

MEMT –101 Advanced Mathematics

UNIT I

Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabola) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.

UNIT II

Probability, compound probability and discrete random variable. Binomial, Normal, Poisson's distribution. Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

UNIT III

Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)

UNIT IV

Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.

UNIT V

Introduction and definition of reliability, derivation of reliability functions, Failure rate, Hazard rate, mean time to failure & their relations, concepts of fault tolerant analysis, Elementary idea about decision theory and goal programming.

Reference Books:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Eastern Edd.
3. Applied Numerical Methods with MATLAB by Steven C chapra, TMH.
4. Introductory Methods of Numerical Analysis by S.S. Shastry,
5. Introduction of Numerical Analysis by Forberg
6. Numerical Solution of Differential Equation by M. K. Jain
7. Numerical Mathematical Analysis by James B. Scarborough
8. Fourier Transforms by J. N. Sheddon
9. Fuzzy Logic in Engineering by T. J. Ross
10. Fuzzy Sets Theory & its Applications by H. J. Zimmersoms

MEMT – 102 Electromagnetic Field Theory

UNIT-1

Introduction & review of Electromagnetic Field theory, boundary value problems.

UNIT-2

Time varying fields, Maxwell's equation, source concepts, Duality equivalence principle, induction theorem, reciprocity theorem, Green's function & applications.

UNIT-3

Plane wave function, Plane waves, Rectangular waveguides Models, Cylindrical wave function, circular guide modes, Coaxial Line modes.

UNIT-4

Spherical wave function; Wave transformation.

Reference Books:

1. Plonsey & Collin; Principle & Application of EM Fields
2. R. F. Harrington; Time Harmonic EM Fields
3. Collins; Fields Theory of Guided Waves
4. Ramo & Whinnery; Fields & Waves in Modern Radio.

MEMT – 103 Advanced Electronic Devices

UNIT -1

Electrostatic electron optics

Analogy with physical optics, Electrostatic lens fields paraxial ray equation, general lens properties aberrations, magnetic lenses focusing action, magnetic fields equation of motion of paraxial electron defects. General equation of motion in the combined electric and magnetic fields.

UNIT-2

Electron Microscope Structures, relation of resolving power, Klystrons bunching. Principle cavity Resonators, mechanism of energy interchange, Klystron amplifiers, Reflex Klystron Oscillator, Power Relation, Magnetron Structural forms, Multicavity Magnetrons their Resonant properties electron behavior in crossed magnetic and electric fields, different case. Output characteristics of magnetrons strapping, Carcintrons.

UNIT-3

Traveling Wave Tube, Backward Oscillators, Characteristics and performance of other Microwave tubes, Principle & Theory of MASERs & LASERs, Varactor diodes operations, Paramagnetic amplifier, Manley-Rowe equation, Tunnel diode theory, Use as an amplifier, Mounting Micro strip.

UNIT-4

P-I-N diodes, Oscillators, Semiconductor devices at Microwave frequency. Gunn effect devices theory, Power transfer, efficiency, mounting, integrated circuits, micro strip transmission lines, Monolithic circuits.

REFERENCE:

1. Vacuum Tubes; Spagenberg
2. Theory & Application of Microwave Tubes; Bronwell Beam
3. Microwave Semiconductor Devices; Shurner
4. Microwave Electronics. Slater

MEMT – 104 Advanced Digital System Design & PLC

UNIT-1

Introduction to finite state machine concept, combinational & sequential circuits. Asynchronous & synchronous system. analysis & synthesis. Representation through languages (like VHDL).

UNIT-2

Digital System implementation using algorithms state machine concepts. Register transfer, Busing, Clocking & Control.

UNIT-3

Semiconductors Memories & PLAs, PAL & Gate array. Micro programmed & PLA based control unit design.

UNIT-4

High Speed computation Hardware, Introduction to Fault Tolerance, Testing of digital hardware.

Unit 5

Application of PLC in control rooms of process plants and power plants.

REFERENCE:

1. F. Hill & G.L Patterson; Switching Theory & Logic Design, 3rd Ed. Johnwilly.
2. S.H. Unfer; Essence of Logic Circuits, Prentics Hall, 1989
3. Digital Design Principle & Practice by John F. Walkerhy.

MEMT – 105 Micro controller System Design

Unit 1

Review of 8 bit and 16 bit Microprocessors, support chips and interfacing techniques. Single chip microcomputers, architecture, program and Data memory, Ports, Input/Output. Interfacing and Programming.

Unit 2

Single chip microcontrollers – Intel 8051/8751, Motorola 68HC05/68HC11 architecture, instruction set and programming. Memory map, Addressing modes, Registers, expanded mode. Interrupt handling timing and serial I/o.

Unit 3

Software development, modular approach, Integrated software development environment, Object oriented interfacing and programming, Recursion, Debugging.

Unit 4

Atmel 89C51/52 and PIC microcontrollers – case studies.

Unit 5

Design & Applications of microcontrollers in data acquisition, embedded controllers, process control etc.

Unit 6

DSP processor architecture and sample design using TI – DSP.

Reference books:

1. John B. Peatman, Design with Microcontrollers, McGraw Hill.
2. Embedded Microcomputer Systems by Jonathan W. Valvano.
3. Data Manuals: Intel, Motorola etc.