

7. List of Topics: 412 CPE – Embedded System Programming

List of Topics for Theory:

- **Introduction to Embedded System Programming:** Embedded System Programming Overview, Design Constraints in Embedded System Programming, Examples of Embedded Systems
- **Embedded Programming Specifics:** Variable types and constants, operators, flow control, functions, bit manipulations, design metrics
- **Embedded Programming Languages:** Overview and Comparison of Languages used to develop Embedded Systems – Low-level Languages (Assembly), High-level languages (C, C++, Embedded C, Ada), and Visual Programming Paradigms (MATLAB, LabVIEW)
- **ARM Programming Model:** Processor and Memory Organization, Instruction Level parallelism, ARM programming model, Instruction Set, Thumb Programming Model, Flow of control, Applications,
- **Networked/Distributed Embedded Systems:** Bus protocols, I2C, SPI Bus, CAN, LIN, Internet Enabled Systems
- **Development – Tools, Debugging and Optimization:** Host and Target machines, Linkers/Locators for Embedded Software, Getting Embedded Software into the Target System, Testing on the Host Machine, Code Optimization
- **Case Studies**

List of Topics for Laboratory:

- Introduction to the Development Board Components (Atmel 89C52)
- Relay Interfacing using 8051 microcontroller
- Switch ,buzzer and LED module Interfacing using 8051
- 4x4 Keypad interfacing using 8051
- 7-Segment display interfacing using 8051
- Controlling the speed and direction of a DC motor using 8051
- Interfacing RTC clock module using 8051
- ADC and DAC interfacing using 8051
- Interfacing LEDs to ARM 7 controller
- Interfacing 16x2 LCD display module using ARM7
- Stepper motor interfacing using ARM7