**Microcontroller and Embedded Systems**

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At the end of this course, students will be able to:

1. Define embedded systems and explain their importance in various applications.
2. Classify embedded systems based on their design and functionality.
3. Describe the architecture of embedded systems, including processors, memories, and I/O interfaces.
4. Identify the key skills required for designing embedded systems.
5. Discuss the role of buses and linking interfaces in embedded systems, with a focus on GPIB (IEEE 488) Link.
6. Explain the process of embedding software into a system and the use of Real Time Operating Systems (RTOS) in embedded systems.
7. Analyze the concept of System on Chip (SOC) and its implementation in VLSI circuits.
8. Identify exemplary applications of embedded systems in various industries.
9. Evaluate recent trends in embedded systems and their implications on technology advancements.
10. Differentiate between CISC, RISC, ARM, and DSP cores in microcontrollers.
11. Compare and contrast microprocessors, microcontrollers, and embedded processors.
12. Survey different types of microcontrollers (four-bit, eight-bit, sixteen-bit, thirty-two-bit) and their applications.
13. Examine the architecture of the 8051 microcontroller, including its hardware components and memory organization.
14. Demonstrate proficiency in 8051 Assembly Language Programming, including addressing modes and instruction set.
15. Develop programs for arithmetic, logical operations, jump/call instructions, I/O port operations, timers/counters, and interrupts on the 8051 microcontroller.
16. Implement serial communication and interrupts programming on the 8051 microcontroller.
17. Interface external peripherals such as keyboards and displays with microcontrollers.
18. Introduce the basic concepts of PIC microcontrollers, especially the PIC16F family.