



Subject Code: 01CT0103

Subject Name: Foundation Skills in Sensor Interfacing

B. Tech. Year – I (Semester I)

Objectives:

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, accelerometer, gyroscope, etc.
5. To control various aceturates and electronics devices
6. To implement data transfer using various protocols like bluetooth, Wi-Fi, GSM, etc.

Credits Earned: 01 Credit

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

1. To create programmes for various open source programmable boards
2. To develop programmes for specific requirements with interfacing of various components and modules
3. To develop hardware and software interfacing for engineering applications

Pre-requisite of course: NA

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
Theory	Tutorial	Practical		E	I		V	T	
				ESE	IA	CSE	Viva	Term Work	
0	0	2	1	00	00	00	25	25	50



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	User centric applications Concept of pulse width modulation, sensors and actuators interfacing, short-range and long-range communication, project implementation and debugging skills	14
Total Hours		30

Suggested Text books / Reference books:

1. Massimo Banzi, “Getting Started with Arduino”, O’Reilly Media, September 2011: Second Edition
2. Michael Margolis, “Arduino Cookbook”, O’Reilly Media, March 2011, First Edition
3. Rui Santos and Sara Santos, “Arduino For Beginners”
4. Alan G. Smith, “Intro Arduino Book A piece of cake!”

Suggested Theory distribution:

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

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
10%	10%	30%	20%	10%	20%



Suggested List of Experiments:

Sr. No.	Content	Contact hours
01	Introduction to open source boards and programming IDEs	2
02	Various pins available on boards and its functionality	2
03	Basic programming to interface LEDs and switches	2
04	Data types and variables, interfacing of LCD Display	2
05	Operators and control statement, Interfacing of Temperature and Humidity sensors	2
06	Programming using with Time, Loops and Functions, Interfacing Ultra sonic sensor for distance measurement	2
07	Use of Strings and arrays in programming	2
08	Function Libraries installation and use	2
09	High voltage applications and controlling, Interfacing of DC Motors	2
10	Speed and intensity control using PWM	2
11	IR transmitters and receivers applications	2
12	Robotics application design using servo motor interfacing	2
13	Integration of communication protocols like bluetooth, Wi-Fi, GSM, etc.	2
14	Project assessment - 1	2
15	Project assessment - 2	2

Supplementary Resources:

1. <https://www.arduino.cc/en/Main/Education>
2. <https://www.tutorialspoint.com/arduino>
3. <http://tronixstuff.com/tutorials>
4. <https://www.arduino.cc/en/Guide/HomePage>
5. <https://startingelectronics.org/software/arduino/learn-to-program-course>