**20EC3101-MICROPROCESSORS AND MICROCONTROLLERS**

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|  **Course Category:** | Program core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 2 - 2 – 0 |
| **Prerequisite:** | Computer architecture and Basic programming. | **Sessional Evaluation:****External Evaluation:****Total Marks:** | 4060100 |

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| **Course****Objectives** | Students undergoing this course are expected to understand: |
| 1. The history and need of different types of microprocessors and learn the internal architecture details, pin configuration and their timing diagrams of 8085µp.
2. To develop various projects, by learning programming and interfacing details of 8085 microprocessor.
3. The internal architecture details, pin configuration, Interrupts and their timing diagrams of 8086µp and development of Assembly Language Programs.
4. The internal architecture details of 8259,8257 & 8253 and their interfacing with 8086 µp.
5. The programming and interfacing details of ADC, DAC, Stepper motor etc. and memory interfacing too.
6. The internal architecture details, pipelining, addressing modes, C.P.U. Registers of 8051 µc including simple programs.
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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: |
| CO1 | Understand the evaluation of different types of microprocessors and features of 8085 µp along with memory interfacing. |
| CO2 | Assess and solve basic binary math operations using the microprocessor and explain the microprocessor 8085 internal architecture and its operation within the area of manufacturing and performance. |
| CO3 | Gain the knowledge on internal architecture of 8086µp and its modes of operations along with timing diagrams. |
| CO4 | Design electrical circuitry in order to interface the processor to external devices 8259,8257 & 8253. |
| CO5 | Illustrate how the different peripherals are interfaced with 8086 µc and develop hardware projects using DAC, ADC & 7-Segment Display.  |
| CO6 | Gain the knowledge on internal architecture of 8051µp and its modes of operations along with timing diagrams by which improving programming skills on microcontroller. |
| **Course****Content****Course****Content** |  **UNIT-I****INTRODUCTION TO MICROPROCESSORS:** Evolution of Microprocessors, Types of microprocessors, Features of 8085 microprocessor, Architecture of 8085 microprocessor, pin configuration, Register set, Instruction Cycle, Timing Diagrams, Stack and Subroutines **UNIT-IIINSTRUCTION SET OF 8085 MICROPROCESSOR:** Addressing modes, Assembly Language Programs (8085) for addition, subtraction, multiplication, division etc., Interrupts of 8085, Memory interfacing of 8085 microprocessor. **UNIT-III****ARCHITECTURE OF 8086 MICROPROCESSOR:** Architecture, pin description, Instruction set, Addressing modes, Interrupt system, Minimum mode and Maximum mode operations of 8086 and its timing diagrams, Assembler directives, Assembly language programs (8086).**UNIT- IV****DATA TRANSFER SCHEMES:** Programmable interrupt controller (8259) and its interfacing, Programmable DMA controller (8257) and its interfacing, Programmable Interval Timer (8253) and its interfacing.**UNIT-V****MEMORY INTERFACING TO 8086:** Interfacing various types of RAM and ROM chips, PPI (8255) and its interfacing, ADC and DAC Interfacing, Waveform generation, Stepper motor control, temperature measurement and control.**UNIT-VI****8051 MICROCONTROLLER:** Architecture, pin description, Register set, Instruction set, Interrupt structure, timer & serial port operations, Simple Assembly Language Programs on general arithmetic and logical operations. |
| **Text Books and Reference Books** | **TEXT BOOKS:**1. “Fundamentals of Microprocessors and Microcontrollers”, by Ram. B, Dhanpat Rai publications Pvt. Ltd, 2012.
2. “Microprocessors and interfacing”, by Douglas V. Hall,[Tata McGraw Hill Education](https://www.google.co.in/search?hl=en&q=inpublisher:%22Tata+McGraw+Hill+Education+Private+Limited%22&tbm=bks&sa=X&ved=2ahUKEwi4ivX6gZT6AhWZRmwGHd2TD2gQmxMoAHoECBMQAg) **,** 3rd edition, 2017.
3. “The 8051 Microcontrollers”, by Kenneth J. Ayala, 3rd Edition, Thomson Publications, 2015.
4. “Design with PIC Microcontrollers” by John B. Peatman, Pearson Educations, 1st edition 2002.

**REFERENCES BOOKS:**1. “Advanced Microprocessors and Peripherals”, by A.K. Ray and K.M. Bhurchandi, TMH, 3rd edition, 2017.
2. “Microprocessor Architecture, Programming and Applications with the 8085” by [Ramesh S. Gaonkar](http://www.goodreads.com/author/show/1283958.Ramesh_S_Gaonkar), Prentice Hall of India, 6th edition, 2013.
3. Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Prentium Proprocessor, Pentium II, III, IV by Barry B.Brey,Pearson Education, 2011.
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| **E-Resources** | 1. <http://w3.ualg.pt/~jmcardo/ensino/ihs2004/Benner93.pdf>
2. http://engreric.com/wpcontent/uploads/2014/06/Syllabus\_CECS346\_Fall15.pdf
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| **Contribution of Course Outcomes towards achievement of Program Outcomes** |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 1 | 1 |  - |  - | 1 |  - | 2 |  - |  2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 3 |
| CO6 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 2 | 2 |