UNIVERSITY DEPARTMENTS

ANNA UNIVERSITY CHENNAI :: CHENNAI 600 025

REGULATIONS – 2008

CURRICULUM FROM III & IV SEMESTERS FOR

B.E.ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER III

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
MA 9211	Mathematics III	3	1	0	4
EE 9211	Electrical Engineering	3	0	0	3
EC 9201	Electromagnetic Fields and Waves	3	0	0	3
EC 9202	Electronic Circuits- I	3	0	0	3
CS 9211	Data Structures and Object Oriented Programming in C++	3	0	0	3
EC 9203	Signals and Systems	3	1	0	4
PRACTICAL					
EE 9212	Electrical Machines Lab	0	0	3	2
EC 9204	Electronic Circuits-I Lab	0	0	3	2
CS 9212	Data Structures and Object Oriented Programming Lab	0	0	3	2
	TOTAL	**18**	**2**	**9**	**26**

SEMESTER IV

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
MA 9263	Probability and Random Processes	3	1	0	4
EC 9251	Digital Electronics and System Design	3	1	0	4
EC 9252	Electronic Circuits- II	3	1	0	4
EC 9253	Communication Systems	3	0	0	3
EC 9254	Control Systems	3	1	0	4
EC 9255	Computer Architecture and organization	3	0	0	3
PRACTICAL					
EC 9256	Electronics Circuits- II Lab	0	0	3	2
EC 9257	Digital System Lab	0	0	3	2
GE 9371	Communication Skills and Soft Skills lab	0	0	2	1
	TOTAL	**18**	**4**	**8**	**27**

MA 9211 MATHEMATICS III 3 1 0 4

(Common to all branches of BE / B.Tech Programmes)

AIM

To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

OBJECTIVES

- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic
- To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes
- To develop Z- transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems

UNIT I FOURIER SERIES 9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval's identity – Harmonic Analysis.

UNIT II FOURIER TRANSFORM 9+3

Fourier integral theorem – Fourier transform pair-Sine and Cosine transforms – Properties – Transform of elementary functions – Convolution theorem – Parseval's identity.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange's Linear equation – Integral surface passing through a given curve – Solution of linear equations of higher order with constant coefficients.

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9+3

Method of separation of Variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in Cartesian coordinates.

UNIT VI Z – TRANSFORM AND DIFFERENCE EQUATIONS 9+3

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Initial and Final value theorems – Formation of difference equation – Solution of difference equation using Z-transform.

L: 45, T: 15, Total : 60

TEXT BOOKS

Grewal, B.S. "Higher Engineering Mathematics", Khanna Publications (2007)

REFERENCES

1) Glyn James, "Advanced Modern Engineering Mathematics, Pearson Education (2007)
2) Ramana, B.V. "Higher Engineering Mathematics" Tata McGraw Hill (2007).

3) Bali, N.P. and Manish Goyal, "A Text Book of Engineering 7th Edition (2007) Lakshmi Publications (P) Limited, New Delhi.

EE9211 ELECTRICAL ENGINEERING 3 0 0 3

AIM

To provide knowledge in the basic concepts of three phase circuits, electrical machines and power system.

PREREQUISTE

Electric circuit analysis

OBJECTIVE

To impart knowledge on

I. Three phase circuits
II. Principles of Electrical Machines
III. Various components of power system

UNIT I DC MACHINES 9

Construction of DC machines – theory of operation of DC generators – characteristics of DC generators. Operating principle of DC motors – types of DC motors and their characteristics – speed control of DC motors.

UNIT II TRANSFORMERS AND THREE PHASE CIRCUITS 9

Introduction – transformer principle of operation – transformer no–load phasor diagram – EMF equation of a transformer – transformer on–load phasor diagram – transformer construction – equivalent circuit of a transformer – regulation of a transformer – transformer losses and efficiency –auto transformers. Three-phase supply – star connection – Delta connection – power in three-phase systems – measurement of power in three-phase systems – comparison of star and delta - advantages

UNIT III INDUCTION MACHINES 9

Construction of single-phase motors – types of single phase motors – double revolving field theory – starting methods – capacitor start capacitor run motors – shaded pole – repulsion type. Principle of operation of three-phase induction motors – construction – types – equivalent circuit – starting and speed control.

UNIT IV SYNCHRONOUS MACHINES 9

Principles of alternator – construction details – types – equation of induced EMF – voltage regulation. Methods of starting of synchronous motors – torque equation – V curves – synchronous condensers .

UNIT V INTRODUCTION OF POWER SYSTEMS 9

Structure of electrical Power system –typical AC power supply scheme –types of power plants –Variable load on Power plants-Interconnected grid system- transmission & distribution of electrical energy –over head Vs Underground system –Protection of power system –substation –types of tariff –power factor improvement

Total: 45

TEXT BOOKS

1. I.J Nagarath and Kothari DP 'Electrical Machines ' Tata McGraw Hill ,1997
2. Del Toro 'Electrical Engineering Fundamentals' Pearson Education, New Delhi, 2007.
3. John Bird 'Electrical Circuit theory and technology' Elsevier, First Indian Edition, 2006.

REFERENCES

1. Rajendra Prasad 'Fundamentals of Electrical engineering' Prentice Hall of India, 2006.
2. Thereja .B.L 'Fundamentals of Electrical Engineering and Electronics' S chand & Co Ltd, 2008
3. V.K Mehta and Rohit Mehta ' Principle of Electrical Engineering' S Chand & Company,2008

EC 9201 ELECTROMAGNETIC FIELDS AND WAVES 3 0 0 3

UNIT I STATIC ELECTRIC FIELD 9

Introduction to co-ordinate systems , Gradient , Divergence , Curl , Divergence theorem, Stokes theorem , Coulombs law , Electric field intensity , Principle of superposition , Electric scalar potential , Electric flux density. Gauss's law and its application, Permittivity, Polarization, Boundary relation, Capacitance, Dielectric strength ,Energy and Energy density, Poisson and Laplace equation and their application, Numerical problems

UNIT II STATIC MAGNETIC FIELD 9

Magnetic field of a current carrying element ,Amperes law , The Biot – Savart law , Magnetic flux Density and Field intensity , Gauss law for magnetic fields , Torque, Magnetic moment ,Magneto motive force , Permeability , Vector potential , Field computation. Inductance, Energy in an Inductor and Energy density, Boundary relation, Hysterisis, Reluctance and Permeance. Numerical problems

UNIT III TIME VARYING ELECTRIC AND MAGNETIC FIELDS 9

Faradays law , Transformer and Mutual induction ,Maxwell's equation , Self and Mutual inductance ,Displacement current , Amperes law and its inconsistency for time varying fields , Boundary relation , Poynting vector , Comparison of field and circuit theory , Numerical problems.

UNIT IV PLANE EM WAVES IN ISOTROPIC MEDIA 9

Wave equation from Maxwell's Equation, Uniform plane waves in perfect dielectric and conductors, Polarization, Reflection and Refraction of plane waves at different boundaries, Surface impedance, Numerical problems

UNIT V APPLICATION OF STATIC FIELDS AND COMPUTATIONAL METHODS 9

Deflection of a charged particle, CRO, Ink Jet Printer, Electro static generator, Magnetic Separator, Cyclotron, Velocity selector and Mass Spectrometer, Electromagnetic pump, Introduction to field computation methods-FDM,FEM,MOM , Numerical problems

Total : 45

TEXT BOOK:

1. David .K.Cheng, "Field and wave Electromagnetics" , 2nd edition, Pearson education, 2004.
2. Mathew.N.O.Sadiku, "Elements of Electromagnetics", Oxford University Press,2006

REFERENCE:

1. Karl E.Longman and Sava V.Savov, "Fundamentals of Electro-Magnetics", Prentice Hall of India, 2006
2. Kraus, Fleisch, "Electromagnetics with Applications", McGraw-Hill, 2005
3. W.H.Hayt and A.Buck,"Engineering ElectroMagnetics" , 7th Edition, Mcgraw Hill,2006
4. Ashutosh Pramanik," ElectroMagnetism" ,Prentice Hall of India, 2006
5. Nannapaneni Narayana Rao," Elements of Engineering ElectroMagnetics", 6th edition, Prentice Hall of India, 2006

EC 9202 ELECTRONIC CIRCUITS - I 3 0 0 3

UNIT I BIASING OF DISCRETE BJT AND MOSFET 9

DC Load line , operating point, Various biasing methods for BJT-Design-Stability-Bias compensation, Thermal stability, Design of biasing for MOSFET and JFET **-**

UNIT II BJT AMPLIFIERS 9

Small signal Analysis of Common Emitter-AC Loadline, Voltage swing limitations, Common collector and common base amplifiers – JFET amplifiers - Differential amplifiers-CMRR- Darlington Amplifier-Bootstrap technique - Cascaded stages - Cascode Amplifier

UNIT III MOSFET AMPLIFIERS 9

Small signal Analysis of Common source, Source follower and Common Gate amplifiers - CMOS Inverters –DC Analysis of CMOS Inverters – Voltage transfer curve – BiMOS Cascode - Design of NMOS inverter using resistive load – Noise Margin – VTC.

UNIT IV IC MOSFET AMPLIFERS 9

Single stage IC MOS amplifiers – Active Loads – Depletion MOS, Enhancement MOS, MOS in Triode region, NMOS current source and PMOS Current source, their equivalent circuits and load line on the VI characteristics– Current steering circuit using MOSFET –– CMOS common source amplifier and CMOS Common source follower – CMOS differential amplifier - CMRR

UNIT V HIGH FREQUENCY ANALYSIS AND LARGE SIGNAL AMPLIFIERS 9

Short circuit current gain , cut off frequency – f_α and f_β unity gain and bandwidth - Miller effect–frequency Analysis of CS and CE Amplifiers-Determinations of BW of Single stage and Multistage Amplifier- Analysis of Class A, Class B, Class AB with darlington output stage and with output stage utilizing MOSFETs – Class C, Class D, Class E power amplifiers.

L:45,T:15
Total: 60

TEXT BOOK:

1. Adel .S. Sedra, Kenneth C. Smith, Micro Electronic circuits, 5th Edition, Oxford University Press, 2004.
2. Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd edition,Tata McGraw Hill, 2007.

REFERENCE:

1. Behzad Razavi, " Design of Analog CMOS Integrated Circuits", Tata McGraw Hill, 2007.
2. . Paul Gray, Hurst, Lewis, Meyer "Analysis and Design of Analog Integrated Circuits", 4th Edition , John Willey & Sons 2005
3. Millman .J. and Halkias C.C, "Integrated Electronics", McGraw Hill, 2001.
4. D.Schilling and C.Belove, "Electronic Circuits", 3rd edition, McGraw Hill, 1989.

CS 9211 DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING IN C++ 3 0 0 3

AIM

To provide an in-depth knowledge in problem solving techniques and data structures.

OBJECTIVES

- To learn the systematic way of solving problems
- To understand the different methods of organizing large amounts of data
- To learn to program in C++
- To efficiently implement the different data structures
- To efficiently implement solutions for specific problems

UNIT I PRINCIPLES OF OBJECT ORIENTED PROGRAMMING 9

Introduction- Tokens-Expressions-contour Structures –Functions in C++, classes and objects, constructors and destructors ,operators overloading and type conversions .

UNIT II ADVANCED OBJECT ORIENTED PROGRAMMING 9

Inheritance, Extending classes, Pointers, Virtual functions and polymorphism, File Handling Templates ,Exception handling, Manipulating strings.

UNIT III DATA STRUCTURES & ALGORITHMS 9

Algorithm, Analysis, Lists, Stacks and queues, Priority queues-Binary Heap-Application, Heaps, skew heaps, Binomial –hashing-hash tables without linked lists

UNIT IV NONLINEAR DATA STRUCTURES 9

Trees-Binary trees, search tree ADT, AVL trees splay Trees, Graph Algorithms-Topological sort, shortest path algorithm network flow problems-minimum spanning tree applications of depth-first-search-Introduction to NP - completeness.

UNIT V SORTING AND SEARCHING 9

Sorting – Insertion sort, Shell sort, Heap sort, Merge sort, Quick sort, Indirect sorting, Bucket sort, Introduction to Algorithm Design Techniques –Greedy algorithm, Divide and Conquer, Dynamic Programming.

Total: 45

TEXT BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 3rd ed, Pearson Education Asia, 2007.
2. E. Balagurusamy, " Object Oriented Programming with C++", McGraw Hill Company Ltd., 2007.

REFERENCES

1. Michael T. Goodrich, "Data Structures and Algorithm Analysis in C++", Wiley student edition, 2007.
2. Sahni, "Data Structures Using C++", The McGraw-Hill, 2006.
3. Seymour, "Data Structures", The McGraw-Hill, 2007.
4. Jean – Paul Tremblay & Paul G.Sorenson, An Introduction to data structures with applications, Tata McGraw Hill edition, II Edition, 2002.
5. John R.Hubbard, Schaum's outline of theory and problem of data structure with C++, McGraw-Hill, New Delhi, 2000.
6. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley, 2000
7. Robert Lafore, Object oriented programming in C++, Galgotia Publication

EC 9203 SIGNALS AND SYSTEMS 3 1 0 4

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS 9

Continuous time signals (CT signals)- Discrete time signals (DT signals) – Step, Ramp, Pulse, Impulse, Exponential, classification of CT and DT signals –periodic and aperiodic signals, random signals, Energy & Power signals - CT systems and DT systems, Classification of systems.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS 9

Fourier series analysis- spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in Signal Analysis.

UNIT III LINEAR TIME INVARIANT –CONTINUOUS TIME SYSTEMS 9

Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis- State variable equations and matrix representation of systems.

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS 9

Baseband Sampling of CT signals- Aliasing, DTFT and properties, Z-transform & properties.

UNIT V LINEAR TIME INVARIANT –DISCRETE TIME SYSTEMS 9

Difference Equations-Block diagram representation-Impulse response-Convolution sum- DTFT and Z Transform analysis of Recursive & Non-Recursive systems- State variable equations and matrix representation of systems.

L:45+T:15
Total: 60

TEXTBOOK

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, Signals and Systems, Pearson, Indian Reprint, 2007.
2. Simon Haykins and Barry Van Veen, Signals and Systems John Wiley & sons, Inc. 2004.

REFERENCE

1. H P Hsu, Rakesh Ranjan“ Signals and Systems”, Schaum’s Outlines, Tata McGraw Hill, Indian Reprint ,2007
2. Edward W. Kamen, Bonnie S. Heck, Fundamentals of Signals and Systems Using the Web and MATLAB, Pearson, Indian Reprint, 2007
3. John Alan Stuller, An Introduction to Signals and Systems, Thomson, 2007
4. M.J.Roberts, Signals & Systems, Analysis using Transform methods & MATLAB, Tata McGraw Hill (India), 2007.
5. Robert A. Gabel and Richard A.Roberts, Signals & Linear Systems, John Wiley, III edition, 1987.

EE9212 ELECTRICAL MACHINES LABORATORY 0 0 3 2

1. Study of DC & AC Starters
2. Study of Transducers
3. Wheatstone Bridge and Schering Bridge
4. ADC and DAC Converters
5. Speed Control of DC Shunt Motor
6. Load Test on DC Shunt Motor
7. OCC & Load Characteristics of DC Shunt Generator
8. Load Test on Single-Phase Transformer
9. Load Test on Three-Phase Induction Motor

10. Load Test on Single-Phase Induction Motor.

Total: 45

EC 9204 ELECTRONIC CIRCUITS - I LAB 0 0 3 2

1. Frequency Response of CE amplifier
2. Frequency response of CB amplifier
3. CC Amplifier - buffer
4. Frequency response of CS Amplifiers
5. Class A and Class B power amplifiers.
6. Differential Amplifiers- Transfer characterisitic.
7. CMRR Measurment
8. Cascode amplifier
9. Cascade amplifier

Total: 45

CS 9212 DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING LAB 0 0 3 2

1. Basic Programs for C++ Concepts
2. Array implementation of List Abstract Data Type (ADT)
3. Linked list implementation of List ADT
4. Cursor implementation of List ADT
5. Stack ADT - Array and linked list implementations

   The next two exercises are to be done by implementing the following source files
   (a) Program source files for Stack Application 1
   (b) Array implementation of Stack ADT
   (c) Linked list implementation of Stack ADT
   (d) Program source files for Stack Application 2
   An appropriate header file for the Stack ADT should be #included in (a) and (d)
6. Implement any Stack Application using array implementation of Stack ADT (by implementing files (a) and (b) given above) and then using linked list implementation of Stack ADT (by using files (a) and implementing file (c))
7. Implement another Stack Application using array and linked list implementations of Stack ADT (by implementing files (d) and using file (b), and then by using files (d) and (c))

8. Queue ADT – Array and linked list implementations
9. Search Tree ADT - Binary Search Tree
10. Hash Table – separate chaining
11. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance.
12. Heap Sort

13. Quick Sort

Total: 45

MA 9263 PROBABILITY AND RANDOM PROCESSES 3 1 0 4

AIM

To provide the necessary basic concepts in probability and random processes for applications such as random signals, linear systems etc. in communications engineering.

OBJECTIVES

- The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable.
- Able to analyze the response of random inputs to linear time invariant systems.

UNIT I RANDOM VARIABLES 9 + 3

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions – Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9 + 3

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables - Central limit theorem (for independent and identically distributed random variables).

UNIT III RANDOM PROCESSES 9 + 3

Classification – Stationary process – Markov process - Poisson process – Random telegraph process.

UNIT IV CORRELATION AND SPECTRAL DENSITIES 9 + 3

Auto-correlation functions – Cross-correlation functions – Properties – Power spectral density – Cross-spectral density – Properties.

UNIT V LINEAR SYSTEMS WITH RANDOM INPUTS 9 + 3

Linear time invariant system – System transfer function – Linear systems with random inputs – Auto-correlation and Cross-correlation functions of input and output – White noise.

L: 45, T: 15,
Total : 60

TEXT BOOKS

1. Ibe, O.C.,"Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, (2007).

2. Peebles, P.Z., “Probability, Random Variables and Random Signal Principles”, Tata McGraw Hill, 4th edition, New Delhi, (2002).

REFERENCES

1. Yates, R.D. and Goodman, D.J., “Probability and Stochastic Processes”, John Wiley and Sons, 2nd edition, (2005).
2. Stark, H. and Woods, J.W., “Probability and Random Processes with Applications to Signal Processing”, Pearson Education, Asia, 3rd edition, (2002).
3. Miller, S.L. and Childers, D.G.,“Probability and Random Processes with Applications to Signal Processing and Communications”, Academic Press, (2004).
4. Hwei Hsu, “Schaum’s Outline of Theory and Problems of Probability, Random Variables and Random Processes”, Tata McGraw Hill edition, New Delhi, (2004).

EC 9251 DIGITAL ELECTRONICS AND SYSTEM DESIGN 3 1 0 4

UNIT I BASIC CONCEPTS AND COMBINATIONAL CIRCUITS 9

Number Systems – n’s complement –Codes - Sum of products and product of sums, Minterms and Maxterms, Karnaugh map and Tabulation method – problem formulation and design of combinational circuits, Adder, Subtractor, Encoder/decoder, – three state devices, Priority Encoder, Mux/Demux, Code-converters, Comparators, Implementation of combinational logic using standard ICs, ROM, EPROM and EEPROM – Coding of Combination Circuits in verilog.

UNIT II SEQUENTIAL CIRCUITS 9

Flip flops – SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits – their design, state minimization, moore/mealy model, state assignment, circuit implementation, Registers- shift registers, Ripple counters, Synchronous counters, Timing signal, RAM, Memory decoding, Semiconductor memories - Feedback sequential- Circuit analysis and design- sequential circuit design with verilog.

UNIT III FUNDAMENTAL MODE SEQUENTIAL CIRCUITS 9

Stable, Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuit

UNIT IV MEMORY, CPLDs AND FPGAs 9

ROM, Read/Write memory – Static RAM, Dynamic RAM, PAL, PLA, CPLD – FPGA XL 4000 – CLBs – I/O Block – Programmable Inter connects– Realization of simple combinational and sequential circuits

UNIT V LOGIC GATES 9

Logic families- TTL, NMOS, CMOS, BiCMOS logic-Electrical behavior-static, dynamic-CMOS input and output structures-CMOS logic families -low voltage CMOS logic & interfacing-Bipolar logic Realization of NAND and NOR logic.

L : 45, P: 15
Total : 60

TEXT BOOK

1. Morris Mano, " Digital logic ", Prentice Hall of India, 1998
2. John. F. Wakerly, "Digital design principles and practices", Pearson Education, Fourth Edition, 2007 .
3. Charles H. Roth, Jr, "Fundamentals of Logic Design", Fourth edition, Jaico Books, 2002

REFERENCE BOOKS

1 William I. Fletcher, "An Engineering Approach to Digital Design", Prentice- Hall of India, 1980
2 Floyd T.L., "Digital Fundamentals", Charles E. Merril publishing company, 1982
3 Jain R.P., "Modern Digital Electronics", Tata McGraw Hill, 1999.

EC 9252 ELECTRONIC CIRCUITS II 3 1 0 4

UNIT I FEEDBACK AMPLIFIERS AND STABILITY 9

Basic feedback concepts – Properties of Negative feedback – Four feedback topologies with amplifier circuit. Examples – Analysis of series – shunt feedback amplifiers – stability problem – Frequency compensation.

UNIT II OSCILLATORS 9

Barkhausen criteria for oscillator – Analysis of RC oscillators – Phase shift Wein bridge oscillators – LC oscillators – Colpitt, Hartley, Clapp, Crystal , Armstrong, Franklin and Ring Oscillators

UNIT III TUNED AMPLIFIERS 9

Basic principles – Inductor losses – Use of transformers – Single tuned amplifier frequency analysis - Amplifier with multiple tuned circuits – Cascade – Synchronous tuning – Stagger tuning – Stability of tuned amplifiers using Neutralization techniques.

UNIT IV MULTIVIBRATORS AND TIME BASE GENERATORS 9

Switching characteristics of transistors – Bistable, Monostable and Astable operation – Collector coupled and Emitter coupled circuits – Schmitt trigger - Voltage sweep generators – Current sweep generators

UNIT V RECTIFIERS AND POWER SUPPLIES 9

Halfwave and fullwave rectifiers with filters – Ripple factor – Series Voltage Regulator analysis and design – IGBT – working and characteristics – AC voltage control using thyristors – SMPS – DC/DC convertors – Buck, Boost, Buck-Boost analysis and design.

L:45,T:15
Total: 60

TEXTBOOK

1 David .A. Bell, Solid state pulse circuits, Prentice Hall of India,1992.
2. F. Bogart Jr. Electronic Devices and Circuits 6th Edition, Pearson Education, 2007.

REFERENCE

1. Paul Gray, Hurst, Lewis, Meyer," Analysis and Design of Analog Integrated Circuits", 4th Edition ,. John Willey & Sons 2005
2 . Behzad Razavi, "Design of Analog CMOS Integrated Circuits", Tata McGraw Hill, 2007.
3 Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd edition,Tata McGraw Hill, 2007.
4. Adel .S. Sedra, Kenneth C. Smith, Micro Electronic circuits, 5th Edition,Oxford University Press, 2004.
5. Muhammed H.Rashid power electronics Pearson Education / PHI , 2004
6. Jacob Millman, Taub Pulse, Digital and Switching Waveforms 2nd Edition 2007

EC 9253 COMMUNICATION SYSTEMS 3 0 0 3

UNIT I ANALOG MODULATION 9

Amplitude Modulation – AM, DSBSC, SSBSC, VSB – Angle modulation – PM and FM – Modulators and Demodulators – Fourier Transform of modulated signals.

UNIT II RECEIVER CHARACTERISTICS 9

Noise sources and types – Noise figure and noise temperature – Noise in cascaded systems – Single tuned receivers - Superheterodyne receivers

UNIT III BASEBAND TECHNIQUES 9

Review of low pass sampling – Quadrature sampling of Bandpass signals – Quantisation – Uniform and non-uniform quantisation – Quantisation noise – Companding laws of speech signals – PCM, DPCM, DM, ADPCM and ADM
Multiplexing – TDM (E and T lines), FDM

UNIT IV BANDPASS SIGNALING 9

Geometric representation of signals – Correlator and matched filter – ML detection – generation and detection, PSD, BER of coherent BPSK, BFSK, QPSK – Principles of QAM – Structure of non-coherent receivers – BFSK, DPSK.

UNIT V NOISE PERFORMANCE 9

Narrow band noise – PSD of in-phase and quadrature noise – Noise performance in AM systems – Noise performance in FM systems – Pre-emphasis and de-emphasis – Capture effect, threshold effect.

Total: 45

TEXT BOOK

1. J.G.Proakis, M.Salehi, "Fundamentals of Communication Systems" – Pearson Education 2006

REFERENCES

1. B.Sklar, "Digital Communications Fundamentals and Applications" 2/e Pearson Education 2007
2. S.Haykin, "Communication Systems" 3/e, John Wiley 2007
3. B.P.Lathi, "Modern Digital and Analog Communication Systems", 3/e, Oxford University Press,2007
4. D.Roody, J.Coolen, "Electronic Communications", 4/e PHI 2006
5. H P Hsu, Schaum Outline Series - "Analog and Digital Communications" TMH 2006

EC 9254 CONTROL SYSTEMS 3 1 0 4

UNIT I CONTROL SYSTEM MODELING 9

Basic Elements of Control System – Open loop and Closed loop systems - Differential equation - Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph

UNIT II TIME RESPONSE ANALYSIS 9

Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors – P, PI, PD and PID Compensation, Analysis using MATLAB

UNIT III FREQUENCY RESPONSE ANALYSIS 9

Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots - Constant M and N Circles - Nichol's Chart - Use of Nichol's Chart in Control System Analysis. Series, Parallel, series-parallel Compensators - Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB.

UNIT IV STABILITY ANALYSIS 9

Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram - Nyquist Stability Criterion - Relative Stability, Analysis using MATLAB

UNIT V STATE VARIABLE ANALYSIS 9

State space representation of Continuous Time systems – State equations – Transfer function from State Variable Representation – Solutions of the state equations - Concepts of Controllability and Observability – State space representation for Discrete time systems. Sampled Data control systems – Sampling Theorem – Sampler & Hold – Open loop & Closed loop sampled data systems.

L:45,P:15
Total:60

TEXTBOOK

1. J.Nagrath and M.Gopal," Control System Engineering", New Age International Publishers, 5th Edition, 2007.

REFERENCE

1. Benjamin.C.Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition,1995.
2. M.Gopal, "Control System – Principles and Design", Tata McGraw Hill, 2nd Edition, 2002.
3. Schaum's Outline Series,'Feedback and Control Systems' Tata McGraw-Hill, 2007.
4. John J.D'azzo & Constantine H.Houpis, 'Linear control system analysis and design', Tata McGrow-Hill, Inc., 1995.
5. Richard C. Dorf & Robert H. Bishop, " Modern Control Systems", Addidon – Wesley, 1999.

EC 9255 COMPUTER ARCHITECTURE AND ORGANIZATION 3 0 0 3

UNIT I INTRODUCTION 9

Computing and Computers, Evolution of Computers, VLSI Era, System Design- Register Level, Processor Level, CPU Organization, Data Representation, Fixed – Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types. Addressing modes.

UNIT II DATA PATH DESIGN 9

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline Design, Modified booth's Algorithm

UNIT III CONTROL DESIGN 9

Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV MEMORY ORGANIZATION 9

Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT V SYSTEM ORGANIZATION 9

Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RISC and CISC processors, Superscalar and vector processor.

Total: 45

TEXTBOOK

1. John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.
2. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, " Computer Organisation", V edition, McGraw-Hill Inc, 1996.

REFERENCE

1. Morris Mano, "Computer System Architecture", Prentice-Hall of India, 2000.
2. Paraami, "Computer Architecture", BEH R002, Oxford Press.
3. P.Pal Chaudhuri, , "Computer organization and design", 2nd Ed., Prentice Hall of India, 2007.
4. Miles J. Murdocca and Vincent P. Heuring, Principles of Computer Architecture, Printice Hall, 2000
5. G.Kane & J.Heinrich, ' MIPS RISC Architecture ', Englewood cliffs, New Jersey, Prentice Hall, 1992.

EC 9256 ELECTRONIC CIRCUITS –II LAB 0 0 3 2

1. Design and Analysis of feeback Amplifiers
2. Design of RC Oscillators
3. Design of LC Oscillators
4. Design and frequency response of Tuned Amplifier
5. Design of Astable Multivibrator
6. Design of Monostable Multivibrator
7. Design of Schmitt trigger, hysterisis
8. AC voltage control using thyristors

Total: 45

EC 9257 DIGITAL SYSTEM LAB 0 0 3 2

1 Implementation of simple Boolean expression using universal gates
2 Priority encoder
3 2 to 4 MUX and implementation of combination logic
4 JK and RS flip flop implementation using logic gates
5 Synchronous up/down counter
6 BCD ripple counter with 7 segment display
7 Ring counters
8 Data transfer using shift registers
9 Half adder and Full adder
10 Binary 4 bit parallel adder
11 System Design using VeriLog

Total: 45

GE 9371 COMMUNICATION SKILLS AND SOFT SKILLS
FIFTH / SIXTH SEMESTER **0 0 2 1**

AIM

To enhance the overall capability of students and to equip them with the necessary Communication Skills and Soft Skills that would help them excel in their profession.

OBJECTIVES

- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their jobs.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

A. Viewing and discussing audio-visual materials (6 periods)

UNIT I Resume / Report Preparation / Letter Writing: (2)

Letter writing – Job application with Resume - Project report - Email etiquette.

UNIT II Presentation skills: (1)

Elements of effective presentation – Structure of presentation - Presentation tools – Body language.

UNIT III Soft Skills: (1)

Time management – Stress management – Assertiveness – Negotiation strategies.

UNIT IV Group Discussion: (1)

Group discussion as part of selection process, Structure of group discussion – Strategies in group discussion – Mock group discussions.

UNIT V Interview Skills: (1)

Kinds of interviews – Interview techniques – Corporate culture – Mock interviews. (Career Lab Software may be used for this section).

Note: Career Lab software may be used to learn the skills, to be applied in the practice session.

B. Practice session (24 periods)

1. **Resume / Report Preparation / Letter writing**: (4)
   Students prepare their own resume and report.
2. **Presentation Skills:** (8)
   Students make presentations on given topics.
3. **Group Discussion**: (6)
   Students participate in group discussions.
4. **Interview Skills**: (6)
   Students participate in Mock Interviews

Total: 30

REFERENCES BOOKS

1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth, Sixth Edition, New Delhi, 2007.
2. Prakash P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd., Second Edition, New Delhi, 2004.

3. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi 2004.
4. David Evans, **Decisionmaker**, Cambridge University Press, 1997.
5. Thorpe, E and Thorpe, S **Objective English**, Pearson Education, Second Edition, New Delhi 2007.
6. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addision Wesley Longman Ltd., Indian reprint 1998.