# AI+ Robotics™

The AI+ Robotics certification program offers a transformative journey into the dynamic intersection of Artificial Intelligence (AI) and Robotics. From foundational concepts to advanced Deep Learning algorithms and Reinforcement Learning, the immersive experience is tailored for Robotics applications. Each module provides a well-rounded understanding, exploring autonomous systems, intelligent agents, and generative AI. Through hands-on activities and real-world case studies, practical skills are honed. Ethical considerations and policy frameworks are navigated responsibly. Stay updated on emerging trends, shaping the future of the industry. By the program's end, acquire both robust theoretical knowledge and practical expertise, empowering you to lead innovation in the ever-evolving AI and Robotics landscape.

## Course Duration:

5 Days

## Prerequisites:

- Familiarity with basic concepts of Artificial Intelligence (AI), without the need for technical expertise.
- Openness to generate innovative ideas and concepts, leveraging AI tools effectively in the process.
- Ability to analyze information critically and evaluate the implications of AI and Robotics technologies.
- Readiness to engage in problem-solving activities and apply AI techniques to real-world scenarios

## Course Objectives:

- Comprehensive understanding of the symbiotic relationship between AI and Robotics.
- Proficiency in foundational Robotics and AI mechanics.
- Advanced knowledge in DL algorithms and RL for Robotics applications.
- Expertise in autonomous systems, intelligent agents, and generative AI.
- Comprehensive grasp of ethical considerations and policy frameworks in AI.
- Empowerment to drive responsible innovation in the evolving AI and Robotics landscape.

## Course Outlines:

**Module 1: Introduction to Robotics and Artificial Intelligence (AI)**

- 1.1 Overview of Robotics: Introduction, History, Evolution, and Impact
- 1.2 Introduction to Artificial Intelligence (AI) in Robotics
- 1.3 Fundamentals of Machine Learning (ML) and Deep Learning
- 1.4 Role of Neural Networks in Robotics

**Module 2: Understanding AI and Robotics Mechanics**

- 2.1 Components of AI Systems and Robotics
- 2.2 Deep Dive into Sensors, Actuators, and Control Systems
- 2.3 Exploring Machine Learning Algorithms in Robotics

**Module 3: Autonomous Systems and Intelligent Agents**

- 3.1 Introduction to Autonomous Systems
- 3.2 Building Blocks of Intelligent Agents
- 3.3 Case Studies: Autonomous Vehicles and Industrial Robots
- 3.4 Key Platforms for Development: ROS (Robot Operating System)

**Module 4: AI and Robotics Development Frameworks**

- 4.1 Python for Robotics and Machine Learning
- 4.2 TensorFlow and PyTorch for AI in Robotics
- 4.3 Introduction to Other Essential Frameworks

**Module 5: Deep Learning Algorithms in Robotics**

- 5.1 Understanding Deep Learning: Neural Networks, CNNs
- 5.2 Robotic Vision Systems: Object Detection, Recognition
- 5.3 Hands-on Session: Training a CNN for Object Recognition
- 5.4 Use-case: Precision Manufacturing with Robotic Vision

**Module 6: Reinforcement Learning in Robotics**

- 6.1 Basics of Reinforcement Learning (RL)
- 6.2 Implementing RL Algorithms for Robotics
- 6.3 Hands-on Session: Developing RL Models for Robots
- 6.4 Use-case: Optimizing Warehouse Operations with RL

**Module 7: Generative Artificial Intelligence (AI) for Robotic Creativity**

- 7.1 Exploring Generative AI: GANs and Applications
- 7.2 Creative Robots: Design, Creation, and Innovation
- 7.3 Hands-on Session: Generating Novel Designs for Robotics
- 7.4 Use-case: Custom Manufacturing with AI

**Module 8: Natural Language Processing (NLP) for Human-Robot Interaction**

- 8.1 Introduction to NLP for Robotics
- 8.2 Voice-Activated Control Systems
- 8.3 Hands-on Session: Creating a Voice-command Robot Interface
- 8.4 Case-Study: Assistive Robots in Healthcare

**Module 9: Practical Activities and Use-Cases**

- 9.1 Hands-on Session-1: Building AI Models for Object Recognition using Python Programming
- 9.2 Hands-on Session-2: Path Planning, Obstacle Avoidance, and Localization Implementation using Python Programming

- 9.3 Hands-on Session-3: PID Controller Implementation using Python programming
- 9.4 Use-cases: Precision Agriculture, Automated Assembly Lines

**Module 10: Emerging Technologies and Innovation in Robotics**

- 10.1 Integration of Blockchain and Robotics
- 10.2 Quantum Computing and Its Potential
- 11.1 Understanding Robotic Process Automation and its use-cases
- 11.2 Popular RPA Tools and Their Features
- 11.3 Integrating AI with RPA

**Module 11: Exploring AI with Robotic Process Automation**

- 11.1 Understanding Robotic Process Automation and its use cases
- 11.2 Popular RPA Tools and Their Features
- 11.3 Integrating AI with RPA

**Module 12: Artificial Intelligence (AI) Ethics, Safety, and Policy**

- 12.1 Ethical Considerations in AI and Robotics
- 12.2 Safety Standards for AI-Driven Robotics
- 12.3 Discussion: Navigating AI Policies and Regulations

**Module 13: Innovations and Future Trends in AI and Robotics**

- 13.1 Latest Innovations in Robotics and AI
- 13.2 Future of Work and Society: Impact of AI and Robotics

## Who should attend

- Robotics Engineers: Enhance robotic system design and functionality using AI for automation and control.
- Mechanical Engineers: Integrate AI to optimize robotics systems and improve performance in manufacturing and production.
- AI Specialists: Apply AI techniques to enhance the intelligence and autonomy of robotic systems.
- IT Specialists & System Integrators: Implement AI-powered solutions to improve robotics infrastructure and communication systems.
- Students & New Graduates: Build essential skills in AI and robotics to succeed in an emerging field with endless growth potential.