Subject Name : Advanced Processors

Subject Code : CE-502

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
04	00	02	06	05	03	70	30	20	30	150

Learning Objectives:

The course will teach students the following skills:

- To learn microprocessor programming and architectures of advance processors.
- To learn the architectural features of the 80286/386/486 processors.
- To learn about the protected mode software model of the 80386 including segmentation, protection, paging and multitasking.
- The technical overview of the Pentium family, Core 2 Duo and overview of the RISC features with Sun SPARC overview.

Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	Introduction	12
2	Programming	14
3	Interrupt	10
4	Memories	6
5	Intel microprocessors	12
6	ARM Processor	6

Total hours (Theory): 60

Total hours (Lab): 30

Total hours: 90

Detailed Syllabus

Sr. No	Topic	Lecture Hours	Weight age(%)
1	**Introduction** Introduction to microprocessors and microcontrollers, system bus organization, 8085 architecture	6	10
2	**Assembly Language Programming** Introduction to 8085 instructions, addressing modes, stacks and subroutines. Introduction to 16-bit and 32-bit microprocessors – 80x86 family. Assembly language programming for 8086/8088.	12	30
3	**Interrupts and interrupt processing** Hardware and software Interrupts in 8085, 8086/8088.	10	10
4	**Interfacing memory** DMA, SRAM/DRAM, cache memory Memory layout for 8086/8088. Virtual mode operation.	10	10
5	**Interfacing peripherals and applications** 8254 software programmable timer/counter, 8259A priority interrupt controller Digital interfacing – keyboards, displays Analog interfacing – sensors, transducers	6	10
6	**32-bit Intel microprocessors:** The Intel 80286, 80386, 80486, Pentium and RISC based intel MMX architecture. Real mode of 80386, Protected mode of 80386, Virtual 8086 mode.	10	20
7	**ARM family of processors** Overview of ARM architecture, Android-ARM hardware-software interface	6	10
	Total	**60**	**100**

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.

- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Learning Outcome:

After completion of the course students are expected to be able to:
- Explain the hardware architecture of 8088/86 microprocessors and treat these Microprocessors as a component for an electronic system rather than as the basis of a personal computer.
- Explain how each assembly language instruction functions with the Intel family of microprocessors.
- Develop software using 16/32 bit assembly language to program a microprocessor.
- Identify and analyze basic hardware differences, and compare and contrast instructions, for the 80286, 80386, 80486, Pentium, and Pentium Pro and Core 2 processors with the 8086/8088 microprocessors.

Reference Books:

1. Microprocessor & Interfacing – Dauglas Hall, THM
2. Microprocessor Architecture, Programming, and Applications With the 8085, Ramesh Gaonkar, Prentice Hall
3. Advanced 80386 Programming Techniques: James Turley
4. Advance Microprocessor - Deniel Tabak
5. The Intel Microprocessors (Eight Editions): Barry B. Brey
6. The 8086 Microprocessor, Kenneth Ayala, Cengage Learning.
7. The 8088 and 8086 Microprocessors, Triebel & Singh, Pearson Education.
8. Computer Architecture & Organization, Subrata Ghoshal, Pearson Publication
9. ARM System Developer's Guide: Designing and Optimizing System Software Morgan Kauffman Publisher
10. IBM PC Assembly Language & Programming, Peter Abel, PHI.

List of experiments:

Sr. No	Name of Experiment
1	Architecture of 8086 Microprocessor
2	Addressing modes of 8086 Microprocessor
3	Data Transfer operations
4	Arithmetic operations
5	Logical operations
6	Bit Manipulation operations
7	String Manipulation operations
8	Iteration Control operations
9	Conditional Branch operations
10	Unconditional Branch operations
11	Extra Programs-1
12	Extra Programs-2
13	8086 microprocessor based design project.