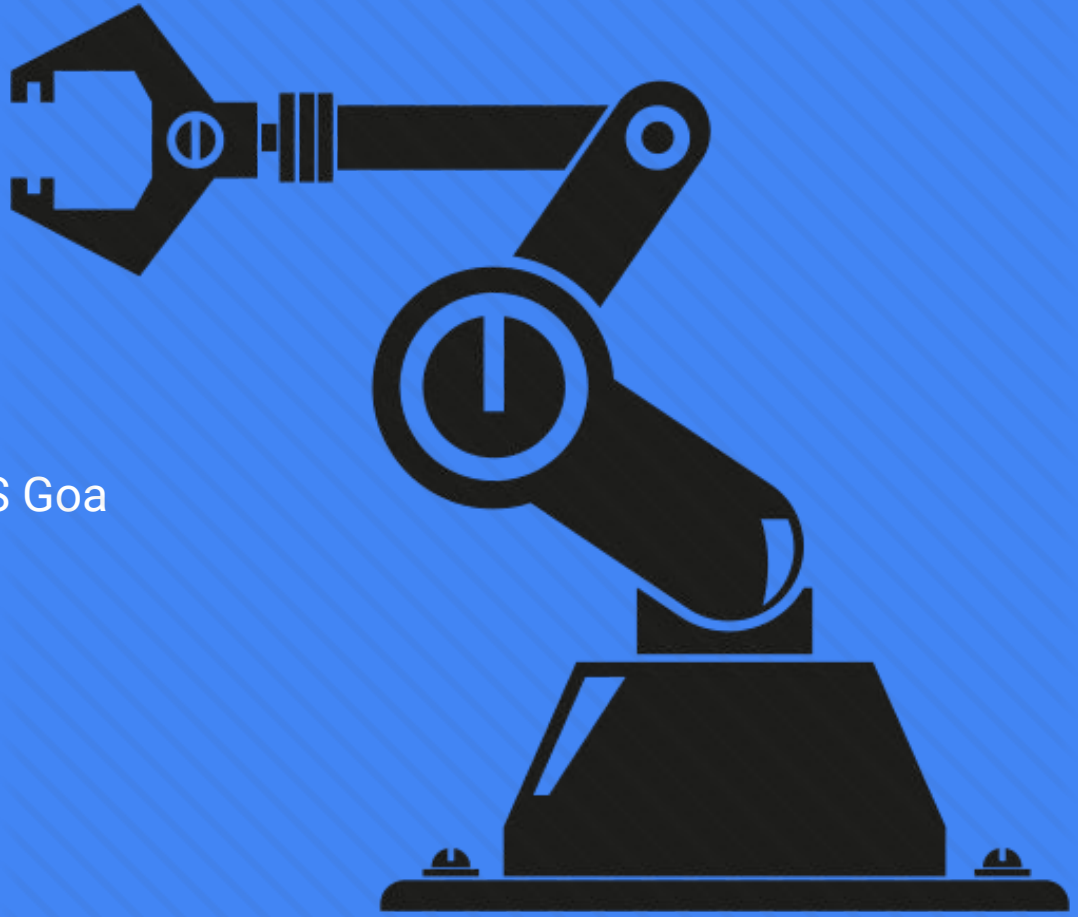
Intermediate Robotics

By Electronics & Robotics Club, BITS Goa



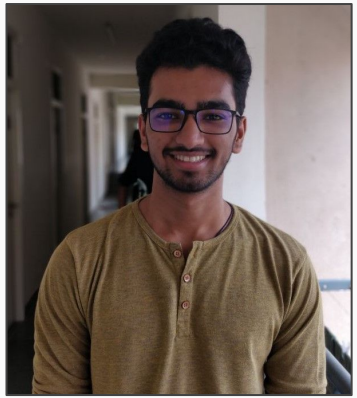
Overview

- Instructors and Mentors
- Course Timeline and Handout
- Lecture Hours
- Course Projects
- Contact Us

Instructors

Rishikesh Vanarse
(Sub Coordinator at ERC)

Harshal Deshpande
(ERC CTE Head)



Mohit Gupta
(Research Head of ERC)

Pranav Mahajan
(Vice President of CTE)

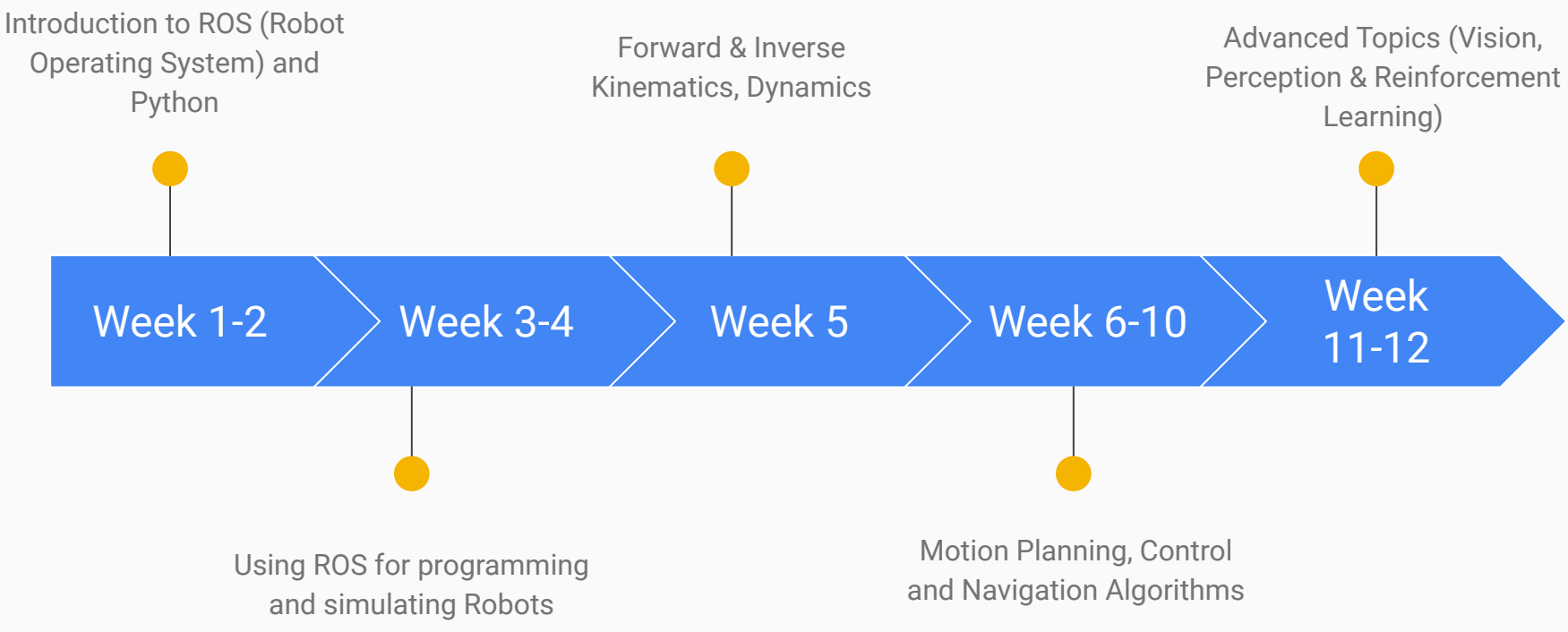
Mentors

Atharv Sonwane
(Core Member of
ERC)

Aditya Bidwai
(Core Member of
ERC)

Advait Kulkarni
(Core Member of
ERC)

COURSE TIMELINE



Handout:

Lecture	Lectures	Topics
1-2	*Introduction to ROS*	- What is ROS? - Why do we need ROS? etc.
	Basics of Bash and Python	- Bash - Creating ROS workspace - Creating ROS package - Python syntax
ROS		
3	*Publishers and Subscribers*	- Publishers in Python - Subscribers in Python - Creating a custom message
4	*Services*	- Service Client - Service Server
5	*Actions*	- Action Server - Action Client
6	*Robot Simulation*	- Turtlebot - Husky - PX4 firmware - rotorS - UUV simulator

Motion Planning and Controls		
7-8	*Kinematics and Dynamics*	- Transforms - Joint Space vs cartesian space - Forward Kinematics - Inverse Kinematics - Dynamics (Lagrangian formulation, Newton-Euler Formulation)
9-10	*ROS: move!t*	- What is move!t? - moveit setup assistant - Using rviz to set goal - Writing python script to set the goal
11-12	*Control Algorithms*	- Laplace Transform - Transfer Functions - Discrete Control - PID - LQR
13-14	*ROS: navigation stack*	- setup of navigation stack - building a map - SLAM - Autonomous navigation
Other Topics		
15	*Vision and Perception*	- OpenCV - Basics of DL - Use of DL in CV
16-17	*Reinforcement Learning in robotics*	- RL in gym env - sim2real

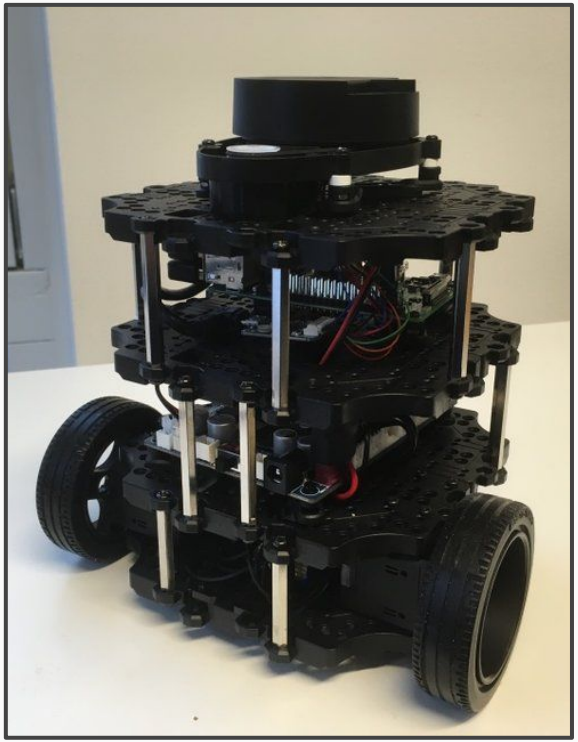
Lecture Hours

Number of Lectures per Week: **2**

Duration of each Lecture: **1hr 30min**

Course Projects:

Motion planning of Turtlebot using ROS navigation stack



Teleop Control and Motion Planning of an Arm using moveit

Motion planning of a quadrotor in PX4 SITL

Contact:

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https://erc-bpgc.github.io/Website/

Thank you!