| Course code | **Course Title** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| **1151BM109** | **Microprocessors and Microcontrollers** | **2** | **2** | **0** | **3** |

**Preamble**
Microcontrollers are the heart of all embedded system applications. Embedded system application ranges from Car appliances to Robotics. To transform the theory into some fruitful application microcontrollers are needed. This course gives the knowledge required for embedded engineers both in terms of coding and architecture

**Prerequisite**
Digital Electronics

**Related Courses**
Digital Signal Processing

**Course Outcomes**

| S.No | Course outcome | Skill Level (Blooms'sTaxonomy) |
|---|---|---|
| CO1 | Write simple ALP for solving mathematical functions using 8086 and 8085 processor | K3 |
| CO2 | Design and write ALP for Interfacing various peripheral devices with 8086 microprocessor | K3 |
| CO3 | Compare the architecture of 8051 with 8086 microprocessor | K2 |
| CO4 | Write 8051 ALP coding for implementing mathematical functions and functions various peripheral devices | K3 |
| CO5 | Explain how Arduino is used in medical applications | K2 |

**COURSE CONTENT**

**UNIT-I 8085 and 8086 Microprocessor** **12**
Introduction to 8085 Architecture, Addressing Modes, Instruction Formats, and Instruction Set. Introduction to 8086 Architecture, Features, Signals, I/O & Memory Interfacing, Addressing Modes, Instruction Formats, Instruction Set, Assembler Directives, Interrupts, Minimum Mode & Maximum Mode Operation, Assembly Language Programming

**UNIT-II Peripheral Devices and Interfacing** **12**
Parallel Peripheral Interface (8255), A/D & D/A Interface, Timer / Counter (8253), Keyboard and Display Controller (8279), USART (8251), Interrupt Controller (8259), DMA Controller (8237).
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**UNIT-III 8051 Architecture** **12**
Hardware features, Architecture, Internal RAM structure, Special Function Registers, Memory Organization, I/O Ports and Circuits, Timers, Interrupts, Serial Communication, Interfacing of External Memory, Interfacing LCD & Keyboard, Real Time Clock

**UNIT-IV 8051 Programming** **12**

Addressing Modes, Instruction Set, Assembly Language Programming and C Programming, Timer Counter Programming, Serial Communication Programming, Interrupt Programming

**UNIT-V Microcontroller Applications** **12**

**Arduino based** Heart rate monitor, Pulse rate monitor, oxymeter, EEG monitor, Breathe analyzer

**TOTAL : 60 periods**

## TEXT BOOKS


1. Proakis, J. G. and Manolakis, D. G "Digital Signal Processing Principles, Ramesh S Gaonkar, Microprocessor Architecture, Programming and application with 8085, 6th Edition, Penram International Publishing
2. A.K Ray & K.M. Burchandi, Advanced Microprocessor and peripherals Architectures, Programming and interfacing ", second edition, Tata McGraw-Hill
3. Muhammad Ali Mazidi, Janice GillispieMazidi and Rolin D McKinlay, The 8051 microcontroller and embedded systems using assembly and C, second edition Pearson education Asia.


## REFERENCE BOOKS


1. Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, third Edition, Penram International Publishers


**Web Resources**

http://duino4projects.com/projects/medical-health-based-projects/