

EMBEDDED SYSTEMS-1 LAB

(Common to CSE & IT)

Course Code :13CT1120

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Course Educational Objectives:

To explore the different embedded processors and its programming that are adopted in different real time systems.

- ❖ It exposes students to the field of Embedded Systems and gives them a chance to hear and read about embedded system topics, and then put those concepts to work by developing and debugging embedded system hardware and firmware.
- ❖ To exposure Integrated development for the different embedded processors.
- ❖ To use these programs, students are encouraged to suggest new scope for applications.

Course Outcomes:

At the end of the course the student will be able to

- ❖ Understand the different IDE tools for different embedded processors
- ❖ Write programs in assembly language for real time problems
- ❖ Design the application by interfacing System Peripherals

LIST OF PROGRAMS:

1. ELEMENTARY OPERATIONS:

- i. Multi precision Addition, Subtraction, and Multiplication.
- ii. Handling Fractional numbers
- iii. BCD-Binary Conversion examples
- iv. ASCII to BCD conversion
- v. Binary to ASCII conversion

2. INPUT OUTPUT CONTROL PROGRAMMING.

ith direction control. Individual pin control, and drive capability. Using the I/O the following programs are practiced.

- i. Controlling the external logical switching, for DC motors, Steppers
- ii. Clock generation and timing using Timers ad Counters
- iii. Pulse width modulation s for DAC application.
- iv. Capture control of external events

3. ANALOG TO DIGITAL CONVERTERS:

Usage of multiplexed channels for in fast data acquisition and storage. Learn about acquisition speed, and waveform storage by sampling. interrupt driven data acquisition.

4. PROGRAMMING USING BUILT IN TIMERS:

- i. As Event Timers
- ii. As fast Counters
- iii. Frequency Generation
- iv. Simple programs to generate FSK

5. CAPTURE CONTROL AND ITS APPLICATION EXAMPLES:

- i. Measurement of pulse width using I/O
- ii. Measurement of Duty cycle, power factor etc
- iii. Measurement of velocity and acceleration.
- iv. Sensing touch.

6. SERIAL COMMUNICATION METHODS:

- i. USART and its programming
- ii. SPI bus and its programming

7. WAVE FORM GENERATION USING PWM METHODS:

- i. Generation of Sine wave
- ii. Generation of FSK

REFERENCES:

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.

