

## IOT WITH ROBOTICS (ROS)



### **INTRODUCTION:**

Robotics and the Internet of Things (IoT) are two of the most important technologies driving modern automation and intelligent systems. Robotics focuses on the design and control of machines capable of performing tasks autonomously or semi-autonomously, while IoT enables devices to communicate, share data, and be monitored or controlled over the internet. When combined, IoT enhances robotics by providing connectivity, remote monitoring, real-time data exchange, and intelligent decision-making capabilities.

IoT-enabled robotic systems are widely used in industries such as manufacturing, logistics, healthcare, agriculture, and smart cities. From autonomous mobile robots in warehouses to smart inspection robots in industries, the integration of IoT and robotics plays a key role in Industry 4.0. Understanding how robots communicate, process data, and execute actions is essential for students aspiring to build careers in automation, robotics, and embedded systems.

This workshop aims to introduce students to the fundamental concepts of robotics and IoT, and to demonstrate how these technologies are interconnected using the Robot Operating System (ROS).

### **ABSTRACT:**

This workshop introduces participants to the basics of robotics and IoT with a focus on understanding how robotic systems operate using the Robot Operating System (ROS). The session begins with an overview of robotics fundamentals, IoT concepts, and the role of ROS as a middleware for robot communication and control. Participants will learn key ROS concepts such as nodes, topics, messages, publishers, and subscribers.

A hands-on simulation session using ROS on Web will allow participants to observe and control a simulated robot directly through a web browser, without the need for installing ROS or Linux. Through this practical

demonstration, participants will understand how code is used to send motion commands to a robot and how ROS manages communication between different components of a robotic system.

By the end of the workshop, participants will gain a clear conceptual and practical understanding of how IoT-enabled robotic systems function and how ROS is used in real-world industrial and research applications.

**Total duration:** 120 minutes

**Software Required:** ROS on Web

**Session Details**

Session	Details
1. Introduction	Introduction to Robotics and IoT: What they are, how they are interconnected, and their role in modern automation and Industry 4.0.
2. Introduction to ROS	Overview of Robot Operating System (ROS): Purpose of ROS, basic concepts such as nodes, topics, messages, publishers, and subscribers.
3. Hands-on ROS Simulation	Demonstration of robot simulation using ROS on Web, controlling robot movement through ROS topics and understanding real-time robot behavior.

**Prerequisites:**

This workshop is designed for participants with diverse academic backgrounds and is beginner-friendly. No prior knowledge of robotics or ROS is required. Basic understanding of programming concepts and interest in robotics and IoT is sufficient to participate effectively.

Participants are encouraged to bring their own laptops with a stable internet connection and a modern web browser to actively take part in the hands-on simulation session.