

DETAILED TOPIC LIST

NUMBER OF SESSIONS

# ROS Mentorship Program

**24 SESSIONS**  
( 1-1.5 HOURS EACH )

## CHAPTER ONE: BASICS & INTRODUCTION TO ROS

- Introduction to Robotics
- Introduction to ROS (Robot Operating System)
- Dual Booting Linux alongside existing Operating System
- Basic Linux Commands & Python
- Installing ROS, Tools & Plugins related to ROS
- Creating a ROS Package & Nodes
- Understanding ROS Topics
- Concept of Publisher/Subscriber Python + ROS Launch creation
- Procedure for ROS bag recording and playback

## CHAPTER TWO: 3D DESIGNING & MODELLING, CAD TO URDF CONVERSION

- Installing and Introduction to CAD & Designing softwares
- Make simple 2D Cad drawings & 3D models
- Stress-Strain, Load & Thermal testing simulation
- Animation, Rendering & Engg. Drawing generation
- Fusion2URDF Installation & Debugging

## CHAPTER THREE: INTRODUCTION TO ROS TOOLS - GAZEBO, RVIZ & RQT

- Cleaning FUSION2URDF package & Setting Parameters for Teleoperation
- Introduction to Blender and using it to model DAE files for making Gazebo World
- Introduction to RViz and using RQT graph
- Exploring & Implementing gazebo plugins

## CHAPTER FOUR: SIMULATION, MAPPING & NAVIGATION

- Demo of Turtlebot and understanding navigation package filesystems
- Introduction and Implementation of SLAM on Self-designed robot
- Introduction, Implementation & Dynamic Tuning of Navigation Stack on Self-designed robot