

ROS Course Outline

Introduction

Understanding Basic ROS Concepts

- Overview of the ROS Architecture and Philosophy
- Setting Up the ROS Workspace Environment
- ROS Master, Nodes, Topics, and Messages
- Using Console Commands
- Working with the Catkin Build System
- The ROS Launch File
- 3D Visualization and User Interaction with the Gazebo Simulator

Creating Your First ROS Program

- Creating a ROS Package
- Setting Up a ROS Project in Eclipse
- Using the ROS C++ Client Library
- Writing a Simple ROS Subscriber and Publisher
- Storing and Retrieving Parameters Using the ROS Parameter Server
- Using RViz for ROS 3D Visualization

Utilizing the TF Transformation System on ROS

Working with the rqt User Interface

Exploring Robot Models on ROS

The Simulation Description Format (SDF)

Deploying ROS Services

Implementing ROS Actions

Using Simulated Time on ROS

Storing Message Data in ROS Bags

Regression Testing with Realistic Scenarios

Applying Different Debugging Strategies in ROS

Exploring Complex Real-World Applications for ROS

Next Steps Towards Creating Your First ROS Project

Troubleshooting

Closing Remarks