GOVERNMENT OF TAMILNADU

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-25

STATE PROJECT COORDINATION UNIT

(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	**ARDUINO PROGRAMMING**
Course Code	**EC/2020/011**
Course Duration	40 Hours
Minimum Eligibility Criteria	8th /10th /+2/ITI/Diploma/Graduate
Pre-requisites (if any)	-
Course Objectives	Training module has been designed for the participants to • Learn the Features of Arduino IDE and Shield. • Understand the Structure of Arduino program and Instructions • Practice on developing program for Arduino based applications. • Practice on Interfacing of different field devices with Arduino
Course Outcomes	At the end of training, the trainees will be able to • Explain the features of Arduino IDE and Shield. • Develop Arduino program for real time applications • Interface different field devices with Arduino. • Complete mini project using Arduino and Sensors.
Expected Job Roles	Arduino Programmer

TEACHING AND SCHEME OF EXAMINATION

Course Code	Course Name	Hours		Assessment Marks		Duration of Examination
				Min	Max	
EC/2020/011	ARDUINO PROGRAMMING	Theory	16	10	20	3 Hours
		Practical	24	40	80	
		Total	40	50	100	

EC/2020/011- ARDUINO PROGRAMMING
DETAILED SYLLABUS

Unit No	Modules	No.of.Hours	
		Theory	Practical
I	**Understanding Arduino Software**	**10 Hours**	
1.1	Basics of Electricity, Overview of Basic Electronics Components	07	03
1.2	Overview of Arduino Board, Installation of Arduino IDE, Overview of Arduino IDE, Programming concept		
1.3	Program formatting and Syntax, Getting started with setup() and loop(), Initializing variables		
1.4	Develop Arduino sketch for LED blink		
1.5	Develop Arduino sketch to read the status of switch - Writing conditional statements		
1.6	Working with loops – Serial communication		
1.7	Using Arduino Libraries – Common coding errors.		
II	**Interfacing of Digital and Analog I/Os with Arduino and Develop sketches**	**15 Hours**	
2.1	LEDs, Pushbuttons, RGB LEDs, Potentiometer, LDR	07	08
2.2	Temperature Sensor, Moisture Sensor, IR Sensor		
2.3	Force Sensor, PIR Motion Sensor, Ultrasonic Sensor		
2.4	TSOP Receiver, RFID Sensor		
2.5	Blue tooth Module, Relay Shield		
2.6	Motor Driver, DC Motor, Servo Motor		
2.7	RTC Module, Solenoid valve		
III	**Practical**	**15 Hours**	
3.1	Smart Home application using Arduino, GPS Tracker, Arduino based Robot	02	13
3.2	Interfacing LED and switch control using Android phone		
3.3	Blue tooth interface and Mini Projects		
	Total theory / Practical Hours	**16**	**24**
	Total hours	**40**	

HARDWARE REQUIREMENT

S.NO	LIST OF TOOLS /EQUIPMENTS
1	Arduino
2	Bluetooth Module
3	Sensors : Temperature Sensor, Moisture Sensor, IR Sensor, Force Sensor, PIR Motion sensor, Ultrasonic Sensor, RFID Sensor
4	TSOP Receiver
5	DC Motor, Servo Motor
6	RTC Module, Solenoid valve

SOFTWARE REQUIREMENT

S.NO	LIST OF SOFTWARE
1	Arduino IDE Software
2	Arduino BlueControl App

REFERENCE BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Arduino Programming	Ryan Turner	Independently Published, 2020
2	Exploring Arduino	Wiley	John Wiley & Sons
3	Programming Arduino	Simon Mank	McGRAW-**HILL**
4	Arduino Programming	Wally Parsons	John Wiley & Sons

ASSESSMENT AND CERTIFICATION

S.No	Criteria for assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the CIICP Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the CIICP Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max. Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Objective and Program	20
	b)Procedure and Connections / Execution	20
	c)Result and Viva	20
	d)Record	20
	Total Marks	**100**

THEORY MODEL QUESTION PAPER

EC/2020/011 – ARDUINO PROGRAMMING

(Maximum Marks: 20)

(N.B: Answer any **Twenty** questions) **20x1= 20 Marks**

1. What is Arduino?
2. Why we should use Arduino?
3. What are the advantages of Arduino?
4. What is sketch in Arduino?
5. Arduino IDE consists of 2 functions. What are they?
6. What is the microcontroller used in Arduino UNO?
7. How many digital pins are there on the UNO board?
8. Expand: IDE
9. Does Arduino is open-source?
10. How many Analog Inputs does Arduino Uno R3 has?
11. Expand: LDR
12. Expand: PIR
13. What is meant by RGB LED?
14. Draw the pin details of LM 35 Temperature Sensor.
15. What are the pins of PIR Motion sensor?
16. Write the Name of the DC Motor Driver IC.
17. What is the use of Ultrasonic Sensor?
18. What is the use RTC Module?
19. What is meant by relay shield?
20. How will you connect 230V AC load with Arduino output?
21. Give any two example for analog sensor?
22. Give any two example for digital output field device.
23. What is meant by upload in Arduino IDE?
24. What is function of Serial Monitor?
25. What are the application of Blue tooth module?