MICROPROCESSORS AND CONTROLLERS
(Core Subject)

Course Code:	10B11CI401	Semester:	4th Semester, B. Tech (CSE) 5th Semester, B. Tech (ECE)
Credits:	4	Contact Hours:	L-3, T-1, P-0

Course Objectives

The objectives are:

1. To study the Standard Intel Architectures.
2. To gain proficiency in Assembler language.
3. To gain experience in programming peripheral and I/O devices.
4. To acquire the background for understanding next-generation CPUs.
5. To learn concepts associated with interfacing a microprocessor to memory and to I/O devices.
6. To learn how to control components of a microprocessor based system though the use of interrupts.
7. To learn about Embedded Systems and micro controller architecture, I/O interfacing and programming.

Course Outcomes

After studying this course the students would gain enough knowledge on:

1. The Standard Architecture of Intel Microprocessors
2. Instruction set of Intel 80x86 processors and proficiency in assembly language programming
3. Concepts associated with interfacing a microprocessor to memory and to I/O devices and to learn the programming of peripheral I/O devices
4. Control components of a microprocessor based system though the use of interrupts
5. Background knowledge for understanding next-generation CPUs
6. Embedded system programming through 8051 architecture, I/O interfacing, programing and testing

Course Contents

Unit	Topics	References (chapter number, page no. etc)	Lectures
1	Introduction to Microprocessor. Overview of the Intel Family of the Microprocessors, The 8086 microprocessor architecture	Berry Brey: Chapter 2	4
2	Addressing Modes; Register Addressing; Immediate Addressing; Direct Data Addressing; Register Indirect Addressing; Base-Plus-Index Addressing; Register Relative Addressing; Base Relative-Plus-Index Addressing	Berry Brey: Chapter 3	2

3	8086 Instruction Set: Data movement Instructions, Arithmetic and Logic Instructions, Program control instruction	Berry Brey: Chapters 4,5,6	4
4	Using assembly language with C/C++; Using Assembly Language with C++ for 16-bit DOS Applications, Mixed Assembly and C++ Objects	Berry Brey: Chapter 7	2
5	Programming the 8086 microprocessor; Modular Programming, Using the Keyboard and Video Display, Disk Files	Berry Brey: Chapter 8	2
6	8086 Hardware specifications; Pin-Outs and the Pin Functions, Clock Generator (8284A), Bus Buffering and Latching, The 8288 Bus Controller	Berry Brey: Chapter 9	4
7	8086 Memory Interface; Memory Devices, Address Decoding, Memory Interface, Dynamic RAM	Berry Brey: Chapter 10	4
8	Basic I/O Interface; I/O Port Address Decoding, Programmable Peripheral Interface (8255), Programmable Interval Timer (8254), Programmable Communications Interface (16550), ADC(ADC804) and DAC (DAC830)	Berry Brey: Chapter 11	5
9	Interrupts; 8259A Interrupt controller	Berry Brey: Chapter 12	2
10	Direct memory access and DMA-controlled I/O; 8237 DMA controller	Berry Brey: Chapter 13	2
11	The arithmetic coprocessor; MMX, and SIMD technologies, 8087 arithmetic coprocessor	Berry Brey: Chapter 14	2
12	Bus interface; ISA Bus, PCI Bus, Parallel Printer Interface, Serial COM Ports, Universal Serial Bus (USB), Accelerated Graphics Port (AGP)	Berry Brey: Chapter 15	2
13	Intel Pentium and Core2 Processors	Berry Brey: Chapter 18	4
14	Embedded Systems and 8051 Architecture, Hardware specifications, Memory System, I/O interfacing, Programming	Kenneth Ayala: Chapters 3,5,6,7,8	5
	Total Number of Lectures		44

Evaluation Scheme

1. Test 1: 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. Internal Assessment : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance

Text Books

1. Berry B.Brey, "The Intel Microprocessors : Architecture, Programming, and Interfacing," Eighth Edition, Prentice Hall, 2009

2. Kenneth Ayala, "The 8051 microcontroller," Third Edition, Thomson, 2005

Reference Books

1. Douglas V Hall, "Microprocessors & Interfacing, Programming & Hardware," Second Edition, Tata McGraw Hill

2. Yu-Cheng Liu,Glenn A. Gibson , "The 8086/8088 Family Architecture, Programming & design", Second Edition, PHI.

3. Kenneth Ayala "The 8086 microprocessor programming and Interfacing the PC," Cengage Learning

4. Tom Shanley, "Protected Mode Software Architecture," Addison-Wesley, 1996