Course No.	Course Name	L-T-P -Credits	Year of Introduction
EE 309	**Microprocessor and Embedded Systems**	**3-0-0-3**	**2015**

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 8051 microcontroller- internal architecture, addressing modes, instruction types, Introduction to 8051 programming.

Expected Outcome:

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

   i.   Apply the fundamentals of assembly level programming of 8085 microprocessor and 8051 microcontroller
  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. Ramesh Gaonkar, Microprocessor, Architecture, Programming and Applications, Penram International Publishing; Sixth edition, 2014.
2. Mathur A., Introduction to Microprocessors, Tata McGraw Hill, New Delhi, 1992.
3. Douglas V. Hall, Microprocessors and Interfacing, Tata McGraw Hill, Education, New Delhi, Third Edition.
4. Rafiquzzaman, Microprocessor Theory and Application, PHI Learning, First Edition. 7. Ray Ajoy and Burchandi, Advanced Microprocessor & Peripherals, Tata McGraw Hill, Education, New Delhi, Second Edition.
5. Mohamed Ali Mazidi,Janice Gillispie Mazidi," The 8051 microcontroller and embedded systems using Assembly and C",second edition, Pearson education /Prentice hall of India
6. 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	Introduction to Embedded Systems-Application domain of embedded systems, features and characteristics, System model, Microprocessor Vs Microcontroller, current trends and challenges, hard and soft real time systems, Embedded product development, Life Cycle Management (water fall model), Tool Chain System, Assemblers, Compilers, linkers, Loaders, Debuggers Profilers & Test Coverage Tools	7	15%	
SECOND INTERNAL EXAMINATION				
V	8051- Microcontrollers Hardware: Microcontroller Architecture: IO Port structure, Register organization, general purpose RAM, Bit Addressable RAM, Special Function Registers (SFRs). Instruction Set, addressing modes Instruction Types.	7	20%	
VI	8051- assembly language programming, data types and directives, Time delay and I/O port programming, Embedded Programming in C, data type and time delay in C, I/O port programming, Timer / counter programming, serial port programming, Interfacing – LCD, ADC, Stepper motor, and DAC.	7	20%	
END SEMESTER EXAM				

QUESTION PAPER PATTERN:

Maximum Marks : 100   **Time: 3 hours**

Part A: 8 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.