

EC-501 Advanced Mathematics for Engineers

Max. Marks: 100

Time Allowed: 3 Hrs

Note: Eight questions of equal marks to be set covering the whole syllabus and any five to be attempted.

1. Fourier Transforms

Introduction, Fourier Integral Theorem, Fourier Sine and Cosine Integral, Complex form of Fourier Integrals, Fourier Transforms, Inverse Fourier Transform, Properties, Modulation Theorem, Convolution Theorem for Fourier Transforms, Parseval's Identity, Fourier Transforms of derivative of functions, Relation between Fourier and Laplace transform.

2. Z -Transforms

Introduction, Properties of Z- Transforms, Evaluation of inverse Z – Transforms.

3. Matrices And Linear System Of Equations

Solution of linear simultaneous equations by Gaussian elimination and its modification, Crout's triangularization method, Iterative methods-Jacobins method, Gauss-Seidal method, Determination of Eigen values by iteration.

4. Conformal Mapping

Conformal mapping, linear transformations, Bi-linear transformations, Schwarz's-Christoffel transformations.

5. Calculus Of Variations

Euler-Lagrange's differential equation, The Brachistochrone problems and other applications. Isoperi-metric problem, Hamilton's Principle and Lagrange's Equation. Rayleigh-Ritz method, Galerkin method.

Books Recommended:

1. Higher Engineering Mathematics - by Dr. B.S. Grewal; Khanna Publishers
2. Fourier Series and Boundary Values Problems - by Churchill; McGraw Hill.
3. Complex Variables & Applications - by Churchill; McGraw Hill.
4. Calculus of Variations - by Elsgole; Addison Wesley.
5. Calculus of Variations - by Galfand & Fomin; Prentice Hall.
6. The Use of Integral Transforms - by I.N. Sneddon., Tata McGraw Hill.

EC-502 Electronics System Design

Max. Marks: 100
Time Allowed: 3 Hrs

Note: Eight questions of equal marks to be set covering the whole syllabus and any five to be attempted.

1. Review of Digital electronics concept

2. MSI and LSI Circuits And Their Applications

Arithmetic Circuits, Comparators, Multiplexers, Code Converters, XOR And AND-OR INVERTER Gates, Wired Logic, Bus Oriented Structures, Tri-State Bus System, Propagation Delay.

3. Sequential Machines

The Concept Of Memory, The Binary Cell, The Cell And The Bouncing Switch, Set / Reset, D, Clocked T, Clocked JK Flip Flop, Design Of Clock F/F, Conversion, Clocking Aspects, Clock Skew, State Diagram Synchronous Analysis Process, Design Steps For Traditional Synchronous Sequential Circuits, State Reduction, Design Steps For Next State Decoders, Design Of Out Put Decoders, Counters, Shift Registers and Memory.

4. Multi Input System Controller Design

System Controllers, Design Phases And System Documentation, Defining The System, Timing And Frequency Considerations, Functional, Position And Detailed Flow Diagram Development, MDS Diagram, Generation, Synchronizing Two System And Choosing Controller, Architecture, State Assignment, Next State Decoders And Its Maps, Output Decoders, Clock And Power Supply Requirements, MSI Decoders, Multiplexers In System Controllers, Indirect Addressed Multiplexers Configurations, Programmable System Controllers, ROM, PLA And PAL Based Design.

5. Asynchronous Finite State Machines

Scope, Asynchronous Analysis, Design Of Asynchronous Machines, Cycle And Races, Plotting And Reading The Excitation Map, Hazards, Essential Hazards Map Entered Variable, MEV Approaches To Asynchronous Design, Hazards In Circuit Developed By MEV Method, Electromagnetic Interference And Electromagnetic Compatibility Grounding And Shielding of Digital Circuits. Interfacing digital system with different media like fiber cable, co-axial cable etc.

Books Recommended:

1. An Engineering Approach To Digital Design - by Fletcher PHI 1990
2. Designing With TTL Circuits - by Texas Instruments.
3. Related IEEE/IEE publications

EC-503 Data Communication Networks

Max. Marks: 100
Time Allowed: 3 Hrs

Note: Eight questions of equal marks to be set covering the whole syllabus and any five to be attempted.

1. Data Transmission

Overview of Data Communication and networking, Analog And Digital Data Transmission, Transmission Impairments, Various Transmission Media, Data Encoding.

2. Digital Data Communication Techniques

Asynchronous And Synchronous Transmission, Error Detection and correction techniques, Physical interfaces

3. Data Link Control

Link Configurations, Protocol principles (Error control, Flow control), Bit Oriented and character oriented protocol, Data link layer services, Link Control.

4. Multiplexing

F.D.M. Synchronous TDM, Statistical TDM

5. Switching and Computer Networks

Communication Networks, Circuit Switching, Message Switching, Packet Switching, X.25, Virtual circuits and Data gram's, LAN/MAN Technologies, Medium Access control protocols (CSMA/CD, Token ring, FDDI, DQDB)

6. Computer Communication Architecture

OSI and TCP/IP Model, Protocol And Architecture, Inter Networking, IP addressing, structure of IP, IPv4, IPv6, Transport layer Protocols, Session Service And Protocols, and Presentation/Application Controls.

7. ATM Networks

Concepts, history, Architecture, Convergence and challenges

8. Network Operating Systems

Overview of network operating systems (Windows NT/Unix/Linux), Mobile IP33N Operating System

9. Network security

Security issues, concept of firewalls, intrusion detection Systems

Books Recommended:

1. Data And Computer Communication - by William Stallings, Prentice Hall, 4th Ed.
2. Computer Networking - by Andrew Tanenbaum.
3. Data communications and networking - by Forouzan
5. Engg. approach to Computer Networking - by Srinivasan Keshav, Pearson Edu.
6. Data Networks - by Bertsekas prentice Hall
7. Related IEEE/IEE publications

EC-504 Advanced Communication Systems

Max. Marks: 100

Time Allowed: 3 Hrs

Note: Eight questions of equal marks to be set covering the whole syllabus and any five to be attempted.

1. Introduction

Introduction to communications systems, analog and digital communication systems, Applications of communication systems.

2. Digital Communication

Introduction, Digital Modulation techniques, BPSK, QPSK, PCM, DPCM, Delta Modulation, Digital Transmission and Transmission Impairments.

3. Optical Networks

WDM, TDM, Telecommunication Infrastructure, Switching, 3G systems, SONET, SDH, Architecture of Optical Transport Network, Link Management Protocols, Solutions.

4. Satellite Communication

Basic Transmission Theory, System Noise Temperature and G/T Ratio, Design Of Down Links, Domestic Satellite Systems Using Small Earth Stations, Uplink Design, Design Of Satellite Link For Specified (C/N). Multiple Access Techniques, Frequency Division Multiple Access (FDMA), TDMA, CDMA, Estimating Channel Requirements, Practical Demand Access Systems, Random Access, Multiple Access With On Board Processing. VSAT

5. Mobile Communications

Mobile telephone service, Transmission protocols, Introduction to GSM, GPRS, CDMA, Switching techniques, Fading, Quality of service (QOS).

Books Recommended:

1. Advanced Communication Systems - by Wayne Tomasi; Pearson.
2. Digital Communication - by Proakis; PHI
3. Optical Networks - by Uyles Black; Pearson
4. Satellite Communication - by Timothy Pratt; Addison Wesley.
5. Related IEEE/IEE publications

EC-505 Neural Networks & Fuzzy Logics

Max. Marks: 100

Time Allowed: 3 Hrs

Note: Eight questions of equal marks to be set covering the whole syllabus and any five to be attempted.

1. Neural networks characteristics, History of development in neural networks principles, Artificial neural net terminology, Model of a neuron, Topology, Learning, types of learning, Supervised, Unsupervised, Re-inforcement learning. Knowledge representation and acquisition.
2. Basic Hop field model, Basic learning laws, Unsupervised learning, Competitive learning, K-means clustering algorithm, Kohonen`s feature maps.
3. Radial basis function neural networks, Basic learning laws in RBF nets, Recurrent back propagation, Introduction to counter propagation networks, CMAC network, and ART networks.
4. Applications of neural nets such as pattern recognition, Optimization, Associative memories, speech and decision-making. VLSI implementation of neural networks.
5. Fuzzy Logic: Basic concepts of fuzzy logic, Fuzzy vs. Crisp set, Linguistic variables, Membership functions, Operations of fuzzy sets, Fuzzy IF- THEN rules, Variable inference techniques, De-Fuzzification, Basic fuzzy inference algorithm, Fuzzy system design, FKBC & PID control, Antilock Breaking system (ABS), Industrial applications.

Books Recommended:

1. Neural Networks - by Simon Haykin
2. Fuzzy logic with engineering application - by ROSS J.T (Tata Mc)
3. Neural Networks & Fuzzy Logic - by Bart Kosko
4. Neural computing theory & practice - by P.D. Wasserman (ANZA PUB).
5. Introduction to applied Fuzzy Electronics-Ahmad M.Ibrahim (PHI)
6. Introduction to artificial neural systems - by J.M. Zurada.(Jaico Pub)
7. An introduction to Fuzzy control - by D. Driankor, H. Hellendorn, M. Reinfrank (Narosa Pub.)
8. Fuzzy Neural Control - by Junhong NIE & DEREK LINKERS (PHI)
9. Related IEEE/IEE publications
10. Fuzzy System Design Principles, Building Fuzzy IF-THEN Rule Bases – by Riza C.Berkiu & Trubatch, IEEE Press

EC-506 Lab-I

Max. Marks: 100
Time Allowed: 2hrs

At least ten experiments are to be performed related to the subjects taught in 1st semester.