

MICROPROCESSORS AND MICROCONTROLLERS [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2017 -2018) SEMESTER – IV			
Subject Code	17CS44	IA Marks	40
Number of Lecture Hours/Week	04	Exam Marks	60
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Module 1			Teaching Hours
The x86 microprocessor: Brief history of the x86 family, Inside the 8088/86, Introduction to assembly programming, Introduction to Program Segments, The Stack, Flag register, x86 Addressing Modes. Assembly language programming: Directives & a Sample Program, Assemble, Link & Run a program, More Sample programs, Control Transfer Instructions, Data Types and Data Definition, Full Segment Definition, Flowcharts and Pseudo code. Text book 1: Ch 1: 1.1 to 1.7, Ch 2: 2.1 to 2.7			10 Hours
Module 2			
x86: Instructions sets description, Arithmetic and logic instructions and programs: Unsigned Addition and Subtraction, Unsigned Multiplication and Division, Logic Instructions, BCD and ASCII conversion, Rotate Instructions. INT 21H and INT 10H Programming : Bios INT 10H Programming , DOS Interrupt 21H. 8088/86 Interrupts, x86 PC and Interrupt Assignment. Text book 1: Ch 3: 3.1 to 3.5, Ch 4: 4.1 , 4.2 Chapter 14: 14.1 and 14.2			10 Hours
Module 3			
Signed Numbers and Strings: Signed number Arithmetic Operations, String operations. Memory and Memory interfacing: Memory address decoding, data integrity in RAM and ROM, 16-bit memory interfacing. 8255 I/O programming: I/O addresses MAP of x86 PC's, programming and interfacing the 8255. Text book 1: Ch 6: 6.1, 6.2. Ch 10: 10.2, 10.4, 10.5. Ch 11: 11.1 to 11.4			10 Hours
Module 4			
Microprocessors versus Microcontrollers, ARM Embedded Systems : The RISC design philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, ARM Processor Fundamentals : Registers , Current Program Status Register , Pipeline, Exceptions, Interrupts, and the Vector Table , Core Extensions Text book 2:Ch 1:1.1 to 1.4, Ch 2:2.1 to 2.5			10 Hours
Module 5			
Introduction to the ARM Instruction Set : Data Processing Instructions , Branch Instructions, Software Interrupt Instructions, Program Status Register Instructions, Coprocessor Instructions, Loading Constants, Simple programming exercises. Text book 2: Ch 3:3.1 to 3.6 (Excluding 3.5.2)			10 Hours
Course Outcomes: After studying this course, students will be able to			
<ul style="list-style-type: none"> Differentiate between microprocessors and microcontrollers Develop assembly language code to solve problems Explain interfacing of various devices to x86 family and ARM processor Demonstrate interrupt routines for interfacing devices 			
Question paper pattern:			

The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Danny Causey, The x86 PC Assembly Language Design and Interfacing, 5th Edition, Pearson, 2013.
2. **ARM system developers guide**, Andrew N Sloss, Dominic Symes and Chris Wright, Elsevier, Morgan Kaufman publishers, 2008.

Reference Books:

1. Douglas V. Hall: Microprocessors and Interfacing, Revised 2nd Edition, TMH, 2006.
2. K. Udaya Kumar & B.S. Umashankar : Advanced Microprocessors & IBM-PC Assembly Language Programming, TMH 2003.
3. Ayala : The 8086 Microprocessor: programming and interfacing - 1st edition, Cengage Learning
4. The Definitive Guide to the ARM Cortex-M3, by Joseph Yiu, 2nd Edition , Newnes, 2009
5. The Insider's Guide to the ARM7 based microcontrollers, Hitex Ltd., 1st edition, 2005
6. ARM System-on-Chip Architecture, Steve Furber, Second Edition, Pearson, 2015
7. Architecture, Programming and Interfacing of Low power Processors- ARM7, Cortex-M and MSP430, Lyla B Das Cengage Learning, 1st Edition