



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

<b>III Year – II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>
<b>MICROPROCESSOR AND MICROCONTROLLERS</b>					

**UNIT-I**

**Introduction:** Basic Microprocessor architecture, Harvard and Von Neumann architectures with examples, Microprocessor Unit versus Microcontroller Unit, CISC and RISC architectures.

**8086 Architecture:** Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response, 8086 system timing, minimum mode and maximum mode configuration.

**UNIT-II**

**8086 Programming:** Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

**UNIT-III**

**8086 Interfacing:** Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheral interface, Interfacing switches and LEDs, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

**UNIT-IV****Intel 8051 MICROCONTROLLER**

Architecture, Hardware concepts, Input/output ports and circuits, external memory, counters/timers, serial data input/output, interrupts. Assembly language programming: Instructions, addressing modes, simple programs. Interfacing to 8051: A/D and D/A Convertors, Stepper motor interface, keyboard, LCD Interfacing, Traffic light controls.

**UNIT-V**

**ARM Architectures and Processors:** ARM Architecture, ARM Processors Families, ARM Cortex-M Series Family, ARM Cortex-M3 Processor Functional Description, functions and interfaces, Programmers Models, ARM Cortex-M3 programming – Software delay, Programming techniques, Loops, Stack and Stack pointer, subroutines and parameter passing, parallel I/O, Nested Vectored Interrupt Controller – functional description and NVIC programmers' model.

**TEXTBOOKS:**

1. A.K Ray, K.M.Bhurchandhi, "Advanced Microprocessor and Peripherals", Tata McGraw Hill Publications, 2000.
2. The 8051 Microcontrollers and Embedded systems Using Assembly and C, Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; Pearson 2-Edition, 2011.
3. The Definitive Guide to ARM Cortex-M3 and Cortex-M4 Processors by Joseph You.



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**REFERENCE BOOKS:**

1. Embedded Systems Fundamentals with Arm Cortex-M based Microcontrollers: A Practical Approach in English, by Dr. Alexander G. Dean, Published by Arm Education Media, 2017.
2. Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3<sup>rd</sup> Edition, 1994.
3. Cortex -M3 Technical Reference Manual.

**Course Outcomes:**

At the end of this course the student will be able to:

1. Understand the architecture of microprocessor/ microcontroller and their operation.
2. Demonstrate programming skills in assembly language for processors and Controllers.
3. Analyze various interfacing techniques and apply them for the design of processor / Controller based systems.