MICROPROCESSORS AND MICROCONTROLLERS

Course Code	20EC3403	Year	II	Semester	II
Course Category	Program Core	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Demonstrate the impact of instruction set architecture on cost-performance of computer design.(L2)
CO2	Apply a basic concept of digital fundamentals to Microprocessor based personal computer system.(L3)
CO3	Utilize the architectural features and instruction set of 16 bit microcontroller MSP430 for low power applications(L3)
CO4	Identify the functions of various peripherals which are interfaced with MSP430.(L3)
CO5	Function MSP430 using the various instructions for different applications.(L4)

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)
Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation
*** - Average value indicates course correlation strength with mapped PO**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2
CO1	2											2		
CO2	3												3	
CO3	2				2								2	
CO4	2				2								2	
CO5		2												2
Average* (Roundedto nearest integer)	2	2			2							2	2	2

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Computers, Microprocessors and Microcontrollers**: Introduction, Common Terminologies Associated with Computing Systems, Microprocessors and Microcontrollers, CISC and RISC Systems, Computing Languages, **Memory** - Random Access Memory (RAM), Read-Only Memory (ROM), Cache Memory, Memory Latency, **Computer Architecture**: Harvard and von Neumann , Evolution of Microcontrollers-4 bit to 32 bit	CO1,CO2
II	Architecture and features of 8086, Pin configuration of 8086, Minimum mode and Maximum mode, Timing diagrams, Addressing modes	CO1,CO2
III	**MSP Microcontroller Introduction and Key Features**: Introduction, Low Power Applications,MSP430 RISC CPU Architecture, Details of 16-Bit RISC CPU, Clock System ,Memory subsystem	CO1,CO3

IV	**On Chip Peripherals, Interfacing and Applications of MSP430**: Watchdog Timer, Timers, Real Time Clock, DAC: Digital-to-Analog Conversion, Direct Memory Access (DMA), LCD Controller, Case studies of applications of MSP 430 data Acquisition system	CO1,CO4
V	**Programming the MSP430:** Addressing Modes, Instruction Set of MSP430, Double Operand Core Instructions, Single Operand Core Instructions (Format II), Program Flow control, Emulated Instructions, Movement Instructions, Implementation of Decimal Arithmetic, Shift and Rotate Instructions.	CO1,CO5

Learning Resources
Text Books
1. K. Uma Rao, Andhe Pallavi,"The 8051 and MSP430 Microcontrollers: Architecture, Programming and Applications", Wiley Publication, 2019 2. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, Tata Mc Hill, 2000. 4. Micro Controllers – Deshmukh, Tata McGraw Hill Edition.6th reprint, 2007.
Reference Books
1. Microprocessors & Interfacing, Douglas.V. Hall, 3 rd Edition, Pearson/ PHI. 2007
e- Resources & other digital material
1. http://freevideolectures.com/Course/3018/Microprocessors-and-Microcontrollers