Quark Summer Technical Project - 2019

Intro to ROS

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Course Introduction

<u>Description</u>:
Welcome to this course! We hope that you enjoy your summer throughout this course.

This course is designed in such a way that it will help you get started with autonomous robots and make you familiar with ROS(Robot Operating System). At the end of the course you will be able to use ROS to simulate robots. We will also go over python in the initial weeks, as we will be using python (C++ for ROS will not be covered in this course as python is easier to learn and implementing algorithms using python is easy) to control a robot in the simulated environment.

The things that shall be covered in python are basic **syntax of loops and basic callback functions** which are used extensively in the course. We shall be working closely with ros wiki for rospy. (http://wiki.ros.org/ROS/Tutorials)

Currently, BITS does not offer any course which is closely related to Robotics apart from Software for Embedded Systems. We are helping you to get started with autonomous robotics and we will be providing you resources which will help you in exploring this field.

<u>Textbook</u>: This course does not have a fixed textbook as such, but we have found this book to be the best if you are just starting with ROS.

#: Programming robots with ROS by Morgan Quigley, Brian Gerkey, William Smart (link)

Apart from this we will be providing some online resources.

<u>Milestones</u>:
A -
Completing Weekly assignments
B -
Completing final project and exploring something new apart from whatever we will be covering in the course

Completion of the weekly assignments and final project will award the participant with a 'Certificate of Completion'. Moreover, the top participants will get a 'Certificate of Excellence'. To be honest, in order to complete these milestones you will have to put in efforts. If you have any doubts feel free to ask no matter how dumb it is.

Weekly Plan:

Week 1	Initiating python into your toolbox	Assignment-1
Week 2	Learning the ros architecture: Packages,Nodes, Topics, ros-service, ros-actions	Assignment-2
Week 3	Continuation of the previous week and file hierarchy	Assignment-3
Week 4	Learning about building a simple urdf (Robot definition file for simulation) and simulating it into an physics simulator	Assignment-4
Week 5	Navigating your simple robot around the world autonomously	Assignment-5
Final Week	INTEGRATE THEM ALL	Final project: Integrating all the above assignments

Please don't cheat in this course. This course will help you a lot in some areas even if you don't want to pursue robotics in the future. Cheating is not going to help you at all.