NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY

B.Tech.

OPEN ELECTIVE

L	T	P	C
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Course Code	**2ECOE08**
Course Name	**Arduino for Engineers**

Course Outcomes (COs):

At the end of the course, the students will be able to –

1. Demonstrate programming proficiency using Embedded C for Arduino
2. Interface Analog and Digital peripherals with Arduino
3. Establish serial communication using I2C and SPI protocol
4. Demonstrate proficiency in developing Arduino based applications

Syllabus: **Teaching Hours: 30 hrs**

UNIT-I: Introduction to Arduino board and Programming

The Arduino family, Arduino Uno board, Atmega328p Microcontroller, Programming using Arduino IDE — **05**

UNIT-II: I/O Programming and Interfacing

LED, push-button switch, Hex keypad, Seven segment display, LCD interfacing — **05**

UNIT-III: Serial Communication

Basics of serial communication, Asynchronous serial communication and data framing, Serial port programming, I2C and SPI communications, LCD interfacing using I2C — **06**

UNIT-IV: Motor Control

Interfacing of DC and Stepper motor, PWM for motor speed control, Relays — **06**

UNIT-V: DAC and Sensor Interfacing to Arduino Board

DAC interfacing, Ultrasonic distance sensor, Humidity and temperature sensor, Infrared sensor, Light sensor (LDR), Wifi and Bluetooth module — **08**

Self-Study:

The self-study content will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Laboratory Work:

Laboratory work will be based on the above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings:

1. Simon Monk, Programming Arduino Getting Started with Sketches, McGraw Hill
2. Jeremy Blum, Exploring Arduino: Tools and Techniques for Engineering Wizardry, Wiley Publishers
3. Michael Margolis, Arduino Cookbook: Recipes to Begin, Expand, and Enhance Your Projects, Oreilly Media
4. Muhammad Mazidi, The 8051 Microcontroller and Embedded Systems using Assembly and C, Pearson Edu.

L = Lecture, T = Tutorial, P = Practical, C = Credit