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: M**emory 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	
• 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

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