Artificial Intelligence

Introduction

The "AI for Robotics" course is a comprehensive program, designed to equip students with a strong fundamentals of artificial intelligence (AI) and its applications in robotics. The course begins with an introduction to AI, covering topics such as machine learning, and computer vision. Students then learn about different types of robots, how to program them, how to explore electronic components, and use them to solve real-world problems. Students delve into sensors, actuators, and machine learning, with practical assignments in designing circuits and building applications. The course also covers advanced topics such as autonomous systems, behavior-based robotics, and ethical considerations in AI. The course culminates in a capstone project where students apply their knowledge to create a functional robotics application. This project gives students the opportunity to put their skills to the test and to develop their problem-solving skills.

REQUIREMENTS:

- 16 years and above
- Familiar with basic IT Skills
- No prior coding experience is required.
- All you need is a passion for learning and a willingness to work hard as part of a team.

CURRICULUM:

Sr. No.	Contents
1	**Module 1: Python for AI Builders** • Getting Started with Python: Setup & Introduction • Control Flow: Decisions and Loops • Essential Data Structures: Lists, Tuples, Sets, and Dictionaries • Functions & Best Practices • Modular Coding: Imports, Modules & Packages • File Handling with Python • Error Handling Like a Pro • Object-Oriented Programming: Classes & Objects • Rapid App Prototyping with Streamlit
2	**Module 2: Foundations of Machine Learning & Deep Learning** • Machine Learning Concepts: Regression to Classification • Deep Learning for Natural Language Processing (NLP) • Simple RNNs: How Sequence Prediction Works • Neural Network Project (ANN) Implementation • Hands-On Project: Deep Learning with RNN • LSTM Networks Explained Intuitively • Project: LSTM & GRU for Text Predictions • Bidirectional RNNs: Predict the Next Word • Encoder-Decoder Architecture: Translating Sequences • Attention Mechanisms: Focus Where It Matters • Transformers: The Power Behind ChatGPT

Sr. No.	Contents
3	**Module 3: Generative AI & LangChain Foundations** • Introduction to Generative AI & LLMs • LangChain 101: The GenAI Orchestrator • Getting Started with LangChain & OpenAI • Exploring Core Modules & Architecture of LangChain • OpenAI, Ollama & Other LLM Providers • Hands-On: Your First LLM App with LangChain
4	**Module 4: Real-World GenAI Projects** • Building Smart Chatbots with Memory • Conversational Q&A Bots with Context • Complete GenAI App with LangChain • RAG Project: Llama2 + GROQ API for Docs • PDF Chatbot with NLP Capabilities • Search Engine with LangChain Tools & Agents • SQL Database Chat Interface with LangChain • Text Summarization Made Easy • YouTube & Webpage Content Summarizer (AI Agent Project)
5	**Module 5: Advanced Integrations & AI Systems** • Google GenAI: Solving Math Word Problems • LangChain + Hugging Face Integration • RAG Pipeline with AstraDB • Multilingual Coding Assistant with CodeLlama • Deploying GenAI Apps with Streamlit & HuggingFace • Building GenAI on AWS • Intro to Nvidia NIM with LangChain • Multi-Agent Systems with CrewAI • Hybrid Search: Vector DB + Cypher Queries • Graph Databases 101 with Cypher Language • LangChain + GraphDB: Practical Implementation

Sr. No.	Contents
6	**Module 6: Fine-Tuning and Advanced Deployment** • Fine-Tuning LLMs: Concepts & Workflow • End-to-End Fine-Tuning with Lamini • Building Stateful, Multi-Actor AI with LangGraph
7	**Module 7:Flask for AI Deployment** • Setting Up a Flask Project for AI • Integrating LLMs & Models into Flask • Building REST APIs for AI Services • File Upload Handling in AI Apps • Deploying Flask Apps on Cloud • Advanced Flask + AI Use Cases

Outcomes:

- Be able to understand the fundamentals of AI and robotics. This includes understanding the concepts of artificial intelligence, machine learning, and computer vision.
- Be able to apply the skills learned in the course to build and program robots. This includes being able to design and build robots that can interact with the environment, use sensors to gather data, and make decisions.
- Be able to develop ethical and responsible AI and robotics solutions. This includes understanding the ethical challenges and social impacts of AI and robotics and being able to develop solutions that are safe and beneficial to society.
- Be able to work as part of a team to solve problems. This includes being able to communicate effectively, collaborate with others, and manage projects.
- Be able to learn new skills and adapt to new technologies. This is a rapidly growing field, and it is important to be able to keep up with the latest developments.

BENEFITS:

- Learn the fundamentals of AI and robotics. This course will teach you the basics of artificial intelligence and robotics, including machine learning, and computer vision. You will also learn how to apply these concepts to build and program robots.
- Gain hands-on experience. The course includes a number of practical assignments that will give you the opportunity to apply the skills you learn. This will help you to develop your problem-solving and programming skills.
- Develop your design thinking skills. The course will also introduce you to design thinking, a methodology for solving problems creatively. This will help you to develop your skills in brainstorming, prototyping, and testing.
- Learn about the ethical and societal considerations of AI and robotics. The course will discuss the ethical challenges and social impacts of AI and robotics. This will help you to become a responsible and ethical engineer.
- Prepare for a career in AI and robotics. The skills you learn in this course will be highly sought-after in the job market. This course can help you prepare for a career in robotics, artificial intelligence, or a related field.

Skill-Wise Earnings:

Skill Level	Avg Monthly Salary
Junior	50k-90k
Mid-Level	90k-150k
Advanced	150k-300k
Freelancer	Unlimited freelancing, depends on project

Affiliation & Collaboarations

