

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	<p>Module 1: Foundations of AI for Robotics</p> <ul style="list-style-type: none">• Introduction to AI and Robotics<ul style="list-style-type: none">○ Understanding human intelligence and artificial intelligence○ Advantages of artificial intelligence• Robotics Fundamentals<ul style="list-style-type: none">○ Introduction to robots and robotics○ Types of robots and their applications○ Overview of different fields within robotics• Programming Robots<ul style="list-style-type: none">○ Introduction to programming concepts○ Basics of robot design and engineering○ Ways to control robots• Introduction to Arduino Simulator<ul style="list-style-type: none">○ Familiarity with the Arduino Simulator interface○ Working with variables and manipulating values○ Understanding of AI tools & software• Arithmetic Operators<ul style="list-style-type: none">○ Explanation of operators in programming○ Understanding arithmetic operators in Arduino Simulator• Practical Assignment: LED Blinking with Arduino Simulator

Sr. No.	Contents
2	<p>Module 2: Application & Techniques for using AI in Robotics</p> <ul style="list-style-type: none"> • Robot Components and Electronics <ul style="list-style-type: none"> ◦ Voltage, current, batteries, and resistors ◦ How to use an Ohm meter ◦ Introduction to basic electronic components • AI Applications <ul style="list-style-type: none"> ◦ Exploring AI applications in various domains ◦ Introduction to face recognition and detection ◦ Using PictoBlox for face detection activity • Introduction to Python and PictoBlox <ul style="list-style-type: none"> ◦ Basics of block coding ◦ Speech recognition functions in PictoBlox • Speech Recognition and Optical Character Recognition <ul style="list-style-type: none"> ◦ Understanding speech recognition technology ◦ Introduction to Optical Character Recognition (OCR) • Sensors and Robotics Toolkit <ul style="list-style-type: none"> ◦ Classification of sensors ◦ Working principle of light sensors and distance sensors • Practical Assignment: Building Sensor Circuits • Practical Assignment: Building an AI Chatbot
3	<p>Facebook Ads Manager & Business Assets</p> <ul style="list-style-type: none"> • Overview of Design Thinking • Introduction to the 5 phases of Design Thinking • Robotics Toolkit and Actuators <ul style="list-style-type: none"> ◦ Understanding actuators and their types ◦ Working with DC motors and pin configurations • Practical Assignment: DC Motor Circuit Design

Sr. No.	Contents
4	<p>Perception and Learning for Robotics</p> <ul style="list-style-type: none"> • Machine Learning for Robotics <ul style="list-style-type: none"> ○ Introduction to machine learning and neural networks ○ Understanding how machines learn ○ Introduction to Teachable Machines • Computer Vision for Robotics <ul style="list-style-type: none"> ○ Image processing techniques ○ Feature extraction, matching, object detection, and recognition • Practical Assignment: Face Recognition-based Attendance System • Practical Assignment: Interactive Virtual Assistant
5	<p>Advanced Topics and Applications</p> <ul style="list-style-type: none"> • Autonomous Systems <ul style="list-style-type: none"> ○ Autonomous navigation and decision-making ○ Behavior-based robotics ○ Case studies of real-world autonomous systems • Ethical and Societal Considerations <ul style="list-style-type: none"> ○ Ethical challenges in AI and robotics ○ Safety considerations in autonomous systems ○ Social impacts and responsible robotics
6	<p>Module 6: Capstone Project</p> <ul style="list-style-type: none"> • Ethical and Societal Considerations <ul style="list-style-type: none"> ○ Students will embark on a hands-on robotics project ○ Students will Apply knowledge gained from previous modules on the projects ○ Developing and presenting a functional robotics application in line follow Robot Project.

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 & Collaborations

