Contents

of a cutting-edge

educational program

in

Robotics

By

FunEdu Space & FutureTech Labs.

(Educational Services wing of FunEdu Kits and Toys Pvt. Ltd.)

Registered Space Tutor Program Partner of ISRO

Contact us at: 9871963840, 8595329112.

Write to us at: ashishdthombre@gmail.com, funedukits@gmail.com,

A. **Robotics Learning Program for students of Engineering and Technical Institute**

B. **A.1. Workshop on Robotics for students of Engineering and Technical Institute**
Total Time Duration: 15 Hours, Course Code: ROBO-HEI-01 Batch Size: Max. 30 Students

Primary Objective This robotics course for students aged 14 to 18 can be designed to introduce them to the fundamentals of robotics, programming, and engineering concepts while fostering creativity and problem-solving skills The workshop is also aimed at nurturing participants' curiosity, inculcating critical thinking, and creating passion for robotic and mechatronics system exploration.

Sr. No.	Topic	Contents	Activities
1	**Introduction to Robotics**	Course overview, robotics history, and the importance of robotics in various industries. Basics of robotics components (sensors, actuators, microcontrollers), and hands-on exploration of robot kits.	Power Point presentations, Demos **Activity:** Quiz/ Application Exercise (2 Hrs.)
2	**Introduction to electronics and microcontrollers**	Basic electronic components (resistors, capacitors, etc.), and circuit design Various open-source microcontroller development boards, ESP 32, Arduino, Raspberry Pi etc, programming basics and connecting sensors and actuators.	Power Point presentations, Demos **Activity**: Quiz/ Application Exercise (2 Hrs.)
3	**Getting Started with ESP32** **Session 3:** Demo of Development Board	Introduction to ESP32, setting up the development environment, building your first ESP32 program Wiring, creating a project, Writing the program, Configuring the project. Compiling and flashing, programming for ESP32	Experiments through Models, Power Point presentations, videos, animations, Demo 1: **(2 Hrs.)**
4	**Session 4** Sensors	Types of sensors in Robotics and their applications. Introduction to ESP32 GPIO, Introduction to IoT for weather monitoring systems, Reading	Experiments and demo through Models, Power Point presentations,

		temperature and humidity from a sensor device, Wiring. Building and running the program, Displaying information using an LCD Creating a project, Writing an ESP32 program, Flashing and running a program Displaying image files	Practice with instructor **(3 Hrs)**
5	**Sensor based control, algorithms, Actuators and Control**	Implementing sensor-based control, obstacle detection, and line-following algorithms, Types of actuators (motors, servos, etc.) and their role in robot movement. Controlling actuators for tasks like robot locomotion, arm manipulation, and gripper control.	Demonstrations and, Power Point presentations **(1 Hr.)**
6	**Project 1:**	line-following robot,	Demonstrations and, Power Point presentations, Project **(2 Hrs.)**
7	**Project 2:**	obstacle avoidance robot	Power Point presentations, demos, Project,**(2 Hrs.)**
8	**Project 3:**	Firefighting Robot	Power Point presentations, demos, Project,**(2 Hrs.)**
9	**Careers and Opportunities in Robotics**	Scope of Robotics, Job profiles and opportunities,	Power Point presentations, discussions, **(40 Min)**
10	**Group Projects and Challenges**	Project Ideas for continuous and further learnings	Power Point presentations, discussions, **(20 Min)**