## 22EE307 MICROPROCESSORS AND MICROCONTROLLERS

L	Т	Ρ	С	
3	0	2	4	

PREREQUISITE KNOWLEDGE: Digital Electronics.

#### COURSE DESCRIPTION AND OBJECTIVES:

This course deals with the basic architecture, assembly language programming, pin definitions, supporting chips and memory interfacing of microprocessors and microcontrollers. The objective of the course is to understand various addressing modes, different peripheral devices and their interfacing with 8086, 8051 and ARM processor.

#### MODULE-1

#### 12L+0T+8P=20 Hours

#### INTRODUCTION TO 8086 MICROPROCESSOR:

Evolution of microprocessors; 8086 microprocessor Architecture, Register model, Memory segmentation, Physical address generation, Addressing modes, Instruction set, Interrupts of 8086. Pin configuration of 8086; 8086 system bus architecture, Physical Memory organization.

#### UNIT-2

UNIT-1

### 12L+0T+8P=20 Hours

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#### **INTRODUCTION TO 8051 MICROCONTROLLER:**

Comparision of Microprocessors and microcontrollers; 8051 Micro controller Architecture; Signal Description of 8051; Memory organization; Addressing modes of 8051; Instruction set; Assembly language program examples in 8051.

#### PRACTICES:

- Programs on different Data Transfer Instructions using 8086.
- Arithmetic operations: Addition, Subtraction, Multiplication, Division using 8086.
- Programs to analyze different addressing modes of 8086.
- Program to sort the array of given numbers in ascending order.

#### MODULE-2

#### 8051 MICROCONTROLLER HARDWARE AND PERIPHERAL INTERFACING:

Parallel Ports in 8051; 8051 Timers; 8051 Serial ports; 8051 Interrupts. Peripheral Interfacing- LCD and Keyboard Interfacing, ADC and Sensor Interfacing, DC Motor and Stepper Motor Interfacing Techniques.

#### UNIT-2

VFSTR

#### ARM ARCHITECTURE:

RISC Vs CISC systems, ARM Philosophy, ARM7TDMI Core Architecture, Functional Diagram, Programmer's Model, ARM State Register Set,THUMB state register set, Current Program Status Register, ARM 7TMI Operating modes, mode bits, Exceptions, Interrupt Vector Table, Interrupt Processing.

# Microprocessor Ref Controller

Source: https://www. electronicsforu. com/resources/ difference-betweenmicroprocessor-andmicrocontroller

UNIT-1

#### SKILLS:

- ✓ Write assembly language program for 8086 and 8051.
- ✓ Debug assembly language programs.
- ✓ Make working I/O interfaces.
- ✓ Develop application programs for 8 bit and 16 bit processor / controllers.

#### PRACTICES:

- Interfacing 7 Segment LED Display to 8051.
- Alphanumeric LCD panel interface to 8051.
- Hex keypad input interface to 8051.
- ADC interface to 8051.
- DAC interface to 8051 for waveform generation.
- Stepper motor control interface to 8051.

#### COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Make use of ARM Processor different applications	Apply	2	1,2,9,11
2	Experiment to interface various peripherals to 8051.	Apply	1	1,2,9,11
3	Understand nalyze the architectures of 8086 mi- croprocessors and 8051 micro controllers. Identify various peripheral interfaces to 8051.	Analyze	1	1,2,9,11
4	Create basic assembly language programs for 8086, 8051 and ARM processors.	Analyze	1, 2	1,2,9,11
5	Develop applications based on different proces- sors and controllers.	Create	1, 2	1,2,9,11

#### **TEXT BOOKS:**

- 1. Douglas V.Hall, "Microprocessors and Interfacing", 2nd edition, Tata McGraw Hill, 2017.
- Kenneth J. Ayala, "The 8051 Microcontroller", 3rd edition, Cengage Learning India Pvt. Ltd, 2009.

#### **REFERENCE BOOKS:**

- Barry B. Brey, "The Intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit extensions: architecture, programming, and interfacing", 8th edition, Pearson Prentice Hall, 2009.
- 2. Mohamed Rafiquzzaman, "Microprocessors and Microcomputer Based System Design", 2nd edition, CRC Press, 2007.
- 3. Steve Furber, "ARM System on Chip Architecture", 2nd edition, Pearson education, 2000.