MICROPROCESSOR AND MICROCONTROLLER

Course Code: 20EE1113

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Prerequisites: Programming for Problem Solving using C, Digital Electronics

Course Outcomes: At the end of the course, the student will be able to

CO1: Understand the Architecture and programming features of 8085 microprocessor (L2)

CO2: Understand Memory and I/O Interfacing of 8085 microprocessor (L2)

CO3: Explain the Architecture of 8086 microprocessor (L2)

CO4: Understand applications of 8086 microprocessors (L2)

CO5: Understand 8051 microcontroller and its peripheral function (L2)

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UNIT-1: ARCHITECTURE AND PROGRAMMING OF 8085 PROCESSOR 10 Lectures

Architecture of 8085 Microprocessor – Registers, ALU, Bus systems, Timing and control signals, Machine cycles and timing diagrams. Programming of 8085 Instruction formats, Addressing modes, Instruction set, Need for interrupts – Characteristics of Interrupts – Types of Interrupts – Interrupt structure – Simple Programs using Assembly language.

Learning Outcome:

1. Understand the architecture of 8085 processor (L2)
2. Describe addressing modes and Instruction set 8085 processor (L2)
3. Explain interrupt structure of 8085 processor(L2)

UNIT-II: 8086 MICROPROCESSOR 10 Lectures

Register organization of 8086–Architecture–signal description of 8086–physical memory organization–general bus operation– I/O addressing capability–addressing mode of 8086 –instruction set off 8086– assembler directives and operators. Simple Assembly Language Program(ALP)

Learning Outcome:

1. UnderstandArchitecture of 8086 microprocessor (L2)
2. Describe addressing modes and instruction set of 8085 microprocessor (L2)
3. Explain the need for Direct memory access (L3)

UNIT- III: MEMORY AND I/O INTERFACING 10 Lectures

Interface requirements -Memory Organization – Interfacing memory, Memory mapped I/O Scheme – I/O mapped I/O scheme – I/O ports – Interfacing – keyboards and LED displays.

Programmable peripheral interface (8255). Data transfer schemes: Programmable data transfer, DMA data transfer – Synchronous, Asynchronous and interrupt driven data transfer schemes

Learning Outcome:

1. Describe the Interface requirements of 8085 microprocessor(L2)
2. Understand memory mapped I/O schemes of 8085 microprocessor(L2)
3. Understand various data transfer modes of 8085 microprocessor(L2)

UNIT-IV: APPLICATIONS OF 8086 MICROPROCESSORS 10 Lectures

Interfacing of A/D converters (ADC 0800/ADC 0808/ADC 0809)-Measurement of frequency, phase angle and power factor – Interfacing of D/A converters (DAC 0800) – Waveform generators – Interfacing of Multiplexed seven segment LED display –Traffic lights control.

Learning Outcome:

1. Understand various converter applications(L2)
2. Apply microprocessor for waveform generator ,LED display(L2)
3. Describe various measuring and control features using microprocessor(L2)

UNIT-V: 8051 MICROCONTROLLER AND PERIPHERAL FUNCTIONS

10 Lectures

Architecture of 8051 – Memory Organization – Addressing modes – Instruction set – Boolean processing – Simple programmes.8051 interrupt structures – Timers - Serial communications – parallel port features Interfacing of 8051 – Applications – Interfacing - Stepper motor and Servo motor. Salient features of AVR, PIC and System onchip using ARM (Sitara ARM Processor)

Learning Outcome:

1. Understand the Architecture of 8051 microcontroller (L2)
2. Describe instruction sets and addressing modes of 8051 microcontroller (L2)
3. Understand timers and Interrupts of 8051 microcontroller(L2)

TEXT BOOKS:

1. Ramesh S Goankar , "*Microprocessor Architecture Programming and Applications with the 8085*", 6th Edition,, Penram International publications(I) pvt Ltd. 2013.(Unit1,2,3,)

2. A.K.Ray, K.M.Bhurchandi ,"Advanced *Microprocessors and Peripherals*", 3rd Edition ,Tata McGraw Hill Publications, 2017. (Unit 4,5)

REFERENCES:

1. B.Kanta Rao ,"*Embedded Systems*", Prentice Hall of India, 1st edition 2011.
2. N.Sentil Kumar, M. Saravanan, S. Jeevananthan, "*Microprocessors and Microcontrollers"*, Oxford University Press, 2010.
3. Ajay V Deshmukh, "*Microcontrollers*", TATA McGraw Hill publications, 2012
4. Kenneth. J. Ayala. "*The 8051 microcontroller*" , 3rd edition, Cengage learning, 2010(Unit-5)

WEB REFERENCES

https://onlinecourses.nptel.ac.in/noc22_ee12/preview