BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT

Avalahalli, Doddaballapur Main Road, Bengaluru – 560064

Department of CSE

Open Course on:

Hands-on Robotics with ROS

Date: 12th - 16th June, 2023

Venue : BOT lab 5th floor, BSN Block, BMSIT&M

Course Coordinators:

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Industry Resource Person:

Mr. S.N. Shashank

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Institute Vision

To emerge as one of the finest technical institutions of higher learning, to develop engineering professionals who are technically competent, ethical and environment friendly for betterment of the society.

Institute Mission

Accomplish stimulating learning environment through high quality academic instruction, innovation and industry-institute interface

Preamble of the Course

Robots are increasingly important in our daily lives, replacing humans in industries and hazardous environments. Programming robots used to be complex, but not anymore. This course introduces Robotics and Robotic Operating System (ROS), a set of open-source software libraries and tools for building robot applications. ROS enables the creation of software for advanced robots capable of machine learning, computer vision, and AI.

Registration!

Registration fees: Rs 400 /-

link to register:

https://projects.bmsit.ac.in

link to pay:

https://bmsitm.gnums.in/

Steps to Register

Registeration

- Go to the link mentioned above for registrartion or scan the QR code given .
- Select the appropiate open course and Register

Steps to make Payment

Payment

- Login to the link given above
- Go to Menu-> other Fee
- Select Fee Head as OpenCourse and make the payment (Rs 400/-)

Key Highlights:

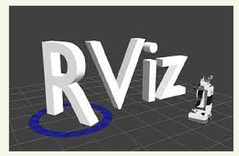
- This course covers embedded systems, microcontroller programming (Arduino), Python3, OpenCV, and simulating Arduino using TinkerCAD.
- The main focus is on ROS (Robotic Operating System), specifically ROS Noetic, with a full mini project on Day 5.
- The course includes software simulations using Gazebo, Rviz, and MoveIt.
- It is designed as a mini competition, with daily Hands-On sessions that are scored. The team with the highest scores at the end will be declared the winner.

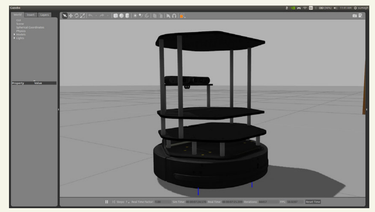
Course Description

- Explore Embedded Systems and create projects with Arduino.
- Gain knowledge of Robotics and how Robots function.
- Use OpenCV for computer vision and object recognition.
- Familiarize yourself with simulation software like TinkerCAD, Gazebo, and Rviz to overcome hardware limitations.
- Learn and apply the basics of ROS using TurtleBot.
- Develop robot applications using ROS.

Learning Outcomes

- ROS: Open-source software for building advanced robot applications.
- TinkerCAD: Simulation software for Arduino/Microcontroller projects.
- Gazebo: Simulation software for testing ROS-based robotic applications.
- Rviz: Simulation software for visualizing sensor data and robot models.
- MoveIt: Platform for developing complex robotic manipulation applications using ROS.
- Mini project: Program a robot to navigate a greenhouse, locate and pick fruits, and sort them by color. Divided into stages, students program the robot's logic using provided software models.





Schedule

SL No	Date	Topics covered	Break	Topics covered	Break	Topics covered	Assessment/ feedback
		8:30 to 10:30 am	10:30 to 10:50 am	10:50 to 12:50 pm	12:50 to 1:50 pm	2:00 to 4:00 pm	4:00 pm to 4:30 pm
1	12.06.2023	Overview of the Course and Introduction to Robotics, Brief overview of Python.	TEA BREAK	Image Processing and introduction to Computer vision using OpenCV	LUNCH BREAK	Hands-On session on Object detection with OpenCV	Overall Feedback & Assessment
2	13.06.2023	OpenCV practical session contd.		Overview of Embedded Systems + Git and GitHub		TinkerCAD Practical session	Overall Feedback & Assessment
3	14.06.2023	Overview of the Course and Introduction to Robotics and ROS		Topics, Publishers, Subscribers and Messages in ROS, TurtleSim		Hands-On TurtleSim exercises	Overall Feedback & Assessment
4	15.06.2023	Smart Arm Project Demonstration		Smart Arm Project Demonstration		Overview of KrishiBot	Overall Feedback & Assessment
5	16.06.2023	Hands-On Workshop with KrishiBot tasks		Hands-On Workshop with KrishiBot tasks		Quiz	Overall Feedback & Assessment

Pre Requisites

The Pre requisites for this course are:

- Basics of Programming Concepts: We'll be using Python so don't worry much, it'll be easy
- A Laptop. Much Preferrably with Ubuntu 20.04 installed as main OS or alongside Windows/other OS. We do not recommend using Virtual Machines as the software simulations are RAM intensive and so may affect computer performance.
- Ubuntu installation is optional.
- A passion to learn :)