Course code	Course Name	L-T-P - Credits	Year of Introduction
EE309	**Microprocessor and Embedded Systems**	**3-0-0-3**	**2016**

Prerequisite: Nil

Course Objectives

- To provide a strong foundation about the principles, programming and various applications of different microprocessors and microcontrollers

Syllabus:

Internal architecture, instruction set, assembly language programming, Sample programs in assembly language of 8085 and 8086; 8051 microcontroller- internal architecture, addressing modes, instruction types, Introduction to 8051 C programming.

Expected Outcome:

After the completion of the course the students will be able to:

i. Apply the fundamentals of assembly level programming of 8085 and 8086 microprocessors.
ii. Work with standard microprocessor real time interfaces
iii. Develop skill for writing C programs for 8051 microcontroller
iv. Design microprocessors/microcontrollers-based systems.

Text books:

1. Douglas V. Hall, Microprocessors and Interfacing, Tata McGraw Hill, Education, New Delhi, Third Edition.
2. Mathur A., Introduction to Microprocessors, Tata McGraw Hill, New Delhi, 1992.
3. Mohamed Ali Mazidi,Janice Gillispie Mazidi," The 8051 microcontroller and embedded systems using Assembly and C", 2/e, Pearson education /PHI
4. Rafiquzzaman, Microprocessor Theory and Application, PHI Learning, First Edition.
5. Ramesh Gaonkar, Microprocessor, Architecture, Programming and Applications, Penram International Publishing; Sixth edition, 2014.
6. Ray Ajoy and Burchandi, Advanced Microprocessor & Peripherals, Tata McGraw Hill, Education, New Delhi, Second Edition.
7. Scott MacKenzie, Raphael C W Phan, " The 8051 Microcontroller", Fourth Edition, Pearson education

Course Plan			
Module	**Contents**	**Hours**	**Sem. Exam Marks**
I	Internal architecture of 8085 microprocessor –Instruction set - Addressing modes – Classification of instructions. Assembly language programming –standard programs in assembly language – code conversion, sorting – binary and BCD arithmetic.	7	15%
II	Stack and Subroutines – CALL and RETURN instructions – Delay subroutines. Timing and control – Machine cycles, instruction cycle and T states – fetch and execute cycles – Timing diagram for instructions.	7	15%

FIRST INTERNAL EXAMINATION			
III	IO and memory interfacing – Address decoding– interrupt structure of 8085. I/O ports- Programmable peripheral interface PPI 8255 - Modes of operation. Interfacing of LEDs, ADC and DAC with 8085	7	15%
IV	Internal Architecture of 8086 – Segment Registers - Instruction Pointer – Flag Register – Index Registers - Stack Pointer Register. Segmentation and Pipe lining, Minimum and maximum modes of operation of 8086. Addressing modes	7	15%
SECOND INTERNAL EXAMINATION			
V	Assembler and assembler directives –Instruction set of 8086, Assembly language programming, Simple programs- Addition of 8 bit binary and decimal numbers, Subtraction of 2 decimal numbers, Addition and subtraction of two 16 bit numbers, Multiplication and division of 8 bit numbers, Sorting of a series of 8 bit numbers, Code conversion-BCD to Binary, Binary to BCD.	7	20%
VI	Intel 8051 Microcontroller, Internal Architecture - I/O port structure, memory organisation, general purpose RAM, Bit addressable RAM, register banks, special function registers; Instruction set summary-addressing modes, instruction types, Introduction to 8051 C programming-pulse wave generation, buzzer interface.	7	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100   Exam Duration: 3Hourrs.

Part A: 8 compulsory questions.

One question from each module of Module I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.