2007-2008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

III Year **I Semester**

COURSE STRUCTURE

Code	Subject	T	P	C
	Managerial Economics and Financial Analysis	4+1*	-	4
	Computer Organization	4+1*	-	4
	Linear IC Applications	4+1*	-	4
	Digital IC Applications	4+1*	-	4
	Antennas and Wave Propagation	4+1*	-	4
	Digital Communications	4+1*	-	4
	Digital Communications Lab.	-	3	2
	IC Applications and ECAD Lab.	-	3	2
		30	6	28

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	4+1*	**0**	**4**

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

UNIT I

INTRODUCTION TO MANAGERIAL ECONOMICS : Definition, Nature and Scope Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

UNIT II

ELASTICITY OF DEMAND : Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting**).**

UNIT III

THEORY OF PRODUCTION AND COST ANALYSIS : Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis : Cost concepts, Opportunity cost, Fixed Vs.Variable costs, Explicit costs Vs.Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-termination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.

UNIT IV

INTRODUCTION TO MARKETS & PRICING STRATEGIES : Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Strategies

UNIT V

BUSINESS & NEW ECONOMIC ENVIRONMENT : Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT VI

CAPITAL AND CAPITAL BUDGETING : Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

UNIT VII

INTRODUCTION TO FINANCIAL ACCOUNTING : Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VIII

FINANCIAL ANALYSIS THROUGH RATIOS : Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXTBOOKS :

1. Managerial Economics and Financial Analysis – Aryasri, TMH,2/E, 2005.
2. Managerial Economics - Varshney & Maheswari, Sultan Chand, 2003.

REFERENCES :

1. Financial Accounting for Management - Ambrish Gupta, Pearson Education, New Delhi, 2004.
2. Financial Accounting - Schaum's Outlines, Shim &Siegel,TMH, 2/E,2004
3. Production and Operations Management – Chary, TMH, 3/e, 2004.
4. Managerial Economics In a Global Economy - Domnick Salvatore, Thomson, 4th Edition 2003.
5. Financial Accounting—A Managerial Perspective – Narayanaswamy, PHI, 2005
6. Managerial Economics - Peterson & Lewis, Pearson Education, 4th Edition, 2004
7. Managerial Economics& Financial Analysis - Raghunatha Reddy & Narasimhachary, Scitech, 2005.
8. Financial Accounting - S.N.Maheswari & S.K. Maheswari, Vikas, 2005.
9. Managerial Economics:Analysis, Problems and Cases - Truet and Truet, Wiley, 2004.
10. Managerial Economics – Dwived, Vikas, 6th Ed.,2002
11. Managerial Economics - Yogesh Maheswari, PHI, 2nd Ed., 2nd Ed. 2005.

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COMPUTER ORGANIZATION

UNIT-I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.

Data types, Complements, Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language. Register Transfer, Bus and memory transfer, Arithmetic Mircro operatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle. Memory – Reference Instructions. Input – Output and Interrupt.

CENTRAL PROCESSING UNIT - Stack organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer

UNIT-III

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, Design of control unit-Hard wired control. Micro programmed control

UNIT-IV

COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT-V

THE MEMORY SYSTEM : Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware

UNIT-VI

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Serial communication;

UNIT-VII

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT-VIII

MULTI PROCESSORS: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration. Interprocessor Communication and Synchronization, Cache Coherance.

TEXT BOOKS:

1. Computer System Architecture – M.Moris Mano, IIIrd Edition, PHI / Pearson, 2006.
2. Computer Organization – Car Hamacher, Zvonks Vranesic, Safwat Zaky, V Edition, McGraw Hill, 2002.

REFERENCE:

1. Computer Organization and Architecture – William Stallings Seventh Edition, PHI/Pearson, 2006.
2. Computer Architecture and Organization – John P. Hayes, Mc Graw Hill International editions, 1998.

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LINEAR IC APPLICATIONS

UNIT I

INTEGRATED CIRCUITS : Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II

Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps,Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT III

LINEAR APPLICATIONS OF OP- AMPS : Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers.

UNIT IV

NON-LINEAR APPLICATIONS OF OP- AMPS : Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT V

OSCILLATORS AND WAVEFORM GENERAGTORS : Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and all pass filters. Applications of VCO (566).

UNIT VI

TIMERS & PHASE LOCKED LOOPS : Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators.

UNIT VII

D to A & A to D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, Specifications AD 574 (12 bit ADC).

UNIT VIII

ANALOG MULTIPLIERS AND MODULATORS : Four Quadrant multiplier, balanced modulator, IC 1496, Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

TEXT BOOKS :

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

REFERENCES :

1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.
2. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition.
3. Micro Electronics – Millman, McGraw Hill,1988.
4. Operational Amplifiers – C.G. Clayton, Butterworth & Company Publ. Ltd./ Elsevier, 1971.

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DIGITAL IC APPLICATIONS

UNIT I

CMOS LOGIC : Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT II

BIPOLAR LOGIC AND INTERFACING : Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT III

THE VHDL HARDWARE DESCRIPTION LANGUAGE : Design flow, program structure, types and constants, functions and procedures, libraries and packages.

UNIT IV

THE VHDL DESIGN ELEMENTS : Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT V

COMBINATIONAL LOGIC DESIGN : Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT VI

DESIGN EXAMPLES (USING VHDL) : Design examples (using VHDL) - Barrel shifter, comparators, floating-point encoder, dual parity encoder.

UNIT VII

SEQUENTIAL LOGIC DESIGN : Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

UNIT VIII

MEMORIES : ROMs : Internal structure, 2D-decoding commercial types, timing and applications. Static RAM: Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS.
Dynamic RAM : Internal structure, timing, synchronous DRAMs. Familiarity with Component Data Sheets – Cypress CY6116,CY7C1006, Specifications.

TEXT BOOKS :

1. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. VHDL Primer – J. Bhasker, Pearson Education/ PHI,3rd Edition.

REFERENCES :

1. Digital System Design Using VHDL – Charles H. Roth Jr., PWS Publications,1998.
2. Introduction to Logic Design – Alan B. Marcovitz,TMH,2nd Edition,2005.
3. Fundamentals of Digital Logic with Verilog Design – Stephen Brown, Zvonko Vransesic, TMH, 2003.
4. Cypress Semiconductors Data Book(Download from website).
5. Fundamentals of Digital Logic with VHDL Design – Stephen Borwn and Zvonko Vramesic, McGraw Hill,2nd Edition.,2005.
6. Linear Integrated Circuit Applications by K. Lal kishore, Pearson Educations 2005

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ANTENNAS AND WAVE PROPAGATION

UNIT I

ANTENNA FUNDAMENTALS : Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna . Antenna Parameters] - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Beam Area, Radiation Intensity, Beam Efficiency, Directivty, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Hight. Related Problems.

UNIT II

Thin Linear Wire Antennas: Retarded Potentials, Radiation from Small Electric Dipole, Quarterwave Monopole and Halfwave Dipole – Current Distributions, Evaluation of Field Components, Power Radiated, Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Hight. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which is not current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics, Loop Antennas : Small Loops - Field Components, Comparison of far fields of small loop and short dipole, Concept of short magnetic dipole, D and Rr relations for small loops.

UNIT III

ANTENNA ARRAYS : 2 element arrays – different cases, Principle of Pattern Multiplication, N element Uniform Linear Arrays – Broadside, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Directivity Relations (no derivations). Related Problems. Binomial Arrays, Effects of Uniform and Non-uniform Amplitude Distributions, Design Relations.

UNIT IV

NON-RESONANT RADIATORS : Introduction, Travelling wave radiators – basic concepts, Longwire antennas – field strength calculations and patterns, V-antennas, Rhombic Antennas and Design Relations, Broadband Antennas: Helical Antennas – Significance, Geometry, basic properties; Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

UNIT V

VHF, UHF AND MICROWAVE ANTENNAS - I : Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Reflector Antennas : Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics,types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrainian Feeds].

UNIT VI

VHF, UHF AND MICROWAVE ANTENNAS - II : Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications. Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

UNIT VII

WAVE PROPAGATION - I: Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

UNIT VIII

WAVE PROPAGATION – II: Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations. Space Wave Propagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-curves and Duct Propagation, Tropospheric Scattering.

TEXT BOOKS :

1. Antennas for All Applications – John D. Kraus and Ronald J. Marhefka, TMHI, 3rd Edn., 2003.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCES :

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 2nd ed., 2001.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill, SECOND EDITION, 1988.

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DIGITAL COMMUNICATIONS

UNIT I

PULSE DIGITAL MODULATION : Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems. Differential PCM systems (DPCM).

UNIT II

DELTA MODULATION : Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT III

DIGITAL MODULATION TECHNIQUES : Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT IV

DATA TRANSMISSION : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK.

UNIT V

INFORMATION THEORY : Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties,

UNIT VI

SOURCE CODING : Introductions, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT VII

LINEAR BLOCK CODES : Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

UNIT VIII

CONVOLUTION CODES : Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOKS :

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCES :

1. Digital and Analog Communication Systems - Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.
3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

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DIGITAL COMMUNICATIONS LAB

1. Pulse Amplitude Modulation and demodulation.
2. Pulse Width Modulation and demodulation.
3. Pulse Position Modulation and demodulation.
4. Sampling Theorem – verification.
5. Time division multiplexing.
6. Pulse code modulation.
7. Differential pulse code modulation.
8. Delta modulation.
9. Frequency shift keying.
10. Phase shift keying .
11. Differential phase shift keying.

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators - 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

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IC APPLICATIONS AND ECAD LAB

Minimum Twelve Experiments to be conducted : (Six from each part A & B)

Part A (IC Application Lab):

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order)
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.

Part B (ECAD Lab):

Simulate the internal structure of the following Digital IC's using VHDL / VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

1. D Flip-Flop 7474
2. Decade counter-7490
3. shift registers-7495 7
4. 3-8 Decoder -74138
5. 4 bit Comparator-7485
6. 8 x 1 Multiplexer -74151 and 2x4 Demultiplexer-74155
7. RAM (16x4)-74189 (Read and Write operations)

Equipment required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. IC Trainer Kits (Optional)
6. Bread Boards
7. Components:- IC741, IC555, IC566, IC1496, IC723, 7805, 7809, 7912 and other essential components.
8. Analog IC Tester

For Software Simulation

1 Computer Systems
2 LAN Connection (Optional)
3 Operating Systems
4 VHDL/ VERILOG
5 FPGAS/CPLDS (Download Tools)