

BHAVNAGAR UNIVERSITY
B.E. SEM VII EC
EC-701 DIGITAL SIGNAL PROCESSING

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS | |
|-----------------|-----------|------------|--------------------|------|----------------|-------------|-----------|
| THEORY HOUR | TUT. HOUR | PRAC. HOUR | THEORY MARKS | HOUR | PRA/ORAL MARKS | | T/W MARKS |
| 4 | - | 2 | 100 | 3 | 50 | 25 | 175 |

SIGNALS & SYSTEM :

Basic elements of DSP. Advantage of Digital over analog signal processing. Classification of signals. A/D conversion. Classification of discrete time system. Linear convolution and its computation & properties. Difference equation and implementation of discrete time system. Application of DSP

ANALYSIS OF LTI SYSTEM :

Z transform and its properties,, inverse Z- transform, system functions, pole-zero plots, construction of system function using pole zero plot, stability Analysis.

ANALYSIS OF SIGNALS :

Review of Fourier transform and its properties, Discrete Fourier transform and its properties. Computation of DFT using different FFT algorithms like decimation in time and decimation in frequency FFT algorithm.

FLOW GRAPH AND FILTER STRUCTURE :

Block diagram presentation of structure. Different structure mechanism for FIR & IIR systems, signal flow graph presentation.

DIGITAL FILTER :

Introduction to IIR & FIR filter design. IIR filter design using impulse invariance and bilinear transformation. FIR filter design using window and frequency sampling methods.

BOOKS :

- 1 DISCRETE TIME SIGNAL PROCESSING BY ALAN V OPPENHEIN AND RONALD W SCHAFFER
2. DIGITAL SIGNAL PROCESSING A.V. OPPENNEIM & R.W. SCHA FOR PHI.
3. THEORY AND APPLICATION OF DIGITAL SIGNAL PROCESSING LAWRENCE R RABINER AND GOLD (PHI)
4. INTRODUCTION TO DIGITAL SIGNAL PROCESING JOHNNY R. JOHANSON PHI
5. DIGITAL FIBER ANALYSIS AND DESIGN ANDREAU ANTONIOU TMH.
6. DIGITAL SIGNAL PROCESSING BY PROKIS

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 702 ELECTIVE PAPER
(1) IMAGE PROCESSING

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | | TOTAL MARKS |
|-----------------|-----------|------------|--------------------|------|----------------|-----------|-------------|
| THEORY HOUR | TUT. HOUR | PRAC. HOUR | THEORY | | PRA/ORAL MARKS | T/W MARKS | |
| | | | MARKS | HOUR | | | |
| 3 | - | - | 100 | 3 | 00 | 00 | 100 |

1. Image representation:

Basic functions in digital image processing; Image model; Sampling and quantization; Basic relationships between pixels; Basic geometric transformations; 2-D function representation; Separable functions; 2-D convolution; 2-D correlation.

2. Image transforms:

2-D Discrete Fourier transform - properties; Walsh, Hadamard, Discrete Cosine, Haar and Slant transforms; The Hostelling transform.

3. Image enhancement:

Spatial and frequency domain _filtering methods; Histogram processing; Spatial mask generation; Color image processing

4. Image restoration:

Degradation model; Circulant matrix formulation for complexity reduction; Algebraic methods; Inverse _filtering; Wiener _filter methods; Constrained least squares method of restoration.

5. Image compression:

Fundamental concepts of image compression; Compression models; Information theoretic perspective; Fundamental coding theorem; lossy and lossless compression methods.

BOOKS:

1. R. C. Gonzales and R. E. Woods, \Digital Image Processing," Addison Wesley, 1992.
2. Anil K. Jain, \Fundamentals of Digital Image processing," Prentice Hall India, 1989.
3. Jae S. Lim, \Two Dimensional Signal and Image Processing," Prentice Hall Inc., Englewood Cli_s, New Jersey, 1990.
4. William K. Pratt, \Digital Image Processing," Wiley Interscience, New York, 2 nd edition,1991.
5. Rosenfield and A. C. Kak, \Digital Picture Processing," 2nd edition, Vols. 1 & 2, Academic Press, New York, 1982.
6. R. J. Schalkoff, \Digital Image Processing and Computer Vision," John Wiley & Sons, New York, 1989.

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 702 ELECTIVE PAPER
(2) SPEECH PROCESSING

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | | TOTAL MARKS |
|-----------------|-----------|------------|--------------------|------|----------------|-----------|-------------|
| THEORY HOUR | TUT. HOUR | PRAC. HOUR | THEORY | | PRA/ORAL MARKS | T/W MARKS | |
| | | | MARKS | HOUR | | | |
| 3 | - | -- | 100 | 3 | 00 | 00 | 100 |

1. SPEECH FUNDAMENTAL

Digital models for the speech signal - mechanism of speech production - acoustic theory - lossless tube models - digital models - linear predictive coding of speech - auto correlation - formulation of LPC equation - solution of LPC equations - levinson durbin algorithm - levinson recursion - schur algorithm - lattice formulations and solutions - PARCOR coefficients

2. SPEECH ANALYSIS

Spectral analysis of speech - short time fourier analysis - filter bank design - speech coding - subband coding of speech - transform coding - channel vocoder - formant vocoder - cepstral vocoder - vector quantizer coder

3. SPEECH SYNTHESIS

Speech synthesis - pitch extraction algorithms - gold rabiner pitch trackers - autocorrelation pitch trackers - voice/unvoiced detection - homomorphic speech processing - homomorphic systems for convolution - complex cepstrums - pitch extraction using homomorphic speech processing

4. SPEECH RECOGNIZATION

Automatic speech recognition systems - isolated word recognition - connected word recognition - large vocabulary word recognition systems - pattern classification - DTW, HMM - speaker recognition systems - speaker verification systems - speaker identification systems

BOOKS:

1. Rabiner L.R. & Schafer R.W., "Digital Processing of Speech Signals", Prentice Hall Inc.
2. Thomas Parsons, "Voice and Speech Processing", McGraw Hill Series
3. Saito S. & Nakata K., "Fundamentals of Speech Signal Processing", Academic Press, Inc.
4. Owens F.J., "Signal Processing of Speech", Macmillan New Electronics
5. Papamichalis P.E., "Practical Approaches to Speech Coding", Texas Instruments, Prentice Hall
6. Rabiner L.R. & Gold, "Theory and Applications of Digital Signal Processing", Prentice Hall of India

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 702 ELECTIVE PAPER
(3) Satellite & space Communication

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | | TOTAL MARKS |
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| THEORY HOURS | TUT. HOURS | PRACT. HOURS | THEORY MARKS | HOURS | PRA/ORAL MARKS | T/W MARKS | |
| 3 | 0 | 0 | 100 | 3 | 00 | 00 | 100 |

1. INTRODUCTION :

Historical progress, orbits of satellite, Types - Low Medium Geo-stationary , Main characteristics angle, shape, period.

2. SATELLITE LINKS :

General characteristics, delay, transponders, earth station, antennas and earth coverage, attitude control, ellipses.

3. SATELLITE CONSTRUCTION :

Subsystems & functions, antennas, transponders, power supplies, command & telemetry, thrust & stabilization.

4. EARTH STATION :

General Block schematics, transmitter & receivers, antenna, system & tracking,, Multiplexing, space time & frequency multiplexing.

5. MULTIPLE ACCESS PRINCIPLES AND TECHNIQUE :

FDMA, Spade system, TDMA – system concept of configuration system timing, Frame format Basic principles of spread spectrum, Multiple access.

BOOKS :

1. J. ,Martin - Communication Satellites (PH)
2. J. J. Spilker – Digital Communication by Satellites (PH)
3. R.M. Gagliardi - Satellite Communication - CBS Publications
4. FEHER - Digital Communication with special Emphasis of to satellite Earth station Engineering (PH)
5. SATELLITES COMMUNICATION BY DENNIS RODDY.

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 702 ELECTIVE PAPER
(4) Medical Electronics

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS | |
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| 3 | 0 | 0 | 100 | 3 | 00 | 00 | 100 |

1. INTRODUCTION :

Electrical properties of Biological Tissues, Generation of cellular bio potentials, Sources of bioelectric potential, elementary aspects of volume conductor theory as it applies to the sources and measurement of ECG, EMG and EEG, Signal characteristics of ECG, EMG and EEG, special aspects of interfacing electronic equipment with the living body, signal modification by instrumentations, Body interface and safety consideration.

2. BIOMEDICAL TRANSDUCERS :

Principles of action, method of usage, Techniques for Testing Blood pressure, Blood flow, Blood PH, Respiration, Eyeforometer, Ultrasonic method in biomedical measurements.

3. RECORDING OF BIOMEDICAL EVENTS :

Kinds of electrodes, Amplifiers and display units used for recording bioelectric potentials, principles, specifications modes of working & testing procedures of ECG, EMG and EEG, Effect of noise, Isolation grounding and shielding Techniques.

4. MEDICAL IMAGING AND COMPUTER APPLICATIONS :

Production and use of X-ray , Laser Computer assisted tomography (CAT), Ultrasonic methods pulsed and Doppler, Elements of intensive care monitoring, patient monitoring system, Biomedical computer applications.

5. ELECTRONICS MEDICAL INSTRUMENTS :

Electronic pace makers, Defibrillators, Micro power Transmitter for Tele metering bio-signals, special characteristics of CRO in medial application, shortwave, Microwave, Diathermy, Basic study of complete pulse generator system for simulation of physiological waveforms.

BOOKS:-

1. ELECTRONIC INSTRUMENTATION FOR MEDICAL APPLICATION DR.R.S. KHANPUR
KOTHARI
PUBLICATION
2. BIOMEDICAL INSTRUMENTATION AND MEASUREMENTS LESLIE CROMWELL,
FRED J. WELLS ERICH
A. P. FEIFFER- PHI
3. PRINCIPLES OF APPLIED BIO-MEDICAL INSTRUMENTATION LA GEDDESS &
L E BOKER-JOHN
WILEY & SONS
NEW YORK..
4. INTRODUCTION TO MEDICAL ELECTRONICS S K GUHA
BHARTI BHAWAN,
PUNA

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 702 ELECTIVE PAPER
(5) EMBEDDED SYSTEM DESIGN

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS | |
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| 3 | 0 | 0 | 100 | 3 | 00 | 00 | 100 |

1. INTRODUCTION TO EMBEDDED SYSTEMS: -

Processor, Hardware and software in Embedded system, Memory Devices & Memory Organization. I/O devices and Buses in Embedded system, CISC, RISC, High performance processors, Embedded digital signal processors, New innovative processors for Embedded system.

2. DEVICES AND BUSES FOR DEVICE NETWORKS: -

I/O devices, timer and counter devices, serial communications, parallel communications, serial and parallel bus standards, devices and Embedded system like ROM, RAM, Timers, Interrupts,

3. DEVICE DRIVERS AND INTERRUPTS:

Serial and parallel port device driver, Programmable timing devices, Deadline and interrupt latency, Interrupt servicing Mechanism.

4. PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C AND C++:-

Software programming in assembly language and high level language. Program Elements like Macros, Functions, Modifiers, data types, Data structures, statements, loop, pointers, queues, stacks, list and ordered list, Embedded programming in C++

5. PROGRAM MODELING CONCEPTS IN PROCESSORS:-

Modeling processes for software analysis before software implementation, Programming models for event controlled or response time constrained real time programs, Modeling of multi-processor systems.

6. INTER PROCESS COMMUNICATION AND SYNCHRONIZATION OF PROCESSES, TASKS AND THREADS:-

Multiple processes in an application, problem of sharing data by multiple task and routines, IPC.

6. REAL TIME OPERATING SYSTEMS

Introduction to real time operating system, case studies of RTOS., HARDWARE SOFTWARE CO DESIGN IN EMBEDDED SYSTEM

BOOKS :

1. EMBEDDED SYSTEMS ARCHITECTURE, DESIGN AND PROGRAMMING BY RAJ KAMAL, TMH.
2. EMBEDDED MICRO-CONTROLLERS BY MAZIDI AND MAZIDI, PEARSON EDUCATION.

BHAVNAGAR UNIVERSITY**B.E.SEM-VII [EC]****EC-702: ELECTIVE PAPER****(6) ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS**

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS |
|-----------------|------------|--------------|--------------------|------|----------------|-------------|
| THEORY HOURS | TUT. HOURS | PRACT. HOURS | THEORY | | PRA/ORAL MARKS | |
| | | | MARKS | HOUR | | |
| 3 | 0 | 00 | 100 | 03 | 00 | 100 |

Introduction :

The AI problems, The Underlying Assumption. What is An AI Techniques. The Level of the Model, Criteria for success.

Problems and state space search:

Problems, Problem spaces and search, Defining the problems As a state space search, production systems, production characteristics. Production system characteristics and issues in the design of search programs

Heuristic Search Techniques:

Generate-and-test, Hill climbing, Best-First Search, Problem reduction, constraint satisfaction, Means-Ends Analysis.

Knowledge Representation Issues:

Representations And Mappings, Approaches to knowledge Representation

Using Predicate Logic:

Representation simple facts in Logic, Representing instance and task Relationships, computable functions and predicates, resolution. Representing Knowledge using rules. Procedural versus declarative knowledge, logic programming, Forward versus Backward reasoning.

Advance topics:

Game playing, Overview, and example domain, The Blocks world, components of A planning system, goal stack planning, Nonlinear, planning using constraint posting, Hierarchical planning, reactive systems, other planning Techniques.

Natural Language Processing:

Introduction, syntactic processing, semantic analysis, semantic analysis, discourse and pragmatic processing.

Connectionist models:

Introduction, Hopfield network, Learning in Neural Network, application of Neural Networks, Recurrent Networks, Distributed Representations, connectionist AI and symbolic AI.

Symbolic Reasoning under uncertainty:

Introduction to Non-monotonic Reasoning, Logics for Non-monotonic Reasoning.

Statistical Reasoning, Probability and Bay's Theorem, Certainty Factors and rules-base systems, Bayesian Networks, Dumpster, Shafter theory, fuzzy logic. Weak-slot and Filler structure, Semantic nets, frames.

Expert Systems:

An Introduction to expert system, explanation facilities, expert system developments process, knowledge acquisition.

Introduction to prolog:

Introduction to prolog: syntax & Numeric function, Basic list Manipulation functions in prolog, functions, predicates & conditional, input, output & local variables, iteration & recursion, property lists & Arrays, Miscellaneous topics, LISP & other All programming languages.

Practical and Term work:

The practical and term work will be based on the topics covered in the syllabus.

Text Book:

“Artificial intelligence” -By Elaine rich and Kevin Knight Tata McGraw-Hill

Introduction to prolog programming By Carl Townsend

Introduction to Artificial Intelligence and Expert System, Patterson, Pearson Education

Artificial Intelligence: Structure and strategies for complex problem solving, 4/e, Luger, Pearson Education

PROLOG Programming for Artificial intelligence -By Ivan Bratko (Addison-Wesley)

Programming with PROLOG -By Klocksinn and mellish.

BHAVNAGAR UNIVERSITY
B.E.SEM-VII [EC]
EC-702: ELECTIVE PAPER
(7) ADVANCE DATA COMMUNICATION

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS | |
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| | | | MARKS | HOUR | | | |
| 3 | 0 | 0 | 100 | 3 | 00 | 00 | |
| | | | | | | 100 | |

High Speed Digital Access: DSL, Cable Modems, and SONET:

DSL Technology: ADSL, Other DSL technologies

Cable Modem: Traditional cable networks, HFC networks, Shraing, CM and CMTS, DOCSIS

SONET: SONET devices, SONET frame, Frame transmission, Synchronous transport signals, STS-1, virtual tributaries, high rate services

Wireless LAN:

IEEE 802.11: Architecture, physical layers, MAC layers, addressing mechanism

Bluetooth: Architecture, Bluetooth layers, Radio layers, baseband layer, L2CAP, Other upper layers

VIRTUAL CIRCUIT SWITCHING: Frame Relay and ATM

Virtual circuit switching: Global addressing, virtual circuit identifier, three phases, data transfer phase, set up phase, teardown phase

Frame Relay: Architecture, Frame relay layers, FRADs, VOFR, LMI, Congestion control and QoS

ATM: Design goals, problems, architecture, switching, ATM layers, congestion control and QoS

NETWORK LAYER PROTOCOLS: ARP, IP, ICMP, IPV6,

UNICAST AND MULTICASTING PROTOCOLS:

Unicast Routing: Metric, interior and exterior routing

Unicast Routing Protocol: RIP, OSPF, BGP

Multicasting Routing: IGMP, Multicast trees, MBONE

Multicast Routing Protocols: DVMRP, MOSPF, CBT, PIM

Transport Layer Protocols : UDP and TCP

Client server paradigm, addressing, multiplexing and demultiplexing, connectionless versus connection oriented services, reliable versus unreliable

UDP: port numbers, user datagram, applications

TCP: port numbers, TCP services, numbering bytes, sequence numbers, segment, connection, state transition diagram, flow control, silly window syndrome, error control, congestion control

Multimedia:

Digitizing audio and video, Audio and video compression

Streaming stored video and audio: 1. using web server 2. using web server with metafile 3.using media server 4. using media server with RTSP

Streaming LIVE audio and video:

Real time interactive audio video: characteristics, real time transport protocol, RTCP

Voice over IP (VOIP): SIP and H.232

Cryptography:

Symmetric key cryptography: traditional ciphers, block ciphers, operation mode

Public key cryptography: RSA, Choosing public and private keys

Message security, User Authentication, and Key Management:

Message security: privacy, message authentication, integrity, nonrepudiation

Digital signature: signing, signing the digest

User authentication:

Key Management: symmetric key distribution and public key certification

KERBEROS: servers, operation, using different servers, Kerberos version 5, Realms

Security Protocols in the Internet:

IP Level security: IPSEC: association, two modes, protocols, payload

Transport level security: Position of TLS, two protocols

Application layer security: PGP

Firewalls: Packet filter firewall, proxy firewall

VPN: private networks, achieving privacy, VPN technology

Books:

1. Data Communication and Networking: By Behrouz Forouzan
2. Computer Networks: Andrew S Tenebaum

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 703 TELEVISION ENGINEERING

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | | TOTAL MARKS |
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B/W & COLOUR T.V. SYSTEM & TRANSMISSION FUNDAMENTALS.

Scanning, synchronization and blanking, composite video signal, CCIR- B standards, bandwidth requirements, modulation, VSB techniques, channel standards, sound transmission, compatibility, tricolor theory, luminance, hue, saturation, generation of color and color difference signals.

Video Camera and Picture Tubes:

Camera tubes, types, characteristics of Vidicon, Plumbicon and CCD tubes, gamma correction, color TV camera tubes. Various picture tubes and principles

TV Transmission :

Principles of B & W and color TV transmission, choice of color sub carrier, freq. Interleaving, color burst signal, important features of NTSC, PAL and SECAM systems, block diagram of TV studio, studio equipment.

MONOCHROME T.V. RECEIVERS :

Block diagram of T.V receiver, front panel controls, construction and working of monochrome TV receiver. Details of requirement, working, performance and characteristics of each stage of monochrome T.V. receiver.

COLOR TELEVISION RECEIVER :

Block diagram of color T.V receiver, detailed study of stages different from monochrome T.V receiver, different types of color picture tubes.

CABLE TELEVISION :

MATV, CCTV, CATV, Modern cable TV systems, Cable TV converters, Pay Television, DTH

ADVANCE IN TELEVISION TECHNOLOGY :

Projection Television, Stereo sound in television, 3D Television Pictures, Digital Television, Digital Equipment for TV studio, HDTV, Flat panel display, Color receivers of new generations, plasma television.

Video Cassette Recoding System: Principle, Need of biasing, VCR standards, types of VCR, recording methods, block diagram, input output systems, servo systems, fault finding and servicing.

TV Servicing equipments: Brief study of various TV servicing equipments

BOOKS :

1. Modern Television practice by R.G. Gulati , Willey Eastern.
2. Monochrome and color television. R.R. Gulati, Willey eastern
3. Television Engineering: Arvind M. Dhake, TMH
4. Basic Television transmission and reception : Maini Anil K .CBS Publishers
5. Color Television By R. R. Gulati, Willey eastern
6. Basic Television principles and servicing, Grob

Practical and term work shall be based upon the above syllabus.

BHAVNAGAR UNIVERSITY
B.E. SEM VII EC
EC-704 VLSI TECHNOLOGY & DESIGN

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS | |
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1. Fabrication of MOSFET:

Introduction, Fabrication Process flow: Basic steps, C-MOS n-Well Process, Layout Design rules, full custom mask layout design.

2. MOS Transistor:

The Metal Oxide Semiconductor (MOS) structure, The MOS System under external bias, Structure & Operation of MOS transistor, MOSFET Current-Voltage Characteristics, MOSFET scaling & small-geometry effects, MOSFET capacitances

3. MOS inverters: Static characteristics:

Introduction, Resistive load Inverter, Inverter with n type MOSFET load (Enhancement & Depletion type MOSFET load), CMOS Inverter

4. MOS inverters Switching characteristics and Interconnect Effects:

Introduction, Delay time definitions, Calculation of Delay times, Inverter design with delay constraints, Estimation of Interconnect Parasitic, Calculation of interconnect delay, Switching Power Dissipation of CMOS Inverters

5. Combinational MOS Logic circuits:

Introduction, MOS logic circuits with Depletion n MOS Loads, CMOS logic circuits, Complex logic circuits, CMOS Transmission Gates (TGs)

6. Sequential MOS Logic circuits:

Introduction, Behavior of Bistable elements, The SR latch circuit, Clocked latch & Flip-flop circuit, CMOS D-latch & Edge-triggered flip-flop

7. Dynamic Logic Circuits:

Introduction, Basic Principles of pass transistor circuits, Voltage Bootstrapping, Synchronous Dynamic Circuit Techniques, CMOS Dynamic Circuit Techniques, High-performance Dynamic CMOS circuits

8. Chip I/P and O/P circuits: On chip Clock Generation and Distribution, Latch –Up and its Prevention.

Design for testability: Introduction, Fault types and models, Controllability and observability, Ad Hoc Testable design techniques, Scan –based techniques, built-in Self Test (BIST) techniques, current monitoring IDDQ test

9. VHDL Programming: Data Flow & Structural Modeling using VHDL, Advanced level HDL Coding.

All VLSI design methodologies should be covered during Laboratory sessions.

One small Project per group of 2/3 students should be given as part of laboratory work

REFERENCE BOOKS:

1. CMOS Digital Integrated circuits – Analysis and Design by Sung – Mo kang, Yusuf, Leblebici, Third Edition. (TMH)
2. Basic VLSI Design By Puck Nell & Eshraghian, PHI, 3rd Ed.
3. Introduction to VLSI Systems by Mead C & Conway, Addison Wesley
4. Digital Integrated Circuits: A Design Perspective By Jan M. Rabaey, PHI
5. VHDL primer by J.Bhaskar, Addison Wesley, Pearson Ed.
6. VHDL by Douglas Perry (TMH)

BHAVNAGAR UNIVERSITY
B.E. SEM VII EC
EC-705 TELECOMMUNICATION & SWITCHING NETWORK

WEF JUNE 08

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1. Electronic switching systems:

Basics of a switching system - electronic space division switching - stored program control – Enhanced Services-Time division switching – Time division Space and Time division Time Switching-time multiplexed space switching - time multiplexed time switching - two stage, three stage and N-stage combination switching

2. Digital circuit switching networks:

Two-stage network - three-stage network - n-stage network - non-blocking switches - blocking probability analysis of multistage switches – lee approximation - improved approximate analysis of blocking switch - examples of digital switching systems - AT & T 5ESS and NTI - DMS 100 switching systems

3. Elements of traffic engineering:

Network traffic load and parameters - grade of service and blocking probability - incoming traffic and service time characterization - blocking models and loss estimates - delay systems

4. Telephone Networks:

Subscriber Loop System-Switching Hierarchy and Routing, Transmission Plan, Numbering Plan, Charging Plan,

5. Signaling:

Customer line signaling – out band signaling – in band signaling - PCM signaling -inter register signaling - common channel signaling principles - CCITT signaling system No: 7 - digital customer line signaling Introduction to ATM switching – Strict sense non block switch – self routing switches –Bense network – ATM routers – Design of typical switches.

6. Speech Digitization and Transmission:

Sampling, Quantization and Binary Coding , Companding, Differential Coding, Vocoders, Pulse Transmission, Line Coding

Text books

1. Viswanathan T., *Telecommunication Switching Systems and Networks*, Prentice Hall of India Pvt. Ltd.
2. Schwartz M., *Telecommunication Networks - Protocols, Modeling and Analysis*, Addison Wesley Publishing Company

Reference books

1. Flood J.E., *Telecommunications Switching Traffic and Networks*, Pearson Education Pvt. Ltd.
2. Freeman R.L., *Telecommunication System Engineering*, Wiley Inter Science Publications
3. Das J., *Review of Digital Communication*, New Age Internal (P) Ltd., Publishers

BHAVNAGAR UNIVERSITY
B.E. SEM VII (EC)
EC- 706 ELECTRONICS APPLICATION PRACTISE

WEF JUNE 08

| TEACHING SCHEME | | | EXAMINATION SCHEME | | | TOTAL MARKS | |
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| | | | MARKS | HOURS | | | |
| 0 | 0 | 4 | 00 | 00 | 50 | 50 | 100 |

student will carry out a project/application work based upon following guide lines.

1. Literature survey/ Design/ Fabrication/ Testing/ Evaluation of an Electronic & communication subsystem.
2. Repairing and preparation of maintenance chart/ Fault finding procedure for existing electronic & communication equipment's.
3. Software and/or hardware development work related to Analysis/ Synthesis/ Design for a selected advance topic in the field of electronics & communication.
4. The students have to design any electronic application in institute related to any of electronics & communication subjects and have to submit the working model of the same at the end of the term to department.

Term work will consist of exhaustive write up covering all aspects of the work done by the student on the selected electronic application work.