

SEMESTER VI

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

THEORY			L	T	P	M
1.		Fundamentals Of Digital Signal Processing	3	1	0	100
2.		Power System Analysis	3	1	0	100
3.		Measurements & Instrumentation	3	1	0	100
4.		Engineering Management	3	1	0	100
5.		Microprocessor & Microcontroller	3	1	0	100
6.		Elective – I	3	1	0	100
PRACTICAL						
1.		Measurements & Instrumentation Laboratory	0	0	3	100
2.		IC, Microprocessor & Micro controller Laboratory	0	0	3	100

SEMESTER VI
FUNDAMENTALS OF DIGITAL SIGNAL PROCESSING

(COMMON for V-SEM BME, V SEM MECT,VI-SEM CSE ,VI SEM EEE and VI-SEM IT)

- 1. DISCRETE – TIME SIGNALS AND SYSTEMS** **9**
Sampling of Analogue signals – aliasing – standard discrete time signals – classification – discrete time systems – Linear time invariant stable casual discrete time systems – classification methods – linear and circular convolution – DFS,. Time response and frequency response analysis of discrete time systems to standard input signals. Z transform – Properties
- 2. DFT & FFT** **9**
DTFT-Discrete Fourier transforms and Properties – Linear filtering- Fast Fourier transform (FFT) & DIT & DIF Algorithms.
- 3. IIR FILTER DESIGN** **9**
Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance-Bilinear transformation – Design of IIR filter in the Frequency domain.
- 4. FIR FILTER DESIGN** **9**
Symmetric & Antisymmetric FIR filters – Linear phase filter – Windowing technique – Rectangular, Kaiser Windows – Frequency sampling techniques – Structure for FIR systems.
- 5. SPECIAL TOPICS IN DSP** **9**
Periodiogram - QMF filters -Principles of Multirate DSP-Interpolation - Decimation by Integer factor- Sub band coding - Polyphase rectification

TEXT BOOK:

1. John G.Proakis and Dimitus G.Manolakis, “Digital Signal Processing, Principles, Algorithms and applications, Prentice Hall of India, New Delhi 3rd edition, 2002.

REFERENCES:

1. Sanjit K.Mitra ‘Digital Signal Processing’, A Computer Based Approach, Tata McGraw-Hill, New Delhi, 1998.
- Allan V. Oppenheim et al & Schaffer , " Discrete time signal Pr

POWER SYSTEM ANALYSIS

1 INTRODUCTION

9

Need for system analysis in planning and operation of power system – distinction between steady state and transient state – per phase analysis of symmetrical three-phase system. General aspects relating to power flow, short circuit and stability analysis - per unit representation.

2 NETWORK MODELLING

9

Primitive network and its matrices – bus incidence matrix – bus admittance and bus impedance matrix formation. Π -equivalent circuit of transformer with off-nominal-tap ratio. Modelling of generator, load, shunt capacitor, transmission line, shunt reactor for short circuit, power flow and stability studies.

3 SHORT CIRCUIT ANALYSIS

9

Need for short circuit study. Approximations in modelling – calculation for radial networks. Symmetrical, unsymmetrical short circuit analysis – sequence impedances – Z-bus in phase frame and in sequence frame fault matrices – unsymmetrical fault analysis.

4 POWER FLOW ANALYSIS

9

Problem definition – bus classification – derivation of power flow equation – solution by Gauss–Seidel and Newton–Raphson methods - P-V bus adjustments for both methods - computation of slack bus power, transmission loss and line flow.

5 STABILITY ANALYSIS

9

Swing equation in state space form - equal area criterion - stability analysis of single machine connected to infinite bus by modified Euler's method using classical machine model – critical clearing angle and time. – voltage stability proximity indices for two-bus system.

Total Hours = 45

TEXT BOOKS

1. John J. Grainger and Stevenson Jr. W.D., 'Power System Analysis', McGraw Hill International Edition, 1994.
2. Nagarath .I.J, Kothari .D.P,'Power system Engineering', TMH Pub. Co. Ltd., 1994.

REFERENCES

1. Stagg, G.W. and El-Abaid, A. H. 'Computer Methods in Power System Analysis', McGraw-Hill International Book Company.
2. Nagarath, I.J., and Kothari, D.P., 'Modern Power System Analysis', Tata McGraw Hill Publishing Company, 1990.

MEASUREMENTS AND INSTRUMENTATION

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|----------|---|-----------|
| 1 | INTRODUCTION
Functional elements of an instrument - static and dynamic characteristics – errors in measurement - statistical evaluation of measurement data - standard and calibration. | 6 |
| 2 | ELECTRICAL AND ELECTRONICS INSTRUMENTS
Principle and types analog and digital ammeters and voltmeters – single and three phase Wattmeters and Energy meter– instrument transformers – instruments for measurement of frequency and phase. | 12 |
| 3 | SIGNAL CONDITIONING CIRCUITS
Bridge circuits – differential and Instrumentation amplifiers - filter circuits - V/f and f/V converters – A/D and D/A converters - multiplexing and demultiplexing - data acquisition systems – grounding techniques. | 9 |
| 4 | STORAGE AND DISPLAY DEVICES
Magnetic disc and tape recorders – digital plotters and printers – CRT displays – digital CRO – LED, LCD and Dot matrix displays. | 8 |
| 5 | TRANSDUCERS
Classification of transducers – selection of transducers – resistive, capacitive and inductive transducers – piezo electric transducers – optical and digital transducers. - transducers for measurement of displacement, temperature, level, flows, pressure, velocity, , torque, speed. | 10 |

Total Hours = 45

TEXT BOOKS

1. Doebeling, E.O., 'Measurement Systems – Application and Design', McGraw Hill Publishing Company, 1990.
2. H.S. Kalsi, 'Electornic Instrumentation', TMH Co., 1995.

REFERENCES

1. Stout M.B., 'Basic Electrical Measurement', Prentice Hall of India, 1986.
2. Dalley, J.W., Riley, W.F. and Meconnel, K.G., 'Instrumentation for Engineering Measurement', John Wiley & Sons, 1993
3. Moorthy, D.V.S., 'Transducers and Instrumentation', Prentice Hall of India Pvt. Ltd., 1995.

ENGINEERING MANAGEMENT

- 1. ENGINEERING ECONOMICS** **9**
Introduction - Demand and Revenue Analysis - Demand Forecasting - Production Analysis - Cost and Supply Analysis, Price and output Determination - Investment Analysis - Plant Location - Economic Optimization.
- 2. MANAGEMENT OF WORK** **9**
Types of Business Organisation, Forms, Planning - Organising – Coordination, Directing.
- 3. THE MANAGEMENT OF ENGINEERS** **9**
Human Resource Development - Motivation- Leadership - Team working and Creativity - Managerial Communication - Personal Management – Time Management - Stores Management - Career Planning.
- 4. THE MANAGEMENT OF ENGINEERING** **9**
Financial Management - Product development - Management techniques in product development - Nature of controlling - Operations Management - Just-in-Time.
- 5. CONTEMPORARY MANAGEMENT ISSUES** **9**
Managing World Economic Change - The global environment - Multinational Strategies - Economic Cycles – Organisational change and Organisational Development - Managerial Ethics and Social responsibilities.

Total hours: 45

TEXT BOOKS:

1. Gail Freeman - Bell and Janes Balkwill, " Management in Engineering - Principles and Practice ", Prentice Hall of India Pvt.Ltd., 1998.
2. Gene Burton and Manab Thaker, " Management Today Principles and Practice ", Tata McGraw Hill, 1995.

REFERENCES:

1. M. Joesph, Putti Management - " A Functional Approach ", McGraw Hill, 1999.
2. R.R. Barathwal, " Engineering Economics ", McGraw Hill, 1997.

MICROPROCESSORS AND MICROCONTROLLERS

1. **ARCHITECTURE** 9
General 8-bit microprocessor and its architecture – 8085 functional block diagram – architecture functions of different sections – architecture of 8086 CPU.

2. **INSTRUCTION SETS** 9
Instruction format-addressing addressing modes – instruction set of 8085 CPU – instruction cycle – timing diagrams – different machine cycles – fetch and execute operations – estimation of execution time.

3. **ASSEMBLY LANGUAGE PROGRAMMING** 9
Assembly format of 8085 – assembly directions – multiple precision arithmetic operations – binary to BCD and BCD to binary code conversion – ALU programming using look up table – stack and subroutines

4. **DATA TRANSFER AND INTERFACING** 9
Data transfer schemes – program I/O – interrupt structure of 8085 – interrupt driven I/O – DMA serial I/O – input/output ports – latches and buffers – peripheral interface IC's – 8212, 8255, 8251, 8279, 8259 – interfacing of A/D and D/A converters – RAM and ROM – memory devices – display devices – applications.

5. **MICROCONTROLLERS** 9
Architecture of 8-bit micro controller (8051) – bus configuration – reset circuitry – power down considerations – instruction sets - programming exercises and micro controller's software design - development and troubleshooting tools – applications.

Total Hours 45

TEXT BOOKS

1. Gaonkar R.S., Microprocessor architecture Programming and application, Wiley Eastern Ltd., New Delhi, 1995.
2. Kenneth Hint, and Daniel Tabak, Microcontrollers, Architecture, Implementation and Programming, McGraw Hill International, USA, 1992.

REFERENCES

1. Mathur A.P., Introduction of Microprocessors, Tata McGraw-Hill Publishing Co.Ltd, New Delhi, 1989.
2. John B.Peatman, Design with Microcontrollers, McGraw Hill International, USA, 1988.

3. Kenneth J.Aylal, The 8051 Microcontroller, Architecture and Programming applications.

MEASUREMENTS AND INSTRUMENTATION LABORATORY

1. Study of temperature measuring transducers (Thermocouples).
2. Study of displacement and pressure transducers (LVDT).
3. AC Bridges.
4. DC Bridges.
5. Instrumentation amplifiers.
6. Linearization using microprocessors.
7. A/D and D/A converters.
8. Study of Transients.
9. Torque and angle measurement.
10. Calibration of Single phase Energy meter.
11. Calibration of Three phase Energy meter.
12. Measurement of Three phase power and power factor.

Total Hours = 45

IC, MICROPROCESSOR AND MICROCONTROLLER LAB

1. IC EXPERIMENTS

1. Study of R-S, J-K, D, T flip-flops, IC 555, IC 741.
2. Code converters.
3. Shift registers and Counters
4. Encoders and Decoders
5. Multiplexers and Demultiplexers
6. Application Circuits of Op-Amps.
7. Application circuits of NE 555.

2. MICROPROCESSORS AND MICROCONTROLLER EXPERIMENTS

1. Familiarisation of 8085 microprocessor.
2. Code conversion - BCD to Binary, Binary to BCD.
3. Addition of two 8 – bit numbers.
4. Subtraction of two 8 – bit numbers.
5. Multiplication of two 8 – bit numbers.
6. Addition of two 16 – bit numbers.
7. Division of 16 – bit number by 8 – bit number.
8. Ascending and Descending order.
9. Factorial of the given number.
10. Study of 8255 chip and waveform generator.
11. Familiarisation of 8051 microcontroller.
12. Study of programmable I/O ports of 8051 microcontroller.
13. Addition of two 8 – bit numbers using 8051 microcontroller.
14. Digital to Analog interfacing.
15. Stepper motor control using 8085.
16. Moving message display using 8279.
17. Seven segment LED displays.
18. Minimum values of datas.

Total Hours = 45

