B.TECH 7th Semester
PROCESS DYNAMICS & CONTROL
(EIE-401-E)

L	T	P
4	1	-

Theory : 100
Sessional : 50
Time : 3Hrs

UNIT-I

INTRODUCTION TO PROCESS CONTROL : Introduction, control systems, process control block diagram, control system evaluation.

process characteristics : classifiaction of defination of process variables, elemnts or process dynamics, various types or processes.

UNIT-II

MATHEMATICAL MODELLING: need of mathematical modelling, state variables and state equations of chemical processes, mathematica l modelling of : thermal system, electrical system, heat exchanger.

UNIT-III

CONTROLLER CHARACTERISTICS : introduction,control system parameters, characteristics of p, i, d, pi, pd, pid, on-off, floating controls modes, tuning of controllers, zieglor nicholos & cohen coon method, comparision between p, i, d, pi, pd, pid errors, iae, ise, iste, dead time velocity error.

UNIT-IV

CONTROLLERS : Electronic, pneumatic & hydraulic controllres.

FINAL CONTROL ELEMENTS : pneumatic actuators, electro pneumatic, hydraulic single stem & rotating shaft control valves.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books:

1 Process control Instrumentation Technology by Curtis Johnson
2 Automatic Process control by Donald P. Eckman
3 Chemical Process Control by George Stephanopoulos
4 Introduction to Programmable Logic Controllers by Gary Dunning

B.TECH 7th Semester
DIGITAL SIGNAL PROCESSING
(EIE-403-E)

L	T	P
4	1	-

Theory : 100
Sessional : 50
Time : 3Hrs

UNIT-I

DISCRETE TIME SIGNALS & SYSTEMS : Discrete time signals & systems, Continuous time & Discrete Time signals, Concept of frequency in Continuous time & Discrete Time signals, Elementary Discrete time signals, Classification of Discrete time signals, Linear Time Invariant Systems, Convolution, Stability, Causality Discrete time signals, Periodic & Non Periodic.

FREQUECY ANALYSIS OF DISCRETE TIME SIGNALS : Frequency analysis of signals & systems, Fourier Series & Fourier Transform of Continuous & Discrete time signals, Power Density Spectrum Properties of Fourier Transform, The Concept of Bandwidth , Sampling of signals in Time & Frequency domain, Sampling Theorem.

UNIT-II

THE TRANSFORM SYSTEM OF LTI SYSTEM : The Z-transform, Direct Z-transform, Inverse Z-transform, Relationship of Z-transform to Fourier transform, The Properties of Z-transform, Poles & Zeros, The System Function, Inversion of Z-transform, One Sided Z-transform & solution of difference equation, Analysis of LTI system in Z-domain, Stability & Causality.

UNIT-III

THE DISCRETE FOURIER TRANSFORM : The discrete Fourier Transform, The DFT and its properties, Linear Filtering Based on DFT, Direct Computation of DFT, Radix-2 FFT Algorithm, Goertzel algorithm, The Chirp Z-Transform.

UNIT-IV

THE DISCRETE TIME SYSTEMS : Implementation of discrete time system, FIR & IIR systems, Direct form structure, Cascade form structure, Frequency selective Filters, Design of linear phase FIR filters, Design of IIR filters from analog filters, Design by approximation of derivatives by Impulse Invariance, Bilinear transformation, The Matched Z-transformation.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

REFERENCES:

1. Digital Signal Processing by John G. Proakis ,Dimitris G. Monalakis.
2. Digital Signal Processing by Alan V. Oppenheim, Ronald W. Schafer, Prentice Hall of

B.TECH 7th Semester
MICROCONTROLLERS
(ECE-415E)

L	T	P
4	1	-

Theory : 100
Sessional : 50
Time : 3Hrs

UNIT – 1

INTRODUCTION: Comparing Microprocessors and Microcontrollers, Technological trends in Microcontrollers development, Survey of microcontrollers-4 bit, 8 bit, 16 bit, 32 bit microcontrollers, Applications of micro-controllers.

UNIT – II

8051 ARCHITECTURE: Block diagram, pin diagram of 8051. functional descriptions of internal units, registers, PSW, internal RAM, ROM, Stack, Oscillation and Clock. I/O Pins, Ports and circuits connecting external memory. Counters and timers. Serial data interrupt, Serial data transmission reception and transmission modes, Timer flag interrupt, external interrupt, software generated interrupts, External memory and memory space decoding, expanding I/Os, memory mapped I/O, Reset & CLK Circuits.

UNIT – III

8051 INSTRUCTION SET AND PROGRAMMING: 8051 Instruction syntax, addressing modes, data transfer instructions, logical instructions, arithmetic instructions, Jump and Call instructions, Interrupts and interrupt handler subroutines, Writing assembly language programs, Time delays, Pure S/W time delays, S/W polled timer, Pure H/W delay, Lookup tables, Serial data transmission using time delays and polling, Interrupt driven serial transmission and reception.

UNIT – IV

8051 APPLICATIONS: Interfacing keyboards, programs for small keyboards and matrix keyboards, Interfacing multiplexed displays, numeric displays and LCD display, Measuring frequency and pulse width, Interfacing ADCs & DACs, Hardware circuits for handling multiple interrupts, 8051 serial data communication modes – Mode 0, Mode 1, Mode 2, Mode 3.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

REFERENCES:

1. Ayala K.J., The 8051 Microcontroller – 2nd ed. Penram International
2. Intel's manual on "Embedded Microcontrollers".

DEPARTMENTAL ELECTIVES-1
B.TECH 7th Semester
ANALYTICAL TESTING INSTRUMENTS
(EIE-407-E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I
Introduction to instrumental analysis, categorization of analytical techniques – spectral methods, electro analytical methods, separative methods, Advantages of instrumental techniques over wet analysis, factors choosing an analytical method
Atomic absorption spectrometer – Beer's law, spectral quantitative analysis, at0mic absorption spectrometry- electrode – less discharge lamp, hollow cathode lamp, monochromators and detectors.

UNIT-II
Chemical Analysis of surfaces: Ion scattering spectrometry, secondary ion mass spectrometry, auger emission spectroscopy, electron spectroscopy for chemical analysis (ESCA), X-Ray fluorescence spectrometry
Thermo analytical methods: Thermo gravimetric analysis (TGA), differential thermal analysis (DTA)

\UNIT-III
Nuclear magnetic resonance spectroscopy: Principle of NMR, Constructional details of NMR, Spectrometer.
X-ray analytical methods – Theory x-ray spectral lines, x-ray tubes, absorption, apparatus sources, wavelength dispersive devices, energy dispersive devices, detectors, scanning electron microscope.

UNIT-IV
Mass spectrometry: Theory, instrumentation, ion sources, mass analyzers and resolution, qualitative and quantitative analysis
Chromatography – Theory of gas chromatography, Gas – chromatography, apparatus – injectors, columns, detector (Thermal conductivity detectors, flame ionization detectors, electron capture detectors) and integrators. Qualitative and quantitative analysis

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books:

1. R.S. Khandpur: Hand book of analytical Instrumentation, Tata – Mc Graw
2. Willard, Merrit: Instrumental methods of Chemical analysis UBS.
3. Braun: Introduction to Instrumental Analysis.

DEPARTMENTAL ELECTIVES – I
B.TECH 7th Semester
NON DESTRUCTIVE TESTING
(EIE-409-E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I
Scope of non destructive testing.

Radiography: X-rays and their generation; X-ray photographic aspects; making of radiographs; radiography of welds & castings, interpretation of radiographs; applications of radiography; radiation safety.
Neutron Radiography

UNIT-II
Ultrasonic methods: Basic principle; generation of ultrasonic waves, industrial applications, special techniques.
Magnetic methods: Basic principle; magnetography

UNIT-III
Electrical methods: Principle, Instrumentation for ECT, Impedence plane diagram, Signal processing applications.
Other Methods: Accoustic methods; leak detection; thermo graphic methods.

UNIT-IV
Liquid Penetrate Testing: Penetrant testing materials, penetrant testing methods.
Accoustic emission methods: Principle, equipment; defect characterization; advantages & disadvantages of AE methods

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested books:

1. R. Halmshaw: Non destructive testing Edward Arnold
2. Baldev Raj, T Jayakumar, M Thavasimuttu, Practical Non Destructive testing, Narosa Publishing House
3. Paul E Mix: Introduction to Non destructive Testing, John Wiley & Sons
4. J Prasad, R Rangachary, BNS Murthy, Treatise or NDT
5. J.H. Lamble: Principles & Practice of NDT

DEPARTMENTAL ELECTIVES – I
B.TECH 7TH SEMESTER
IC FABRICATION PROCESSES
(EIE-411-E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

Unit 1:
Environmental Requirements for IC Fabrication, Introduction to Si IC processing, crystal growth, Vapour phase epitaxy.

Unit 2:
Oxidation: Thermal oxidation process-oxidation kinetics,SiO2 applications. Plasma oxidation. Lithography: Photo, e-beam and x-ray lithography –Process and equipments.

Unit 3:
Diffusion: Fick's Laws, constant and limited source diffusion, diffusion sources, equipment, calculation of junction depth. Ion-Implantation: Basic process, equipment, Introduction to Range theory.

Unit 4:
Metallization: Physical Vapour deposition- Equipment, Metallisation choices, problems, sputtering. Packaging & Assembly Techniques, Isolation Techniques, Fabrication process sequence for bipolar Ics and nMOSIC's.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

REFERENCES:
1. Sze S.M, VLSI Technology, Mc Graw Hill(1998).
2.Ghandhi,S.K, VLSI Fabrication Principles, Prentice Hall.

DEPARTMENTAL ELECTIVES – II
B.TECH 7th Semester
VLSI SYSTEMS
(EIE-413-E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

MOS devices and circuits: MOS transistor, inverter, delay and parasitic effects. Basic gates, super buffers, depletion and enhancement mode pull ups. Pull-up/pull down ratios for inverting logic coupled by pass transistors, transit times and clock periods, cross coupled circuits: Fluid model for visualizing MOS transistor behavior, effects of scaling down the dimensions of MOS circuits and systems.

UNIT-II

Integrated system fabrication: Patterning scaling, Silicon gate n-channel MOS process, Yield statistics, Scaling of processing technology, design rules, electrical parameters; current limitations in conductors.

Implementing integrated system designs: patterning and fabrication, hard layout and digitization using a symbolic layout language, an interactive layout system. The Caltech immediate from for LSI layout description, the multi-project chip.

UNIT-III

Data and control flow in systematic structures: Notation, Two phase clock, shift register, relating different levels of abstraction, implementing dynamic registers, designing a subsystem, register to register transfer, combinational logic programmable logic array, finite state machine, structured design methodology

UNIT-IV

Overview of an LSI computer system and the design of the OM2 data path chip: OM project at CALTECH, system overview, overall structure of data path, ALU, ALU registers buses, barrel shifter, register array, communication with outside world, encoding the control operation of data path, functional specification of OM 2 data path chip.

System timing: The third dimension, synchronous systems, clock distribution, clock generation, synchronization failure, self timed system, self timed signaling, self-timed elements.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Books:

1. C. Mead & L. Conway: Introduction to VLSI systems (1980).

DEPARTMENTAL ELECTIVES – II
B.TECH 7TH SEMESTER
COMPUTER ORGANISATION
(EIE-415-E)

L	T	P
3	2	-

Theory : 100
Sessional : 50
Time : 3Hrs

UNIT-I

BASIC STRUCTURE OF COMPUTER HARDWARE AND SOFTWARE:
Functional units, historical perspective, Register transfer and micro-operation. Information representation, Instruction format, Instruction types, addressing modes machine and assembley language programming, macros and subroutines.

UNIT-II

PROCESSOR DESIGN : Fixed - Point and floating-point arithmetic addition, subtraction, multiplication and division, decimal arithmetic unit- BCD adder, BCD subtraction, decimal arithmetic operation, ALU design forms of parallel processing classification of parallel structures, array professors structure of general purpose multiprocessors.
CONTROL DESIGN:- Hardwirred control design methods, multiplier control unit, CPU control unit, Microprogrammed control: basic concepts multiplier control unit, microprogrammed comtupers, CPU control unit.

UNIT-III

MEMORY ORGANISATION : - Memory device characteristics, random access memories: semiconductor RAMS, serial – access memories – memory organization, magnetic disk memories, magnetics tape memory associative memory.

UNIT-IV

SYSTEM ORGANISATION:- input-output systems- programmed IO, DMA and Interrupts, IO processors, interconnection networks- single bus, crossbar networks, multistage networks, hypercube networks, mesh networks tree networks, ring networks, pipelining – basic concepts.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

REFERENCES:

1. Hayes J.P, Computer and Organisation, McGraw Hill.
2. Mane M.M. Computer System Architecture, PHI
3.Hamacher VC, Vianesic VG & Zaky S G Computer organization, McGraw Hill.

DEPARTMENTAL ELECTIVES – II
B.TECH 7TH SEMESTER
MOBILE COMMUNICATION
(EIE-417-E)

L	T	P
3	2	-

Theory : 100
Sessional : 50
Time : 3Hrs

Unit 1:
Introduction to Paging Systems and cordless telephone systems, Basic Cellular concept, frequency reuse, Interference, capacity improvement, trunking.
Mobile radio propagation: Propagation mechanisms, path loss, path loss prediction models, Okumara and HATA model, log distance path loss model, fading, Ray tracing, Two ray-Rayleigh fading model.

Unit 2:
Diversity Techniques, Macroscopic and microscopic combining techniques. RAKA receiver. USDC Codec. Frequency management, frequency spectrum utilization. Channel assignment. FCA. DCA. Spread spectrum, frequency hopping in cellular CDMA.

Unit 3:
Handoffs, queuing of handoffs, mobile assisted handoffs, soft handoffs, cell site handoffs, Intersystem handoffs, dropped call.
Wireless networking: generations of wireless networks, CDPD, ARDIS, RMD,CCS,SS-7, UMTS, Wireless LAN.

Unit 4:
Intelligent cell concept, Advanced Intelligent networks, SS-7 network ISDN for AIN, AIN for mobile communication.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Reference:
Rappapori T.S. Wireless Communications, Principles and Practice, IEEE Press Prentice Hall.
Lee W C Y, Mobile Cellular Telecommunication, Analog and Digital Systems, McGraw Hill Inc.

B.TECH 7TH SEMESTER
PROCESS DYNAMICS& CONTROL LAB
(EIE-421-E)

L	T	P
-	-	3

Sessional : 50
Viva : 25
Time : 3Hrs

LIST OF EXPERIMENTS :

1. To study the response of a variety of simulated linear systems.
2. To study the performance of various types of controllers used to control the temerature of an oven.
3. To study the performance of an analog pid controller using simulated system.
4. To study the dc position control.
5. To conduct an experimental study of operating characteristics of a stepper motor
6. To conduct the speed control of a stepper motor mannual and Through microprocessor kit.
7. To study the ac position control.
8. To study the speed control process of a dc motor.

NOTE:
At least 8 experiments are to be performed with atleast 6 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope

B.TECH 7TH SEMESTER
DSP Lab
(EIE-423-E)

L	T	P
-	-	3

Sessional : 50
Viva : 25
Time : 3Hrs

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LIST OF EXPERIMENTS

1 Write a program to plot the following functions :

a) impulse function

b) unit step

c) unit ramp

d) exponential

e) sinusoidal

2. Write a program to plot $2\delta(n+2) - \delta(n-4)$ for $-2<n<5$

3. Write a program to plot $n[u(n)-u(n-10) + 10\, e^{-0.3(n-10)}\, u(n-10)-u(n-20)$

4. Write a program to find the convolution of two sequences using in built convolution function

5. Write a program to plot real, imaginary phase and magnitude of exponential function.

6. Write a program to plot poles and zeros of a z plane

7. Write a program to compute DFT

8. Write a program to design a Butterworth LPF

9. Write a program to design a Butterworth HPF

10 Write a program to design a FIR LPF

NOTE:
At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope