

Course code	Course Name	L-T-P-Credits	Year of Introduction
EE 309	Microprocessor and Embedded Systems	3-0-0-3	2016
<b>Course Objectives</b> To provide a strong foundation about the principles, programming and various applications of different microprocessors and microcontrollers			
<b>Syllabus:</b> Internal architecture, instruction set, assembly language programming, Sample Programs in assembly language of 8085 and 8051 microcontroller-internal architecture,			
<b>Expected Outcome:</b> The students will be able to: <ol style="list-style-type: none"> <li>1. Apply the fundamentals of assembly level programming of 8085 microprocessor and 8051 microcontroller</li> <li>2. Work with standard microprocessor real time interfaces</li> <li>3. Develop skill for writing C programs for 8051 microcontroller</li> <li>4. Design microprocessors/microcontrollers-based systems.</li> </ol>			
<b>Text books:</b> <ol style="list-style-type: none"> <li>1. Douglas V. Hall, Microprocessors and Interfacing, Tata McGraw Hill, Education, New</li> <li>2. Mathur A., Introduction to Microprocessors, Tata McGraw Hill, New Delhi, 1992.</li> <li>3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems using Assembly and C", second edition, Pearson</li> <li>4. Rafiquzzaman, Microprocessor Theory and Application, PHI Learning, First Edition.</li> <li>5. Ramesh Gaonkar, Microprocessor, Architecture, Programming and Applications, Penram</li> <li>6. Ray A joy and Burchandi, Advanced Microprocessor &amp; Peripherals, Tata McGraw Hill, Education, New Delhi, Second Edition.</li> <li>7. Scott MacKenzie, Raphael C W Phan, "The 8051 Microcontroller", Fourth Edition, Pearson education Delhi, Third Edition. / Prentice hall of India International Publishing; Sixth edition, 2014.</li> </ol>			
<b>Course Plan</b>			
Module	Contents	Hours	End 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%
<b>FIRST INTERNAL EXAMINATION</b>			

<b>III</b>	IO and memory interfacing –Address decoding–interrupt Structure of 8085.I/O ports – Programmable peripheral interface PPI8255 -Modes of operation. Interfacing of LEDs, ADC and DAC with 8085	7	15%
<b>IV</b>	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%
<b>SECONDINTERNAL EXAMINATION</b>			
<b>V</b>	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%
<b>VI</b>	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%
<b>ENDSEMESTER EXAM</b>			

### QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

**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 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 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 questions:

(2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.