CERTIFICATE COURSE IN ROBOTICS

(6 Months)

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING

SANKETHIKA VIDYA BHAVAN, MASAB TANK, TELANGANA:HYDERABAD

Certificate Course in ROBOTICS

Duration of the Course : 6 Months

Eligibility : Intermediate or its equivalent

Total Teaching Hrs : 250 Hrs

Scheme of Instruction and Examination

Sub Code	Subject Name	Instruction Period/Week		Total Periods	Scheme of Examination			
		Theory	Practical		Duration	Internal Marks	End Exam Marks	Total Marks
THEORY								
RB-101	Foundation to Robotics	03	-	50	3Hrs	0	100	100
RB-102	Advanced Robotics	03	-	50	3Hrs	0	100	100
PRACTICALS								
RB-103	Foundation to Robotics Lab	-	04	75	3Hrs	40	60	100
RB-104	Advanced Robotics Lab	-	04	75	3Hrs	40	60	100
	TOTAL	06	08	250		80	320	400

Certificate Course in Robotics

Subject Code	**:**	RB-101
Subject Name	:	Foundation to Robotics
Periods/Week	:	03 Hrs
Total Periods	:	50 Hrs

About Course

This course is an introduction to the world of STEM And Robotics. It is designed as an interactive approach to applied science, technology, engineering and math. This course takes you through hands on experience of building a robot, Learn about Arduino board, working of motors, motor drivers and other important concepts.

Course Objectives: This course enables the students to

- Learn Conceptual understanding of theories related to Voltage, LEDs, Switch mechanisms, Sensor controlled buzzers and more…
- Understand wireless technology by building your own blue-tooth/mobile app controlled robot
- Practical understanding of basic electronics, circuit building and circuit debugging techniques.

Course Outcomes: On completion of this course the students are able to

- Implement the fundamentals of Arduino Programming
- Develop wireless technology by building your own blue-tooth/mobile app controlled robot
- Implementation of theories related to Bluetooth Controller, Ultra Sonic Sensors, etc.
- Working with IR Sensors
- Assemble the Robot

UNIT-1: Introduction to Robotics (10 Hrs)

Applications of Robotics, Basics of Robotics, Basic Electronic Components Kit, Working with LED, Light Brightness Control, Working with Push Button, Two way switches, Reset Switch, Limit Switch.

UNIT -2: Actuators and Sensors (10 Hrs)

Working with Motors (Actuators), Measuring Electrical Parameters, Working with Potentiometer, Working with Buzzer, IR Sensors and, Light Sensors.

UNIT -3: Arduino Programming-1 (10 Hrs)

Introduction to Microcontroller, Programming on Arduino Board, Pin Diagram of Arduino, L293D Drivers, Variables, Operators, Data Types, Conditional Statements, Looping statements, controlling an LED Blinking, Reading input.

UNIT -4: Arduino Programming-2 (10 Hrs)

Controlling a Motor, Working with Motor Driver Shield, Programming on sensors, Sensor based motor control, Pulse Width Modulation, Liquid Crystal Display, Controlling your robot.

UNIT -5: Building Prototypes-I (5 Hrs)

Automatic Street Lighting System, Door Open Detection.

UNIT -6: Building Prototypes-II (5 Hrs)

Home Automation, Water Tank Level Indication.

Certificate Course in Robotics

Subject Code	**:**	RB-102
Subject Name	:	Advanced Robotics
Periods/Week	:	03 Hrs
Total Periods	:	50 Hrs

About Course

This course covers advanced topics of Robotics. It also takes you through hands on programming a robot with Arduino. Find out about making calculations, speed control of robot, instructing it to your needs and some more.

Course Objectives: This course will enable students to

- Learn Conceptual understanding of theories related to Voltage, LEDs, Switch mechanisms, Sensor controlled buzzers and more…
- Understand wireless technology by building your own blue-tooth/mobile app controlled robot
- Practical understanding of basic electronics, circuit building and circuit debugging techniques.

Course Outcomes: The students should be able to

- The fundamentals to ensure a solid footing in the tech-world!
- The fundamentals of Arduino Programming
- Understand wireless technology by building your own blue-tooth/mobile app controlled robot
- Conceptual understanding of theories related to Bluetooth Controller, Ultra Sonic Sensors, etc.
- Working with IR Sensors
- Robot Assembly
- Troubleshooting codes is neither difficult nor exhausting – it's fun and simple, when you need to do it with Robots…
- Working with Ultra Sonic Sensors
- Working Servo Motors
- Quadruped Robot Assembly
- Troubleshooting codes is neither difficult nor exhausting – it's fun and simple, when you need to do it with Robots

UNIT-1: Introduction to Robotics (10 Hrs)

Applications of Robotics, Basics of Robotics, Basic Electronic Components Kit, Working with LED, Light Brightness Control, Working with Push Button, Two way switches, Reset Switch, Limit Switch.

UNIT -2: Actuators and Sensors (10 Hrs)

Working with Motors (Actuators), Measuring Electrical Parameters, Working with Potentiometer, Working with Buzzer, IR Sensors and Light Sensors.

UNIT -3: Arduino Programming-1 (10 Hrs)

Introduction to Microcontroller, Programming on Arduino Board, Variables, Operators Data Types, Conditional Statements, Looping Statements, Controlling an LED Blinking, Reading input.

UNIT -4: Arduino Programming-2 (10 Hrs)

Controlling a Motor, Programming on sensors, Sensor based motor control, Pulse Width Modulation, Liquid Crystal Display, Controlling your robot.

UNIT -5: Building Prototypes-I (5 Hrs)

1. Automatic Street Lighting System,
2. Door Open Detection

UNIT -6: Building Prototypes-II (5 Hrs)

1. Home Automation,
2. Water Tank Level Indication.

Certificate Course in Robotics

Subject Code	**:**	RB-103
Subject Name	:	Foundation to Robotics LAB
Periods/Week	:	04 Hrs
Total Periods	:	75 Hrs

Course Objectives: This course will enable students to

- Learn Conceptual understanding of theories related to Voltage, LEDs, Switch mechanisms, Sensor controlled buzzers and more…
- Understand wireless technology by building your own blue-tooth/mobile app controlled robot
- Practical understanding of basic electronics, circuit building and circuit debugging techniques.

List of Experiments

1. a) Write program using Arduino IDE for Blink LED

   b) Learn how to Control LED's
2. a) Write a Program for Left, Right, Start, Stop and forward functions for Dc Motors.

   b) Write a Program to Control Robot Car with IR sensors.
3. a) Develop and demonstrate prototype of Home automation system.

   b) Design a prototype for Automatic street lighting system.
4. a) Evolve a prototype of Soil moisture testing robot.

   b) Develop a program and a prototype for Smart trash bin.
5. Design a prototype for Automatic railway crossing.
6. Develop a Blue tooth-controlled war robot

Certificate Course in Robotics

Subject Code	**:**	RB-104
Subject Name	:	Advanced Robotics LAB
Periods/Week	:	04 Hrs
Total Periods	:	75 Hrs

Course Objectives: This course will enable students to

- Learn Conceptual understanding of theories related to Voltage, LEDs, Switch mechanisms, Sensor controlled buzzers and more…
- Understand wireless technology by building your own blue-tooth/mobile app controlled robot
- Practical understanding of basic electronics, circuit building and circuit debugging techniques.

List of Experiments

1. a) Build and program Line Following robot.

   b) Write a program to develop Light Follower robot.
2. a) Design and program a prototype of Wall Following robot.

   b) Design and develop Obstacle Avoiding robot using ultrasonic sensors.
3. a) Write a program for Pit Avoiding robot.
4. Write a program on various movements of Servo Motor.
5. a) Design a quadruped robot and program it to stand.

   b) Write a program for quadruped robot to walk.
6. a) To program a quadruped robot to turn left and right.

   b) To program a quadruped robot for gesture control.