Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Decl. U/S 3 of the UGC Act 1956)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B. Tech-Electronics and Communication Engineering (Full Time)
Curriculum and Syllabus
2013 Regulation

III SEMESTER						
S. No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13005	Solid State Devices	3	0	0	3
2	BMA13006	Mathematics – III for Electrical and Instrumentation Engineers	3	1	0	4
3	BCS13031	Object Oriented Programming	3	1	0	4
4	BEE13004	Circuit Theory	3	1	0	4
5	BEE13008	Electrical Machines	3	0	0	3
6	BEE13005	Electromagnetic field Theory	3	1	0	4
7	BEC13L02	Circuits & Devices Lab	0	0	3	1
8	BEE13L22	Electrical Engineering Lab	0	0	3	1
		TOTAL	**18**	**4**	**6**	**24**

IV SEMESTER						
S. No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13007	Digital Electronics	3	1	0	4
2	BEC13006	Electronic Circuits	3	0	0	3
3	BEC13008	Signals and Systems	3	1	0	4
4	BMA13011	Probability and Random Process	3	1	0	4
5	BCS13032	Data Structures and Algorithms	3	1	0	4
6	BEE13009	Networks and Systems	3	1	0	4
7	BEC13L03	Electronic Circuits Lab	0	0	3	1
8	BCS13L22	Data Structures using C++ Lab	0	0	3	1
9	BEN13L01	Soft Skills-I Career & Confidence Building	1	0	2	2
		TOTAL	**19**	**5**	**8**	**27**

V SEMESTER						
S.No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13009	Microprocessor and Microcontroller	3	0	0	3
2	BMA13015	Analytic functions and Optimization Techniques	3	1	0	4
3	BEC13010	Linear Integrated Circuits	3	0	0	3
4	BEC13011	Transmissions Lines & Wave Guides	3	1	0	4
5	BEC13012	Communication Systems	3	0	0	3
6	BEE13033	Control Systems	3	1	0	4
7	BEC13L04	Linear & Digital IC lab	0	0	3	1
8	BEC13L05	Microprocessor Lab	0	0	3	1
9	BEN13L02	Soft Skills-II Qualitative and Quantitative Skills	0	0	3	2
		TOTAL	**18**	**3**	**9**	**25**

VI SEMESTER						
S. No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13013	Digital Signal Processing	3	1	0	4
2	BCS13034	Computer Networks	3	0	0	3
3	BEC13014	Digital Communication	3	1	0	4
4	BEC13015	Measurements & Instrumentation	3	0	0	3
5	BEC13016	Antennas and Wave Propagation	3	1	0	4
6	BMG13007	Management Concepts and Organizational Behavior	3	0	0	3
7	BEC13L06	Communication Lab – I	0	0	3	1
8	BEC13L07	Digital Simulation & Signal Processing Lab	0	0	3	1
		TOTAL	**18**	**3**	**6**	**23**

VII Semester						
S. No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13017	Quantum Computing	3	0	0	3
2	BEC13EXX	Elective-I	3	0	0	3
3	BEC13018	Optical Communication	3	1	0	4
4	BEC13019	Microwave Engineering	3	0	0	3
5	BEC13020	Introduction to VLSI Design & Embedded Systems	3	1	0	4
6	BMG13004	Entrepreneurship Development	3	0	0	3
7	BEC13L08	Communication Lab-II	0	0	3	1
8	BEC13L09	VLSI & Embedded System Design Lab	0	0	3	1
9	BEC13L010	Comprehension	0	0	2	1
		TOTAL	**18**	**2**	**8**	**23**

VIII SEMESTER						
S. No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13021	Cellular Mobile Communication	3	0	0	3
2	BEC13EXX	Elective – II	3	0	0	3
3	BEC13L11	Engineering Applications of P-SPICE & MATLAB	0	0	3	1
4	BEC13L12	Project	0	0	30	10
		TOTAL	**6**	**0**	**33**	**17**

Total Credits (III Semester to VIII Semester): 139

LIST OF ELECTIVES						
S.No	**Sub. Code**	**Title of the Subject**	**L**	**T**	**P**	**C**
1	BEC13E01	Biomedical Instrumentation	3	0	0	3
2	BEC13E02	Digital Image Processing	3	0	0	3
3	BEC13E03	Radar & Navigational Aids	3	0	0	3
4	BEC13E04	Satellite Communication	3	0	0	3
5	BEC13E05	Pattern Recognition	3	0	0	3
6	BEE13E31	Electromagnetic Interference & Compatibility In System Design	3	0	0	3
7	BEC13E06	Neural networks and its Applications	3	0	0	3
8	BEC13E07	Device Modeling	3	0	0	3
9	BCS13E46	Real Time Operating Systems	3	0	0	3
10	BEC13E08	Advanced Microprocessors	3	0	0	3
11	BEC13E09	Bio-Signal Processing	3	0	0	3
12	BEC13E10	Television & Video Engineering	3	0	0	3
13	BCS13E47	Operating Systems	3	0	0	3
14	BEE13E32	Power Electronics	3	0	0	3
15	BITI3004	Visual Programming	3	0	0	3
16	BCS13E48	Database Management Systems	3	0	0	3
17	BMG13E11	Total Quality Management	3	0	0	3
18	BMG13EXX	Disaster Management	3	0	0	3
19	BEC13E11	Cryptography and Network Security	3	0	0	3

BEC13005 **SOLID STATE DEVICES** **3 0 0 3**

OBJECTIVES

- To learn crystal structures of elements used for fabrication of semiconductor devices.
- To study energy band structure of semiconductor devices.
- To understand Fermi levels, movement of charge carriers, Diffusion current and Drift current.
- To study behavior of semiconductor junction under different biasing conditions. Fabrication of different Semiconductor devices, Varactor diode, Zener diode, Schottky diode, BJT, MOSFET, etc.
- To study VI Characteristics of devices and limitations in factors like current, power frequency.

UNIT: I SEMICONDUCTOR DIODES **9 Hrs**

Theory of PN Junction Diode – VI characteristics – Static and Dynamic Resistance – Effect of Temperature on Diodes – Space Charge and Diffusion Capacitance - Zener Diode – Avalanche and Zener Break Down Mechanisms – Zener Diode as a Voltage Regulator.

UNIT: II BJT & BIASING **9 Hrs**

Principles of Transistor Action – Current Components – Cut Off, Active & Saturation Region – I/P & O/P characteristics CE, CB and CC. Small Signal Large Signal 'β', Break Down & Switching Characteristics – Transistor Biasing – Bias Stabilization – Bias Compensation – Thermal Runaway – Design with Heat Sink.

UNIT: III FET & MOSFET **9 Hrs**

Construction Feature & Working Principles of JFET, MOSFET Depletion and Enhancement Mode, Biasing of FET, and MOSFETS,Transmission Gate using CMOS.

UNIT: IV POWER DEVICES **9 Hrs**

Charge Transfer Device, UJT, SCR, Diac, Triac, GTO and Introduction to Gallium Arsenide Devices, Device Technology , Planer Process, Diffusion, Ion Implantation and Vapour Deposition, Additive and Subtractive Sequences, Process Sequence for Bipolar, NMOS and CMOS Integrated Circuits

UNIT: V SMALL SIGNAL MODEL **9 Hrs**

Small Signal Model of Transistor- Analysis of Amplifiers using Small Signal Model. Common Emitter, Common Base, Common Collector, Common Source, Common Drain, Common Gate, Multistage Amplifiers.

Total No of Hrs: 45

TEXT BOOKS:

1. Nandita Das Gupta, Amitava Das Gupta, "*Semiconductor Devices*", Prentice Hall of India, 2005
2. Sedra and Smith, "*Microelectronic Circuits*" Oxford University Press, 2004
3. Mohammed Gausi and Spencer, "*Introduction to Electronics Circuit Design*", Pearson Education, 2004

REFERENCES:

1. Boylestad, Robert. L and Nashelsky Louis ," *Electronic Devices and Circuit theory*" Prentice Hall of India,6th Edition, 2001
2. William & Harris, "*Electronic Devices and Circuits*", Tata McGraw Hill International Editions, 2000
3. Millman Halkias, "*Electron Devices*", Tata McGraw Hill, 2000

BMA13006 MATHEMATICS – III FOR ELECTRICAL AND INSTRUMENTATION ENGINEERS 3 1 0 4

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 and Laplace transform techniques used in wide variety of situations in which the functions used are not periodic

UNIT: I LAPLACE TRANSFORMS I 12 Hrs

Transforms of simple functions – Properties of Transforms – Inverse Transforms – Transforms of Derivatives and Integrals.

UNIT: II LAPLACE TRANSFORMS II 12 Hrs

Periodic functions – Initial and final value theorems – Convolution theorem – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients and Linear simultaneous differential equations of first order with constant coefficients.

UNIT: III FOURIER SERIES 12 Hrs

Dirichlet's conditions – General Fourier series – Half range Sine & Cosine series – Complex form of Fourier series – Parseval's identity – Harmonic Analysis.

UNIT: IV FOURIER TRANSFORMS 12 Hrs

Statement of Fourier integral theorem – Fourier transform pairs – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's theorem.

UNIT: V Z TRANSFORMS AND DIFFERENCE EQUATION 12 Hrs

Z-transforms – Elementary properties – Inverse Z transforms – Partial fraction – Residue

Method – Convolution theorem – Solution of difference equation using Z transform (simple problems).

Total No. of Hrs: 60

TEXT BOOKS:

1. Veerarajan T., *Engineering Mathematics* (for first year), Tata McGraw Hill Publishing Co., (2007).

2. Veerarajan T., *Engineering Mathematics* (for semester III), Tata McGraw Hill Publishing Co., (2005).

3. Singaravelu, *Transforms and Partial Differential Equations*, Meenakshi Agency, (2009).

REFERENCES:

1. Kreyszig E., *Advanced Engineering Mathematics* (9 th ed.), John Wiley & Sons, (2011).
2. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).

BCS13031 **OBJECT ORIENTED PROGRAMMING** **3 1 0 4**

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 learn to JAVA programming
- To efficiently implement solutions for specific problems

UNIT: I INTRODUCTION **12 Hrs**

Programming Methodologies – Comparison – Object Oriented Concepts – Basics of C++ Environment.

UNIT: II CLASSES **12 Hrs**

Definition – Data Members – Function Members – Access Specifies – Constructor – Default constructors – Copy Constructors – Destructors – Static members – This pointer – Constant Members – Free Store Operators – Control Statements

UNIT: III INHERITANCE AND POLYMORPHISM **12 Hrs**

Overloading Operators – Functions – Friends – Class derivation – Virtual Functions – Abstract Base Classes – Multiple Inheritances. Microsoft Foundation Class Libraries.

UNIT: IV TEMPLATES **12 Hrs**

Class Templates – Function Templates – Exception Handling – Streams.

UNIT: V JAVA PROGRAMMING **12 Hrs**

Java Environment – Classes – Definition – Fields – Methods – Object Creation – Constructors – Overloading Methods – Static Members – This Keyword – Nested Classes – Extending Classes – Inheritance – Member Accessibility – Overriding Methods – Abstract Classes – Interfaces.

Total No. of Hrs: 60

TEXT BOOKS:

1. Gary J. Bronson, "*Object Oriented Program Development using C++*", Thomson Learning, 4th Edition 2005.
2. Gary J. Bronson, "*Object oriented program development using Java*, Thomson Learning , 2nd Revised Edition 2005.
3. Stanley B.Lippman, "*The C++ Primer*", Addison Wesley Publishers, 4th Edition ,2005.
4. H.M.Deitel and P.E.Deitel, "*Java How to Program*", Prentice Hall, 1998.

REFERENCES:

1. Deitel and Deitel, "*C++ How to Program*" Prentice Hall, 1998.
2. N.Barkakati, "*Object Oriented Programming in C++",* Prentice Hall of India Pvt. Ltd, 1997.
3. Ken Arnold and James Gosling, "*The Java Programming Language*", Addison Wesley 1998.

BEE13004 **CIRCUIT THEORY** **3 1 0 4**

OBJECTIVE

- To expose both theoretical and practical knowledge in basis circuit concepts, circuit modeling, methods of circuits analysis in time domain and frequency domain for solving simple and multidimensional circuits including coupled circuits and 3 phase circuits.

UNIT-I: BASIC CIRCUIT CONCEPTS **12 Hrs**

V-I Relationships Of R, L And C – Independent Sources – Dependent Sources – Kirchhoff's Laws - Simple Resistive Circuits – Network Reduction – Voltage Division – Current Division – Source Transformation. Formation of Matrix Equations and Analysis Using Mesh-Current and Node-Voltage Methods.

UNIT-II: AC FUNDAMENTALS **12 Hrs**

AC Quantity, Phasor Representation – Analysis Of Simple Series And Parallel Circuits – Power And Power Factor – Analysis Mesh Current And Node Voltage Methods – Series Resonance And Parallel Resonance

UNIT-III: NETWORK THEOREMS AND APPLICATIONS **12 Hrs**

Superposition Theorem – Thevenin's Theorem – Norton's Theorem - Maximum Power Transfer Theorem - Reciprocity Theorem – Compensation Theorem – Substitution Theorem - Millman's Theorem and Tellegen's Theorem with Applications.

UNIT-IV: THREE PHASE CIRCUITS **12 Hrs**

Three Phase Systems - Phase Sequence – Solution of Three Phase Balanced Circuits – Solution of Three Phase Unbalanced Circuits – Power Measurement and Two Watt Meter Method

UNIT-V: COUPLED CIRCUITS **12 Hrs**

Mutual Inductance – Coefficient Of Coupling – Ideal Transformer – Analysis Of Multi Winding Couple Circuits – Single & Double Tuned Circuits – Critical Coupling.

TOTAL NO. OF HRS : 60

TEXT BOOKS:

1. Bruce Carlson, "*Circuits: Engineering Concepts and Analysis of Linear Electric Circuits*", Thomson Learning, 1st Edition, 2002.
2. Artice.M. Davis, "*Linear Circuits Analysis*", Thomson Learning 2002
3. Sudhakar, A. and Shyam Mohan S.P. "*Circuits and Network Analysis and Synthesis*", Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1994.

REFERENCES:

1. Hyatt, W.H. Jr and Kimmerly, J.E., "*Engineering Circuits Analysis*", McGraw Hill International Editions, 1993.
2. Edminister, J.A., "*Theory and Problems of Electric Circuits*", Schaum's Outline Series McGraw Hill Book Company, 2nd Edition, 1983.
3. Paranjothi S.R., "*Electric Circuit Analysis*", New Age International Ltd., Delhi, 2nd Edition, 2000.

BEE13008 ELECTRICAL MACHINES 3 0 0 3

OBJECTIVES

- Constructional details, principle of operation, performance, starters and testing of D.C. machines.
- Constructional details, principle of operation and performance of transformers.
- Constructional details, principle of operation and performance of induction motors.
- Constructional details and principle of operation of alternators and special machines.

UNIT-I: D.C MACHINES 9 Hrs

Constructional Details- Emf And Torque – Circuit Model – Methods Of Excitation – Characteristics Of Generators – Characteristics Of Motors – Starting And Speed Control Methods – Testing And Efficiency – Losses In D.C Machines – Applications

UNIT-II: TRANSFORMERS 9 Hrs

Constructional Details - Principle of Operation –EMF Equation – Equivalent Circuit - Losses and Efficiency - Voltage Regulation – Auto Transformers – Three Phase Transformers – Constructional Details – Types of Connections.

UNIT-III: INDUCTION MOTORS 9 Hrs

Construction Details - Types – Principle of Operation – Torque Equation - Equivalent Circuit – Characteristics - Performance Calculations – Starting Methods – Speed Control Methods.

UNIT-IV: SYNCHRONOUS MACHINES 9 Hrs

Construction of Synchronous machines – Classification - Induced EMF Equation – Voltage Regulation – EMF Method – Parallel Operation. Synchronous Motor – Principles of Operation – Methods of Starting – Hunting – Effect of Change of Excitation of a Synchronous Motor.

UNIT-V: SINGLE PHASE INDUCTION MOTORS & SPECIAL MACHINES 9 Hrs

Single Phase Induction Motors – Construction & Principles of Working – Types. Universal Motor – Reluctance Motor – Stepper Motor – Two-Phase Servo Motor - Tachogenerator - Linear Induction Motor. (Qualitative Treatment)

Total No. of Hrs: 45

TEXT BOOKS:

1. Mulukutla.S.Sarma, "*Electric Machines, Stead state theory and dynamic Performance*", 2nd Edition Thomson Learning 1997
2. S.K Bhattacharya, "*Electrical Machines*", 3rd Edition Tata McGraw Hill Publications 2008.

REFERENCES:

1. I.J. Nagrath & D.P. Kothari, "*Electrical Machines*", Tata McGraw Hill Publications, Second Edition 1997.
2. Nasar S.A, "*Electrical Machines & Power Systems*", TMH Publications
3. I McKenzie Smith ,"*Hughes Electrical Technology*", Revised Low price Edition, Pearson Education, Seventh edition.
4. Irving I.Kosow, "*Electric Machinery and Transformers*", PHI, Second Edition, 2001.

BEE13005 ELECTROMAGNETIC FIELD THEORY 3 1 0 4

OBJECTIVES

- To analyze fields a potentials due to static changes
- To evaluate static magnetic fields
- To understand how materials affect electric and magnetic fields
- To understand the relation between the fields under time varying situations
- To understand principles of propagation of uniform plane waves.

UNIT: I INTRODUCTION 12 Hrs

Sources and Effects of Electromagnetic Fields – Vector Fields – Co-OrdinateSystems-Rectangular, Cylindrical, & Spherical Coordinate Systems–Expressions for Grad, Div, Curl in Cylindrical & Spherical Coordinates**.**

UNIT: II ELECTROSTATICS 12 Hrs

The Field Concept – Sources Of Electromagnetic Fields, Changes – Columb's Law – Electric Field Intensity – Electric Flux – Gauss's Law – Potential – Boundary Value Problems – Laplace And Poisson's Equations – Electrostatic Energy – Dielectrics – Capacitance.

UNIT: III MAGNETOSTATICS 12 Hrs

Lorentz Law Of Force, Magnetic Field Intensity – Biot–Savart Law - Ampere's Law –Magnetic Field Due To Straight Conductors, Circular Loop, Infinite Sheet Of Current –Magnetic Flux Density (B) – B In Free Space, Conductor, Magnetic Materials –Magnetization – Magnetic Field In Multiple Media – Boundary Conditions – Scalar And Vector Potential – Magnetic Force – Torque – Inductance – Energy Density – Magnetic circuits.

UNIT: IV ELECROMAGNETIC FIELDS 12 Hrs

Faraday's Laws, Induced Emf – Transformer And Motional Emf – Forces And Energy Inquasi-Stationary Electromagnetic Fields - Maxwell's Equations (Differential And Integral forms) – Displacement Current – Relation Between Field Theory And Circuit Theory.

UNIT: V ELECTROMAGNETIC WAVES 12 Hrs

Generation – Electro Magnetic Wave Equations – Wave Parameters; Velocity, Intrinsic Impedance, Propagation Constant – Waves In Free Space, Loss And Lossless Dielectrics, Conductors-Skin Depth, Poynting Vector – Plane Wave Reflection And Refraction –Transmission Lines – Line Equations – Input Impedances – Standing Wave Ratio And Power.

TEXT BOOKS: Total No. of Hrs: 60

1. Mathew N. O. SADIKU, "*Elements of Electromagnetics*", Oxford University PressInc. First India edition, 2007
2. William H. Hayt & John A.Buck ,"*Engineering Electromagnetics*",Tata Mc-Graw-Hill 7th Edition 2005.

REFERENCES:

1. John D Kraus, "*Electromagnetics*", Tata McGraw Hill Book Co., New York, Third Edition, 1989.
2. Joseph A Edminister, "*Theory and Problems of Electro Magnetics*", Schaums Outline Series Tata McGraw Hill book company New York, 1986.

BEC13L02	**CIRCUITS & DEVICES LAB**	**0**	**0**	**3**	**1**

OBJECTIVES

- To learn the voltage – current characteristics of solid state devices like diodes and transistors

1. VERIFICATION OF SUPERPOSITION THEOREM, MPT, THEVENIN,NORTRON
2. VERIFICATION OF NODAL & MESH ANALYSIS
3. CHARACTERISTICS OF P-N JUNCTION & ZENER DIODE
4. I/P & O/P OF CHARACTERISTICS OF BJT
5. CHARACTERISTICS OF JFET; FINDING B OF THE TRANSISTOR AND FIXED BIASING
6. BIASING OF TRANSISTOR IN CE MODE; BJT AMPLIFIER DESIGN CE MODE
7. BJT AMPLIFIER CB MODE AND CC MODE; JFET C.S. AMPLIFIER
8. UJT CHARACTERISTICS; SCR CHARACTERISTICS
9. MOSFET CHARACTERISTICS; STUDY OF RESONANT CIRCUITS
10. MINI PROJECT

BEE13L22 ELECTRICAL ENGINEERING LAB 0 0 3 1

OBJECTIVES

- To learn the torque and speed characteristics of generators, motors and transformers by performing load tests.

1. OCC AND LOAD TEST ON DC SHUNT GENERATOR
2. LOAD TEST ON DC SHUNT MOTOR
3. LOAD TEST ON DC SERIES MOTOR
4. SPEED CONTROL OF DC SHUNT MOTOR
5. SWINBURNE'S TEST
6. LOAD TEST ON SINGLE PHASE TRANSFORMER
7. OC AND SC TESTS ON SINGLE PHASE TRANSFORMER.
8. REGULATION OF THREE PHASE ALTERNATOR BY EMF METHOD
9. LOAD TEST ON ALTERNATOR
10. V AND INVERTER V CURVE OF SYNCHRONOUS MOTOR
11. LOAD TEST ON THREE PHASE INDUCTION MOTOR
12. LOAD TEST ON SINGLE PHASE INDUCTION MOTOR

BEC13007 **DIGITAL ELECTRONICS** **3 1 0 4**

OBJECTIVES

- To introduce number systems and codes.
- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
- To introduce the methods for simplifying Boolean expressions.
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.

UNIT I: NUMBER SYSTEMS **12 Hrs**

Review of Binary, Octal And Hexadecimal Number Systems – Conversions; Binary Arithmetic – Signed Magnitude form – 1's, 2's Complement Representation. Codes: - BCD, Excess-3, Grey Codes, ASCII Codes, Error Detecting Codes (hamming code)-Applications of Error Detecting Codes.

UNIT II: BOOLEAN ALGEBRA **12 Hrs**

Boolean Algebra – De Morgan's Law - Simplifications of Boolean Expression – Sum of Products and Product of Sums – Karnaugh Map(up to 5 variables) – Quince McClusky Method of Simplification (Including Don't care conditions)

UNIT III: COMBINATIONAL LOGIC **12 Hrs**

Logic gates – AND, OR, NOT, NOR, NAND and EX-OR – Combinational Logic- Arithmetic Circuits – Half adder – Full adder, Half Subtractor - Decimal Adder – Excess 3 Adder – Code Converters – Multiplexer – Demultiplexer- Encoder – Decoder – Design of General Combinational Logic Circuit. PAL, PLA and FPGA.

UNIT IV: SEQUENTIAL LOGIC DESIGN **15 Hrs**

Building Blocks Of Sequential Logic-Rs, JK, Master-Slave, D And T Flip-Flop, Asynchronous And Synchronous Counters - Binary And BCD Counters - Shift Registers –Basic Models Of Sequential Machines – Concept Of State Diagram - State Table – State Reduction - Design And Implementation Of Synchronous Sequential Circuits .

UNIT-V LOGIC FAMILIES **9 Hrs**

Characteristics of RTL, DTL, TTL, Families – Schottky, Clamped TTL, ECL, IIL –Mos Inverters – Complementary MOS Inverters. IC Based Full Adder, IC Based Magnitude Comparator.

Total No. of Hrs: 60

TEXT BOOKS:

1. Charles H. Roth, "*Fundamentals of Logic Design*", Thompson Learning, 5th Edition.
2. John. M. Yarbrough, "*Digital Logic: Application and design*", Thomson Learning

REFERENCES:

1. FLOYD:" *Digital Fundamentals*", 10th Edition Universal Book Stall, New Delhi.1993,.
2. Morris Mano, "*Digital Electronics and Design*", Prentice Hall of India, 2000
3. ALBERT PAUL, MALVINO AND DONALD P LEACH: "*Digital Principles and Applications*" Tata Mc Graw Hill publications.

BEC13006 ELECTRONIC CIRCUITS 3 0 0 3

OBJECTIVES

- On completion of this course the student will understand
- The methods of biasing transistors and Design of simple amplifier circuits
- Method of calculating cutoff frequencies and to determine bandwidth
- Design of power amplifiers and heat sinks

UNIT I: RECTIFIER & POWER SUPPLY 9 Hrs

Half & Full Wave Rectifies – Filters – Shunt, Inductor, LC Section & Ripple Factor, π Calculation for C, L and LC Filters – Voltage Regulators – Zener – Series Voltage Regulator – Shunt Voltage Regulator – SMPS- IC Voltage Regulators.

UNIT II: AMPLIFIERS 9 Hrs

Amplifiers – Frequency Response of RC Coupled Amplifiers – Frequency Response of Emitter follower, Gain Band Width Product – FET - Amplifier at Low and High Frequency Cascaded Amplifiers

UNIT III: FEED BACK AMPLIFIER & OSCILLATORS 9 Hrs

Four Basic Type of Feedback – Effect of Feedback on Amplifier Performance-Examples of Different types of Feedback Amplifiers-Voltage Series & Shunt Feedback, Current Series & Shunt Feedback – Condition for Oscillation Barkhaushen Criteria – LC Oscillators – Hartley & Colpitts – RC Oscillators – Wein Bridge, RC Phase Shift Crystal Oscillator.

UNIT IV: MULTIVIBRATORS 9 Hrs

Collector Coupled & Emitter Coupled Astable Multivibrator, – Mono Stable, Bistable Multivibrator - Triggering Methods – Storage Delay and Calculation of Switching Time - Schmitt Trigger Circuits, Speed up Capacitor in Switching – UJT based Relaxation Oscillator.

UNIT V: POWER AMPLIFIER 9 Hrs

Classification – Class A, B, C & AB, Class B-push pull – Class B Complimentary, Symmetry, Class S, and Power sections Classifications, Efficiency, Distortion in Amplifiers-Tuned Amplifiers.

Total No. of Hrs: 45

TEXT BOOKS:

1. Mohammed. H. Rashid, "*Micro Electronic Circuits, Analysis and Design*", Thomson Learning
2. David. A. Bell, "*Solid state Pulse Circuits*", Prentice Hall India, 4th Edition, 2000.

REFERENCES:

1. Millman Taub ,"*H Pulse Digital & Switching waveform* ", Tata McGraw Hill International, 2001
2. Jacob Millman, Cristas C. Halkias," *Integrated Electronics*", Tata McGraw Hill., Edition 1991.

BEC13008 SIGNALS AND SYSTEMS 3 1 0 4

OBJECTIVES

- To study the properties and representation of discrete and continuous signals.
- To study the sampling process and analysis of discrete systems using Z-transforms.
- To study the analysis and synthesis of discrete time systems.

UNIT I: CLASSIFICATION OF SIGNALS AND SYSTEMS 12 Hrs

Continuous Time Signals (CT signals), Discrete Time Signals (DT Signals) – Step, Ramp, Pulse, Impulse, Exponential, Classification of CT and DT signals – Periodic and Aperiodic, Random Signals, CT Systems and DT Systems, Classification of Systems – Linear Time Invariant Systems.

UNIT II: ANALYSIS OF C.T SIGNALS 12 Hrs

Fourier series Analysis, Spectrum of C.T. Signals, Fourier Transform and Laplace Transform–Applications in Signal Analysis.

UNIT III: LTI – CT SYSTEM 12 Hrs

Differential Equation, Block Diagram Representation, Impulse Response, Convolution Integral, Frequency Response, Fourier Methods and Laplace Transforms in Analysis, State Equations and Matrix.

UNIT IV: ANALYSIS OF D.T. SIGNALS 12 Hrs

Spectrum of D.T. signals, Discrete Time Fourier Transform (DTFT), Discrete Fourier Transform (DFT), Properties of Z – Transform in Signal Analysis.

UNIT V: LTI – DT SYSTEMS 12 Hrs

Difference Equations, Block Diagram Representation, Impulse Response, Convolution, Frequency Response, And Z – Transform Analysis, Realization Of Digital Filters – Direct Form-I, Direct Form-II, Transposed, Parallel, Cascade, Lattice-Ladder Structure, State Variable Equation And Matrix.

Total No. of Hrs: 60

TEXT BOOKS:

1. Alan V Oppenheim,"*Signals and Systems*",Prentice Hall of India Pvt. Ltd, 2nd Edition, 1997.
2. Roger E. Zeimer et al, "*Signals and Systems*": Continuous and Discrete, McMillan, 2nd Edition, 1990.

REFERENCES:

1. Douglas K Lindner, "*Signals and Systems*", McGraw Hill International, 1999.
2. Simon Haykin and Barry Van Veen ," *Signals and Systems*", John Wiley and Sons, Inc., 1999.
3. Robert A. Gabel and Richard A. Roberts,"*Signals and Linear Systems*", John Wiley, 3 Edition, 1987.

BMA13011 PROBABILITY AND RANDOM PROCESS 3 1 0 4

OBJECTIVES

- Have a fundamental knowledge of the basic probability concepts.
- Have a well – founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand and characterize phenomena which evolve with respect to time in probabilistic manner.
- Be able to analyze the response of random inputs to linear time invariant systems.

UNIT I: RANDOM VARIABLES 12 Hrs

Baye's Theorem – Random Variables – Distribution functions – Moments – Moment Generating functions – Chebychev's Inequality (statement only) – Function of Random Variables.

UNIT II: STANDARD DISTRIBUTIONS 12 Hrs

Marginal and Conditional Distributions – Binomial – Poisson – Geometric – Uniform – Exponential– Normal distributions – Central Limit theorem (applications only).

UNIT III: RANDOM PROCESS 12 Hrs

Classification of Random Process – Stationary Process – Ergodic Process – Poisson Process –Birth and Death Process – Markov Process – Markov Chains.

UNIT IV: CORRELATION 12 Hrs

Auto Correlation – Auto Covariance – Cross Correlation – Cross Covariance.

UNIT V: SPECTRAL DENSITY 12 Hrs

Spectral Density – Cross Spectral Density – Applications to Linear Systems with Random Inputs and Outputs.

Total No. of Hrs: 60

TEXT BOOKS:

1. Veerarajan T., "*Probability, Statistics and, Random Processes*", Tata McGraw Hill Publishing Co., (2008).
2. Singaravelu, "*Probability and Random Processes*", Meenakshi Agency, (2008).
3. Kandasamy P., Thilagavathy K., Gunavathi K., " *Probability and Queuing theory*", S.Chand & Co., (2010).

REFERENCES:

1. Gupta S.C., Kapoor V.K., "*Fundamentals of Mathematical Statistics*", S.Chand & Co., (2007).
2. Richard Johnson A., "*Miller & Freund's Probability and statistics for Engineers*" (8^{th} ed), Prentice Hall of India, (2009).

BCS13032 DATA STRUCTURES AND ALGORITHMS 3 1 0 4

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: LINEAR DATA STRUCTURES 12 Hrs

Stacks, Queues & Lists Implementation and Application Singly linked list – Doubly linked lists.

UNIT II: NON LINEAR DATA STRUCTURE 12 Hrs

Trees – Binary Trees – Binary Search Tree – Tree Traversals – AVL Trees

UNIT III: ALGORITHMS ANALYSIS 12 Hrs

Sorting And Searching – Space Complexity – Time Complexity – Big Oh – Binary Searching – Analysis – Quick sort – Heap sort – Merge sort – Analysis

UNIT IV: GRAPH ALGORITHMS 12 Hrs

Graph operations – DFS – BFS – Minimum cost spanning tree – Krushkal's Prim's Algorithms

UNIT V: ALGORITHMS DESIGN METHODS 12 Hrs

Greedy Method – Shortest Path – Divide and Conquer – Matrix Multiplication – Dynamic Programming – Back Tracking – Travelling Sales Person Problem.

Total No. of Hrs: 60

TEXT BOOKS:

1. Gilberg & Forugan, "*Data Structures: A Pseudo Code Approach using C++* ", Thomson Learning 1st Edition, 2002.
2. E.Horowitz, S.Sahani & S.Rajasekharan, "*Computer Algorithms*", Galgotia 1999.
3. Weiss Mark Allen. "*Data Structures and Algorithms Analysis in C*", Pearson Education, 2/e, 1997

REFERENCES:

1. E.Horowitz, S.Sahani & Dinesh Mehta, "*Fundamental of Data Structures in C++*", Galgotia 1999.
2. Sara Baase & Allen VanGelder," *Computer Algorithms*", Galgotia 2000
3. Bhagat Singh, Thomas L.Naps, "*Introduction to Data Structures*", BPB Publications

BEE13009 NETWORKS AND SYSTEMS 3 1 0 4

OBJECTIVES

- The student should obtain equations to solve circuits in steady and in transitory state through the application of mathematical and software tools.
- To understand port parameters for two port network.
- To understand filter response and characteristics.

UNIT: I TRANSIENT ANALYSIS 12 Hrs

Transient Concepts-Behavior Of Circuit Elements Under Switching Conditions and Their Representation- Forced and Free Response of RL, RC And RLC Circuits with D.C. And Sinusoidal Excitations Using Laplace Transform Method – Natural Frequency and Damping Factor.

UNIT: II TWO PORT NETWORKS 12 Hrs

Characterization of Two Port Networks in Terms of Z, Y, H and T Parameters – Networks Equivalents – Relations Between Network Parameters – Analysis of T, Ladder, Bridged–T and Lattice Networks – Transfer Function of Terminated Two Port Networks.

UNIT: III S -DOMAIN ANALYSIS & NETWORK SYNTHESIS 12 Hrs

S - Domain Network – Driving Point and Transfer Impedances and Their Properties – Transform Network Analysis – Concept of Complex Frequency - Poles and Zeros of Network functions – Time Domain Response from Pole-Zero Plot. Realizability of One Port Network – Hurwitz Polynomials and Properties – Positive Real Functions and properties – Synthesis of RL, RC and LC one Port Networks.

UNIT: IV FILTERS & ATTENUATORS 12 Hrs

Classification of Filters - Filter networks - Design of Constant K, M–Derived and Composite filters. Analysis of T, π, Lattice, Bridged-T, and L type attenuators.

UNIT: V SYSTEMS AND THEIR REPRESENTATION 12 Hrs

Basic Elements in Control Systems – Open And Closed Loop Systems – Electrical Analogy of Mechanical and Thermal Systems – Transfer Function – Block Diagram Reduction Techniques – Signal Flow Graphs.

Total No. of Hours : 60

TEXT BOOKS:

1. Sudhakar. A., and Shyam mohan, "*Circuits and Networks Analysis and Synthesis*" Tata McGraw Hill Publishing Co. Ltd. New Delhi, 3rd Edition 1994.
2. Kuo F.F., "*Network Analysis and Synthesis*", Wiley International Edition, Second Edition, 1966.

REFERENCES:

1. Van Valkenburg, M.E., "*Network Analysis*", Prentice – Hall of India Private Ltd., New Delhi, Third Edition, 1974.
2. Roy Choudhury, "*Networks and Systems*", New Age International Ltd, 1992.

BEC13L03 ELECTRONIC CIRCUITS LAB 0 0 3 1

OBJECTIVES

- To learn the characteristics of feedback amplifiers, oscillators and power amplifiers

1. RECTIFIERS – HALF WAVE, FULL WAVE WITH FILTER
2. FWR WITH SHUNT, L AND Π FILTERS
3. VOLTAGE REGULATOR-SERIES & SHUNT
4. RC COUPLED AMPLIFIER (WITH FEEDBACK)
5. FEEDBACK CIRCUITS(VOLTAGE SERIES FEEDBACK; VOLTAGE SHUNT FEEDBACK)
6. SCHMITT TRIGGER
7. MULTI VIBRATORS_MONOSTABLE, A STABLE, BISTABLE
8. LC OSCILLATORS

   a..HARTLEY OSCILLATOR

   b..COLPITTS OSCILLATOR
9. AUDIO OSCILLATORS

   a. WEIN BRIDGE OSCILLATOR

   b. RC PHASE SHIFT OSCILLATOR
10. CLASS A – POWER AMPLIFIER
11. CLASS B – POWER AMPLIFIER
12. TUNED AMPLIFIER

BCS13L22 DATA STRUCTURES USING C++ LAB 0 0 3 1

OBJECTIVES

- To implement the various data structure algorithms with examples

1. IMPLEMENTATION OF ARRAYS (SINGLE AND MULTI DIMENSIONAL)
2. IMPLEMENTATION OF STACK, QUEUE, CIRCULAR QUEUE (USING ARRAYS AND POINTERS)
3. SINGLE LINKED LIST
4. CIRCULAR LINKED LIST
5. DOUBLY LINKED LIST
6. GENERAL LISTS
7. EVALUATION OF EXPRESSION
8. BINARY TREE IMPLEMENTATION AND TRAVERSALS
9. IN ORDER THREADED BINARY TREES
10. QUICK SORT AND HEAP SORT
11. AVL TREE – INSERTION.

BEN13L01 Soft Skills-I CAREER & CONFIDENCE BUILDING 1 0 2 2

OBJECTIVES

- Behavioral patterns and Basic Etiquette
- Value system
- Inter personal Skills
- Behaving in Corporate Culture
- Self Awareness / Confidence
- Managing Self and Personality Styles including Body language
- International Culture / Cross Culture Etiquette

UNIT –I

Creation of awareness of the top Companies / Different Verticals / courses for improving skill set matrix, Industry expectations to enable them to prepare for their career –Development of positive frame of mind –Avoiding inhibitions – Creation of self awareness – Overcoming of inferiority/ superiority complex.

UNIT – II

Selection of appropriate field vis-a-vis personality / Interest to create awareness of existing Industries, preparation of Curriculum Vitae- Objectives, Profiles vis-a-vis companies.

UNIT - III

Group discussions: Do's and Don'ts – Handling of Group discussions-What evaluators look for! Interpersonal relationships – with colleagues – Clients – Understanding one's own behavior –perception by others, How to work with persons whose background, culture, language / work style different from one's , Behavior pattern in multi –national offices.

UNIT – IV

Interview –Awareness of facing questions – Do's and Don'ts of personal interview / Group interview, Enabling students prepare for different procedures / Levels to enter into any company – Books / websites to help for further preparation, technical interview – How to prepare to face it, Undergoing

Employability skills test.

UNIT – V

Entrepreneurship development – Preparation for tests prior to the interview – Qualities and Pre-requisites for launching a firm.

REFERENCES:

1. *Quantitative Aptitude* -R.S.Aggarwal Pub: S. Chand, 1989.

2. *Soft Skills* –Shalini Verma, Pub: Pearson-2009.

3. *English Language Laboratories*-Nira Vonar,Pub:PHI Learning,2011

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Decl. U/S 3 of the UGC Act 1956)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BEC13009 MICROPROCESSOR AND MICROCONTROLLER 3 0 0 3

OBJECTIVES

- To introduce the architecture and programming of 8085 microprocessor.
- To introduce the interfacing of peripheral devices with 8085 microprocessor.
- To introduce the architecture and programming of 8086 microprocessor.
- To introduce the architecture, programming and interfacing of 8051 micro controller.

UNIT I: 8085 CPU **9 Hrs**

8085 Architecture - Instruction set - Addressing modes – Timing diagrams –Assembly language-Programming –Counters – Time delays- Interrupts – Memory interfacing –Interfacing ,i/o devices, 8085 based system design.

UNIT II: PERIPHERALS INTERFACING **9 Hrs**

Interfacing serial I/O (8251)-Parallel I/O (8255) –Keyboard and display controller (8279)-ADC/DAC Interfacing-Timer (8253).Programmable Interrupt Controller (8259), DMA controller, Applications of 8085

UNIT III: 8086 CPU **9 Hrs**

Intel 8086 internal architecture –8086 Addressing modes –instruction set -8086 Assembly language-Interrupts, Introduction to Pentium processor.

UNIT IV: 8051 MICROCONTROLLER **9 Hrs**

8051 Microcontroller hardware –I/O pins, Ports and circuits-External memory –Counters and Timers-Serial Data I/O – Interrupts.

UNIT V: 8051 PROGRAMMING AND APPLICATIONS **9 Hrs**

8051 Instruction set – Addressing Modes –Assembly Language Programming -8051 interfacing LCD, ADC, and Sensors Stepper motors, Motors, Keyboard and DAC

Total No. of Hrs: 45

TEXT BOOKS:

1. Ramesh S Gaonakar, "*Microprocessor Architecture, Programming and Application with 8085*", Penram International Publishing , New Delhi , 4th Edition 2000.(unit I,II)
2. John Uffenback,"*The 80x86 Family, Design, Programming and Interfacing*",Pearson education, 3rd Edition 2002.
3. Mohammed ali Mazidi and Janice Gillispie Mazidi , "*The 8051 Microcontroller and Embedded Systems*" ,Pearson education Asia ,New Delhi,2003.(Unit IV,V).

REFERENCES:

1. A.K.Ray and K.M.Burchandi ,"*Intel Microprocessors Architecture Programming and Interfacing*" McGraw Hill International edition, 2000.
2. Kenneth Jayala, "*The 8051 Microcontroller Architecture Programming andAapplication*" ,2nd edition ,Penram International publishers (India), New Delhi,1996.
3. M.Rafi Quazzaman, "*Microprocessors Theory and Applications*", Intel and Motorola prentice Hall of India , Pvt. Ltd., New Delhi, 2003

BMA13015 ANALYTIC FUNCTIONS AND OPTIMIZATION TECHNIQUES 3 1 0 4

OBJECTIVES:

- To learn the concepts of linear programming
- To learn the concepts of various analytic functions and transformations
- To learn the concepts of queuing

UNIT I: ANALYTIC FUNCTIONS 12 Hrs

Analytic functions – Cauchy Riemann equations in Cartesian and Polar form – Properties of analytic functions – Construction of analytic functions – Simple Transformations – Standard transformations : w = z2, w = ez, w = sin z, w = cosh z – Bilinear transformations.

UNIT II: COMPLEX INTEGRATION 12 Hrs

Cauchy's integral theorem (without proof) – Cauchy's integral formulae (without proof) – Taylor's and Laurent's series (without proof) – Singularities: Types – Residues – Cauchy's residue theorem (without proof) – Evaluation of real integrals by Contour Integration (excluding poles on real axis).

UNIT III: LINEAR PROGRAMMING 12 Hrs

Formulation of LPP – Standard form of LPP – Graphical method – Simplex method – Big M method – Two phase method.

UNIT IV TRANSPORTATION AND ASSIGNMENT 12 Hrs

Formulation of Transportation problem – North West corner method – Least cost method – Vogel's approximation method – Optimality test – MODI method – Degeneracy – Assignment problem: Hungarian method – Travelling salesman problem.

UNIT V QUEUING 12 Hrs

Elementary concepts – Pure Birth and Death process – Single server Markovian models with

infinite and finite capacity – Multi server Markovian models with infinite and finite capacity.

Total no. of hrs: 60

TEXT BOOKS:

1. Veerarajan T., *Engineering Mathematics* (for first year), Tata McGraw Hill Publishing Co., (2007).
2. Kreyszig E., *Advanced Engineering Mathematics* (9 th ed.), John Wiley & Sons, (2011).
3. Hamdy A. Taha, *Operations Research: An Introduction* (9th ed.), Pearson, (2010).

REFERENCES:

1. Hillier, Lieberman, *Introduction to Operations Research* (8th Ed.) (IAE), Tata McGraw Hill Publishing Co., (2005).
2. Panneerselvam R., *Operations Research (2nd ed.),* Prentice Hall of India, (2011).
3. Hira D.S., Gupta P.K., *Operations Research*, S. Chand & Co., (2007).

BEC13010 LINEAR INTEGRATED CIRCUITS 3 0 0 3

OBJECTIVES

- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To teach the theory of ADC and DAC

UNIT I: CIRCUIT CONFIGURATION FOR LINEAR ICs 9 Hrs

Current Sources, Analysis of Difference Amplifiers with Active Loads, Supply and Temperature Independent Biasing, Band Gap References, Monolithic IC operational Amplifiers, Specifications, Frequency Compensation, Slew Rate and Methods of Improving Slew Rate.

UNIT II: APPLICATION 9 Hrs

Scale Changer- Inverter and Non-inverter - summer and Subtractor – Multiplier and Divider – Differentiator and Integrator – Instrumentation Amplifier – AC Amplifier – Op- Amp Circuits using Diodes; Precision Rectifier – Clipper and Clamper – Sample and Hold Circuit – Log and Antilog Amplifiers.

UNIT III: COMPARATORS AND SIGNAL GENERATORS 9 Hrs

Applications of Comparators – Regenerative Comparators (Schmitt Trigger) – Square Wave Generator (Astable Multivibrator) – Monostable Multivibrator –Triangular Wave Generator – Saw Tooth Wave Generator – Sine Wave Generators Based on IC555 Timer, IC556 Timer.

UNIT IV: ACTIVE FILTERS AND TIMERS 9 Hrs

RC Active Filters: Low pass – High pass – Band pass – Band reject – Notch – First order – Second order – Transformation – State Variable Filter – Switched Capacitor Filters – Timer Functional Diagram – Monostable operation – Astable operation – Application – Schmitt Trigger – Counter Timers.

UNIT V: PLL, ADC AND DAC 9 Hrs

Basic Principles – Phase Detector and Comparator: Analog and Digital Voltage Controlled Oscillator – Low pass Filter - PLL – Applications of PLL – DAC/ADC Techniques – Integrating DAC /ADC Specifications, High Speed A/D Converters (EX: Sigma-Delta ADC)

Total No. of Hrs: 45

TEXT BOOKS:

1. James. M. Fiore, "*Operational amplifiers and linear integrated circuits*", 1st Edition, Thomson Learning.
2. Roy Choudhury and Shail Jain: *Linear Integrated Circuits*, New Age International Publishers, 1991.

REFERENCES:

1. Coughlin and Dirscol, "*Operational Amplifiers and Linear Integrated Circuits*", Prentice Hall of India Pvt., Ltd., 1992
2. Millman and Halkias:"*Integrated Electronics*", McGraw Hill, 1992.

BEC13011 TRANSMISSION LINES & WAVE GUIDES 3 1 0 4

OBJECTIVES

- To become familiar with propagation of signals through lines.
- To understand signal propagation at Radio frequencies.
- To understand radio propagation in guided systems.
- To become familiar with resonators.

UNIT: I TRANSMISSION LINE BASICS 12 Hrs

Different types of transmission lines – Definition of Characteristic impedance – The transmission line as a cascade of T-Sections - Definition of Propagation Constant, Basic transmission line equation- Wave Characteristics of an infinite transmission line, Transmission line parameters and their evaluation.

UNIT: II ATTENUATION AND REFLECTION 12 Hrs

Waveform distortion – Distortion less transmission line – The telephone cable – Inductance loading of telephone cables. Input impedance of lossless lines, Conditions for minimum attenuation – Reflection on a line not terminated by Zo– Reflection factor and reflection loss

UNIT: III STANDING WAVES 12 Hrs

The Line at Radio Frequencies: Standing waves and standing wave ratio on a line – One eighth wave line – The quarter wave line and impedance matching – The half wave line. The Smith Chart – Application of the Smith Chart –Single stub matching and double stub matching.

UNIT: IV GUIDED WAVES 12 Hrs

Waves between parallel planes of perfect conductors – Transverse electric and transverse magnetic waves – Characteristics of TE and TM Waves – Transverse Electromagnetic waves – Velocities of propagation – Component uniform plane waves between parallel planes – Attenuation of TE and TM waves in parallel plane guides

UNIT: V RECTANGULAR AND CIRCULAR WAVEGUIDES 12 Hrs

Transverse Magnetic Waves in Rectangular Wave guides – Transverse Electric Waves in Rectangular Waveguides- Impossibility of TEM waves in waveguides - Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides

Total No. of Hrs: 60

TEXT BOOKS:

1. J.D. Ryder "*Networks, Lines and Fields*", PHI, New Delhi, 2003. (Unit I & II)
2. E.C. Jordan and K.G. Balmain "*Electro Magnetic Waves and Radiating System*," PHI, New Delhi, 2003.

REFERENCES:

1. Ramo, Whineery and Van Duzer: "*Fields and Waves in Communication Electronics*" John Wiley, 2003.
2. David M. Pozar: "*Microwave Engineering*" – 2nd Edition – John Wiley.
3. David K. Cheng,"*Field and Waves in Electromagnetism*", Pearson Education, 1989.

BEC13012 COMMUNICATION SYSTEMS 3 0 0 3

OBJECTIVES :

- To provide various Amplitude modulation and demodulation systems.
- To provide some depth analysis in noise performance of various receiver.
- To study some basic information theory with some channel coding theorem.

UNIT I: SIGNALS & NOISE 9 Hrs

Periodic & Aperiodic Signals – Noise - External Noise – Thermal Agitation – Shot Noise – Noise Figure – Signal to Noise Ratio – Equivalent Noise Resistance

UNIT II: INTRODUCTION TO COMMUNICATION 9 Hrs

Basic Communication Systems – Need for Modulation in Communication Systems – Amplitude Modulation – Double Side Band Amplitude Modulation – Single Side Band and VSB Modulation – Modulators. Noise in Linear Modulators Noise in Linear Modulation Systems. FM Modulation.

UNIT III: DETECTORS, TRANSMITTER AND RECEIVER 9 Hrs

AM Demodulators – FM Detectors, AM Transmitter. FM Transmitter – SSB Transmitters, Broadband Transmitter and Receiver AM & FM Receivers, Communication Receivers, Integrated Circuit Based AM & FM Transmitter:& Receiver.

UNIT IV: MODULATION TECHNIQUES AND PULSE MODULATION 9 Hrs

Phase Modulation – Noise Triangle – Pre-Emphasis and De-Emphasis – Stereophonic FM Multiplex System – Comparison of Wideband and Narrow Band FM – AFC, Introduction – Sampling Theorem –Quantization, Quantization Error, PAM, PTM, PM, PCM – Telegraph.

UNIT V: DIGITAL MODULATION & INFORMATION THEORY 9 Hrs

Introduction to Digital Modulation System, ASK, FSK, PSK, Transmitter and Receiver, Introduction-Information & Entropy, Source Coding Theory, Data Compaction, Discrete Memoryless Channel, Mutual Information Channel Capacity, Channel Coding Theory.

Total No. of Hrs: 45

TEXT BOOKS:

1. Roy Blake, "*Electronic Communication Systems*", Thomson Learning 2nd Edition, , 2002.
2. George Kennedy: "*Electronic Communication Systems*", Tata McGraw Hill publications, 1992

REFERENCES:

1. Taub & Schilling," *Principles of Communication*", Tata McGraw Hill,1986
2. Simon Haykins, "*Principles of Communications*", Prentice Hall of India. 2001

BEE13033 CONTROL SYSTEMS 3 1 0 4

OBJECTIVES

- To understand the open loop and closed loop (feedback) systems.
- To understand time domain and frequency domain analysis of control systems required for stability analysis.
- To understand the compensation technique that can be used to stabilize control systems

UNIT I: TIME RESPONSE 12 Hrs

Standard test Signals-time domain study of first order and second order feedback control systems-Time domain specifications - I and II order system response - Error coefficients - Generalized error series - Steady state error - P, PI, PID controllers.

UNIT II: FREQUENCY RESPONSE 12 Hrs

Frequency response - Bode plot - Polar plot - Constant M an N circles - Nichols chart - Determination of closed loop response from open loop response - Correlation between frequency domain and time domain specifications.

UNIT III: STABILITY OF CONTROL SYSTEM 12Hrs

Characteristics equation - Location of roots in S plane for stability - Routh Hurwitz criterion - Root locus construction - Effect of pole, zero addition - Gain margin and phase margin - Nyquist stability criterion.

UNIT IV: COMPENSATOR DESIGN 12 Hrs

Performance criteria - Lag, lead and lag-lead networks - Compensator design using Bode plots.

UNIT V: STATE SPACE ANALYSIS 12 Hrs

State space analysis - State space formulation -State variables - Phase variables and Canonical variables – Derivation of transfer function from state model- State transition matrix-Solution of state equations by Laplace transform – concept of controllability & observabliity.

Total No. of Hours: 60

TEXT BOOKS:

1. K. Ogata, '*Modern Control Engineering*', 4th edition, Pearson Education, New Delhi, 2003 / PHI.
2. I.J. Nagrath & M. Gopal, '*Control Systems Engineering'*, New Age International Publishers, 2003.

REFERENCES:

1. B.C. Kuo, '*Automatic Control Systems*', Prentice Hall of India Ltd., New Delhi, 1995.
2. M. Gopal, '*Control Systems, Principles & De*sign', Tata McGraw Hill, New Delhi, 2002.
3. M.N. Bandyopadhyay, '*Control Engineering Theory and Practice'*, Prentice Hall of India, 2003.

BEC13L04 LINEAR & DIGITAL IC LAB 0 0 3 1

OBJECTIVES:

- To implement the characteristics of linear IC's, digital IC's and flip flops

1. MEASUREMENT OF OP-AMP CHARACTERISTICS SUCH AS SLEWRATE,CMRR,GAIN
2. OP-AMP APPLICATIONS I – INVERTING & NON-INVERTING AMPLIFIER, SUMMER, MULTIPLIER, LOGARITHMIC AND DIFFERENTIAL AMPLIFIERS, INTEGRATOR
3. OP-AMP APPLICATIONS –II –WAVE FORM GENERATION, MULTIVIBRATORS
4. STUDY OF 555 IC AND ITS APPLICATIONS
5. VOLTAGE CONTROLLED OSCILLATOR (VCO)
6. A/D & D/A CONVERTERS
7. IMPLEMENTATION OF BOOLEAN FUNCTIONS USING LOGIC GATES –POS &SOP FORM.
8. MULTIBIT ADDERS & SUBTRACTORS (2 & 3 BITS).
9. MULTIPLEXERS ,DEMULTIPLEXERSENCODER & DECODER AND ITS LOGIC CIRCUIT DESIGN
10. STUDY OF FLIP FLOPS
11. STUDY OF REGISTERS
12. STUDY OF COUNTERS
13. IMPLEMENTATION OF ANY GENERAL COMBINATIONAL / SEQUENTIAL LOGIC CIRCUITS

BEC13L05	**MICROPROCESSOR LAB**	**0**	**0**	**3**	**1**

OBJECTIVES:

- To implement the various programming examples using 8085 Microprocessor

8085 MICROPROCESSOR:

1. ASSEMBLY LANGUAGE PROGRAMMING FOR SINGLE BYTE, MULTIBYTE, ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION,
2. AVERAGE OF N NUMBERS, BLOCK MOVEMENT OF DATA, MAXIMUM OF GIVEN SERIES, SQUARE OF A GIVEN NUMBER

INTERFACING:

3. WAVE FORM GENERATION USING 8255 PPI
4. TRAFFIC LIGHT CONTROLLER
5. STEPPER MOTOR CONTROLLER
6. KEYBOARD INTERFACING
7. MATRIX DISPLAY
8. A/D INTERFACE USING ADC 0809
9. DAC INTERFACE USING DAC 0808.

BEN13L02 SOFT SKILLS II QUALITATIVE AND QUANTITATIVE SKILLS 0 0 3 2

OBJECTIVES

- Outline the basic steps in problem solving.
- List out the key elements
- Explain the use of tools and techniques in problem solving.
- Discuss the personality types and problem solving techniques.
- By adapting different thinking styles in group and lean environment.
- Recognizing and removing barriers to thinking in challenging situations.
- Make better decision through critical thinking and creative problem solving.

METHODOLOGY

The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talent of the students which they will be employing during various in their real life.

1. Group activities + individual activities
2. Collaborative learning
3. Interactive sessions
4. Ensure Participation
5. Empirical Learning

UNIT-1

Self Introduction – Narration-Current News Update – Numbers – Height & Distance – Square & Cube Roots

UNIT – 2

Current Tech Update – Verbal Aptitude Test I – GD-I – Odd man out series – Permutation & Combination – Problems on ages

UNIT – 3

GD-II – Resume Writing – Mock Interview I / reading comprehension

UNIT – 4

Mock Interview II / reading comprehension – Mock Interview III / reading comprehension – GD – III – Ratio & Proportion – Clocks – H.C.F. & L.C.M

UNIT – 5

GD – IV – Verbal Aptitude Test II – Review – Partnership – Puzzles - Test

REFERENCES:

1 Pushpalata and Sanjay Kumar, "*Communicate or Collapse: A Handbook of Effective Public Speaking*", Group Discussions and Interviews. Prentice-Hall,Delhi,2007
2 Thorpe, Edgar, "*Course in Mental Ability and Quantitative Aptitude*", Tata McGraw-Hill,2003
3 Thorpe, Edgar, "*Test of Reasoning*", Tata McGraw-Hill, 2003
4 Prasad, H.M, "*How to prepare for Group Discussion and Interview*", Tata McGraw-Hill,2001
5 "*Career Press Editors. 101 Great Resumes*", Jaico Publishing House, 2003
6 Agarwal, R.S, "*A Modern Approach to Verbal Non-Verbal Reasoning*", S. Chand & Co.,2004
7 Mishra Sunita and Murali krishna, "*Communication Skills for Engineers*", Pearson Education, First Edition, 2004

BEC13013 **DIGITAL SIGNAL PROCESSING** **3 1 0 4**

OBJECTIVES

- To study DFT and its computation
- To study the design techniques for digital filters
- To study the finite word length effects in signal processing
- To study the non-parametric methods of power spectrum estimations
- To study the fundamentals of digital signal processors.

UNIT I: DFT AND FFT **12 Hrs**

Discrete Fourier Transform (DFT)-Properties-Convolution of Sequences-Linear Convolution—Circular Convolution—Introduction to Radix-2 FFT—Properties –DIT (FFT)-DIF (FFT)-Algorithms of Radix-2FFT-Computing Inverse DFT by doing a direct DFT.

UNIT II: DESIGN OF DIGITAL FILTER **12 Hrs**

Review of Design Techniques for Analog Low Pass Filters-Frequency Transformation-Design of IIR Filters-Properties of IIR Filters-Characteristics of FIR Filters with Linear Phase-Properties of FIR Filters-Design of FIR Filters using Windows-Fourier Series Method-Frequency sampling Method.

UNIT III: FINITE WORD LENGTH EFFECT **12 Hrs**

Quantization Noise-Derivation for Quantization Noise Power-Fixed Point and Binary Floating Point Number Representations-Comparison-Overflow Error-Truncation Error-Co-efficient Quantization Error-Limit Cycle Oscillations-Signal Scaling-Analytical Model of Sample and Hold Operations.

UNIT IV: MULTIRATE SIGNAL PROCESSING **9 Hrs**

Multi rate Signal Processing-Interpolation, Decimation, Single and Multistage Realization, Filter Bank Implementation, Applications-Sub Band Coding.

UNIT V: AN OVERVIEW OF TMS320CXX **15 Hrs**

Introduction-Architecture of TMS Processor, Buses-Internal Memory Organization-Central Processing Unit-Arithmetic Logic Unit-Barrel Shifter-Multiplier/Adder Unit-Compare, Select and Store Unit-Exponent Encoder-Pipeline-on Chip Peripherals-External Bus Interface-Data Address Generation Logic-Programme Address Generation Logic.

Total No. of Hrs : 60

TEXT BOOKS:

1. Sanjit k.Mitra "*Digital signal processing*",A Computer Based Approach,Tata McGraw Hill,New delhi,1998.
2. Johnny R.Johnson,"*Introduction to Digital Signal Processing*",Minth printing,September 2001.
3. M.D.Srinath,P.K.Rajasekaran,R.Vishwanathan "*Introduction to Statistical Signal Processing With Application*",Prentice-Hall of India Pvt.Ltd.,NEW DELHI,1999.
4. John.G.Proakis and Dimitris G.Manolakis, "*Digital Signal Processing Algorithm and Application*",PHI of India Ltd,New Delhi,3rd edition 2000.

REFERENCES:

1. Ashok Ambardar,"*Analog And Digital Signal Processing*",2nd Edition,Thomson Learning 2000.
2. Ashok Ambardar,"*Analog and Digital Signal Processing A Modern Introduction*",I st edition Thomson Learning 2006

BCS13034 COMPUTER NETWORKS 3 0 0 3

OBJECTIVES

- To understand different storage media and OSI layers
- To introduce the features of different I/O peripheral devices and their interfaces.
- To introduce the students the functions of different layers.
- To introduce IEEE standard employed in computer networking.
- To make students to get familiarized with different protocols and network components.

UNIT I: DATA COMMUNICATION 9 Hrs

ISO Reference Model, Open System Standard, Transmission of Digital Data – Electrical Interface, Modems, Line Configuration, Error Detection and Correction (CRC) - Introduction to Bluetooth.

UNIT II: DATA LINK CONTROL AND PROTOCOLS 9 Hrs

Flow Control and Error Control, Stop And Wait, Sliding Windows, Automatic Repeat (ARQ), Asynchronous Protocols, - X Modem, Y Modem, Synchronous Protocols – Character Oriented and Bit Oriented Protocols (HDLC).

UNIT-III LOCAL AREA NETWORKS 9 Hrs

IEEE 802 Standards, LLC, MAC Layer Protocols – CSMA/CD Ethernet, Token Bus, Token Ring, FDDI, Distributed Queue Dual Bus, Switched Multimegabit Data Service.

UNIT-IV WIDE AREA NETWORKS 9 Hrs

Circuit Switch Packet Switch, Message Switching, X.25 Protocols, Architecture and Layers of Protocol, ISDN and ATM Protocol – Architecture Header Structure, Function of AAL Layer,Internetworking Devices, Repeater, Bridge, Routers and Gateways, Routing Algorithms.

UNIT-V UPPER OSI LAYERS 9 Hrs

Session Layer Protocols, Presentation Layer – Data Security, Brief Introduction to Encryption / Decryption, Data Compression, Application Layer Protocols, MHS, File Transfer.

Total No. of Hrs: 45

TEXT BOOKS:

1. Behrous A. Forouzan Etal, "*Data Communication and Networking*", Tata McGraw Hill, 2nd Edition, 2000.
2. William A, Shay, "*Understanding Data Communications and Networks*", Thomson Learning, 3rd Edition 2003.
3. Miller, "*Data and Network Communications*", Thomson Learning
4. Gallo, "*Computer Communications and Networking Technologies*", Thomson Learning, 1st edition 2001.

REFERENCES:

1. William Stallings, "*Data and Computer Communication*", Prentice Hall of India, Fifth Edition 1997.
2. Andrew S. Tanenbaum, "*Computer Networks*", prentice hall of India, Third Edition 1996.
3. Fred Hallsall, "*Data Communication Computer Networks and Open System*", Addison – Wesley, 1992.

BEC13014 DIGITAL COMMUNICATION 3 1 0 4

OBJECTIVES

- To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
- To learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channels.

UNIT I: PULSE MODULATION 12 Hrs

PCM and TDMA Principles, Differential Pulse Code Modulation and Delta Modulation, Linear Prediction and Prediction Filters, Speech Coding at Low Bit Rates.

UNIT II: BAND LIMITED SIGNALING 12 Hrs

Power Spectra of PAM Signals; Inter Symbol Interference, Ideal Nyquist Channel, and Raised Cosine Channels, Correlative Coding and Precoding, Eye Patterns and Equalization Techniques.

UNIT III: DIGITAL MODULATION, DETECTION AND ESTIMATION 12 Hrs

Gram Schmidt Procedures, Matched Filters, Correlation Receivers, Likelihood Functions, and Maximum Likelihood Detections, BPSK, QPSK, FSK and MSK Schemes Bit and Symbol Error Properties, Performance, Comparisons, Principles of Carrier and Timing Synchronizations.

UNIT IV: ERROR CONTROL CODING 12 Hrs

Introduction to Linear Block Codes, Hamming Codes, BCH Coding, RS Coding, Convolution coding, Coding Grain Viterbi Decoding.

UNIT V: SPREAD SPECTRUM SYSTEMS 12 Hrs

Pseudo Noise Sequences, Generation and Correlation Properties, Direct Sequence Spread Spectrum Systems, Frequency Hop System, Processing Gain Antijam and Multipath Performance.

Total No. of Hrs: **60**

TEXT BOOKS:

1. B.P. Lathi," *Modern Digital and Analog communication system*", Oxford publications, Third edition.
2. Simon Haykin, "Digital *communications*", John Wiley, 1988.

REFERENCES:

1. Roy Blake, "*Electronic Communication systems*", , Thomson Learning, 2nd edition 2002
2. John. G. Proakis, "*Digital Communication*", McGraw Hill Inc., Third Edition, Malaysia, 1995.
3. M.K. Simen, "*Digital Communication Techniques Signal Design & Detection*", Prentice Hall of India, 1999.

BEC13015 MEASUREMENTS AND INSTRUMENTATION 3 0 0 3

OBJECTIVES

- Basic measurement concepts
- Concepts of electronic measurements
- Importance of signal generators and signal analysers in measurements
- Relevance of digital instruments in measurements
- The need for data acquisition systems

UNIT I: TRANSDUCERS 9 Hrs

Measurements, Instrumentation, Errors in Measurements, Calibration and Standard, Classification and Characteristics of Transducers, Digital, Electrical, Electronic Weighing System, AC / DC Bridge Measurement and their Applications.

UNIT II: SIGNAL GENERATOR AND SIGNAL ANALYZERS 9 Hrs

A.F. Generator, Pulse Generator, AM / FM Signal Generator, Function Generator, Sweep Frequency Generator, Wave Analyzers, Spectrum Analyzers, Logic Analyzer, Distortion Analyzers.

UNIT III: DIGITAL INSTRUMENTS 9 Hrs

Digital Voltmeters and Multimeters, Automation in Voltmeters, Accuracy of DVM, Guarding Techniques, Frequency, Period, Time Interval and Pulse width Measurements, Automatic Vector Voltmeter**.**

UNIT IV: DATA DISPLAY AND RECORDING SYSTEM 9 Hrs

CRO, Single Beam, Dual Trace, Double Beam CRO, Digital Storage and Analog Storage Oscilloscope, Sampling Oscilloscope, Power Scope, Curve Tracer, Analog, Digital Recorders and Printers

UNIT V: COMPUTER CONTROLLED TEST SYSTEM 9 Hrs

Testing and Audio Amplifier, Testing a Radio Receiver, Instrument used in Computer Controlled Instrumentation, Digital Control Description, Microprocessor Based Measurements, Case Studies in Instrumentation.

Total No. of Hrs: 45

TEXT BOOKS:

1. Rangan C.S. "*Instrumentation Devices and Systems*", Tata McGraw Hill, 1998.
2. Cooper, "*Electronic Instrumentation and Measurement Techniques*", Prentice Hall of India, 1988.
3. A. K. Shawney "*Electronics and Electrical Instrumentation"* Tata McGraw Hill, 1975.

REFERENCES:

1. Bouwels A.J., "*Digital Instrumentation*", McGraw Hill, 1986.
2. Barney .C, "*Intelligent Instrumentation* ", Prentice Hall of India, 1985.
3. Oliver and Cage, "*Electronic Measurements and Instruments and Instrumentation*", McGraw Hill, 1975.
4. Deobelin, "*Measurements Systems*", McGraw Hill, 1990.

BEC13016 ANTENNAS AND WAVE PROPAGATION 3 1 0 4

OBJECTIVES

- To study radiation from a current element.
- To study antenna arrays
- To study aperture antennas
- To learn special antennas such as frequency independent and broad band antennas.
- To study radio wave propagation.

UNIT I: RADIATION PRINCIPLE AND ANTENNA TERMINOLOGIES 12 Hrs

Principle of Radiation, Isotropic Radiator – Antenna Terminologies - Reciprocity Theorem - Friis Formula

UNIT II: ANTENNA FUNDAMENTALS 12 Hrs

Introduction – Basic Antenna Parameters - Beam Area - Directivity Gain – Resolution Aperture – Point Sources – Arrays of Point Sources -Radiation from an Oscillating Dipole - Short Linear Antennas - Half Wave Dipole as a Basic Radiating Element - Folded Unipole and Dipole Antennas - Shunt Fed Dipoles - Slot Antennas - Loop Antennas - Standing Wave Radiators.

UNIT III: ANTENNA ARRAYS & PRACTICE 12 Hrs

Pattern Multiplication - Arrays of Two Driven Antennas - Broadside Arrays - End Fire Arrays - Collinear Arrays - Parasitic Arrays -Antenna for Low & Medium Frequencies - Tower Antenna

UNIT IV: SPECIAL ANTENNA 12 Hrs

Effects of Ground on Antenna Performance - Ground Systems - Top Loading - Excitation Methods - Antenna Couplers, Baluns - Yagi Antenna - Comer Reflector - Biconical Antennas - Turnstile Antennas - Helical Antennas - Parabolic Reflectors

UNIT V: WAVE PROPAGATION: 12 Hrs

Propagation in Free Space - Propagation Around the Earth - Surface Wave and its Propagation - Structure of the Ionosphere - Propagation of Plane Waves in an Ionized Medium - Determination of Critical Frequencies - Maximum Usable Frequency - Effect of Earth's Magnetic Field - Ionospheric Variations - Fading - Tropospheric Propagation - Space Wave - Super Refraction - Frequency - Refractive Index of Troposphere - Effect of Surface Irregularities - Scatter Propagation.

Total No. of Hrs: 60

TEXT BOOKS:

1. Prasad .K.D., "*Antennas and Wave Propagation*", Satya Prakasan, 3rd Edition, 1996
2. John D. Kraus,. "*Antennas*" Tata McGraw Hill 2nd Edition, 2000.

REFERENCES:

1. Edward.C. Jordan and Keith.G. Balmain, "*Electromagnetic Waves and Radiating Systems*", Prentice Hall, 2nd Edition, 1995.
2. Ballany , "*Antenna Theory* " , John Wiley & Sons, second edition , 2003.

BMG13007 MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR 3 0 0 3

OBJECTIVES

- Knowledge on the management is essential for all kinds of people in all kinds of organizations.
- After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling.
- Students will also gain some basic knowledge on international aspect of management.

UNIT-I: 9 Hrs

Management-Definition, Evolution-Nature of Management-Distinction Between Administration and Management,MBO,Management Functions-Planning,Organization,Motivating,Control and Operations-Marketing, Finance,HR.

UNIT-II 9 Hrs

Organizing Definitions-Process of Organization-Importance of Organization-Organization Structure-Organizational Chart- and Managing HR and Communicating-Types of Communication-Formal Communication-Features of Formal Communication, Motivating and Leading.

UNIT-III: 9 Hrs

Behavior of an Individual in an Organization-Attitude, Value, Job Satisfaction, Personality, Perception, Concepts of Learning, Motivation, Theories and Application. Group Behavior-Structure Process, Decision Making, Work Team-Different from Group.

UNIT-IV: 9 Hrs

Power and Politics, Directing-Characteristics of Directing-Importance of Directing-Principles of Directing-Techniques of Directing, Organizational Culture, Organizational Work Culture and Work Design.

UNIT-V: 9 Hrs

HR Policies and Practices, Definitions of Supervision-Qualities of a Good Supervisor-Responsibilities or Functions of a Supervisor, Appraisal of Performance-Span of Supervision Managing the Future-New Worker/New Organization etc.

Total No. of Hrs: 45

TEXT BOOKS:

1. Jayasankar.J, "*Principles of Management*", Margham Publications
2. John Pierce,"*Management and Organisational Behaviour*", 1 st Edition, Thomson Learning(2005)
3. L.K.M. Prasad, "*Management Principles*", Sultan Chand and Sons

REFERENCES:

1. Koontz, "Essentials of Management", Tata Mc Graw-Hill Publications(2001)
2. Gupta C.B.,"Management Theory and Practice", Sultan Chand and Sons

BEC13L06 COMMUNICATION LAB – I 0 0 3 1

OBJECTIVES:

- To implement the various analog and digital modulation and demodulation techniques.

1. DESIGN AND TESTING OF AMPLITUDE MODULATION
2. DESIGN AND TESTING OF AMPLITUDE DEMODULATION
3. DESIGN AND TESTING OF FREQUENCY MODULATION
4. DESIGN AND TESTING OF FREQUENCY DEMODULATION (ANY ONE METHOD)
5. DESIGN AND TESTING OF PULSE AMPLITUDE MODULATION & DEMODULATION
6. DESIGN AND TESTING OF ASK, FSK AND PSK
7. STUDY OF LINE CODING AND DECODING TECHNIQUES
8. STUDY OF SAMPLING
9. STUDY OF PULSE CODE MODULATION
10. DESIGN & TESTING OF EYE PATTERN
11. BLOCK/HAMMING CODES.
12. PN SEQUENCE GENERATOR.

BEC13L07 DIGITAL SIMULATION AND SIGNAL PROCESSING LAB 0 0 3 1

OBJECTIVES:

- To learn the design of combinational and sequential circuits using simulation tools

DIGITAL SIMULATION USING EDA TOOLS (25 % OF COURSE)

1. APPLICATION OF COMBINATION LOGIC DESIGN
2. APPLICATION OF SEQUENTIAL LOGIC DESIGN

USING MATLAB (25 % OF COURSE)

3. REPRESENTATION OF TIME-SERIES; COMPUTATION OF CONVOLUTION
4. RESPONSE OF A DIFFERENCE EQUATION TO INITIAL CONDITIONS; STABILITY
5. DFT COMPUTATION
6. COMPUTATIONAL EXPERIMENTS WITH DIGITAL FILTERING

DSP PROCESSOR IMPLEMENTATION (40 % OF COURSE)

7. SAMPLING & WAVEFORM GENERATION
8. FIR & IIR FILTERS IMPLEMENTATION
9. FAST FOURIER TRANSFORMS
10. ADAPTIVE FILTERS
11. MULTIRATE SIGNAL PROCESSING

MEASUREMENT ON SIGNAL PARAMETERS IN TIME DOMAIN & FREQUENCY DOMAIN. (10 % OF COURSE)

12. DETERMINATION OF THE INDIVIDUAL AMPLITUDES OF THE DIFFERENT DOMINATE HARMONICS OF A COMPOSITE SIGNAL (EXAMPLE; SQUARE WAVE SIGNALS) USING SPECTRUM ANALYZER.
13. DETERMINATION OF THE PHASE DIFFERENCE BETWEEN TWO SIGNALS (DERIVED FROM THE SAME SOURCE (SAY 1 KHZ SQUARE WAVE SIGNAL) USING TWO DIFFERENT PATHS, ONE OF WHICH CONTAINS A DELAY UNIT) USING CRO AND A PHASE DETECTOR CIRCUITRY,
14. DETERMINATION OF THE FREQUENCY OF UNKNOWN SIGNALS: USING CRO AND LISSAJOUS PATTERNS.

BEC13017 QUANTUM COMPUTING 3 0 0 3

OBJECTIVES

- To understand the building blocks of a quantum computer.
- To understand the principles, quantum information and limitation of quantum operations formalizing.
- To understand the various quantum algorithms.

UNIT I: INTRODUCTION 9 Hrs

Introduction to Quantum Computing-Power of Quantum Computing-Quantum Information-Quantum Computers. The Wave and the Corpuscular Nature of Light Photon Behavior, State Description, Measurement in Multiple Bases, Superposition States.

UNIT II: QUANTUM MECHANICS 9 Hrs

The Superposition Probability Rule-A Photon Coincidence Experiment-Quantum Cryptography-Quantum Mechanics-Hilbert Space-Linear Operators Tensor and Outer Products-Quantum States,Quantum Operators-Spectral Decomposition of a Quantum Operators-Double Silt Experiments.

UNIT III: QUBITS AND QUANTUM GATES 9 Hrs

Qubits, Blocks Sphere Representation-Rotation Operation-The Measurement of a Single Qubits-A Pair of Qubits-Qubits-Physical Implementation-Measurement of the Spin-Qubits as Polarized Photon-Entanglement, Exchange of Information-Quantum Teleportation's - The Non-Cloning Theorem-Full Adder Circuits-Single and Multiple Qubit Controlled Operations -Matrix Representation of Quantum Gates and Circuits.

UNIT IV: QUANTUM CIRCUITS 9 Hrs

Classes of Quantum Algorithms-Quantum Parallelism-Deutsch's Problem-QFT(Quantum Fourier Transform)-Short's Factoring Algorithm-Simon's Algorithm-Quantum Search Algorithm -Universal Quantum Gate-State Transformation-Quantum Circuit for The Walsh-Hadamard Transform-Mathematical Models of Quantum Computers.

UNIT V: QUANTUM ALGORITHM 9 Hrs

Error and correction for errors, simple examples of error correcting codes in classical computation, linear codes, Quantum error correction and simple examples, Shor code. Introduction Different implementations of quantum computer. Dense Coding-Quantum Key Distribution-Bell States-Brief Introduction to Quantum Computing Software, **Quantum error-correcting codes:** Error models, Criteria for a good code: reversible operations, 3-qubit phase code, 9-qubit code.7-qubit code. **Stabilizer codes:** Criteria for a good code, 4-qubit error-detecting code.

Total No. of Hrs: 45

TEXT BOOKS:

1. Dan C. Marinescu, Gabriela M. Marinescu, "*Approaching Quantum Computing*", Pearson Education 2008-09.
2. M.A. Neilson and I.L .Chuang 'Quantum *computing and Quantum information'*, Cambridge University Press,2009.

REFERENCE:

1. Vishal Sahni "*Introduction to Quantum Computing* "TATA McGraw-Hill Publishing Company Limited.

BEC13018 OPTICAL COMMUNICATION 3 1 0 4

OBJECTIVES

- To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
- To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
- To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers.
- To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
- To learn fiber slicing and connectors, noise effects on system performance, operational principles WDM and solutions.

UNIT I: INTRODUCTION TO OPTICAL FIBERS 12 Hrs

The General System – Evolution of Fiber Optical System – Elements of an Optical Fiber Transmission Link – Ray Theory Transmission – Cylindrical Fiber – Single Mode Fibers

UNIT II: ATTENUATION OF OPTICAL FIBERS 12 Hrs

Absorption Losses, Scattering Losses – Bending Losses – Core and Cladding Losses – Material Dispersion – Wave Guide Dispersion – Signal Distortion in SM Fibers - Inter-modal Dispersion

UNIT III: OPTICAL SOURCES 12 Hrs

Direct and Indirect Band Gap Material – LED Structures - LED Power and Efficiency – Modulation – Laser Diodes Structures and Radiation Pattern – Single Mode Lasers – Modulation of Laser Diodes.

UNIT IV: OPTICAL DETECTORS 12Hrs

PIN and APD Diodes – Photo Detector Noise, SNR, Detector Response Time, Avalanche Multiplication Noise – Comparison of Photo Detectors – Fundamentals Receiver Operation – FET Pre-amplifiers

UNIT V: DIGITAL SYSTEMS 12 Hrs

Point –Point Links – System Design Consideration – Fiber Splicing and Connectors – Line Power Budget – Rise Time Budget – Noise Effects on System Performance – Operational Principles of WDM.

Total No. of Hrs: 60

TEXT BOOKS:

1. Gerd Keiser, "*Optical Fiber Communication System*", McGraw Hill, International, Singapore 3rd ed., 2000.
2. John M. Senior, "*Optical Fiber Communication principles and practice*" – Prentice Hall of India private limited, 1996

REFERENCES:

1. J. Gower, "*Optical communication system*", Prentice Hall of India, 2001.
2. Govind P. Agrawal "*Fiber-Optic Communication Systems*", Wiley India 3rd Edition.

BEC13019 MICROWAVE ENGINEERING 3 0 0 3

OBJECTIVES

- To study Microwave sources and amplifiers.
- To study passive microwave components and their S- Parameters.
- To study Microwave semiconductor devices & applications.

UNIT I: MICROWAVE GENERATORS 9 Hrs

Limitations of Conventional Tubes at Very High Frequencies – Velocity – Modulated Tubes, Two – Cavity Klystron Amplifiers, Reflex Klystron Oscillators, Multi – Cavity klystron Amplifiers – Periodic Slow – Wave Structures and their Use in Traveling Wave Tube Amplifiers, Focusing Techniques, TWTA Performance Characteristics – Electron Motion in Crossed Electric and Magnetic Fields, Magnetron Oscillators, Hartree Equation Rieke Diagram and Performance Charts – Other Microwave Tubes.

UNIT II: MICROWAVE SOLID-STATE DEVICES 9 Hrs

Varactor Diodes, Manley – Rowe Relations, Low Noise Parametric Amplifiers, Harmonic Generation with Varactors and Step-Recovery Diodes – Transferred – Electron Devices and Their Operation, Cavity – Controlled Modes, LSA Mode-Avalanche – Transit Time Devices and Their Operation, TRAPATT Mode, Other Devices for Microwave Generation – PIN Diodes and Their use as Attenuators and Switches – Fabrication Techniques.

UNIT III: MICROWAVE CIRCUITS 9 Hrs

Small – Signal Equivalent Circuits, High-Frequency Applications, Performance Criteria and Limitations of BJTs and FETs – HEMTs – Fabrication Techniques

UNIT IV MICROWAVE PASSIVE DEVICES 9 Hrs

Transmission Lines for use at Microwave and Wave Frequencies – Attenuators, Directional Couplers, Terminators, Phase Shifters, Faraday Rotations Isolators and Circulators, Resonance Isolators and Field Displacement Isolators, Microwave Filters, Frequency Meters, Hybrid Junctions, Duplex - Microwave Integrated Circuits.

UNIT V MICROWAVE MEASUREMENTS 9 Hrs

Slotted - Line Techniques – Measurements of Wavelength – Measurement of Low and High VSWR – Measurement of Frequency and Frequency Meters – Measurement of Insertion Loss and Attenuation by Substitution Methods – Measurement of Low and High Powers at Microwave Frequencies – Modern Measurement Techniques using Automatic Network Analyzer and Spectrum Analyzer.

TEXT BOOKS: **Total No. of Hrs: 45**

1. Annapurna Das, Sisir. K. Das, "*Microwave Engineering*", Tata McGraw Hill Co., Ltd., 1999. Reprint 2001.
2. Samuel Y.LIAO : "*Microwave Devices and Circuits*" – Prentice Hall of India – 3rd Edition (2003)

REFERENCES:

1. D.M. Pozer, "*Microwave Engineering*", Addison – Wesley, 1998.
2. R.E. Collins: *Foundations for Microwave Engg*. – IEEE Press Second Edition (2002)

BEC13020 INTRODUCTION TO VLSI DESIGN & EMBEDDED SYSTEMS 3 1 0 4

OBJECTIVES

- To learn the basic CMOS circuits.
- To learn the CMOS process technology.
- To learn techniques of chip design using programmable devices.
- To learn the concepts of modeling a digital system using Hardware Description Language.
- To learn PIC microcontroller

UNIT I: VLSI FABRICATION TECHNOLOGY 12 Hrs

An Overview of Wafer Fabrication-Wafer Processing – Oxidation – Patterning – Diffusion – Ion Implantation – Deposition – Silicon Gate n-MOS Process – CMOS Process – n-well – p-well - Twin Tub – CMOS Process Enhancements – Interconnect – Circuit Elements.

UNIT II: DESIGNING COMBINATIONAL LOGIC GATES IN CMOS 12 Hrs

Stick Diagram, Static CMOS DESIGN: Complementary CMOS, Ratioed Logic, Pass Transistor Logic, Dynamic CMOS Design: Basic Principles, Domino CMOS, n-p CMOS Logic – Introduction to FPGA.

UNIT III: DESINING SEQUENTIAL LOGIC CIRCUITS 12 Hrs

Classification of Memory Elements, Static Latches and Registers, Multiplexer Based Latches, Static SR Flip Flops. Dynamic Latches and Registers, Dynamic Transmission Gate Register, Clocked CMOS Register TSPCR. Dynamic Shift Register.

UNIT IV: VHDL & VERILOG PROGRAMMING 12 Hrs

Basic Language Elements-Behavioral Modeling, Structural Modeling, Dataflow Model in Programming Examples.

UNIT V: PIC MICROCONTROLLER 12 Hrs

Programming of PIC Micro Controllers. Architecture of 16C54 and 16F84 Micro Controllers. Instruction Set of PIC Micro Controllers. Simple Applications with the above PIC Micro Controllers, ARM Processor- Architecture and Examples Programs.

Total No. of Hrs: 60

TEXT BOOKS:

1. Charles. H. Roth, "*Digital System design using VHDL*", Thomson Learning, 1st Edition (with CD), 2000.
2. Douglas A Pucknell and Kamran Eshranghain, "*Basic VLSI Design*," Prentice Hall of India, New Delhi. November 2001.
3. Navabi.Z. "*VHDL Analysis and modeling of Digital systems"* McGraw Hill,1993
4. Debaprabad Das by "*VLSI Design*" ,Oxford,2011

REFERENCES:

1. Wayne wolf, "*Modern VLSI Design*", , Prentice Hall, 2nd Edition ,1998
2. Charles H. Roth, "*Digital System Design using VHDL*".I edition Thomson Learning 2000.

BMG13004 ENTERPRENEURSHIP DEVELOPMENT 3 0 0 3

OBJECTIVES

- To provide theoretical foundations of entrepreneurship development.
- To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur.
- To acquaint students with the special challenges of starting new ventures and introducing new product and service ideas.

UNIT – I **9 Hrs**

Entrepreneur – traits and types, creating and starting the venture - sources of new ideas, Methods of generating ideas, product planning and development process, Establishing evaluation criteria.

UNIT –II **9 Hrs**

Business plan - Marketing plan – Marketing research for the new venture, marketing mix, steps in preparing marketing plan. Financial plan – Proforma of income statements, cash flow, balance sheet, Break even Analysis, Application of funds. Organizational plan-legal forms of Business, Tax attributes, Role of Board of Directors, Advisors, Designing the Organization. Risk assessment, Sources of finance-equity, financial institutions, and commercial banks.

UNIT – III **9 Hrs**

Record keeping - Meaning, methods, types, Hiring – concept, procedure for hiring, Motivation - Entrepreneurial theories of motivation, leadership - styles of leadership.

UNIT – IV **9 Hrs**

Financial control - Managing cash flow, managing inventory, fixed assets, Managing cost and profits, Taxes. Entrepreneurial skills - Marketing skills, Strategic planning, Time Management skills, Negotiation skills.

UNIT –V **9 Hrs**

Other routes for success - Joint venture – meaning, types, Advantages Acquisition – Meaning, importance advantages Merger - Advantages, disadvantages Franchising – Advantages of franchising entrepreneur's point of view, types Going public-Raising funds from the market

TEXT BOOKS: **Total No. of Hrs: 45**

1. Hirsch, *Entrepreneurship*, Tata McGraw Hill, New Delhi, 2001.
2. Kuratko, *Entrepreneurship*, 6th edition, Thomas learning, 2005.
3. Prasana Chandra, *Projects-Planning, Analysis, Selection, Implementation and Reviews*, Tata McGraw-Hill Publishing Company Limited, 1996.

REFERENCES:

1. P.C Jain (ED) *Hand Book for entrepreneurs*, EDII, Oxford University press, New Delhi, 1999.
2. Staff College for Technical Education, Manila and Centre for Research and Industrial Staff Performance, Bhopal, *Entrepreneurship development*, Tata McGraw-Hill Publishing Company Limited, 1998.
3. P. saravanavel, *Entrepreneurial Development*, Ess Pee Kay publishing house, Chennai.
4. S.S. Khanka, *Entrepreneurial Development*, S. Chand and Company Limited, New Delhi.

BEC13L08 COMMUNICATION LAB-II 0 0 3 1

OBJECTIVES

- To learn the characteristics of Klystron, Gunn and various optical devices

1. REFLEX KLYSTRON MODE CHARACTERISTICS.
2. MEASUREMENT OF GUIDE WAVE LENGTH
3. MEASUREMENT OF VSWR AND IMPEDANCE OF UNKNOWN LOADS, INCLUDING MEASUREMENT OF HIGH VSWRS.
4. MEASUREMENT OF THE COUPLING AND THE DIRECTIVITY OF WAVE-GUIDE DIRECTIONAL COUPLERS.
5. MEASUREMENT OF INSERTION LOSS AND ISOLATION OF NON – RECIPROCAL FERRITE DEVICES.
6. STUDY OF TEE JUNCTION (E-PLAN, H-PLANE AND E-H PLANE TEES.)
7. MEASUREMENT OF THE GAIN AND RADIATION PATTERN OF A WAVE GUIDE HORN ANTENNA
8. STUDY OF GUNN OSCILLATOR CHARACTERISTICS.
9. STUDY OF A FIBER-OPTIC COMMUNICATION LINK.
10. CHARACTERISTICS OF LED AND PIN DIODE
11. CHARACTERISTICS OF LASER DIODE
12. CHARACTERISTICS OF AVALANCHE PHOTO DIODE
13. MEASUREMENTS OF FIBER PARAMETER: NUMERICAL APERTURE, ATTENUATION

BEC13L09 VLSI & EMBEDDED SYSTEM DESIGN LAB 0 0 3 1

OBJECTIVES

- To implement the combinational and sequential circuits using simulation tools like Xilinx

(Experiments from 1 to 6 should be done using CPLD Trainer kits, and Experiments from 7 to 12 should be done using PIC microcontroller).

1. DESIGN AND TESTING OF ADDER AND SUBTRACTOR
2. DESIGN AND TESTING OF NMOS & CMOS INVERTORS
3. DESIGN AND TESTING OF JK, D, T AND SR FLIP FLOPS, AND REGISTERS
4. DESIGN AND TESTING OF COUNTERS-SYNCHRONOUS & ASYNCHRONOUS
5. DESIGN AND TESTING OF MULTIPLEXER, DEMULTIPLEXER, ENCODER ,DECODER
6. DESIGN AND TESTING OF MAGNITUDE COMPARATOR WITH 8/16 BITS.
7. ADC INTERFACE EXPERIMENT WITH TEMPERATURE SENSOR.
8. STEPPER MOTOR INTERFACE
9. TRAFFIC LIGHT CONTROLLER
10. DAC / DC MOTOR SPEED CONTROL
11. PIC TO PC SERIAL (RS232) COMMUNICATION
12. 5 X 7 MATRIX LED DISPLAY INTERFACE AND 16 X 2 CHARACTER LCD INTERFACE.

BEC13L10	**COMPREHENSION**	**0**	**0**	**2**	**1**

OBJECTIVE

- To Provide practice for competitive exams

UNIT I: NETWORKS AND ELECTRONICS DEVICES

Network graphs, nodal and mesh analysis, network theorems, steady state sinusoidal analysis using phasors. Solution of network equations using Laplace transforms, state equations for networks. Energy bands, carrier transport in silicon, generation and recombination of carriers, P-N Junction diode, Zener diode, Tunnel diode, BJT, JFET, MOS Capacitor, MOSFET, LED, P-I-N and Avalanche Photo Diode, Basics of Laser's. Device Technology.

UNIT II: ANALOG CIRCUITS

Small Signal Equivalent circuit of diodes, BJT's, MOSFET's and Analog CMOS. Simple Diode circuits, clipping, clamping, Rectifier. Biasing and bias stability of transistor and FET amplifiers, Sinusoidal oscillators, function generators and wave shaping circuits.

UNIT III: DIGITAL CIRCUITS

Boolean algebra, Minimization of Boolean functions, Combinational circuits, Sequential circuits, sample and hold circuits, ADC's, AC's Semiconductor, Memories, Microprocessor (8085).

UNIT IV: SIGNALS AND SYSTEMS AND CONTROL SYSTEMS

Definition and Properties of Laplace Transform, Continuous- Time and Discrete- Time Fourier series, Continuous –Time and Discrete- Time Fourier Transform, DFT and FFT Z Transform. Sampling theorem. Linear Time Invariant (LTI) Systems. Basic Control System component, Signal Flow Graphs Transfer functions Of Systems, Tools and Techniques for LTI Control System Analysis, Root- loci, Routh-Hurwitz criterion, bode and Nyquist plots. Control system Compensators elements of Lead- Lag compensation, Elements of proportional-integral-derivative (PID) control.

UNIT V: COMMUNICATIONS & ELECTROMAGNETICS

Random Signals and Noise, Analog Communication Systems, Fundamentals of information Theory and Channel Capacity Theorem. Digital Communication Systems, Digital Modulation Schemes, Basics of TDMA FDMA and CDMA and GSM. Elements Of Vector Calculus: Maxwell's Equations, Plane Waves, Transmission Lines, Smith Chart, Impedance Matching, S- Parameters , Pulse Excitation, Waveguides, Basics of Antennas.

BEC13021 CELLULAR MOBILE COMMUNICATION 3 0 0 3

OBJECTIVES

- It deals with the fundamental cellular radio concepts such as frequency reuse and handoff.
- It presents different ways to radio propagation models and predict the large scale effects of radio propagation in many operating environment.
- It provides idea about analog and digital modulation techniques used in wireless communication.

UNIT I: INTRODUCTION TO WIRELESS MOBILE COMMUNICATION 9 Hrs

History and Evolution of Mobile Radio Systems, Types of Mobile Wireless Services / Systems – Cellular, WII, Paging, Satellite Systems, Standard, Future Trends in Personal Wireless Systems.

UNIT II: CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS 9 Hrs

Cellular Concept and Frequency Reuse, Multiple Access Schemes, Channel Assignment and Handoff, Interface and System Capacity, Trunking and Erlang Capacity Calculations.

UNIT III: MOBILE RADIO PROPAGATION 9 Hrs

Radio Wave Propagation Issues in Personal Wireless Systems, Propagation Models, Multipath Fading and Based and Impulse Models, Parameters of Mobile Multipath Channels, Antenna System in Mobile Radio.

UNIT IV: MODULATION AND SIGNAL PROCESSING 9 Hrs

Analog and Digital Modulation Techniques, Performance of Various Modulation Techniques – Spectral Efficiency, Error Rate, Power Amplification, Equalization / Rake Receiver Concepts, Diversity and Space-Time Processing, Speech Coding and Channel Coding.

UNIT V: SYSTEM EXAMPLES AND DESIGN ISSUES 9 Hrs

Multiple Access Techniques – FDMA, TDMA and CDMA Systems, Operational Systems, Wireless Networking- adhoc Network, Design Issues in Personal Wireless Systems.

Total No. of Hrs: 45

TEXT BOOKS:

1. Roy Blake," *Wireless Communication technology*", Thomson Learning, 1st Edition 2001.
2. Dharma P. Agarwal," *Introduction to wireless and Mobile systems*", Thomson Learning, II Edition, 2006.
3. T.S. Rappaport, "*Wireless Communication, Principle and Practice*", Prentice Hall, NJ, 1996

REFERENCES:

1. K. Feher, "*Wireless Digital Communication*", Prentice Hall of India, New Delhi, 1995.
2. W.C.Y. Lee, "*Mobile Communication Engineering Theory and Application*", McGraw Hill International, Second Edition, 1998.

BEC13L11 ENGINEERING APPLICATIONS OF P-SPICE AND MATLAB 0 0 3 1

OBJECTIVES

- To implement the various analog circuits using PSPICE and communication systems using MATLAB

P-SPICE IMPLEMENTATION:

1. CHARACTERISTICS OF BJT, MOSFET, UJT.
2. CHARACTERISTICS OF SCR, DIAC, TRIAC.
3. VERIFICATION OF SUPERPOSITION AND MPT THEOREMS.
4. CIRCUITS WITH INDEPENDENT SOURCES, MUTUAL AND SELF COUPLING.
5. FREQUENCY ANALYSIS OF RC COUPLED AMPLIFIER, FET AMPLIFIER.
6. MULTIVIBRATOR CIRCUITS.
7. SUMMER, SUBTRACTOR, DIFFERENTIATOR, INTEGRATOR.
8. LPF, HPF, BPF, BRF AND NOTCH FILTERS.

MATLAB IMPLEMENTATION:

1. STABILITY CHECK USING ROUTH-HURWITZ CRITERION BODE PLOT, ROOT LOCUS.
2. CONVERSION OF STATE SPACE TO TRANSFER FUNCTION & VICE-VERSA, POLES, ZEROS AND RESIDUAL, FUNCTION DETERMINATION.
3. AM,FM. TRANSCEIVER
4. ASK,FSK AND PSK TRANSCEIVER

BEC13E01 BIOMEDICAL INSTRUMENTATION 3 0 0 3

OBJECTIVES

- To study the methods of recording various bio potentials
- To study how to measure biochemical and various physiological information
- To understand the working of units which will help to restore normal functioning
- To understand the use of radiation for diagnostic and therapy
- To understand the need and technique of electrical safety in Hospitals

UNIT I: BASIC PHYSIOLOGY 9 Hrs

Cells and their Structures – Transport of Ions Through Cell Membrane – Resting and Excited State – Transmembrane Potential – Action Potential – Bio-Electric Potential – Nervous System – Physiology of Muscles – Heart and Blood Circulation – Respiratory System – Urinary System.

UNIT II: BASIC TRANSDUCER PRINCIPLES AND ELECTRODES 9 Hrs

The Transducer Principles – Active Transducers – Passive Transducers – Transducer for Bio-Medical Application – Electrode Theory- Bio-Potential Electrode – Bio-Chemical Transducer.

UNIT III: CARDIOVASCULAR SYSTEM 9 Hrs

The Heart and Cardiovascular System – Blood Pressure – Characteristics of Blood Flow – Heart Sounds - Electro Cardiograph – Measurements of Blood Pressure – Measurement of Blood Flow and Cardiac O/P Plethysmography – Measurements of Heart Sounds.

UNIT IV: X-RAY AND RADIOISOTOPE INSTRUMENTATION: 9 Hrs

X-ray Imaging Radiography – Fluoroscopy – Image Intensifiers – Angiography - Medical use of Radioisotopes – Beta Radiations – Detectors – Radiation Therapy.

UNIT V: BIO-TELEMETRY: 9 hrs

Introduction to Bio-Telemetry – Physiological Parameters Adaptable to Bio-Telemetry – The Components of Bio-Telemetry Systems – Implantable Units – Applications of Telemetry in Patient Care – Application of Computer in Bio-Medical Instrumentation, Anatomy of Nervous System – Measurement from the Nervous System – EEG – EMG.

Total No. of Hrs: 45

TEXT BOOKS:

1. M. Arumugam, "*Bio-medical Instrumentation*" – Anuradha Agencies Publishers, 1992.
2. Khandpur," *Handbook on Biomedical Instrumentation*" – Tata McGraw Hill Co Ltd., 1989.

REFERENCES:

1. Leusis Cromwell Fred, J. Werbell and Erich A.pfraffer, "*Biomedical instrumentation and Measurements*" – Prentice Hall of India, 1990.
2. Joseph J. Carr and John M. Brown, "*Introduction to Biomedical equipment Technology*", John Wiley and Sons, New York, 1997.

BEC13E02 DIGITAL IMAGE PROCESSING 3 0 0 3

OBJECTIVES

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedure
- To study the image segmentation and representation techniques.

UNIT I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS 9 Hrs

Light, Luminance, Brightness and Contrast, Eye, The Monochrome Vision Model, Processing Problems and Applications, Vision Camera, Digital Processing System, 2-D sampling Theory, Aliasing, Image Quantization, Lloyd Max Quantizer, Dither, Color Images, Linear Systems And Shift Invariance, Fourier Transform, Z-Transform, Matrix theory Results, Block Matrices and Kronecker Products.

UNIT II IMAGE TRANSFORMS 9 Hrs

2-D orthogonal and Unitary Transforms, 1-D and 2-d DFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-Loeve, Singular Value Decomposition Transforms.

UNIT III IMAGE ENHANCEMENT 9 Hrs

Point Operations – Contrast Stretching, Clipping and Thresholding Density Slicing, Histogram Equalization, Modification and Specification, Spatial Operations – Spatial Averaging, Low Pass, High Pass, Band Pass Filtering, Direction Smoothing, Medium Filtering, Generalized Cepstrum and Homomorphic Filtering, Edge Enhancement using 2-D IIR and FIR filters, Color Image Enhancement

UNIT IV IMAGE RESTORATION 9 Hrs

Image Observation Models, Sources of Degradation, Inverse and Wiener Filtering, Geometric Mean Filter, Non-Linear Filters. Smoothing Splines and Interpolation, Constrained Least Squares Restoration.

UNIT V IMAGEDATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTION 9 Hrs

Image Data Rates, Pixels Coding, Predictive Techniques Transform Coding and Vector DPCM, Block Truncation Coding, Wavelet Transform Coding of Images, Color Image Coding. Random Transform

Total No. of Hrs: 45

TEXT BOOKS:

1. Anil K. Jain, "*Fundamentals of Digital Image Processing*", PHI 1995.
2. Milan Sonka,*" Image Processing – Analysis and Machine vision*", Thomson Learning. 2nd Edition.
3. Alasdar McAndrew, "*Introduction to digital image processing*", Thomson Learning 2004.

REFERENCES:

1. M.A. Sid Ahmed, "*Image Processing*", McGraw Hill, Inc, 1995.
2. R. Gonzalaz and P. Wintz, "*Digital Image Processing*", Addition Wesley 2nd Ed, 1987.
3. William. K. Pratt, "*Digital Image Processing*", Wiley Inter Science, 2nd Ed, 1991.

BEC13E03 RADAR AND NAVIGATIONAL AIDS 3 0 0 3

OBJECTIVES

- To derive and discuss the Range equation and the nature of detection.
- To apply Doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars
- To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers.
- To understand principles of navigation, in addition to approach and landing aids as related to navigation
- To understand navigation of ships from shore to shore.

UNIT I RANGE AND EQUATION AND TYPES FO RADAR 9 Hrs

Range Parameters, Pulsed Radars, Signal to Noise Ratio, Integration of Pluses Beam Parameters, System Losses and Propagation Effects MTI; CW and Pulse-Doppler Radar, Delay Lines Tracking Radar, Mono pulse, Sequential, Simultaneous, Conical Scan and Monopulse Trackers, Beacons,

UNIT II TRANSMITTER, RECEIVERS AND ANTENNAS 9 Hrs

Klystron, Magnetron, TWT Amplifiers and Oscillators, Crossed Fields Devices, Parabolic Cassegrainian, Coefficient, Squares Antennas, Radomes, Feeds, Receivers, Performance Figures, Displays Scope and PPI Duplexers.

UNIT III DETECTION OF RADAR SIGNALS IN NOISE 9 Hrs

MF, Correlation Detection, Detector Characteristics, Automatic Detection, CFAR Receiver, Pulse Compression and Classification of Targets with Radar.

UNIT IV PROPAGATION OF RADAR WAVES AND CLUTTER 9 Hrs

Plane Earth and Spherical Earth Problem, Refraction and Diffraction, GTD Analyzers, Surface and Sea Clutter, Detection of Targets, Effects of Weather on Radar.

UNIT V RADAR TOPICS AND NAVIGATIONAL AIDS 9 Hrs

Synthetic Aperture, Over the Horizon Radar, ARSR, ASR, Bistatic and Monostatic Radars, LORAN, ILS, GCA, Direction Finder, VOR Concepts, Airborne Doppler Navigation.

Total No. of Hrs: 45

TEXT BOOKS:

1. M.I. Skoinik "*Introduction to Radar Systems*:, McGraw Hill 1981.
2. N.S. Nagaraja, *Elements of Electronic Navigation Systems*, 2nd Edition, TMH, 2000.

REFERENCES:

1. F.E. Terman, "*Electronics and Radio Engineering*" McGraw Hill
2. Peyton Z. Peebles:, "*Radar Principles*", John Wiley, 2004
3. J.C Toomay, " *Principles of Radar*", 2nd Edition –PHI, 2004

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BEC13E04 SATELLITE COMMUNICATION 3 0 0 3

OBJECTIVES

- Overview of satellite systems in relation to other terrestrial systems.
- Study of satellite orbits and launching.
- Study of earth segment and space segment components
- Study of satellite access by various users.
- Study of DTH and compression standards.

UNIT I ELEMENTS OF ORBITAL MECHANICS: 9 Hrs

Equation, Orbital Elements, Orbital Perturbation; Tracking and Orbital Determination, Orbital Correction / Control.

ELEMENTS OF COMMUNICATION SATELLITE DESIGN**:**

Space Environment, Spacecraft Configuration, Spacecraft Subsystem, Payload, Reliability Consideration – Spacecraft Integration and Testing.

UNIT II MULTIPLE ACCESS TECHNIQUES: 9 Hrs

FDM – FM – FDMA, TDMA, SSMA / CDMA, RANDOM MULTIPLE Access Techniques; Packet Switching and Packet Satellite Networks Satellite on Board Processing and Switching.

UNIT III SATELLITE LINK DESIGN 9 Hrs

Types of System: BSS, Performance Requirements and Standards for Telephony, TV and DATA. Performance Impairments; Noise, Interference, Inter modulation. Design of Typical Satellite Links.

UNIT IV DOMESTIC SATELLITE SYSTEMS: 9 Hrs

The INSAT System, International System: INTELSAT, IMMARSAT, Satellite Based Personal Communication LEO, ICO, GEO Systems.

UNIT V EARTH STATION DESIGN 9 Hrs

Earth Station Configuration, Site Selection, Antenna and Tracking Systems, Receiver and Transmitter Subsystems, Terminal Equipment: Telephone / Video Interface, Rearward Links, Miscellaneous Facilities Like Echo Suppressor, FM Digitizers, Ground Station Measurements, Elements of Frequency Co-ordination and Control. VSATNetworks and Terminals – Satellite Broadcasting, Satellite TV Systems.

Total No. of Hrs: 45

TEXT BOOKS:

1. T. Pratt and C.W. Bostian, "*Satellite Communication*" – John Wiley & Son, 1986.
2. A. Abdul Namith, "Satellite *Communication*"-Lakshmi Publications.

REFERENCES:

1. B.N. Agarwal, "*Design of Geosynchronous Spacecraft*" – prentice Hall, 1986.
2. D. Roddy, "*Satellite Communication*" – Prentice Hall, 1989.
3. M. Richharia : *Satellite Communication Systems* Design Principles Macmillan Press Ltd. Second Edition 2003.

BEC13E05 PATTERN RECOGNITION 3 0 0 3

OBJECTIVES

- To learn the different techniques of pattern recognition and training.
- To learn various rules available in decision making.
- Study the different approaches of pattern classification and application in clinical diagnosis.

UNIT-I FUNDAMENTALS OF PATTERN RECOGNITION 9 Hrs

Basic Concepts of Pattern Recognition - Decision Theoretic Algorithms - Structural Pattern Recognition.

UNIT-II INTRODUCTORY NEURAL NETWORKS 9Hrs

Artificial Neural Network Structures - Supervised Training via Error back Propagation: Derivations.

UNIT-III ADVANCED FUNDAMENTALS OF NEURAL NETWORKS 9 Hrs

Acceleration and Stabilization of Supervised Gradient Training of MLPs - Advances in Network Algorithms for Classification and Recongnition - Recurrent Neural Networks.

UNIT-IV NEURAL, FEATURE, AND DATA ENGINEERING 9 Hrs

Neural Engineering and Testing of FANNs - Feature and Data Engineering.

UNIT-VTESTING AND APPLICATIONS 9 Hrs

Some Comparative Studies of Forward Artificial Neural Networks - Pattern Recognition Applications in Texture Classification & Recognition - Speech Recognition - Neural Processing of Digital Images – Character Recognition.

TEXT BOOKS: **TOTAL NO. OF HRS: 45**

1. CARAL G. LOONEY," *Pattern Recognition Using Neural Networks – Theory and Algorithms for Engineering and Scientists*" – New York Oxford University Press 1997.
2. Earl Gose, Richard Johnsonbaugh, Steve Jost, "*Pattern Recognition and Image Analysis*", Prentice Hall of India Pvt. Ltd., New Delhi, 1999.

REFERENCES:

1. P. A. Devijver and J. Kittler, "*Pattern Recognition",* Prentice-Hall International, Englewood Cliffs, NJ, 1980.
2. William Gibson, *Pattern Recognition*, science fiction,2003

BEE13E31 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY IN SYSTEM DESIGN

3 0 0 3

OBJECTIVES

- To understand EMI Sources, EMI problems and their solution methods in PCB level / Subsystem and system level design.
- To measure the emission. immunity level from different systems to couple with the prescribed EMC standards

UNIT I EMI ENVIRONMENT **9 Hrs**

Sources of EMI, Conducted and Radiated EMI, Transient EMI, EMI-EMC Definitions and Units of Parameters. Units of Specification, Civilian Standards Military Standards.

UNIT II EMI COUPLING PRINCIPLES **9 Hrs**

Conducted, Radiated and Transient Coupling, Common Impedance Ground Coupling, Radiated Common Mode and Ground Loop Coupling, and Radiated Differential Mode Coupling, Near Field Cable to Cable Coupling, Power Mains and Power Supply Coupling.

UNIT III EMI MEASUREMENTS **9 Hrs**

EMI Test Instruments Systems. EMI Test, EMI Shielded Chamber, Open Area Test Site, TEM Cell Antennas, Conductors Sensors / Injectors / Couplers. Military Test Method and Procedures, Calibration Procedures.

UNIT IV EMICONTROL TECHINQUES **9 Hrs**

Shielding, Filtering, Grounding, Bonding, Isolation Transformer, Transient Suppressors, Cable Routing, Signal Control, Component Selection and Mounting.

UNIT V EMI DESIGN OF PCBs **9 Hrs**

PCB Traces Cross Talk, Impedance Control, Power Distribution Decoupling, Zoning Motherboard Design and Propagation Delay Performance Models.

Total No. of Hrs: 45

TEXT BOOKS:

1. V.P. Kodali, "*Engineering EMC Principles, Measurements and Technologies*", IEEE Press, 1996.
2. Clayton R. Paul – *Introduction to Electromagnetic compatibility* – Wiley & Sons – 1992

REFERENCES:

1. Bernhard Keiser." *Principles of Electromagnetic Compatibility*", Artech House, #rd Ed, 1986.
2. Henry W. Ott, "*Noise Reduction Techniques in Electronic Systems*", John Wiley and Sons, Newyork, 1988.

BEC13E06 NEURAL NETWORKS AND ITS APPLICATIONS 3 0 0 3

OBJECTIVES

- To study the various neural network algorithms and its application in pattern recognition.

UNIT I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS 9 Hrs

Neuro – Physiology – General Processing Element – ADALINE – LMS Learning Rule – MADALINE – Perception Networks

UNIT II BPN AND BAM 9 Hrs

Back Propagation Network – Updating of Output and Hidden Layer Weights – Application of BPN – Associative Memory – Bi-Directional Associative Memory - Hop Field Memory – Traveling Sales Man Problem

UNIT III SIMULATED ANNEALING AND CPN 9 Hrs

Annealing, Boltzmann Machine – Learning – Application – Counter Propagation Network – Architecture – Training – Application.

UNIT IV SOM AND ART 9 Hrs

Self-Organizing Map – Learning Algorithm – Feature Map Classifier – Applications – Architecture of Adaptive Resonance Theory – Pattern Matching in ART Network. Neocognitron: Architecture of Neocognitron – Data Processing and Performance of Architecture of Spacio – Temporal Networks for Speech Recognition

UNIT V CASE STUDY 9 Hrs

Implementation of BPN Algorithm in a Computer Language - Application of Neural Networks for Pattern Recognition - Data Comparison - Hop Field Networks for an n-bit A/D Converter

Total No. of Hrs: 45

TEXT BOOKS:

1. Hagan, "*Neural Networks Design",* Thomson Learning.
2. J.A. Freeman and B.M. Skapura, "*Neural Networks, Algorithms Applications and Programming Techniques*", Addison-Wesley, 1990.

REFERENCES:

1. Laurence Fausett, "*Fundamentals of Neural Networks: Architecture, Algorithms and Applications*", Prentice Hall, 1994.
2. Simon Haykin, "*Neural Networks and Learning Machines*" -3/E - Pearson/ Prentice Hall 2009

BEC13E07 DEVICE MODELING 3 0 0 3

OBJECTIVES

- To understand passive devices and structures
- To understand the integrated BJT and MOS devices

UNIT I INTEGRATED PASSIVE DEVICES: 9 Hrs

Types and Structures of Resistors and Capacitors in Monolithic Technology – Dependence of Model Parameters on Structure.

UNIT II INTEGRATED DIODES: 9 Hrs

Junction and Schottky Diodes in Monolithic Technologies – Static and Dynamic Behavior – Small and Large Signal Models – SPICE Models.

UNIT III INTEGRATED BIPOLAR TRANSISTOR: 9 Hrs

Types and Structures in Monolithic Technologies – Basic Model (Eber Moll_-Cunmel – Poon Model – Dynamic Model, Parasitic Effects – SPICE Model –Parameter Extraction.

UNIT IV INTEGRATED MOS TRANSISTOR: 9 Hrs

n-MOS and p-MOS Transistor – Threshold Voltage -Threshold Voltage Equations – MOS Device Equations – Basic DC Equations Second Order Effects – MOS Models Small Signal AC Characteristics – MOSFET SPICE Model Level 1,2,3,4

UNIT V SPICE MODELLING 9 Hrs

Advanced Concepts of Large Signal & Low Signal Modeling

Total No. of Hrs: 45.

TEXT BOOKS:

1. Daniel Foty, "MOSFET *Modeling with Spice"* prentice hall, 1997.
2. Neil Weste and Kamran Eshranghian *"Principles of CMOS VLSI Design, A System Perspective*", "Addition – Wesley, 1993.

REFERENCES:

1. Jacob Millman & Arvin Millman, "*Micro Electronics*", McGraw Hill (Second Edi) 1987.
2. M. Satyagi, John Wiley " *Introduction to Semi-conductor materials and devices"*, New Edition

BCS13E46 REAL TIME OPERATING SYSTEMS 3 0 0 3

OBJECTIVES

- Review of elements and fundamentals of Systems.
- To understand the embedded tools.
- To understand the queues and scheduling

UNIT- I EMBEDDED SYSTEM FUNDAMENTALS 9 Hrs

Introduction, Characteristics of embedded systems and challenges in system design –design issues in embedded real-time systems, critical performance issues in embedded real-time systems.

UNIT - II SURVEY OF SOFTWARE ARCHITECTUREs 9 Hrs

Round –robin, round-robin with interrupts, queues. Function- scheduling architecture, real time operating system architecture, scheduling architecture.

UNIT- III ELEMENTS OF REAL TIME OPERATING SYSTEMS 9 Hrs

Tasks & task states, tasks & data, semaphores & shares data, message queues, mailboxes and pipes, timer functions, events, memory management and interrupt routines in an RTOS environment.

UNIT -IV BASIC DESIGN USING REAL-TIME OPERATING SYSTEMS 9 Hrs

Principles, encapsulating semaphores & queues, hard real-time scheduling considerations, saving memory space, saving power.

UNIT- V EMBEDDED TOOLS 9 Hrs

Embedded software development tools- host and target machines, linker/locators for embedded software, getting embedded software into the target system. Debugging techniques- testing on host system, instruction set simulators, the assert, macro using laboratory tools.

TOTAL NO. OF HRS: 45

TEXT BOOKS:

1. Wayne wolf, "*Computers as Components- Principles of Embedded Computing Systems Design*", academic press, 2001.
2. David E. Simon, "*An Embedded Software Primer*", Pearson education, 1999.

REFERENCES:

1. Arnold s. Berger, "*Embedded Systems Design- An Introduction to Processes, Tools & Techniques",* CMP books, 2002.
2. Jean j. Labrosse, "*Embedded Systems Building Blocks*", CMP books, 2002.
3. Michael Barr, "*Programming Embedded Systems in C and C++",* O'Reilly, 1999.

BEC13E08 ADVANCED MICROPROCESSORS 3 0 0 3

OBJECTIVES

- To introduce the concepts in internal programming model of Intel family of microprocessors.
- To introduce the programming techniques using MASM, DOS and BIOS function calls.
- To introduce the architecture programming and interfacing of 16 bit microcontrollers.
- To introduce the concepts and architecture of RISC processor

UNIT I THE INTEL X86 FAMILY 9 Hrs

The Intel X86 Family Architecture, 32 bit Processor Evolution Systems Connections and Timing, Instruction and Data Formats, Instruction set of X86 Processors, Addressing Modes.

UNIT II INTEL X86 ASSEMBLY LANGUAGE PROGRAM 9 Hrs

Implementation of Strings, Procedures, Macros, BIOS and DOS Services using X86 Assembly Language Programming, Memory and I/O Interfacing, Analog Interfacing and Industrial Control.

UNIT III SYSTEM DEVELOPMENT 9 Hrs

Microprocessors Based System Design, TMS 320 Series DSP Based Signal Processing, Microcontroller 8096, architecture, addressing mode and system design.

UNIT IV THE MOTOROLA MC 68000 FAMILY 9 Hrs

The MC 68000 Architecture, CPU Registrars, Data Formats, Addressing Modes, Instruction Set and Assembler Directors, Memory Management Instruction and Data, Caches, Exception Processing.

UNIT V RISC PROCESSORS 9 Hrs

RISC vs CISC, RISC Properties and Evaluation, Advanced RISC Microprocessors, DEC ALPHA, The Power PC family. The SUN SPARC Family, the MIPS RX 100 Family, the Intel 860 Family. The Motorola M88000 Family, HP Precision Architecture.

Total No. of Hrs: 45

TEXT BOOKS:

1. B.B. Bery, "*The Intel Microprocessors 8086 / 8088, 80186 / 80188, 80286, 80386, 80486, PENTIUM, and PENTIUM Processors*", Prentice Hall, 1997.
2. K Udaya kumar, B.S. Uma Shankar, "*Advanced Microprocessors and IBM PC Assembly Language Programming*", Tata McGraw Hill, 1996.

REFERENCES:

1. Daniel Tabak, "*Advanced Microprocessors*", McGraw Hill, 1995.
2. Douglas V. Hall, "Microprocessors *and Interfacing – Programming Hardware*", McGraw Hill, 1992.
3. W.A. Tribel & A. Singh, "*The 68000 and 68020 Microprocessors – Architecture, Software and Interfacing Techniques*", Prentice hall of India, 1991
4. Rifiquzzaman, "*Microprocessors – Theory and Applications: Intel and Motorola*", Prentice Hall, 1992.
5. Kenneth J. Ayala, "*The 8051 Microcontroller, Architecture, Programming and Application*", Penram International Publishing (India), 1996.
6. John Peatman, "*Design with Microcontrollers*", McGraw Hill International, 1988.

BEC13E09 BIO-SIGNAL PROCESSING 3 0 0 3

OBJECTIVES

- To introduce the concepts of spectrum in biosignal
- To introduce adaptive filtering and wavelet detection in biosignal.
- To understand the biosignal classification and recognition

UNIT I SIGNAL, SYSTEM AND SPECTRUM 10 Hrs

Characteristics of Some Dynamic Signals – Bio-Electric Signals, Impedance,. Acoustic Signals, Mechanical Signals, Bio-Magnetic Signals Bio-Chemical Signals. Signal Conversion – Simple Signal Conversion Systems, Conversion Requirements for Bio-Medical Signals. Basics of Digital Filtering – FIR and IIR filters. Spectral Analysis – Power Spectral Densities Function, Cross Spectral Density and Co-Herence Function, Cepstral Analysis and Homomorphic Filtering. Estimation of Mean of Finite Time Signal

UNIT II TIME SERIES ANALYSIS AND SPECTRAL ESTIMATION 9 Hrs

Time Series Analysis – Linear Prediction Models, Process Order Estimation, Attic Representation, Non-Stationary Process, Adaptive Segmentation, Model Based ECG Simulator. Spectral Estimation – Blackman Turkey Method, Periodogram and Model Based Estimation.

UNIT III ADAPTIVE FILTERING AND WAVELET DETECTION 9 Hrs

Filtering – LMS adaptive filter, adaptive noise canceling in ECG, improved adaptive filtering in FECG. Wavelet detection in ECG – Structural, features, matched filtering, adaptive wavelet detection, detection of overlapping wavelets.

UNIT IV BIOSIGNAL CLASSIFICATION AND RECOGITION 9Hrs

Signal classification and recognition – statistical signal classification, linear discriminate function, direct feature selection and ordering, Back propagation neural network based classification.

UNIT V SELECTED TOPICS IN BIO-SIGNAL PROCESSING 8 Hrs

Application of wavelet transform on Bio-signal – TFR representation, ECG data compression, ECG characterization. Application of Chaos theory on Biomedical signals. Software implementation of signal processing algorithms on biomedical signals.

Total No. of Hrs: 45

TEXT BOOKS:

1. Vallaru Rao and Hayagiva Rao, "*C++ Neural Networks and Fuzzy Logic*", BPS Publication, New Delhi, 1996
2. Special topics on" *The Applications of Chaos Theory on Bio-Signal*", Journal of IEEE Engg. In Medicine and Biology Magazine, October, 1996.

REFERENCES:

1. Willies J Tompkins, "*Bio-medical Digital Signal Processing*" Prentice Hall, New Jersey, 1993.
2. Samuel D. Stearns Ruth A. David, "*Signal Processing Algorithms using FORTRAN and C*", Prentice Hall, New Jersey, 1993.

BEC13E10 TELEVISION AND VIDEO ENGINEERING 3 0 0 3

OBJECTIVES

- To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture Tubes and Television Camera Tubes
- To study the principles of Monochrome Television Transmitter and Receiver systems.
- To study the various Color Television systems with a greater emphasis on PAL system.
- To study the advanced topics in Television systems and Video Engineering.

UNIT I FUNDAMENTALS OF TELEVISION 9 Hrs

Characteristics of Eye and Television Pictures – Resolution and Brightness Gradation. Theory of Scanning. Camera Tubes – Videocon and Silicon Diode Array Videocon. Monochrome Picture Tube, Composite.

UNIT II MONOCHROME TELEVISION RECEIVER 9 Hrs

Transmission and Propagation of TV signal, TV Antenna, Receiver: VHF Tuners, Vision IF Subsystem, Inter Carrier Sound System, and Video Amplifiers. Synchronous Separation AFC and Deflection Oscillators Frame and Line Deflection Circuits.

UNIT III COLOUR TELEVISION SYSTEMS 9 Hrs

Color Characteristics – Color Cameras Color Picture Tubes, Color signal Generation and Encoding, NTSC, PAL and SECAM Systems.

UNIT IV COLOUR TELEVISION RECEIVERS 9 Hrs

Block Diagram of PAL-D Receivers, Luminance Channel./ Chrominance amplifier, Color Burst Separation and Burst phase Discriminators. R, G, B Matrix and Drives.

UNIT V SPECIAL TOPICS IN TELEVISION 9 Hrs

Digital Tuning Techniques, Remote Control. Introduction to Cable and Satellite Television. Video Tape Recorders. Videodisc system. Fundamental of Digital TV and High Definition Television.

TEXT BOOKS: Total No. of Hrs: 45

1. Gulati. R.R "*Modern Television Practice, Principle of Technology and Servicing"*, New Age International Pvt. Ltd., 2002.
2. R.R. Gulati "*Monochrome and colour television"*, New age International Publisher, 2003

REFERENCES:

1. Dhake A, M., "*Television and Video Engineering*", Tata McGraw Hill, 1995.
2. Grob. B. Herndon. C.E., "*Basic Television and Video Systems*", McGraw Hill 1999.

BCS13E47 OPERATING SYSTEMS 3 0 0 3

OBJECTIVES

- To have an overview of different types of operating systems
- To know the components of an operating system.
- To have a thorough knowledge of process management
- To have a thorough knowledge of storage management
- To know the concepts of I/O and file system

UNIT I INTRODUCTION 9 Hrs

Mainframe Systems – Desktop Systems – Multi Processor Systems - Distributed Systems – Cluster Systems – Real Time Systems-Hardware Protection-System Components-Handheld Systems-Operating System Services-System Calls-System Programs-System Structure-Visual Machines-System Design and Implementation.

UNIT II PROCESS MANAGEMENT 9 Hrs

Process Concept-Process Scheduling-Operation on Process-Co-operating Processes- Inter Process Communication-Threads-Overview-Multithreading Models. CPU Scheduling-Basic Concepts-Scheduling Criteria-Scheduling Algorithms-Multiple-Processor Scheduling-Real Time Scheduling-Algorithm Evaluation

UNIT 1II SYNCHRONIZATION ANDDEADLOCKS 9 Hrs

Process Synchronization-The Critical Section Problem-Synchronization Hardware-Semaphores-Classical Problems Of Synchronization-Deadlocks-System Model-Deadlock Characterization-Methods Of Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery form Deadlock.

UNIT 1V MEMORY MANAGEMENT: 9 Hrs

Background-Swapping-Contiguous Memory Allocations - Virtual Memory – Address Translation – Paging – Segmentation – Segmentation with Paging. - Static Paging Algorithm – Dynamic Paging Algorithm

UNIT V FILES AND SECONDARY STORAGE MANAGEMENT: 9 Hrs

File Systems – File Concepts – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection –

File System Structure – File System Implementation – Recovery – Disk Structure – Disk Scheduling – Disk Management

Total No. of Hrs: 45

TEXT BOOKS:

1. Silberschatz, Galvin, GAGNE "*Operating System Concepts*" John Wiley & Sons INC, 6th Edition, 2002
2. William Stallings, "*Operating Systems*", Prentice Hall of India, 1997.

REFERENCES:

1. D.M. Dhamdhere, "*Operating Systems*", Tata McGraw Hill, 2002
2. Charles Crowley, "*Operating Systems: A Design Oriented Approach*", Tata McGraw Hill 1999.
3. Andrew S. Tanenbaum, "*Modern Operating Systems*", Prentice Hall of India, 1995.
4. Harvey M. Deitel, "*Operating Systems*", Second Edition, Pearson Education Pvt. Ltd, 2002.

BEE13E32 POWER ELECTRONICS 3 0 0 3

OBJECTIVES

- To study about power electronic circuits for voltage and current control and protection.
- To learn the switching characteristics of transistors and SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR.
- To learn controlled rectification AC supplies.
- To study of converters and inverters.
- To learn about motor control, charges, SMPS and UPS.

UNIT-I POWER ELECTRONIC DEVICES 9 Hrs

Characteristics of Power Devices – Characteristics of SCR – Two Transistor Model of SCR,Characteristics of TRIAC, BJT, MOSFET, IGBT, GTO both Static and Switching Characteristics – Protection of Thyristors against Over Voltage – Over Current, dv/dt and di/dt.

UNIT-II TRIGGERING & COMMUTATION TECHNIQUES 9 Hrs

Turn on Circuits for SCR – Triggering with Single Pulse & Train of Pulses – Triggering with Microprocessor – Different Techniques of Commutation – Natural and Forced Commutation – Series & Parallel Operations.

UNIT-III PHASE CONTROLLED CONVERTERS 9 Hrs

Converters – Single Phase – Three Phase – Half Controlled and Fully Controlled Rectifiers with R, RL and RLE Loads – Waveforms of Load Voltage and Line Current – Harmonic Factor, Power Factor, Ripple Factor, Distortion Factor – Operation with Freewheeling Diode – Effect of Source Inductance – Dual Converter**.**

UNIT-IV INVERTERS & CHOPPERS 9Hrs

Voltage and Current Source Inverters, Resonant, Series Inverter – Basic Series Inverter, Modified, Improved – PWM Techniques – Single Phase AC Choppers with R and RL Load – Half Wave and Full Wave – DC Choppers – Various Classes of Operation – Buck, Boost and Buck – Boost Type Choppers – Merits and Applications.

UNIT-V AC VOLTAGE CONTROLLERS & INDUSTRAIL APPLICATIONS 9 Hrs

Single-Phase and Three-Phase AC Voltage Controllers - Sequence Control of AC Voltage Regulators. Cycloconverters – Single-Phase and Three-Phase Cycloconverters, SMPS & UPS – Static Compensators – HVDC Transmission System.

TEXT BOOKS:

Total No. of Hrs: 45

1. Rashid, M.H., "*Power Electronics - Circuits Devices and Applications*", Prentice Hall of India, 3rd Edition, 2004.
2. Singh.M.D and Kanchandani, "*Power Electronics*", Tata McGraw Hill & Hill publication Company Ltd, New Delhi, 2002.

REFERENCES:

1. Dubey, G.K., Doradia, S.R., Joshi, A. and Sinha, R.M., "*Thyristorised Power Controllers*", Wiley Eastern Limited, 1986.
2. Lander,W., "*Power Electronics*", McGraw Hill and Company, Third Edition, 1993.
3. P.S. Bimbhra, "*Power Electronics*", Khanna Publishers, 3rd Edition, 1999.

BITI13004 VISUAL PROGRAMMING 3 0 0 3

OBJECTIVES

- To introduce the concepts of windows programming
- To introduce GUI programming using Microsoft Foundation Classes
- To enable the students to develop programs and simple applications using Visual C++

UNIT I FORMS AND CONTROL 9Hrs

Customizing a Form-Writing Simple Programs-Toolbox-Creating Controls-Name Property-Command Button-Access Keys-Image Controls-Text Boxes-Labels-Message Boxes-Grid-Editing Tools-Variables-Data Types-String –Numbers.

UNIT II FUNCTIONS AND EVENTS 9 Hrs

Displaying Information-Determinate Loops-Indeterminate Loops-Conditionals-Built-In Functions-Functions and Procedures- Lists-Arrays-Sorting and Searching-Records-Control Arrays-Combo Boxes-Grid Control-Projects with Multiple forms-Do Events and Sub Main-Error Trapping.

UNIT III MENUS AND MOUSE ACTIVITY 9 Hrs

VB Objects-Dialogue Boxes-Common Controls-Menus-MDI Forms-Testing, Debugging and Optimization-Working with Graphics- Monitoring Mouse Activity-File Handling-File System Controls-File System Objects-COM/OLE-Automation-DLL Services-OLE Drag and Drop.

UNIT IV VISUAL C++ PROGRAMMING 9 Hrs

Visual C++ Components – Developing Simple Applications – Microsoft Foundation Classes – Controls – Message Handling – Document View Architecture – Dialog Based Applications – Mouse and Keyboard Events –Reading and Writing Documents – SDI and MDI Environments – Splitter Windows and Multiple Views.

UNIT V ADVANCED CONCEPTS 9 Hrs

Concepts and Tools for Windows Application – Procedure Oriented Windows Applications –Windows Applications using the MFC – Application and Class Wizards – Getting Started with OLE – Getting Started with Active X Controls – COM and DHTML

TEXT BOOKS: Total No. of Hrs: 45

1. Gary Cornell-"*Visual Basic 6 from the Ground Up*"-Tata McGraw Hill, New Delhi,1999
2. David Kruglirski J, "*Inside Visual C++*", Microsoft Press 1993.
3. CHRIS H.PAPPAS & WILLIAM H.MURRAY –"*The Complete reference –Visual C++*", Tata McGraw Hill, edition 1999, Chapter 1, 2,3,4,16-27 (IV & V unit)

REFERENCES:

1. Deitel & Deitel, T.R.Nieto, "*Visual Basic 6, How to program*", Prentice Hall of India, 1999.
2. Lars Klander, "*Core visual C++ 6*", Pearson Education Asia, 2000.
3. Gray J.Bronson,"*A first book of Visual C++",* Vikas Publishing House Thomson Learning) 2000.
4. Steven Holzner –"*Visual Basic 6 – Programming Black Book*" by Dream tech Press ,edition 2000
5. Noel Jerke-"*Visual Basic 6(The Complete Reference)"*-Tata McGraw Hill, New Delhi1999.

BCS13E48 DATABASE MANAGEMENT SYSTEMS 3 0 0 3

OBJECTIVES

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database design
- To understand the internal storage structures using different file and indexing techniques
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure

UNIT-I INTRODUCTION 9 Hrs

Definition -Need for a DBMS-Uses of DBMS- Advantages and Disadvantages of DBMS

Database and Database users- View of Data –Architecture-Data Models-Data Dictionary –Database Languages

UNIT II RELATIONAL APPROACH 9 Hrs

Relational Model-Structure of a Relational Database-Relational Algebra- Tuple Relational Calculus-Domain Relational Calculus-SQL-Embedded SQL-Query Languages

UNIT III RELATIONAL DATABASE DESIGN 9 Hrs

Relational Database Design-Integrity Constraint-Pitfalls and Design –Functional Dependency-Normalization-Entity Relationship Model-Storage and File Structure-Indexing and Hashing-Basic Concepts-B+ tree Index File-B+ tree Index File-Static Hashing –Dynamic Hashing.

UNIT IV OBJECT ORIENTED RELATIONAL DATABASE TECHNOLOGY 9 Hrs

Concepts for Object Oriented Data Model – Object Oriented Database Languages -Persistent Programming Language-Object Relational Databases. System Implementation techniques: Query Processing-Transaction Processing-Concurrency Control-Recovery System.

UNIT V ENHANCED DATA MODELS FOR ADVANCED APPLICATIONS 9 Hrs

Database System Architecture- Client Server System-Centralized Systems-Parallel Systems-Distributed System-Distributed Databases.

TOTAL NO. OF HRS: 45

TEXT BOOKS:

1. Abraham Silberschatz, Henry F.korth, S.Sudharshan, "*Database system concepts*" 4th Edition, Tata McGraw-Hill, 1997
2. Ramez Elmasri, Shamkant B.Navathe, "*Fundamentals of database systems*", 4th edition Pearson Education-2002

REFERENCES:

1. C.J.Date, "*An Introduction to Database systems*",7th Edition, Pearson Education,1997.
2. Raghu Ramakrishnan, "*Database Management Systems*", WCB McGraw Hill, 1998.
3. Bipin C.Desai, "*An Introduction to Database Systems*", Galgotia publications, 2001

BMG13E11 TOTAL QUALITY MANAGEMENT 3 0 0 3

OBJECTIVES

- To understand the statistical approach for quality control.
- To create an awareness about the ISO and QS certification process and its need for the industries

UNIT-I **9** Hrs

Introduction to Deming's Philosophy, Customer Satisfaction: Who is the Customer, Complaints, and Feedback. Employee Involvement.

UNIT-II 9 Hrs

Continuous Process Improvement: IIT, Kan Ban, Cellular Manufacturing, Juran's Trilogy, PDSA, Kizan, Re – Engineering. Supplier Partnership. Performance Measures.

UNIT-III 9 Hrs

Quality Systems – ISO 9000, Others. QFD, Quality by Design: Tools and Pitfalls Design of Expressions: Statistical Tests (F.T. Etc.) Orthogonal Design.

UNIT-IV 9 Hrs

Taguchi and Quality Engineering: Loss Function, Orthogonal Arrays, Signal / Noise Parameter Design, Tolerance Design. Failure Mode Effect Analysis.

UNIT-V 9 Hrs

ISO 14000 and 14001.Management tools: Forced Field Analysis, Nominal Group Techniques, Affinity Diagrams, Interrelationship Diagram, Tree Diagram, Matrix Diagram, Prioritization Matrix, Process Decision program charts, Activity Network Diagram.

TEXT BOOKS: Total No. of Hrs: 45

1. James R. Williams and Lindsey M., "*The Management and Control of Quality*", Thomson Press, SW, 2002.
2. Feighbaunn A.V.," Total Quality Management", McGraw Hill

REFERENCES:

1. Oakland, J.S." *Total Quality Management* ",Butterworth – Heinemann Ltd.
2. Subbraj Ramaswamy, "*Total Quality Management*", Tata Mc. Graw Hill, 2005.

BEC13E11 CRYPTOGRAPHY AND NETWORK SECURITY 3 0 0 3

OBJECTIVES

- To study the various cryptographic algorithms, firewall and wireless network security concepts**.**

UNIT -I INTRODUCTION ON SECURITY 9 Hrs

Security Goals, Types of Attacks: Passive attack, active attack, attacks on confidentiality, attacks on Integrity and availability. Security services and mechanisms, Techniques: Cryptography, Steganography, Revision on Mathematics for Cryptography.

UNIT- II SYMMETRIC & ASYMMETRIC KEY ALGORITHMS 9 Hrs

Substitution Ciphers, Transposition Ciphers, Stream and Block Ciphers, Data Encryption Standards (DES), Advanced Encryption Standard (AES), RC4, principle of asymmetric key algorithms, RSA Cryptosystem

UNIT -III INTEGRITY, AUTHENTICATION AND KEY MANAGEMENT 9 Hrs

Message Integrity, Hash functions: SHA, Digital signatures: Digital signature standards. Authentication Entity Authentication: Biometrics, Key management Techniques. Introduction to Quantum Cryptography.

UNIT- IV NETWORK SECURITY, FIREWALLS AND WEB SECURITY 9 Hrs

Introduction on Firewalls, Types of Firewalls, Firewall Configuration and Limitation of Firewall. IP Security Overview, IP security Architecture, authentication Header, Security payload, security associations, Key Management. Web security requirement, secure sockets layer, transport layer security, secure electronic transaction, dual signature

UNIT- V WIRELESS NETWORK SECURITY 9 Hrs

Security Attack issues specific to Wireless systems: Worm hole, Tunneling, DoS.WEP for Wi-Fi network, Security for 4G networks: Secure Ad hoc Network, Secure Sensor Network

Total No of Hrs: 45

REFERENCES:

1. Behrouz A. Fourouzan , "*Cryptography and Network security*" Tata McGraw- Hill, 2008
2. William Stallings, *"Cryptography and Network security: principles and practice*", 2nd Edition, Prentice Hall of India, New Delhi, 2002
3. Atul Kahate , "*Cryptography and Network security*", 2nd Edition, Tata McGraw- Hill, 2008
4. R.K.Nichols and P.C. Lekkas ,""*Wireless Security*", Mc Graw-Hill Professional, New York, NY, USA, 2001
5. H. Yang et al., "*Security in Mobile Ad Hoc Networks: Challenges and Solution*", IEEE Wireless Communications, Feb. 2004.
6. Securing Ad Hoc Networks," *IEEE Network Magazine*", vol. 13, no. 6, pp. 24-30, December 1999.

BMG13EXX **DISASTER MANAGEMENT** **3 0 0 3**

OBJECTIVE

- Disaster management refers to the policies, programs, administrative actions and operations undertaken to address a natural or man-made disaster through preparedness, mitigation, response and recovery.

UNIT-I INTRODUCTION TO DISASTERS: **9 Hrs**

Concepts, and definitions-Disaster, Hazard, Vulnerability, Resilience, Risks Disasters: Classification, Causes, Impacts - including social, economic, political, environmental, health, psychosocial, etc.)

UNIT-II RISK MANAGEMENT **9 Hrs**

Goals and objectives of ISDR Programme- Risk identification – Risk sharing – Disaster and development: Development plans and disaster management –Alternative to dominant approach –disaster-development linkages -Principle of risk partnership.

UNIT-III RISK REDUCTION **9 Hrs**

Trigger mechanism – constitution of trigger mechanism - risk reduction by education -disaster information network - risk reduction by public awareness Application of various technologies: Data bases - RDBMS - Management Information systems - Decision support system and other systems - Geographic information systems Remote sensing-an insight - contribution of remote sensing and GIS - Case study.

UNIT-IV INTER-RELATIONSHIPS BETWEEN DISASTERS AND DEVELOPMENT: **9 Hrs**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources financial arrangements – areas of improvement –disaster preparedness — emergency response.

UNIT-V DISASTER RISK MANAGEMENT IN INDIA **9 Hrs**

Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, and Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation)

Total No. of Hours: 45

TEXT BOOKS:

1. Pardeep Sahni, Madhavi Malalgoda and Ariyabandu, "*Disaster risk reduction in Southasia*", PHI
2. Amita sinvhal, "*Understanding earthquake disasters*" TMH, 2010.

REFERENCES:

1. Pardeep sahni, Alka Dhameja and Uma medury, "*Disaster mitigation: Experiences and reflections*".