COURSE TITLE	**FOUNDATION SKILLS IN SENSOR INTERFACING**
COURSE CODE	**01CT1103**
COURSE CREDITS	**2**

Objective:

1 To stimulate students programming and debugging abilities

2 To improve the logical ability

3 To design programs using open-source integrated development environments and programmable microcontroller-based boards

4 To interface various sensors and modules like IR, ultrasonic, temperature, humidity, etc

5 To control various aceturates and electronics devices

6 To implement data transfer using various protocols like bluetooth, Wi-Fi, GSM, etc.

7 1. To stimulate students programming and debugging abilities
2. To improve the logical ability
3. To design programs using open-source integrated development environments and programmable microcontroller-based boards
4. To interface various sensors and modules like IR, ultrasonic, temperature, humidity, etc.
5. To control various actuators and electronics devices
6. To implement data transfer using various protocols like Bluetooth, Wi-Fi, GSM, etc.

8 After completion of this course, student will be able to stimulate students programming and debugging abilities, To improve the logical ability, To design programs using open-source integrated development environments and programmable microcontroller-based boards, To interface various sensors and modules like IR, ultrasonic, temperature, humidity, etc., to control various actuators and electronics devices, To implement data transfer using various protocols like Bluetooth, Wi-Fi, GSM, etc.

Course Outcomes: After completion of this course, student will be able to:

1 Understand application-based programming concept

2 To create programmes for various open-source programmable boards

3 To develop programmes for specific requirements with interfacing of various components and modules

4 To develop hardware and software interfacing for engineering applications

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	4	0	30	20	25	25

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Contents : Unit	Topics	Contact Hours
Total Hours		

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Open source boards and IDE** Overview, various boards, hardware specifications, components and various pins, gui of ide, installation of ide, combination of software and hardware, connection with hardware and libraries	4
2	**Programming using IDE** Program structure, data types, variables, constants, operators, control statements, loops, functions, arrays, strings	8
3	**Function libraries** Input and output functions, character functions, math functions, tone generation, communication protocols and trigonometric functions	4
4	**Sensors and its interfacing with hardware board** Sensors and its classification, analog and digital sensors, active and passive sensors, application specific sensors, working principle of various sensors, interfacing of various sensors with Arduino board	12
5	**Actuators** Actuators and its classification, types of motion actuators, types of energy actuators, application specific actuators, working principle of various actuators, interfacing of various actuators with Arduino board	6
6	**Communication protocols** Wired and Wireless communication protocols, Working principle of various protocols like UART, I2C, SPI, Bluetooth, ZigBee and it's interfacing with Arduino Board, GSM module working and it's interfacing with Arduino board	12
7	**Project Implementation** Designing, developing, coding of electronic projects by making use of sensors, actuators and Arduino to solve the real world problems, troubleshooting and debugging skills to implement the project	6
Total Hours		**52**

Textbook :

1 Getting Started with Arduino, Massimo Banzi, O'Reilly Media, 2011

2 Arduino Cookbook, Michael Margolis, O'Reilly Media, 2011

References:

1 Intro Arduino Book A piece of cake!, Intro Arduino Book A piece of cake!, Alan G. Smith,, CreateSpace Independent Publishing Platform, 2011

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	10.00	30.00	20.00	10.00	20.00

Instructional Method:

1 Practical examination will be directed toward the completion of semester for assessment of performance of understudies in laboratory.

Supplementary Resources:

1 https://www.arduino.cc/en/Main/Education
2 https://www.tutorialspoint.com/arduino
3 http://tronixstuff.com/tutorials

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