EMBEDDED PROCESSORS
(ELECTIVE- II)

Course Code: 13CS2113   **L P C**
                                                4 0 3

Pre requisites: Computer Organisation and Architecture

Course Educational Objectives:
Explicitly state the objectives of the course in line with the NBA manual/ABET outcome based education principles.

- Graduates will be familiar with modern engineering software tools and hardware equipment to analyze Computer Science and engineering problems
- Graduates will develop innovative thinking capabilities to foster research in Embedded System areas of related to Computer Science and engineering
- Graduates will demonstrate the ability to design a Embedded system that meets desired specifications within the realistic constraints.

Course Outcomes:
Upon completion of the course, students should possess the following skills:

- Be able to design the hardware and software required to implement an embedded processing system.
- Be able to take a problem statement and implement a solution using a combination of hardware and software while using a microprocessor/microcontroller.
- Be able to use the standard ports and interface devices on a typical microcontroller.
- Be able to write simple assembly language programs which utilize microcontroller.
- Be able to understand the general process of embedded system development

UNIT-I

Introduction to Classic 8051 family Architecture. Address and data bus with multiplexed I/O pins. Registers Examples with arithmetic and Boolean instruction set. Applications using Timers Counters and I/O programming for external logic sensing and control. Interrupts and its programming. This is an example of Van Neumann Architecture.

UNIT-II

Introduction to the advanced Harvard architecture for faster instructions. Introduction to PIC family Architecture and instruction set. Introduction to the shorter RISC instruction set and its usage with example programs. Interrupts using change of state on ports and its use in all application programming.

PERIPHERAL SYSTEMS IN PIC 16F877A PROCESSOR.

(a) Digital Input and Output Programming,
(b) Timers and Counters
 (c) Capture Control and PWM
(d) Analog to Digital Converters and their Programming
(e) Simple data acquisition systems and programming.

UNIT-III

Introduction to Atmega processor with a large register set.   Atmega architecture exposes Accumulator free programming, with advanced addressing modes and faster Cache memory controlled I/O . Programming using the popular using the popular Atmega 8535 processor and instruction set. The versatile peripherals and their applications in 8535. Interrupts and Its Programming Logical sequence of steps to design a program to suit an objective. Examples in Robotics, Motor control, Display control will be exposed.

UNIT-IV

Peripheral systems in Atmega 8535
    (a) Digital Input and Output Programming
    (b) Timers and Counters wave form generation.
    (c) Capture Control and PWM
    (d) Analog to Digital Converters and their Programming
    (e) Simple data acquisition programming.

UNIT-V
Serial Communication busses
      (a) USART, with addressable feature
      (b) SPI bus
      (c) 12c two wire bus
      (d) Introduction to USB bus

Text Books :

1. Bendapudy Kanta Rao: Embedded Systems, Prentice Hall India, 1st Edition, 2011.

2. Milan Verle: **PIC** microcontrollers,MikroElektronika, 1st Edition,2008.

3. Muhammad Ali Mazidi,Sarmad Naimi,Sepehar Naimi:The AVR Microcontroller and Embedded systems using assembly & C, 1st Edition, Prentice Hall, Pearson education, 2009.

References :

1. Ali Mazidi Mohammed Gillispie, Mazide Janice: The 8051Microcontroller and Embedded Systems using assembly & C, 2nd Edition, Pearson Education, 2009.

2. Timothy D.Green: Embedded Systems Programming with the PIC16F877, 2nd Edition,2008.

3. Kenneth J Ayala : The 8051 Micro Controller, 3rd Edition, Thomson Publishers, 2009.