation
- Using Tensorflow
- Understanding MNIST Dataset
- Initializing weights and biases
- Gradient Tape
- Defining loss/cost Function
- Train the Neural Network
- Minimizing the loss by adjusting weights and biases

Modern Deep Learning Optimizers and Regularization

- SGD with Momentum
- RMSprop
- AdaGrad
- Adam
- Dropout Layers and Regularization
- Batch Normalization

Building Deep Neural Network Using Keras

- What is Keras?
- Keras Sequential Model and Functional API
- Solve a Linear Regression and Classification Problem with Example
- Saving and Loading a Keras Model

Convolutional Neural Networks (CNNs)

- Introduction to CNN
- CNN Architecture
- Convolutional Operations
- Pooling,Stride and Padding Operations
- Data Augmentation
- Building,Training and Evaluating First CNN Model
- Model Performance Optimization
- Auto encoders for CNN

- Transfer Learning and Object Detection Using Pre-trained CNN Models
  - LeNet
  - AlexNet
  - VGG16
  - ResNet50
  - Yolo algorithm

Word Embedding

- What is Word Embedding?
- Word2Vec Embedding
  - CBOW
  - skipgram
- Keras Embedding Layers
- Visualize Word Embedding
- Google Word2Vec Embedding
- GloVe Embedding.

Recurrent Neural Networks (RNNs)

- Introduction to RNN
- RNN Architecture
- Types of RNN
- Implementing basic RNN in tensorflow
- Need for LSTM and GRU
- Deep RNN/LSTM/GRU
- Text Classification Using LSTM
- Prediction for Time Series problem
- Bidirectional RNN/LSTM
- Seq-2-Seq Modeling
- Encoder-Decoder Model
- Attention Mechanism

Speech Recognition APIs

- Text To Speech
- Speech To Text
- Automate task using voice
- Voice Search on Web

LLMs (Generative AI)

Understanding LLMs

- Introduction Large Language Models
- History of LLM(seq 2 seq,attention,transformer)
- Understanding OpenAI, LLaMA, Gemini
- Obtaining API key
- API documentation and resources

Understanding Lang Chain

- Introduction to Lang Chain
- Obtaining LLM
- Understanding temperature
- LLM versus ChatModel
- Maintaining Chat history

Understanding Prompt

- Prompt Template
- Input variables
- Validation
- Various types of prompts
- F-string v/s prompt template

Understanding Roles & Messages

- System Message
- User Message
- Developer Message
- AI Message

Understanding Output Parsers

- Str Output Parser
- List Output Parser
- JSON Output Parser
- Pydantic Output Parser

Understanding Chains

- Why chains are important
- Simple Chain
- Sequential Chain
- Parallel Chain
- Conditional Chain

Understanding Document Loaders

- Text Loader
- Web Loader
- PDF Loader
- Other Loaders

Understanding Text Splitter

- Character Text Splitter
- Recursive Character Text Splitter
- Markdown Text Splitter
- Other Splitters

Understanding Embeddings

- Word embeddings v/s contextual embeddings
- Creating embeddings for document & text
- Embeddings from gemini & gpt

Understanding Vector Store

- Understanding FAISS, Chroma
- Creating vectorstore from text, documents
- Implementing sematic search
- Other Operations

Understanding Retrievers

- Wikipedia Retriever
- Vectorstore Retriever
- MMR
- Contextual Compression Retriever

Retrieval-Augmented Generation (RAG)

- What is Retrieval-Augmented Generation (RAG)?
- Differences between traditional LLMs and RAG-based models.
- Why is RAG important? (Reducing hallucinations, improving factual accuracy)
- Use cases of RAG (chatbots, document Q&A, knowledge retrieval).
- Unstructured vs. Structured data
- RAG pipeline implementation
- Adapting RAG models to domain-specific knowledge
- Fine-tuning in RAG

Image Generation

- DALL-E Model
- Designing Image prompt
- Generating Image Caption

LLMs (Agentic AI)

Foundations of Agentic AI

- What is Agentic AI?
- Agent vs LLM
- Agent Architecture
- Components of an AI Agent
- Frameworks & Tools
- Why LangGraph over LangChain?
- Agent Design Patterns
- Real-World Use Cases

LangGraph Fundamentals

- Introduction to LangGraph
- Graphs, Nodes, and Edges
- State Management
- Reducers
- Evaluators
- Building Your First LangGraph Agent
- Agent Lifecycle
- Debugging Graphs

Agent Workflows and Control Flow

- Sequential Workflows
- Conditional Workflows
- Parallel Execution
- Iterative Workflows
- Dynamic Routing
- Tool Calling Workflows
- Agent Decision Making
- Workflow Optimization

Persistence, Memory, and Human-in-the-Loop

- Threads
- Checkpoints & Super-Steps
- Fault Tolerance

- Time Travel
  - Overview
  - Replay
  - Fork
- Short-Term Memory
- Long-Term Memory
- Trim Messages
- Delete Messages
- Summarize Messages
- Interrupts
  - Pause
  - Resume
  - Multiple Interrupts
- Human-in-the-Loop Systems
  - Approval Systems
  - Manual Approval
  - Confidence Thresholds
  - Random Audits
  - Review Process

Advanced LangGraph Features

- Streaming Fundamentals
- Stream Output Formats
- Stream Modes
- Graph State Streaming
- LLM Token Streaming
- Subgraphs
- Stateful vs Stateless Subgraphs
- Persistence in Subgraphs
- Checkpointer References
- Nested Graph Architectures
- Error Handling Strategies

Building Production AI Agents

- Tool-Using Agents
  - Search Tools
  - Database Tools
  - API Tools
  - Custom Tools
- Multi-Agent Systems
  - Supervisor Agents
  - Worker Agents
  - Agent Collaboration
- Agentic RAG using LangGraph
- Reasoning-Based RAG
- Production Deployment Concepts
- Monitoring and Evaluation
- End-to-End Agent Development Project

Capstone Projects

- AI Research Assistant
- Customer Support Agent
- SQL Database Agent
- Multi-Agent Content Generation System
- Agentic RAG Knowledge Assistant

LangSmith

Application Monitoring Fundamentals

- Problems in LLM Application Development
- Why Debugging LLM Applications is Difficult
- Need for Observability in AI Systems
- Introduction to LangSmith
- Logging vs Tracing vs Evaluation

LangSmith Platform Overview

- LangSmith Architecture
- LangSmith Ecosystem
- Integration with LangChain
- Projects
- Runs
- Traces
- Datasets
- Evaluations

Setting Up LangSmith

- Installing Required Libraries
- Environment Configuration
- API Key Setup
- Connecting LangChain Applications
- First Trace in LangSmith

Tracing and Debugging

- What is Tracing?
- Execution Flow Visualization
- Prompt and Response Inspection
- Token Usage Analysis
- Tool Execution Tracing
- Agent Reasoning Visualization
- Intermediate Steps Analysis
- Debugging Chains and Agents
- Identifying Tool Call Failures

API Development

Introduction to APIs

- What is API? (REST concept)
- HTTP methods: GET, POST, PUT, DELETE
- Request vs Response

Basic FastAPI Setup

- Installation & project structure
- First API (Hello World)
- Running server with Uvicorn

Request Handling

- Query parameters

- Path parameters
- Request body (JSON)

Response Handling

- JSON response
- Custom response
- Status codes

Automatic Documentation

- Swagger UI (/docs)
- ReDoc (/redoc)
- API testing

Pydantic Models (Very Important)

- Data validation
- Request/response schema
- Type checking

Model Integration

- Load trained model (pickle/joblib)
- Prediction API
- Input → model → output

Async Programming

- async / await concept
- FastAPI performance advantage

File Upload & Handling

- Image/file upload APIs
- Use case: image classification model

Deployment Preparation

- Requirements.txt
- Environment setup
- Production considerations

Docker

Introduction to Docker

- What is containerization?
- Docker vs Virtual Machine
- Why Docker in Data Science?

Docker Installation & Setup

- Install Docker
- Docker Desktop overview
- Basic commands

Docker Images

- What is an image?
- Pull image from Docker Hub
- Create custom image

Docker Containers

- What is a container?
- Run, stop, delete container
- Interactive vs detached mode

Docker File

- Basic structure:
  - FROM
  - WORKDIR
  - COPY
  - RUN
  - CMD

Docker + FastAPI Integration

- Containerize FastAPI app
- Installing Requirements
- API run inside container

Claude AI

Introduction to Claude AI

- What is Claude AI?
- Claude Models Overview
- Claude vs ChatGPT vs Gemini
- Claude Interface and Features
- Claude Projects

- Claude Artifacts
- Real-World Use Cases

Prompt Engineering with Claude

- Fundamentals of Prompting
- Role-Based Prompting
- Context Engineering
- Zero-Shot and Few-Shot Prompting
- Chain of Thought Prompting
- Structured Output Generation
- Prompt Templates and Best Practices

Claude for Programming and Data Analysis

- Python Code Generation
- Java Development Support
- SQL Query Writing
- Code Debugging and Optimization
- Data Analysis with Claude
- CSV and Excel Analysis
- Documentation Generation

Claude Projects, Artifacts, and AI Agents

- Creating and Managing Projects
- Building Knowledge Bases
- Interactive Artifacts
- AI Agent Fundamentals
- Agent Workflows
- Multi-Step Task Automation
- Practical AI Agent Use Cases