

Course Catalog Description:

Introduction to Arduino and its development environment. Electronics and programming fundamentals for Arduino. Interfacing Arduino with electronic devices such as LEDs, motors, and sensors. Analyze and troubleshoot problems in Arduino programs and projects.

Pre-requisites: None

Course Objectives:

1. To explain to the students the principles of Arduino programming and electronics
2. Provide hands-on experience on using the Arduino IDE to control various electronic components such as LEDs and sensors.
3. To help students in developing a basic understanding of Arduino pin layout for connecting different electronic devices.
4. To guide students to use their skills to create their own projects and interact with the physical world in new and innovative ways.

Course Learning Outcomes:

Upon successful completion of this course, the student should be able to:

1. Explain the basics of Arduino programming and electronic devices.
2. Write programs using Arduino IDE to control different electronic devices.
3. Work effectively in a team design, build, and program an Arduino-based project.
4. Analyze and troubleshoot problems in their Arduino programs and projects.

Required Materials:

- Course material will be provided on blackboard in the form of Manual and Lecture Slides.
- Lectures / Labs for the course will be conducted face to face on campus. For backup, Blackboard Collaborate Ultra or MS Teams will be used.
- Arduino IDE must be installed in the LAB and in students' personal devices for practice

Assessment Plan

No.	Assessment Task	Weekly Due	Assessment Score
1	Attendance	Weekly	5%
2	Classwork / Participation	Weekly	35%
3	Project Report	08	60%

Teaching Plan/Course Outline:

Week	Lab Topic
1	Introduction to Arduino and its development environment • Overview of Arduino and its uses • Digital and Analog inputs • Setting up the Arduino Integrated Development Environment (IDE) • Variables and datatypes • Conditional operators
2	Introduction to Arduino Programming • Using Iterations and functions • Basic structure of an Arduino sketch • Writing and uploading Arduino sketch • Arduino libraries
3	Electronics Fundamentals for Arduino • Resistance and Ohm's Law • Series / Parallel Circuits • Voltage and current divider
4	Electronics Fundamentals for Arduino • LEDs, pushbuttons, sensors, and potentiometer • Using breadboard • Pulse Width Modulation
5	Arduino Projects • Hello World • Blink LED
6	Arduino Projects • Traffic Lights LED Project • Interfacing analog sensors with Arduino
7	Arduino Projects • Light detection with an LDR
8	Arduino Projects • Using PWM to control brightness of LED and speed of motor. • Power issues with arduino pins • Project Submission