



DEEP LEARNING

From AI fundamentals to building and applying intelligent Deep Learning solutions for real-world applications.



6

MONTHS



12

TEACHING
WEEKS



10

MODULES



1 MO

PROJECT



2 MO

INTERNSHIP

TABLE OF CONTENTS

01	Course Overview	03
02	Why This Course	04
03	Course at a Glance	05
04	Program Timeline	05
05	Module Curriculum	06
06	Project Phase & Internship	12
07	Additional Skills Training	13
08	Job Scope	14
09	Professional Capabilities Developed	15
10	Program Outcomes	16
11	Career Alignment	16
12	Prerequisites	17
13	Delivery Approach	18
14	Curriculum Governance	18
15	Get in Touch	19

01 COURSE OVERVIEW

Artificial Intelligence (AI) enables machines to learn from data, understand patterns, make decisions, and perform tasks that typically require human intelligence. Deep Learning is a specialized branch of AI that uses multi-layered neural networks to learn complex patterns from large amounts of data. It powers applications such as image and speech recognition, natural language processing, autonomous systems, computer vision, and intelligent robotics. This module introduces the fundamentals of AI and Deep Learning, helping learners understand how intelligent models are developed, trained, evaluated, and applied to real-world problems.

IN SIMPLE TERMS

This course takes you from AI fundamentals to building and applying intelligent Deep Learning solutions for real-world applications.

02 WHY THIS COURSE

- Build a strong foundation in Artificial Intelligence and Deep Learning.
- Understand how machines learn, recognize patterns, and make intelligent decisions.
- Gain practical knowledge of Neural Networks and Deep Learning models.
- Work with real, simulation, and synthetic data.
- Develop skills in Computer Vision, Speech Processing, and intelligent systems.
- Learn to apply AI and Deep Learning to real-world problems.
- Gain hands-on experience through practical projects and industry-oriented applications.
- Prepare for careers in Medical & Healthcare, Education, Manufacturing, Defence & Security, Robotics, Automotive, Agriculture.

03 COURSE AT A GLANCE

	PREREQUISITE	None
	COURSE DURATION	24 Weeks (6 Months)
	MODE OF INSTRUCTION	In-Person (Offline)
	TEACHING DURATION	12 Weeks (3 Months)
	PROJECT DURATION	4 Weeks (1 Month)
	INTERNSHIP DURATION	8 Weeks (2 Months)
	DAILY STRUCTURE	Teaching class 2 hours & Lab Practice 4 hours / day

04 PROGRAM TIMELINE



Twelve weeks of classroom teaching and lab practice, followed by four weeks of project work and an eight-week internship.

05

MODULE CURRICULUM

10 MODULES · TEACHING WEEKS 1-12

MO1

AI BUILDING BLOCKS

Artificial Neural Networks

WEEK 1

-
- 01 Introduction to Artificial Intelligence-AI
 - 02 Introduction to Machine Learning-ML
 - 03 Introduction to Deep Learning-DL
 - 04 Perceptron and Multilayer Perceptron-MLP
 - 05 Artificial Neural Networks
 - 06 Shallow and Deep Neural Networks
 - 07 Supervised Learning and Unsupervised Learning
 - 08 Training and Inference
 - 09 Applications
 - 10 Introduction to Reinforcement Learning-RL
-

MO2

ALGORITHM DEVELOPMENT

Python Programming Language

WEEK 2

-
- 01 Fundamentals of Python Programming Language
 - 02 Functions and User Defined Functions
 - 03 Libraries for Data Science and Deep Learning
 - 04 Available Programs and Licenses
 - 05 Advantages of LLMs for Python Programming
 - 06 Graphical User Interface
 - 07 Technical Computing
-

MO3

ENVIRONMENT AWARENESS

Digital Image Processing and Computer Vision

WEEK 3-4

-
- 01 Python and OpenCV
 - 02 Digital Image Processing
 - 03 Types of Images
 - 04 Conversion
 - 05 Digital Image Filters
 - 06 Camera and Specifications
 - 07 Computer Vision
 - 08 Object Location Identification
-

MO4

MAKING MACHINES DECIDE

Deep Learning for Classification and Regression

WEEK 5-6

-
- 01** Convolutional Neural Networks

 - 02** Feature Extraction using Kernels

 - 03** Important Layers in Deep Learning for Classification

 - 04** FC Layer in DL Architecture

 - 05** Serialization and Activation Functions

 - 06** FC Layer Inputs and Outputs

 - 07** Training and Inference

 - 08** Parameters and Hyperparameters

 - 09** Hyperparameter Tuning

 - 10** Deep Learning for Regression

 - 11** Comparison between Classification and Regression

 - 12** Converting Classification Architecture to Regression and vice versa

M05 COLLECTING DATA

Datasets

WEEK 7

- 01 Available Datasets
 - 02 Open Sourced and Licenses
 - 03 Preprocessing, Training and Inference
 - 04 DL for Own Datasets
 - 05 When to choose ML and DL
 - 06 How much data do we need in DL
 - 07 Preprocessing Data and Accuracy Dependency
-

M06 USING EXISTING AI SYSTEMS

Transfer Learning

WEEK 8

- 01 Studying and Understanding Popular DL Architectures
 - 02 Comparison and Applications
 - 03 Transfer Learning and why & when to use it
 - 04 Dataset size, Training and Accuracy considerations
 - 05 Advantages of Transfer Learning
-

AI COMPUTATION

MO7

DL and Transfer Learning for Edge AI Devices & AI Accelerators

WEEK 9

-
- 01 Comparison between CPU, GPU, TPU and NPU
 - 02 Supported AI Operations by Edge AI Devices
 - 03 Dataset size and the CNN Architecture
 - 04 Training and Importance of Optimization
 - 05 Model Conversion and Deployment
 - 06 Transfer Learning Implementation for Edge AI Devices
 - 07 Memory Limitation of Edge AI Devices
 - 08 AI Accelerators and Neural Processing Unit-NPU
 - 09 Necessity of NPU Accelerators for Real Time Applications
-

CHOOSING THE RIGHT AI APPROACH

MO8

Deep Learning and Machine Learning & Choosing the Right Approach

WEEK 10

-
- 01 Supervised Learning with ML
 - 02 Dataset size requirement for DL and ML
 - 03 Requirement of Domain Knowledge for ML
 - 04 Training Algorithms and Comparison
 - 05 Inference with Trained Models
 - 06 Advantages of ML over DL
-

M09

DATA: THE FUEL OF AI

Deep Learning using Real, Simulation and Synthetic Data

WEEK 11

-
- 01 Collecting Real Data from Sensors
 - 02 Preprocessing and Preparing the Dataset
 - 03 Training and Inference using Real Data
 - 04 Importance of Mathematical Models
 - 05 Importance of Simulation
 - 06 Collecting Data from Simulation
 - 07 Training and Inference using Simulation Data
 - 08 Synthetic Data Availability
 - 09 Training and Inference using Synthetic Data
-

M10

REAL-TIME APPLICATIONS

Deep Learning for Medical and Autonomous System

WEEK 12

-
- 01 Present Applications of DL in Medical
 - 02 Future Applications of DL in Medical
 - 03 Present Applications of DL in Autonomous Systems
 - 04 Future Applications of DL in Autonomous Systems
-

06 PROJECT PHASE & INTERNSHIP



COURSE PROJECT

WEEK 13-16

- Minor Project: Design, Development, and Implementation
- Major Project: Real-time AI Application



INTERNSHIP

WEEK 17-24

Real-time project work.

By the end of the program, learners finish with twelve weeks of teaching, a minor and a major project, and an eight-week internship of real-time project work.

07 ADDITIONAL SKILLS TRAINING

Along with the technical curriculum, students will receive dedicated training in professional and career-development skills:

- **English Language Skills:** Improve grammar, vocabulary, reading, writing, and workplace English.
- **Communication Skills:** Develop effective verbal and written communication.
- **Soft Skills Development:** Build confidence, teamwork, problem-solving, and interpersonal skills.
- **Public Speaking & Presentation Skills:** Improve presentation, speaking, and audience-engagement skills.
- **Resume Preparation:** Create professional, industry-ready resumes.
- **Interview Preparation:** Learn interview techniques, question handling, and professional responses.
- **Mock Interviews:** Participate in practice interviews with feedback and performance evaluation.
- **5 Real-World Interview Opportunities:** Get opportunities to attend five actual industry interviews.
- **Career Guidance & Placement Preparation:** Receive guidance for career planning, job opportunities, and placement readiness.

08 JOB SCOPE

JOB TITLE	OPENINGS • INDIA / ABROAD	AVG. PACKAGE
Deep Learning Engineer	3,000+ / 15,000+	₹10-20 LPA
Machine Learning Engineer	12,000+ / 60,000+	₹9-18 LPA
AI/ML Engineer	10,000+ / 50,000+	₹8-15 LPA
Computer Vision Engineer	4,000+ / 20,000+	₹8-18 LPA
NLP Engineer	3,000+ / 15,000+	₹8-18 LPA
Generative AI Engineer	5,000+ / 25,000+	₹10-22 LPA
Deep Learning Research Engineer	1,000+ / 8,000+	₹12-25 LPA
AI Research Scientist	1,000+ / 10,000+	₹12-30 LPA
Neural Network Engineer	1,000+ / 7,000+	₹9-20 LPA
Applied AI Engineer	4,000+ / 20,000+	₹9-20 LPA
Speech AI Engineer	1,000+ / 6,000+	₹8-18 LPA
AI Solutions Engineer	4,000+ / 20,000+	₹8-18 LPA

09

PROFESSIONAL CAPABILITIES DEVELOPED

 Neural Network Foundations

- Explain how a perceptron, a multi-layer perceptron and a deep network differ, and when a shallow network is enough
- Set up supervised and unsupervised learning tasks and trace a model through training and inference
- Place reinforcement learning correctly alongside other learning methods when framing a problem

 Python for AI

- Write working Python from fundamentals to functions, using the standard data science and deep learning libraries
- Use LLM tools to help write and debug Python code faster
- Build simple GUI front-ends and technical computing scripts around a trained model

 Vision and Image Processing

- Process images in Python with OpenCV: image types, filters and camera input
- Identify the location of objects in images and live camera feeds
- Connect cameras and prepare their output for a deep learning pipeline

 Model Design and Tuning

- Build CNNs and explain how kernels extract features before the fully connected layers decide
- Tell parameters and hyperparameters apart, and tune models methodically instead of by trial and error
- Convert a classification architecture into a regression model when the task needs a number, not a label

 Dataset Engineering

- Find open datasets and check their licences before using them
- Preprocess raw data and build your own labelled datasets from scratch
- Estimate how much data a task really needs before committing to ML or DL

 Transfer Learning Practice

- Compare popular deep learning architectures and pick the right one for a task
- Apply transfer learning to get strong results from small datasets
- Weigh dataset size against the accuracy a project actually needs

 Edge AI Deployment

- Choose between CPU, GPU, TPU and NPU for a given workload
- Convert trained models and deploy them on edge AI devices within tight memory limits
- Run real-time inference on NPU accelerators, not just on a lab desktop

 Applied AI Judgement

- Decide between classical ML and deep learning based on data size and domain knowledge, and defend the choice
- Work with data from real sensors, mathematical models, simulation and synthetic sources
- Map deep learning methods to present and future use cases in medical and autonomous systems

10 PROGRAM OUTCOMES

- Build, train and test deep learning models for image classification, regression and object identification tasks
- Take a trained model from the desktop to an edge AI device: convert it, fit it within memory limits and run it in real time on an NPU accelerator
- Collect and prepare datasets from real sensors, simulation and synthetic sources, and document them properly
- Leave with a working portfolio: a minor project and a major real-time AI application project built in the four project weeks
- Carry eight weeks of internship experience on real-time project work into job interviews
- Judge for any new problem whether classical ML or deep learning is the right tool, and explain why

11 CAREER ALIGNMENT

This program prepares you for the applied layer of the deep learning job market: engineers who build, train and ship working vision models, not paper-only researchers. The edge AI deployment skills, running models on NPU accelerators and small devices, are a differentiator that few fresh candidates carry into interviews. Recruiters shortlist on proof of work, so the minor project, major project and internship give you real builds to demonstrate, not just certificates.

TARGET ROLES

Deep Learning Engineer

Edge AI Engineer

Computer Vision Engineer

Perception Engineer (Autonomous Systems)

Medical Imaging AI Engineer

AI Deployment Engineer

12 PREREQUISITES

✓ REQUIRED

- Basic computer use: managing files, installing software, browsing
- Genuine interest in AI and the discipline to practise daily in the lab

★ RECOMMENDED BACKGROUND

- Comfort with school-level maths (the course explains the rest as needed)
- Any past exposure to coding, in any language, even a little
- A habit of reading and experimenting on your own between sessions

i HOW THE PROGRAM BUILDS TECHNICAL READINESS

The program assumes no coding background, and the official prerequisite is none. Python is taught from scratch in Module 2 before any deep learning work begins, and every concept is practised the same day in the four-hour lab. By the time model building starts, you have already written working Python programs, so each module builds on skills you have practised, not theory you have only heard.

⊗ NOT REQUIRED

- No prior programming experience: Python is taught from scratch in Module 2
- No prior AI or machine learning knowledge
- No engineering or computer science degree
- No prior electronics or hardware experience for the edge AI modules

13 DELIVERY APPROACH

TRAINING PHASE • WEEKS 1-12

- 12 teaching weeks with 2 hours of classroom teaching and 4 hours of lab practice every day
- Every topic follows the same rhythm: concept first, live demonstration next, then guided lab work on the same day
- Lab time mixes individual practice with team exercises, so you learn to build on your own and work in a group

BEYOND THE CLASSROOM • WEEKS 13-24

- Weeks 13 to 16: project phase, starting with a minor project and finishing with a major real-time AI application project
- Weeks 17 to 24: an eight-week internship of real-time project work, applying classroom skills on live problems

ASSESSMENT

- Continuous lab-based assessment through all 12 teaching weeks, leading up to the minor and major projects as the final proof of skill

14 CURRICULUM GOVERNANCE

This curriculum is reviewed and refreshed on a regular cycle to keep pace with the fast-moving deep learning and edge AI hardware landscape, so that learners consistently train on current architectures, tools and deployment practice rather than a static snapshot of today's syllabus.

LET'S BUILD YOUR **AI** CAREER.



WEBSITE

quantumacademics.ai

EMAIL

hello@quantumacademics.ai

PHONE / WHATSAPP

8098 809 809



CAMPUS

Jubilee Hills, Hyderabad, Telangana 500033



BOOK A FREE DEMO

quantumacademics.ai/book-demo