5th Semester	REC5C003	Microprocessors and Microcontrollers	L-T-P 3-0-0	3Credits

Module I:

Introduction to 8 bit and 16 bit Microprocessors-H/W architecture: (10 Hours)
Introduction to microprocessor, computer and its organization, Programming system; Address bus, data bus and control bus, Tristate bus; clock generation; Connecting Microprocessor to I/O devices; Data transfer schemes; Architectural advancements of microprocessors. Introductory System design using microprocessors; 8086 – Hardware Architecture; External memory addressing; Bus cycles; some important Companion Chips; Maximum mode bus cycle; 8086 system configuration; Memory Interfacing; Minimum mode system configuration, Interrupt processing.

Module II:

16-bit microprocessor instruction set and assembly language programming: (08 Hours)
Programmer's model of 8086; operand types, operand addressing; assembler directives, instruction Set- Data transfer group, Arithmetic group, Logical group.

Module III:

Microprocessor peripheral interfacing: (08 Hours)
Introduction; Generation of I/O ports; Programmable Peripheral Interface (PPI) - Intel 8255; Sample- and-Hold Circuit and Multiplexer; Keyboard and Display Interface; Keyboard and Display Controller (8279).

Module IV:

8-bit microcontroller- H/W architecture instruction set and programming: (12 Hours)
Introduction to 8051 Micro-Controllers, Architecture; Memory Organization; Special Function register; Port Operation; Memory Interfacing, I/O Interfacing; Programming 8051 resources, interrupts; Programmer's model of 8051; Operand types, Operand addressing; Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions; Programming.

Module V: **(10 Hours)**
Maximum mode system configuration, Direct memory access, Interfacing of D- to-A converter, A-to-D converter, CRT Terminal Interface, Printer Interface, Programming of 8051 timers, 8051 serial interface. Introduction to 80386 and 80486 Microprocessor family.

Books:

[1] Microprocessor Architecture, Programming and application with 8085, R.S. Gaonkar, PRI Penram International publishing PVT. Ltd., 5th Edition
[2] Microprocessors and Interfacing, Programming and Hardware, Douglas V Hall, TMH Publication, 2006.
[3] Microprocessors and Interfacing, N. Senthil Kumar, M. Saravanan, S. Jeevananthan

and S.K. Shah, Oxford University Press.
[4] The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D.M C Kinlay, Pearson Education, Second Edition, 2008.
[5] Microcontrollers: Principles and Application, Ajit Pal, PHI Publication
[6] Microprocessors and Microcontrollers Architecture, programming and system design using 8085, 8086, 8051 and 8096, Krishna Kant, PHI Publication, 2007.
[7] Advanced Microprocessors and Peripherals, A.K. Ray, K M Bhurchandi, TMH Publication, 2007.
[8] Textbook of Microprocessor and Microcontroller, Thyagarajan, Scitech Publication.

Digital Learning Resources:

Course Name:	Microcontrollers and Applications
Course Link:	https://nptel.ac.in/courses/117/104/117104072/
Course Instructor:	Prof. S. P Das, IIT Kanpur