



VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT – 395 007

EC 702 EC: Digital Signal Processing
B E IV (Electronics & Communication) – 7th Semester

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme	100	25	Cont. Evaluation : 20
Marks			Examination : 30

- 1. Introduction:** Signals, Systems & Signal Processing, Classification of signals, The concept of frequency in continuous time and discrete time signals, Sampling theorem.
- 2. Discrete-time Signals and Systems :** Discrete-time signals : Sequences, Discrete time systems, Block diagram representation, Classification, Convolution representation of LTI systems, Analysis of Discrete time systems described by difference equations, Homogeneous, particular and total solution, zero input and zero state response, Implementation of Discrete Time systems, Correlation of discrete time signals.
- 3. The Z Transform:** Z Transform, Properties of Z transform, Rational Z Transform, Inverse Z transform, Transfer function representation, Analysis of LTI systems in Z domain, Causality & Stability, Pole-zero cancellations, Multiple order poles and stability.
- 4. Frequency Analysis:** Frequency analysis of discrete time signals, Fourier series and Power density spectrum of discrete time periodic signal. Fourier transform and Energy density spectrum of discrete time aperiodic signals. Relationships of the Fourier transform to Z-transform, Frequency domain classification and concept of bandwidth, Dualities, Relation of system function and frequency response and Computation of frequency response.
- 5. The Discrete Fourier Transform :** Frequency domain sampling : Discrete time Fourier transform (DTFT) and Discrete Fourier transform (DFT), Inverse DFT, Properties of DFT, Circular convolution, Linear convolution using DFT, Linear filtering methods based on the DFT.
- 6. The Fast Fourier transform (FFT) algorithms:** Divide and Conquer approach, Introduction to radix-2 FFTs, Decimation in time FFT, Decimation in frequency FFT, Computing the inverse DFT by using FFT.
- 7. Introduction to Digital Filters:** Causality & its Implications, Non-recursive digital filters-Finite Impulse Response (FIR) filters: Linear phase FIR filters, Filter design using Window, Frequency sampling method, Comparison of FIR and IIR filters. Recursive Digital Filters-Infinite Impulse Response (IIR) Filters: Analog approximations, Approximate derivatives, Impulse Invariance method, Bilinear transformation method, Matched Z-transform, Direct realization of digital filters using analog Butterworth & Chebyshev approximations.
- 8. Digital Signal Processors:** Differences from general purpose processors, Digital processing system and TMS family from TI, Generalized DSP architectures, Software developments, Hardware Issues, Choice of digital signal processors, Applications.

References :

1. John G Proakis & Dimitris G Manolakis, Digital Signal Processing : Principles, Algorithms, and Applications, Prentice Hall India, 3rd edition
2. R.A.Barapte,J.S.Katre, Digital Signal Processing, TechMax Pub., Pune
3. Manson H. Hayes, Digital Signal Processing, Schaum's outlines, TMH
4. P.Rameshbabu, Digital Signal Processing, Scitech Pub.,Pune.
5. Sen M. Kuo and Woon-Sen Gan, Digital Signal Processors: Architectures, Implementations and Applications, Low Price Edition.

EC 703 EC/ECC: Electronic System Design
B E IV (Electronics & Communication)7th Semester

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Ext Examination : 30

1. LINEAR POWER SUPPLIES: Basic operation, voltage regulator circuits, Power dissipation in series pass transistor, Out put resistance , load and line regulation, protection circuits: fold-back, thermal and Crowbar, Three- terminal regulators(fixed regulator), voltage adjustment and current boosting of fixed regulators, Dual – track voltage regulator, Merits and drawbacks of linear regulators.

2. SWITCHING POWER SUPPLY: Basic operations, choice of switching frequency-operation and design of different types of switching regulators, buck type, boost type, buck-boost type, isolated multi-winding SMPS: push-pull, fold back and fly back configuration (discontinuous mode),Design of filter inductors and high frequency transformers, Feedback loop stabilization, Merits & Demerits of SMPS.

3. ANALOG ELECTRONICS CONTROLLER: Fundamentals of Process Control, Discontinuous and continuous controllers, ON-OFF, multiposition, floating and P, PD, PI, PID Controllers- Realization for system with known parameters using analog electronics components.

4.FUNCTION GENERATION: Realization of functions: square, square root, Analog Scheme using op-amps and analog multiplier ICs., Digital function generation scheme using ADC, DAC, EPROM device and Microcontroller 8051. Analog multiplexer and its use in waveform generation.

5. 8051 MICROCONTROLLER ARCHITECTURE AND PROGRAMMING: Review of 8051 family and its architecture, Assembly Language, Data Transfer and Addressing Modes, Arithmetic, Logical, Branch, Subroutine Instructions and Programming, Bit manipulations, Machine cycle and Time delay calculations.

6. PERIPHERALS OF 8051: I/O port programming, Timer/Counter Programming, Serial communication, Interrupt Programming, Interfacing of LCD, keyboard, ADC, DAC. Digital function generation scheme using DAC and Microcontroller - 8051.

References:

1. K.R. Botkar, Integrated Circuits, 2002 Khanna Publishers.
2. Ramakant Gaikwad, OPAMP and Linear Integrated Circuits, PHI.
3. Ebrahim Pressman, Design of Switch mode Power Supply Design, McGraw Hill, 1992
4. Ned Mohan,Undeland,William Robbins, Power Electronics, John Wiley,2nd Edition.
5. Johnson Curtis D., Process control instrumentation technology, Prentice Hall India 1997.
6. Mazidi Muhammad, 8051 Microcontroller and embedded systems, 2000 Pearson Education Asia.
7. Keneth Ayala, 8051 Microcontroller, PHI.

EC 802 EC/ECC: CELLULAR MOBILE TECHNOLOGY
B E IV (Electronics & Communication)– 8th Semester

	Lecture	Tutorial	Practical
Teaching Hours	3	0	0
Examination Scheme Marks	100	00	Cont. Evaluation : 00 Examination : 00

1. Introduction to Cellular Mobile Systems – A basic cellular system, Operation of a cellular system, performance criteria, Planning a cellular system, Evolution, Trends and Development of Cellular systems.

2. Elements of Cellular System Design- concepts of frequency reuse, clustering, Geometry of Hexagonal cells and derivation of frequency reuse factor and frequency reuse distance, co-channel and adjacent channel interference, derivation of desired C/I from a normal case in an omni directional antenna system, cell splitting, cell sectorization, Call blocking probability and Erlang B formula (Trunking and Grade of Services), Channel assignment strategies.

3. Handoffs and Dropped Calls- Handoff Mechanism, Value of Implementing Handoffs, Initiation of Handoff, Delaying a Handoff, Forced Handoff, Queuing of Handoffs, Power difference Handoffs, MAHO and Soft Handoff, Cell-site Handoff only, Intersystem Handoff, Introduction to Dropped Call Rate.

4. Modern Cellular Mobile Systems: Evolution, Features and comparison of 2G, 2.5G, 3G systems, Features of 4G, Introduction to WLL and user requirements.

5. Digital Cellular Mobile Systems-Introduction to GSM, BSS, NSS, OSS, GSM reference architecture, Radio aspects, GSM channels and channel modes, Typical Call Flow Sequence, Multiple access scheme, Different types of time slot, Burst and Training sequence, Channel coding and Interleaving, Signal Processing in GSM, Radio Resource Management, Mobility Management, Communication Management, Network Management.

6. CDMA – Introduction and comparison with TDMA,FDMA, CDMA digital cellular standard, output power limit and control, CDMA reverse link and power control, Modulation characteristics, interleaving, Access channel and reverse traffic channel, Forward CDMA channel, power control sub channel, Features of IS – 95 CDMA, Diversity, Power control, Soft handoff.

7. CDMA Systems- system capacity equation, Linear feedback shift register and MLS sequences, PN sequence generation and Walsh coding/decoding.

8. IMT 2000-3G Mobile communication Systems- Introduction, IMT-2000 Radio Aspects.

References:

1. Mobile Cellular Telecommunications, Analog and Digital Systems –William C. Lee, McGraw Hill International Edition 1995
2. Mobile and Personal Communication Systems and Services – Raj Pandya ,PHI 2002
3. Wireless Communication- Theodore Rappaport, PHI publication
4. Principles and applications of GSM – Vijay K. Garg, Joseph E. Wilkes, LPE, Pearson Education
5. IS-95 CDMA and CDMA 2000 – Vijay K. Garg, Joseph E. Wilkes, LPE, Pearson Education
6. Wireless and Cellular Communication – Sanjay Sharma, S.K. Kataria and Sons.
7. Wireless Communication – Sanjay Sharma , S.K. Kataria and Sons

EC 818 ECC: INFORMATICS
[ELECTIVE 1.4, GROUP-I]

B E IV (Electronics & Communication.) – 8th Semester

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

1. LOCAL AREA NETWORKS

IEEE 802 Protocols,
 802.1 {Internetworking),
 802.2(LLC),802.3 (CSMA/CD),
 802.4 (Token bus),
 802.5 (Token Ring),
 Fast Ethernet: FDDI,

2. ADVANCED TOPOICS ON LAN:

Wireless LAN 802.11, CSMA / CA
 802.11 ARCHITECTURE
 802.11 Services
 802.11 medium Access Control
 802.11 physical layer
 Basics of Bluetooth

3. METROPOLITAN AREA NETWORK:

Metropolitan Area Network (IEEE 802.6)
 SMDS -- Switched Multimegabit Data Services.

4. FRAME RELAY SERVICES:

Introduction
 Frame Relay Operation
 Layers & Implementation
 Congestion Control

5. INTERGRATED SERVICE DIGITAL NETWORK (ISDN):

Voice & Data Communication over Telephone Network, IDN, Introduction to ISDN,B,D & H Channels, BRI & PRI User Interfaces, Digital Subscriber Loop, Functional Grouping & Reference Points, The ISDN Layers, LAPB & LAPD Data Link Layer Protocols, X.25 Protocol, ISDN Standards & Services

6. BROADBAND ISDN:

Layered Model, Interactive & Distributive Services, B-ISDN Access Methods, and Comparison of ISDN & B-ISDN.

7. ASYNCHRONOUS TRANSFER MODE (ATM)

ATM Layered Model (Protocol Architecture), ATM Topology, ATM Cell & Headers, AAL & ATM Layers in Detail, ATM Switches, ATM LAN.

8. SONET/SDN

Synchronous Optical Network, Synchronous Transport Signal, Physical Configuration, The SONET Layers, The SONET Frame, Multiplexing STS Frames.

Reference:

1. Introduction to Data Communications & Networking by Behrowz Forouzan,Tata McGraw Hill, 1999.
2. Data & Computer Communication by William Stallings, McMillan, 5th edition, 1998.
3. Computer Networks by Andrew S. Tanenbaum, PHI, 3rd edition, 1998.
4. 802-11 Wireless Networks: The Definitive Guide, Gast Matthew.S, 2nd Ed, Oreilly Publication
5. ISDN and Broadband ISDN with Frame Relay and ATM, Stallings William, 4th ed, PHI

EC 830 EC: VLSI Circuits
B E IV (EC) - 8th Semester 2008

	Lecture	Tutorial	Practical
Teaching Hours	3	1	--
Examination Scheme Marks	100	25	

Sr No	Topic name
1	CMOS Logic circuits
	<ul style="list-style-type: none"> ➤ Introduction ➤ MOS Transistors, CMOS Logic, Compound gates, Pass transistors and transmission gates, Tristates, Multiplexers, Latches, Flip-flops ➤ CMOS Inverter fabrication and processing technology
2	MOS Transistor Theory
	<ul style="list-style-type: none"> ➤ NMOS and PMOS transistors regions of operation, Ideal I-V characteristic, MOS capacitance model ➤ DC transfer characteristic, Beta (β) ratio effects, Noise margin ➤ Pass transistor DC characteristic ➤ Tristate inverter ➤ Switch level RC delay model
3	CMOS Circuit characterization and performance Estimation
	<ul style="list-style-type: none"> ➤ Delay Estimation, RC Delay model, Elmore delay model, linear delay model, parasitic delay ➤ Logical Effort and transistor sizing ➤ Power dissipation in CMOS gates, Static & Dynamic dissipation ➤ Interconnect: Resistance, capacitance, delay, crosstalk,
4	Combinational Circuit design
	<ul style="list-style-type: none"> ➤ Static CMOS, skewed gates, Dynamic circuits, Domino logic ➤ Half adder and full adder design, carry ripple adder, transmission gate adder, carry generation and propagation adder, subtractor
5	ASIC Design
	<ul style="list-style-type: none"> ➤ VLSI Design Flow ➤ Design methodology and tools ➤ Structured design techniques ➤ Types of ASICs, Full-Custom ASICs, Standard-Cell-Based ASICs, Gate-Array-Based ASICs, ➤ Programmable logic array (PLA), Programmable array logic(PAL), Programmable logic devices (PLD), CPLD ➤ Field Programmable gate arrays (FPGA) Types and Structure, Programmable ASICs: The Anti fuse, Static RAM, EPROM and EEPROM Technology
6	IC Packaging
	Package options, chip to package connections
7	Introduction to HDL
	What Is VHDL, Capabilities, Hardware Abstraction, Basic Terminology, Entity Declaration, Architecture Body, Configuration declaration, Package Declaration, Package Body, Model Analysis
8	Basic Language Elements
	Identifiers, Data Objects, Data Types, Operators

9	Behavioral Modeling
	Entity Declaration, Architecture Body, Process Statement, Variable Assignment Statement, Signal Assignment Statement, Wait Statement, If Statement, Case Statement, Null Statement, loop Statement, Exit Statement, Next Statement, Assertion Statement, Report Statement, More on Signal Assignment Statement, Other Sequential Statements, Multiple Processes, Postponed Processes
10	Dataflow Modeling
	Concurrent Signal Assignment Statement , Concurrent versus Sequential Signal Assignment, Delta Delay Revisited, Multiple Drivers, Selected Signal Assignment Statement, The UNAFFECTED Value, Block Statement, Concurrent Assertion Statement, Conditional Signal Assignment Statement, Value of a Signal,
11	Structural Modeling
	An Example, Component Declaration, Component Instantiation, Other Examples, Resolving Signal Values.
12	Synthesis and Design Implementation
	Design Synthesis, FPGA and CPLD case study, To use a CPLD or an FPGA

References

1. *“VHDL primer”*, J Bhaskar, 3rd edition, Addison Wesley Longman Singapore, (Pearson Education Asia 2000)
2. *“CMOS VLSI Design A circuit and systems perspective”*, Neil Weste, David Harris, 3rd Ed, Pearson Education
3. *Application Specific Integrated Circuits*, by Michael John Sebastian Smith, Addison Wesley Longman Singapore Pte Ltd (Pearson Education Asia 2000)
4. *“Introduction to VLSI Circuits and Systems”*, John P Uyemura, Wiley India Edition
5. *“VHDL for programmable logic”* by Kevin Skahill, Pearson Education 2006
6. *“Modern VLSI Design”* by Wayne Wolf, 3rd Ed, PHI
7. *“FPGA based System Design”*, Wayne Wolf, Pearson Education 2005