



AI, EDGE AI WITH INTEGRATED ROBOTICS

From AI fundamentals to building intelligent systems using Edge AI and applying them to real-world robotics.



12

MONTHS



24

TEACHING
WEEKS



11

MODULES



2 MO

PROJECT



4 MO

INTERNSHIP

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01 COURSE OVERVIEW

Artificial Intelligence (AI) enables computers and machines to perform tasks that require human-like intelligence, including learning, pattern recognition, decision-making, problem-solving, and automation. Edge AI brings AI and Machine Learning capabilities directly to devices such as smartphones, cameras, sensors, robots, and embedded systems, enabling real-time processing, faster responses, and intelligent decision-making. AI, Edge AI with integrated Robotics combines intelligent software with robotic systems, allowing robots to perceive their surroundings, recognize objects, understand commands, learn from data, navigate environments, and perform tasks autonomously. Together, these technologies power applications across robotics, automation, manufacturing, cybersecurity, surveillance, agriculture, and smart systems.

IN SIMPLE TERMS

This course helps you move from AI fundamentals to building intelligent systems using Edge AI and applying them to real-world robotics.

02 WHY THIS COURSE

This course is designed to build practical skills in AI, Edge AI, and Robotics, helping learners understand how intelligent systems are developed and applied in real-world environments.

- Learn the fundamentals of Artificial Intelligence and Machine Learning
- Develop real-time AI applications using Edge AI
- Understand AI-powered robotics and autonomous systems
- Gain hands-on experience with AI models, sensors, embedded systems, and robots
- Build industry-oriented projects and practical solutions
- Develop skills for careers in AI, Robotics, Automation, Edge Computing, and Intelligent Systems
- Prepare for real-world projects, internships, and AI-driven career opportunities

03 COURSE AT A GLANCE

	PREREQUISITE	None
	COURSE DURATION	48 Weeks (12 Months)
	MODE OF INSTRUCTION	In-Person (Offline)
	TEACHING DURATION	24 Weeks (6 Months)
	PROJECT DURATION	8 Weeks (2 Months)
	INTERNSHIP DURATION	16 Weeks (4 Months)
	DAILY STRUCTURE	Teaching class 2 hours & Lab Practice 4 hours / day

04 PROGRAM TIMELINE



Twenty-four weeks of classroom teaching and lab practice, followed by eight weeks of project work and a sixteen-week internship.

05

MODULE CURRICULUM

11 MODULES · TEACHING WEEKS 1-24

MO1

INTRODUCTION

Artificial Neural Networks

WEEK 1-2

-
- 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 3-4

-
- 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
 - 08 Building Artificial Neural Network with Python
-

MO3

FROM SELF-AWARENESS TO ACHIEVEMENT

MEMS Technology

WEEK 5-6

01	1D, 2D, 3D Signals
02	Sensor specifications
03	Sensor sensitivity
04	Sensor limitations
05	Accelerometers
06	Gyroscopes
07	Magnetometer
08	Pressure Sensors
09	Other Sensors used in Robotics

MO4

SENSING ENVIRONMENT

Digital Image Processing and Computer Vision

WEEK 7-10

-
- 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
-

MO5

MAKING MACHINES LEARN

Deep Learning

WEEK 11-12

-
- 01 Convolutional Neural Networks
 - 02 Feature Extraction using Kernels
 - 03 Important Layers in Deep Learning
 - 04 Different Standard DL Architecture
 - 05 Training and Inference
-

VOCAL INTERACTIVITY

MO6

Microphone, Digital Signal Processing and AI Implementation

WEEK 13-14

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- 01 Microphone
 - 02 Microphone in Cameras
 - 03 Digital Signal Processing
 - 04 Understanding Features of the Audio
 - 05 Array of Microphones
 - 06 Recording Multi Track Audio
 - 07 AI Implementation
-

ADVANCED SENSING

MO7

RADAR, Depth Camera, LIDAR and Point Cloud

WEEK 15-16

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- 01 RADAR, Movement Identification
 - 02 Depth Camera
 - 03 RGB vs Depth Camera
 - 04 Integrating RGB and Depth Information
 - 05 Time of Flight
 - 06 LIDAR and Point Cloud (PC)
 - 07 Object Identification in Point Cloud
 - 08 Distance Measurement
 - 09 Depth Camera and LIDAR in Robotics
-

M08 COMPUTING POWER Edge AI and IoT

WEEK 17-18

-
- 01 Why and when to use Edge AI
 - 02 AI for Physical Devices
 - 03 Zero Latency and Great Reliability
 - 04 Enhanced Privacy and Security
 - 05 Applications and Challenges
 - 06 Future of Edge AI
 - 07 Internet of Things-IoT
 - 08 Integrating AI and IOT
-

M09 REAL-TIME COMPUTATION AI Accelerators and Neural Processing Unit

WEEK 19-20

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- 01 Comparison between CPU, GPU, TPU and NPU
 - 02 Necessity of Neural Processing Unit
 - 03 AI Operations and NPU Real Time AI Operations
 - 04 Low Power Consumption for Battery Operated Systems
 - 05 On Device Training
 - 06 Challenges and Limitations
 - 07 Future of NPU
-

**Ground Vehicles and Navigating Rovers**

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- 01** Ground Vehicles
 -
 - 02** Sensors and Hardware of Ground Vehicles
 -
 - 03** Identification of approaching and receding targets
 -
 - 04** Depth information from navigation
 -
 - 05** Path finding and localization
 -
 - 06** Pedestrian identification
 -
 - 07** Discussion on Self-Driving Car
 -

ADVANCED ROBOTICS

M11

Sensors and Hardware of Quadrupedal, Humanoid and Soft Robotics

WEEK 23-24

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- | | |
|----|--|
| 01 | Sensors and Hardware of Quadrupedal Robots |
| 02 | Anatomy and Gait |
| 03 | Sensors and AI Implementation |
| 04 | Battery Power Requirement and Challenges |
| 05 | Industrial Applications of Quadrupedal Robots |
| 06 | Sensors and Hardware of Humanoid Robots |
| 07 | Anatomy and Gait |
| 08 | Sensors and Power Requirement |
| 09 | Applications |
| 10 | Future of Quadrupedal and Humanoid Robots |
| 11 | Soft Robotics |
| 12 | Primary Materials used to make the robot flexible and deformable |
| 13 | Pneumatic and Hydraulic Actuation |
| 14 | Degrees of Freedom |
| 15 | Human Safety and Applications of Soft Robots |
-

06 PROJECT PHASE & INTERNSHIP



COURSE PROJECT

WEEK 25-32

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



INTERNSHIP

WEEK 33-48

Real-time project work.

By the end of the program, learners finish with twenty-four weeks of teaching, a minor and a major project, and a sixteen-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
AI/ML Engineer	10,000+ / 50,000+	₹8-15 LPA
Artificial Intelligence Engineer	8,000+ / 40,000+	₹8-16 LPA
Machine Learning Engineer	12,000+ / 60,000+	₹9-18 LPA
Deep Learning Engineer	3,000+ / 15,000+	₹10-20 LPA
Computer Vision Engineer	4,000+ / 20,000+	₹8-18 LPA
Edge AI Engineer	6,900+ / 15,000+	₹8-20 LPA
Embedded AI Engineer	3,000+ / 15,000+	₹7-18 LPA
AI/IoT Engineer	5,000+ / 25,000+	₹7-16 LPA
AI Engineer	10,000+ / 40,000+	₹8-18 LPA
Robotics Engineer	3,000+ / 15,000+	₹6-15 LPA
AI Robotics Engineer	2,000+ / 12,000+	₹8-20 LPA
Robotics Software Engineer	2,000+ / 12,000+	₹8-18 LPA
ROS/ROS2 Developer	1,500+ / 8,000+	₹7-16 LPA
Autonomous Systems Engineer	2,000+ / 10,000+	₹10-22 LPA
Autonomous Robotics Engineer	1,000+ / 6,000+	₹10-25 LPA
AI & Automation Engineer	5,000+ / 25,000+	₹7-16 LPA
Robotics R&D Engineer	1,000+ / 7,000+	₹10-22 LPA

09

PROFESSIONAL CAPABILITIES DEVELOPED

 Neural Network Foundations

- Explain and build the core blocks of AI: the perceptron, multi-layer networks, supervised and unsupervised learning
- Run the full cycle of model training and inference, and know how the two differ in practice
- Understand where reinforcement learning fits into robot decision making

 Python for AI

- Write clean Python with functions, data structures and the standard data science and deep learning libraries
- Use LLM assistants effectively to speed up Python coding and debugging
- Build a working artificial neural network in Python and wrap it in a simple GUI

 MEMS Sensor Engineering

- Read a sensor datasheet: sensitivity, specifications and the real limitations of a part
- Work hands-on with accelerometers, gyroscopes, magnetometers and pressure sensors used on robots
- Handle 1D, 2D and 3D sensor signals and prepare them as inputs for AI models

 Computer Vision

- Process images in Python with OpenCV: image types, filters and camera handling
- Identify objects in camera frames and locate their position in the image
- Apply CNNs, kernels and standard deep learning architectures to vision tasks

 Audio and DSP

- Capture and process sound: microphones, DSP fundamentals and audio feature extraction
- Work with microphone arrays and multi-track recording setups
- Implement AI on audio signals so machines can respond to what they hear

 Advanced Perception

- Detect and track movement with RADAR, and understand RGB versus depth imaging
- Measure distance with time-of-flight depth cameras and LIDAR
- Identify objects inside point clouds, the same data format used in self-driving perception

 Edge AI Deployment

- Judge when AI must run on the device itself: zero latency, data privacy, and AI plus IoT integration
- Compare CPU, GPU, TPU and NPU and pick the right processor for real-time AI operations
- Run low-power on-device AI, including on-device training, for battery-operated systems

 Robot Platforms

- Build perception for ground rovers: path finding, localisation, target identification, pedestrian identification
- Understand quadrupedal and humanoid robots: anatomy, gait, sensing, battery and power, and human safety
- Work with soft robotics: materials, pneumatic and hydraulic actuation, and degrees of freedom

10 PROGRAM OUTCOMES

- Build, train and run neural networks in Python, from a simple perceptron up to CNN-based deep learning models
- Work hands-on across the full sensor range: MEMS motion sensors, cameras, microphone arrays, RADAR, depth cameras and LIDAR
- Deploy AI on edge devices and NPU accelerators, choosing the right processor for real-time, low-power and privacy-sensitive applications
- Apply AI on real robot platforms: navigation and pedestrian identification on ground rovers, plus system-level study of quadrupedal, humanoid and soft robots
- Leave with a working project portfolio: a minor project and a major real-world robotics and AI application project
- Carry sixteen weeks of internship experience on real-time project work, the kind of hands-on exposure employers probe in interviews

11 CAREER ALIGNMENT

Most AI courses stop at software. This program prepares you for the layer where AI meets hardware: robots, autonomous vehicles, drones and smart devices that must see, hear and sense the world around them. Training across the full perception stack, from camera and microphone to RADAR, LIDAR and point clouds, along with on-device AI deployment, sets your profile apart. A portfolio of working hardware projects speaks louder to employers than certificates alone.



TARGET ROLES

Robotics Perception Engineer

Sensor Fusion Engineer

Embedded Vision Engineer

On-Device AI Engineer

Autonomous Navigation Engineer

Audio AI and DSP Engineer

12 PREREQUISITES

REQUIRED

- Basic computer operation: comfortable using a laptop, managing files and browsing the web
- Commitment to the daily schedule: 2 hours of teaching plus 4 hours of lab practice through the 24 teaching weeks

RECOMMENDED BACKGROUND

- Comfort with school-level mathematics: basic algebra and reading graphs make neural network concepts easier
- Curiosity about how machines sense and act: most lab work is hands-on with real sensors and robots
- Any past exposure to programming or electronics: useful for a faster start, though everything is taught from the beginning

HOW THE PROGRAM BUILDS TECHNICAL READINESS

The program assumes no prior background, and the official prerequisite is none. Python is taught from scratch in Module 2 before any AI coding begins. Every sensor, from accelerometers to LIDAR, is taught from first principles, so no electronics background is assumed. Daily lab hours turn each concept into working skill before the next module starts.

NOT REQUIRED

- No prior programming knowledge: Python is taught from fundamentals in Module 2
- No electronics or engineering degree: every sensor is taught from first principles
- No prior AI or machine learning study: the program starts at the perceptron and builds up step by step
- No mathematics beyond school level: the concepts needed are covered in class

13 DELIVERY APPROACH

TRAINING PHASE • WEEKS 1-24

- 24 teaching weeks with a fixed daily rhythm: 2 hours of classroom teaching followed by 4 hours of supervised lab practice
- Every topic follows the same path: concept explanation, live demonstration, then guided hands-on lab work on real sensors, cameras, edge AI devices and robots
- Lab sessions mix individual exercises with team tasks, building both independent problem solving and project teamwork

BEYOND THE CLASSROOM • WEEKS 25-48

- Weeks 25 to 32: project phase with a minor project and a major real-world robotics and AI application project, both built for the student portfolio
- Weeks 33 to 48: a sixteen-week internship of real-time project work, applying classroom and lab skills on live industry-style problems

ASSESSMENT

- Continuous lab-based assessment through the 24 teaching weeks, culminating in the evaluation of the minor and major projects

14 CURRICULUM GOVERNANCE

This curriculum is reviewed and refreshed on a regular cycle to keep pace with the fast-moving edge AI, sensor and robotics landscape, so that learners consistently train on current devices, platforms and engineering practice rather than a static snapshot of today's syllabus.

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



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