Course Syllabi: UTA011 : Engineering Design –III (L : T : P :: 2 : 0 : 4)

1. Course number and name: UTA011 Engineering Design-III

2. Credits and contact hours: 8.0 and 6

3. Text book, title, author, and year

Text Books / Reference Books
- *Michael McRoberts, Beginning Arduino, Technology in action publications.*
- *Alan G. Smith, Introduction to Arduino: a piece of cake, CreateSpace Independent Publishing Platform (2011)*
- *John Boxall, Arduino Workshop - a Hands-On Introduction with 65 Projects, No Starch Press; 1 edition (2013).*

   a. Other supplemental materials
- Nil

4. Specific course information
   a. Brief description of the content of the course (catalog description)

Arduino Microcontroller: Features of Ardunio Microcontroller, Architecture of Arduino, Different boards of Arduino, Arduino Interfacing and Applications, Anatomy of an Interactive Device like Sensors and Actuators, a to D converters and their comparison, Blinking an LED, LCD Display, Driving a DC and stepper motor, Temperature sensors, Serial Communications, Sending Debug Information from Arduino to Your Computer, Sending Formatted Text and Numeric Data from Arduino, Receiving Serial Data in Arduino, Sending Multiple Text Fields from Arduino in a Single Message, Receiving Multiple Text Fields in a Single Message in Arduino. Light controlling with PWM.

Introduction to ARM processor: Features of ARM processor, ARM Architecture, Instruction set, ARM Programming

Programming of Arduino: The Code designing step by step. Taking a Variety of Actions Based on a Single Variable, Comparing Character and Numeric Values, Comparing Strings, Performing Logical Comparisons, Performing Bitwise Operations, Combining Operations and Assignment, Using Embedded techniques to program Arduino microcontroller, Understanding the libraries of Arduino programming language and applying for circuit design

Laboratory work: Introduction to Arduino board. Programming examples of Arduino board. Interfacing of LED, seven segment display, ADC and DAC with Arduino board. Introduction to ARM processor kit.

Projects: Arduino and ARM based projects to be allocated by concerned faculty.

5. Specific goals for the course
After the completion of the course, the students will be able to:
- Understand of features of Arduino board.
- Analyze of internal Architecture of Arduino board.
- Apply Arduino board programming concepts.
- Design and implement Buggy project based on different goals and challenges defined.

6. Brief list of topics to be covered
- ARM Processor

- Arduino Microcontroller
- Programming of Arduino