Birla Institute of Technology and Science, K.K. Birla Goa Campus
Center for Technical Education
First Semester – 2019-2020
Course Title: *Introduction to Robotics*

Instructor In-Charge: Harshal Deshpande

Team of Instructors: Tejas Rane
Mohit Gupta
Rishikesh Vanarse
Prathamesh Thorwe
Aditya Phopale

Along with the instructors, the course will have mentors who will help in the implementation sessions.

Course Description: As the name suggests the course aims to cover the basics of robotics and the recent advancements in the field of robotics. This course is aimed at students who are interested in robotics and basic electronics. At the end of this course students will be able to interface few basic sensors with a microcontroller based on Arduino IDE and will be able understand basic schematic diagrams. This course will definitely help students who want to explore the field of robotics and embedded systems.

Course Plan:

Lecture	Learning Objective	Details
1-3	Introduction	We will be covering basic mechanisms in these lectures. We will also cover how to manufacture those mechanisms in industry and on-campus. Designing basics.
4	C Programming	We will be teaching C programming. We will cover basic syntax in this lecture.
5	Introduction to Arduino	We will introduce Arduino and Arduino ide and how C programming is used in Arduino. You'll also be introduced to ESP-32 and basic electric components.
6	*Implementation Session*	You'll be carrying out small tasks given during the lecture.
7-8	Arduino/ESP Contd.	During these lectures you'll get introduced to various sensors. You'll also do some small tasks.
9	*Implementation Session*	You'll be carrying out small tasks given during the lecture.
10	Advanced Microcontroller Concepts	In this lecture you'll be learning about the various communication protocols and interrupts.
11	Introduction to Control Systems	In this lecture you'll be introduced to control systems.

12	*Implementation Session*	You'll be carrying out small tasks given during the lecture.
13	Basic Electronics Components	In this lecture you'll be introduced to basic ICs like IC 741, LM317, timer IC 555, etc.
14	Robotic Manipulator	In this lecture you'll learn about kinematics of a robotic arm.
15	*Implementation Session*	You'll be carrying out small tasks given during the lecture.
16-17	MATLAB and Simulink	You'll learn how to use MATLAB and Simulink in these lectures
18-19	Introduction to Open Source Robotics	In these lectures you'll be introduced to python, version control systems, ROS (Robot Operating System).
20	*ENDGAME*	We will have a small competition in which everyone must display their projects and compete.

Course Projects:

1. Ground Based Mobile Robot
2. Robotics Arm

Evaluation:

Component	**Weightage**	**Total Weightage**
Implementation Sessions	20	80
Final Project Submission	20	20
		Total: 100

Note: Each lecture will be of 1:30~2:00 hours long with a 5-10 min break in between.

We will also be providing some homework tasks which will help you in the completion of the project. In the Implementation Session you will be evaluated based on the completion of tasks in the lecture.

The Final Project submission must be done by everyone. You have to show us the working of both the projects.