

## SEMESTER - V

HS 1501 - MANAGEMENT SCIENCE

(2-1-0)

### Principles of management

Definition and concept of management. Evolution of management thought. Systems approach and decision. Theory approach to management. Process of decision-making.

**Functions of Management Planning:** types of plans, Major steps in managerial planning. Strategies MBO. Organization; nature and purpose, Process of organization. Basic departmentation. Co-ordinating supervision, communication and direction. Leadership, motivation. Controlling; nature and purpose control techniques and information technology. International Management; Japanese Management vs. U.S. Management Managerial functions in international Business.

### Organization Theory

Group Dynamics; Defining and classifying groups, Group Processes. Group task.

### Group cohesiveness

Conflict Management: discovery of conflicts, Processing of grievances, conflicts resolution, conflict and intergroup relations.

Stress Management: Nature of stress, Potential Sources of stress, consequences strategies.

### Suggested text books & references

- Koontz, H. and Weihrich, H., "Essential of Management".
- Mathur, S.S., "Principles of Management".
- Agarwal, R.D., "Organisation and management".
- Robbin, S.P., "Organisational Behaviour".
- Hicks and Gullet, "Organisations: Theory and Behaviour".
- Allen, "Management and Organisation".

## EC 1501 - ELECTRONIC INSTRUMENTATION

(2-1-0)

### Measurement basics

Errors, resolution, unit of measurement and standards, moving coil instrument and its variations, micro voltmeters, gain phase meter.

### Cathode ray oscilloscope

Basic block diagram, function of blocks, dual trace oscilloscope, analog and digital storage oscilloscope.

### Transducer

Transducers for measurement of temp, pressure level and flow, linear and angular position, velocity and acceleration, digital transducer, transducer interfacing and data acquisition, computer controlled instrumentation and IEEE4888 interfacing.

### Process instrumentation

First and second order process, controllers, final control element, close loop response of process.

Analysis of a complete process stability analysis.

Distributed digital control system

Computer based process control system: - Case study.

### Suggested Text Books & References

- Helfrick, and Cooper, W.O., "Modern Electronic Instrumentation and Measurement Techniques ", PHI 1992. .
- Barney, "Inteliegent Instrumentation", PHI 1992.
- Sahweny, A.K., "Electrical and Electronic Measurements & Instrumentation", Dhanpat Roy & Sons.

**Representation of information**

Number systems, integer & floating point representation, character code (ASCII, EBCDIC), Error detection & correction codes.

**Basic Building Block:**

Boolean Algebra, combination logic design, flip-flops, registers, counter, ALU, Arithmetic and logic operation, faster algorithms and their implementation. Organisation of central units (Hardware and Micro programmed), Microprogramming organisation. Memory types and Organisation. Address decoding and selecting.

Peripheral devices? I/O devices (tape and disks) Programmed & Interrupt control mechanisms. I/O controllers, Bus bandwidths. Assembly Language Programming.

Programmers Model of a machine. Example of a typical 16 to 20 bit processor Registers, Addressing modes, instruction set, use of an assembly language for specific programs for typical programs like: Table search, subroutines Symbolic and numeric manipulations, and I/O.

**Suggested Text Books & Reference**

- Gear, C.W., "Computer Organisation and Programming", Mc Graw Hill, 1975.
- Tannenbaum, A.S., "Structured Computer Organisation", Prentice Hall of India.
- Mano, M.M., "Computer System Architecture", Prentice Hall of India 1983.
- Langholz, G., Grancioni, J. and Kandel, A.L., "Elements of Computer Organisation Prentice Hall International, 1988.
- Assembler "Manual for the Chosen Machine".
- Hayes, "Computer Architecture and Organisation", McGraw-Hill International Edition.
- Sloan, F.E., "Computer Hardware and Organisation", 2<sup>nd</sup> Edn, Galgotia Public, Pvt. Ltd

**Representation of Signals**

Analog between vectors and signals, Examples of Orthogonal Basis Functions Fourier series Fourier transform, Properties of the Fourier Transform, Fourier Transforms involving impulse functions, Spectral density and Correlation functions of deterministic signals.

**Transmission of Signals through Systems**

Linear time Invariant systems, causality, stability, transfer function and frequency response, graphical interpretation of convolution, distortion less transmission, ideal low pass filter, Hilbert Transform, Pre-Envelope.

**Random signals**

Probability, Random variables, Probability density and distribution functions, Statistical averages, Joint movements, Transformation of random variables, Random processes, Stationary. Covariance functions, Ergodicity, Autocorrelation function and power spectral density, transmission of random processes through a linear filter, Gaussian process.

**Continuous wave modulation**

Motivation for modulation, Amplitude modulation, Double Sideband Suppressed Carrier modulation, Vestigial Sideband modulation, Single Sideband modulation, Frequency Division multiplexing. Angle modulation: Phase & Frequency, Modulation, Narrow Band Frequency Modulation. Stereophonic FM.

**Pulse modulation**

Sampling Theorem, Pulse Amplitude Modulation, Time Division Multiplexing, Pulse Position Modulation and pulse Width Modulation; Uniform and non uniform quantization of signals, Pulse code modulation, Delta modulation, Differential Pulse Code Modulation, Coding Speech at low bit rates.

**Suggested Text Books & References**

- Simon Haykin, "Communication Systems", 3<sup>rd</sup> Ed, John Wiley & Sons, 1997.
- Simon Haykin, "Communication Systems", 2<sup>nd</sup> Ed., John Wiley & Sons, 1996..
- Taub and Schilling, "Principles of Communication Systems", Tata McGraw Hill, 1998.
- Lathi, "Modern Digital and Analog Communication Systems"; 3<sup>rd</sup> Ed., Oxford University Press, Delhi, 1998.
- Bruce Carlson, "Communication Systems", McGraw Hill Kogakusha, 1986.
- Sbanmugam K. Sam, "Digital and Analog Communication Systems", John Wiley & Sons, 1997.

## EC 1503 - MICROPROCESSOR THEORY

### Introduction to 8-bit Microprocessor & 16 bit Microprocessor

#### 8-bit Microprocessor:

Internal architecture in details, pin description, flags, Instruction set, Addressing mode, testing and running of simple programmes using Debug/MASM assembler, interrupts and related instructions. Programs on - 8-bit addition, 16-bit addition, data transfer.

#### 16-bit Microprocessor

Introduction to 16-bit processor (8086) - architecture details, flags, addressing modes, interrupts, programming.

#### Interfacing (with 8 bit, 16 bit processors)

Data transfer schemes; Memory interfacing RAM; ROM & Address decoding; Input output interfacing - parallel I/O; Serial I/O, Keyboard and display interfacing, I/O mapped (mapped I/O, DMA concepts (using 8255, 8254, 8251, 8237, 8259 etc.), application programmes.

#### Microcontroller

8051/8751 architecture programming modes, internal RAM/ROM, registers, I/O ports, interrupt system insertion set typical application. Advanced Microprocessor; Introduction to Intel \* 86 processors; Pentium I, II, III of Motorola 68 xxx processors.

#### Suggested Text Books and References

- Hall, D.V, "Microprocessor. and Interlacing" Tata McGraw Hill (2<sup>nd</sup> edition)
- Brey, "The Intel Microprocessor", Prentice Hall of India (4111 cdililll).
- Rafiquek Kuzzman, v.. "Microprocessor and Application".

## EC 1504 - AUTOMATIC CONTROL SYSTEMS

(3-1-0)

The control problem, open and closed loops, Illustrative examples.

Mathematical equations and transfer function; Basic components and their models: Block diagram, Signal flow graph analysis; Multivariable systems and transfer function matrix.

### **Transient and Steady State Response**

Test inputs: First, second and higher order systems, Static and dynamic error coefficient, Transient response and performance specifications,

### **Basic Control Actions**

proportional, Derivative and Integral control; Tachogenerator feedback.

### **Root locus Technique**

Introduction, general rules for construction of root loci, root locus analysis, Root contours.

### **Frequency Response**

Polar plot Nyquist diagram; Bode diagrams, gain magnitude-phase shift plot, closed loop frequency response, frequency domain specifications.

### **Compensation Design**

Concept of compensation, Design of lag and lead networks both in the s-plane and in the frequency

### **State Space Methods**

introduction to state variable formulation and its solution.

### **Suggested Text Books & References**

- Ogata, K.. "Modern Control Engineering", Prentice Hall of India Pvt.Ltd.,1998.
- Gopal, M., "Control Systems: Principle and Design", Tata McGraw
- HiU,199TKuo, B.C., "Automatic Control Systems", Prentice Hall of India Pvt Ltd.; 1990.

## PRACTICAL / DRAWING / DESIGN

### EC 1505-P - Electronic Instrumentation Lab.

(0-0-3)

#### List of Experiments:

- Study of Electronic type voltmeters.
- Measurement of Capacitance using:
  - Maxwell's bridge
  - Hay's bridge
  - Anderson's bridge
- Transducer interfacing.
- IEEE 488 interface
- Study of computer controlled instrumentation

### EC 1506 - P - Communication Systems – I Lab.

(0-0-3)

#### List of experiments:

- Study of Amplitude Modulated Transmitter and Receiver.
- Study of Frequency Modulation.
- Study of SSB Suppressed Carrier (SSB-SC).
- Study of PAM/PWM/PPM Modulator and Demodulator.
- Study of Delta Modulator.

### EC 1507-P - Microprocessor Theory Lab.

(0-0-3)

#### List of experiments:

- A Program to add: Two 8-bit numbers and Two 16-bit numbers
- A Program to find the smallest number in a data array.
- A Program to find multiplication of two 8-bit numbers.
- A Program to find a square root of a number.
- Program and verification of Speed control of stepper motor.
- Program and verification of Seven-segment display.

### EC 1508 P - Automatic Control Systems Lab.

(0-0-3)

#### List of experiments:

- Conversion of angular displacement corresponding to voltage signal by synchros
- Study of open loop and closed loop system
- Study of P, PI and PID controllers
- Find the stability of second order system by Bode – plot / root – locus techniques
- Study the techniques (Lead and Lag compensation) for improving the stability of second order systems

### HS 1505 – P GENERAL PROFICIENCY – V

(0-0-0)