

Electrical Engineering

Semester V						
Sr No	Course Code	Course Name	L	T	P	C
1	EE 325	<u>Microprocessors and Microcontrollers</u>	3	0	0	6
2	EE 321	<u>Digital Signal Processing</u>	3	0	0	3
3	EE 315	<u>DSP Lab</u>	0	0	4	2
4	EE 319	<u>Microprocessors and microcontrollers lab</u>	0	0	3	3
5	EE 311	<u>Electrical Machines and Power Electronics Laboratory</u>	0	0	3	3
6		HSS Elective	3	0	0	6
7		Electives				12
		Total Credits				35

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1	Title of the course (L-T-P-C)	Microprocessors and Microcontrollers (3-0-0-6)
2	Pre-requisite courses(s)	--
3	Course content	Block diagram view of a general purpose processor; elements of hardware and software architectures; introduction to concepts of data and control paths, registers and memory organization. Instruction set basics and assembly language programming: instruction structure and addressing modes, instruction encoding, and study of 8085A instruction set, hardware architecture and interrupts. Introduction to microcontrollers. 8051 hardware and instruction set architecture, timers/counters, interrupts and serial interface (including multi-processor communication). Interfacing basics using examples of I/O devices: parallel port, serial ports, keypad, display, etc. Introductory discussion on processor performance evaluation and design using a RISC ISA (including concepts of pipelining, pipelining hazards, cache, virtual memory and parallelism).
4	Texts/References	<ul style="list-style-type: none">• R.S. Ganorkar, Microprocessor Architecture, Programming, and Applications with the 8085, Penram International Publishing, Fifth Edition, 2011.• J.H. Hennessy, and D.A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann Publishers, Fourth Edition, 2006.• Kenneth J. Ayala, The 8051 Microcontroller, Architecture, Programming and Applications, Penram International Publishing, 1996.

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1	Title of the course (L-T-P-C)	Digital Signal Processing (3-0-0-3)
2	Pre-requisite courses(s)	Signals and Systems
3	Course content	Review of basic signal processing, and sampling, introduction to DSP, Z transform, DFT, FFT, Implementation of discrete time systems, and Introduction to digital filters.
4	Texts/References	<ol style="list-style-type: none">1. Proakis and Manolokis, "Digital Signal Processing," 4th edition, Prentice Hall, 2006.2. S K Mitra, "Digital Signal Processing," McGraw Hill, Inc., 4th edition, 2017.3. Alan V Oppenheim, "Digital Signal Processing," Prentice Hall, 1975.

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1	Title of the course (L-T-P-C)	DSP Lab (0-0-4-2)
2	Pre-requisite courses(s)	DSP
3	Course content	<ul style="list-style-type: none">• Overview of DSP kit• generation of waveform• Convolution and correlation• DFT and FFT Design of digital filters
4	Texts/References	<ol style="list-style-type: none">1. Proakis and Manolokis, "Digital Signal Processing," 4th edition, Prentice Hall, 2006.2. S K Mitra, "Digital Signal Processing," McGraw Hill, Inc., 4th edition, 2017.3. Alan V Oppenheim, "Digital Signal Processing," Prentice Hall, 1975.

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1	Title of the course (L-T-P-C)	Microprocessors and microcontrollers lab (0-0-3-3)
2	Pre-requisite courses(s)	--
3	Course content	Software experiments using an 8085 Kit to learn its instruction set. Hardware experiments for the use of peripherals like 8251 (USART). Experiments using a development board to learn the instruction set and assembly programming for 8051 family of microcontrollers. Experiments to learn Port IO, control of on chip peripherals such as timers, interfacing with off chip peripherals such as LCD displays, Keyboards, Stepper motors and ADC chips. Experiments for the use of other microcontrollers such as PIC using development boards.
4	Texts/References	<ul style="list-style-type: none">• R. S. Gaonkar, Microprocessor Architecture: Programming and Applications with the 8085/8080A, Penram International Publishing, 1996.• Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publishing, 1996.

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1	Title of the course (L-T-P-C)	Electrical Machines and Power Electronics Laboratory (0-0-3-3)
2	Pre-requisite courses(s)	Nil
3	Course content	Experiments reinforcing concepts learnt in EE206
4	Texts/References	