VIDYA JYOTHI INSTITUTE OF TECHNOLOGY
An Autonomous Institution
Aziznagar Gate, C.B. Post, Hyderabad – 500075, Telangana, India.

SYLLABI (R18)

for

B.Tech (ECE) First Year

B.Tech Syllabus (R-18)

COURSE STRUCTURE FOR B.TECH I YEAR

IB.Tech I Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	A21002	Mathematics-I	3	1	0	4.0
2.	A21003	Applied Physics	3	1	0	4.0
3.	A21201	Basic Electrical Engineering	3	0	0	3.0
4.	A21301	Engineering Graphics & Modeling	1	0	3	2.5
5.	A21501	Programming For Problem Solving-I	2	0	0	2.0
6.	A21082	Applied Physics Lab	0	0	3	1.5
7.	A21281	Basic Electrical Engineering Lab	0	0	2	1.0
8.	A21081	English Language Skills Lab (ELSL)	0	0	2	1.0
9.	A21581	Programming For Problem Solving Lab-I	0	0	2	1.0
Total number of Credits			**12**	**2**	**12**	**20**

I B.Tech II Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	A22005	English	2	0	0	2.0
2.	A22006	Mathematics-II	3	1	0	4.0
3.	A22008	Chemistry	3	1	0	4.0
4.	A22502	Programming For Problem Solving-II	2	0	0	2.0
5.	A22084	English Communication Skills Lab (ECSL)	0	0	2	1.0
6.	A22086	Chemistry Lab	0	0	3	1.5
7.	A22382	Engineering Workshop	0	1	3	2.5
8.	A22582	Programming For Problem Solving Lab-II	0	0	2	1.0
Total number of Credits			**10**	**3**	**10**	**18**

COURSE STRUCTURE FOR B.TECH II YEAR

II B.Tech I Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	A23011	Complex Analysis and Fourier Transforms	3	0	0	3.0
2.	A23503	OOP Through JAVA	3	0	0	3.0
3.	A23401	Electronic Devices and Circuits	3	0	0	3.0
4.	A23402	Probability Theory and Stochastic Processes	3	0	0	3.0
5.	A23403	Signals and Systems	3	0	0	3.0
6.	A23404	Network Analysis and Transmission Lines	3	0	0	3.0
7.	A23481	Electronic Devices and Circuits Laboratory	0	0	2	1.0
8.	A23482	Basic Simulation Laboratory	0	0	2	1.0
9.	A23MC2	Gender Sensitization	2	0	0	0
Total number			**20**	**0**	**4**	**20**

II B.Tech II Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	A24407	Switching Theory and Logic Design	2	1	0	3.0
2.	A24408	Electrical Technology	3	0	0	3.0
3.	A24015	Professional Communications	2	0	0	2.0
4.	A24409	Analog and Digital Communications	3	1	0	4.0
5.	A24410	Analog and Pulse Circuits	3	0	0	3.0
6.	A24411	Electromagnetic Waves	3	0	0	3.0
7.	A24485	Analog & Digital Comm. Laboratory	0	0	2	1.0
8.	A24486	Analog and Pulse Circuits Laboratory	0	0	2	1.0
9.	A24MC2	Environmental Science	2	0	0	0
Total number			**18**	**2**	**4**	**20**

COURSE STRUCTURE FOR B.TECH III YEAR

III B.Tech I Semester:

S.N	Course	Course Title	L	T	P	Credi
1	A25218	Control Systems	3	0	0	3.0
2	A25412	Microprocessors & Microcontrollers	2	1	0	3.0
3	A25413	Linear & Digital IC Applications	3	0	0	3.0
4	A25414	Antenna And Propagation	3	0	0	3.0
5	PE-1	**Professional Elective-1**	3	0	0	3.0
	A25415	1. Computer Architecture				
	A25416	2. Information Theory and Coding				
	A25417	3. Introduction to Mems				
6	OE-1	**Open Elective-1**	3	0	0	3.0
	A25418	1. Introduction to Microcontrollers				
	A25419	2. Basic Electronics				
7	A25487	Microprocessor and Microcontrollers Laboratory	0	0	2	1.0
8	A25488	Linear & Digital IC App. Laboratory	0	0	2	1.0
9	A25TP2	Personality Development &Behavioural Skills	2	0	0	1.0
Total Number			**19**	**1**	**4**	**21**

III B.Tech II Semester:

S.N	Course	Course Title	L	T	P	Credit
1	A26017	Managerial Economics & Financial Analysis	3	0	0	3.0
2	A26420	Digital Signal Processing	2	1	0	3.0
3	A26421	Microwave Engineering	2	1	0	3.0
4	A26422	Data Communication and Networks	2	1	0	3.0
5	PE-2	**Professional Elective-2**	3	0	0	3.0
	A26423	1. Digital Signal Processors and Architectures				
	A26424	2. Modelling and Simulation using MATLAB				
	A26425	3. Optical Communications				
6	OE – 2	**Open Elective-2**	3	0	0	3.0
	A26426	1. Basic Electronic Instrumentation				
	A26427	2. Consumer Electronics				
7	A26489	Digital Signal Processing Laboratory	0	0	2	1.0
8	A26088	Adv. Communication Skills Laboratory	0	0	2	1.0
9	A26TP2	Quantitative Methods & Logical Reasoning	2	0	0	1.0
Total Number			**1**	**3**	**4**	**21**

COURSE STRUCTURE FOR B.TECH IV YEAR

IV B.Tech I Semester:

S.No	Course Category	Course Title	L	T	P	Credits
1	A27429	Embedded System Design	2	1	0	3.0
2	A27430	VLSI Design	2	1	0	3.0
3	PE-3	**Professional Elective-3**	3	0	0	3.0
	A27431	1. Digital Image Processing				
	A27432	2. Cellular and Mobile Communications				
	A27433	3. Radar Engineering				
4	PE-4	**Professional Elective-4**	3	0	0	3.0
	A27434	1. Biomedical Instrumentation				
	A27435	2. Satellite Communications				
	A27436	3. Telecommunication Switching Systems and Networks				
5	OE-3	**Open Elective-3**	3	0	0	3.0
	A27437	1. Automotive Electronics				
	A27438	2. Introduction to Communication Engineering				
6	A27491	Embedded & VLSI Laboratory	0	0	2	1.0
7	A27492	Antenna and Microwave Engineering Laboratory	0	0	2	1.0
8	A274P1	Mini Project	0	0	0	3.0
Total Number			**13**	**2**	**4**	**20**

IV B.Tech II Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1	A28439	Electronic Measurements & Instrumentation	3	0	0	3.0
2	A28440	Wireless Communications and Networks	3	0	0	3.0
3	A284TS	Technical Seminar	0	0	0	2.0
4	A284CV	Comprehensive Viva Voce	0	0	0	2.0
5	A284P2	Major Project	0	0	0	10.0
Total number			**6**	0	0	**20**

MATHEMATICS - I
(Matrices and Calculus)

I Year I Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Write the matrix representation of system of linear equations and identify the consistency of the system of equations.
2. Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.
3. Analyze the convergence of sequence and series.
4. Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.
5. Examine the extrema of functions of two variables with/ without constraints.

UNIT-I:
Matrices and Linear System of Equations:
Matrices and Linear system of equations: Real matrices – Symmetric, skew - symmetric, Orthogonal. Complex matrices: Hermitian, Skew – Hermitian and Unitary. Rank-Echelon form, Normal form. Solution of Linear Systems – Gauss Elimination, Gauss Jordan & LU Decomposition methods.

UNIT-II:
Eigen Values and Eigen Vectors:
Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix- Quadratic forms: Reduction to Canonical form, Nature, Index, Signature.

UNIT-III:
Sequences & Series:
Basic definitions of Sequences and series, Convergence and divergence, Ratio test, Comparison test, Cauchy's root test, Raabe's test, Integral test, Absolute and conditional convergence.

UNIT-IV:
Beta & Gamma Functions and Mean Value Theorems:
Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.
Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems.

UNIT-V:
Functions of Several variables:
Partial Differentiation and total differentiation, Functional dependence, Jacobian Determinant- Maxima and Minima of functions of two variables with constraints and without constraints, Method of Lagrange Multipliers.

Textbooks:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010.
2. Advanced Engineering Mathematics, Jain &Iyengar, Narosa Publications.

Reference Books:

1. Calculus and Analytic Geometry, G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2nd Edition), Michael D. Greenberg.

APPLIED PHYSICS

L	T	P	C
3	1	0	4

I Year I Semester

Course Outcomes:

1. Identify various optical phenomena of light.
2. Discuss the basic principles of quantum mechanics.
3. Classify solids based on the band theory.
4. Elucidate the characteristics of semiconductors and semiconductor devices.
5. Explain the working principle of lasers and optical fibers.

UNIT – I:
Wave Optics:
Principle of Superposition, coherence and methods to produce coherent sources, Interference - Interference in thin films by reflection, Newton's Rings.Diffraction – Fraunhofer and Fresnel Diffraction, Farunhofer diffraction due to single slit, Plane Diffraction Grating, resolving power of Grating. Polarization – Polarization of light waves, Plane of vibration, plane of polarization, Double refraction, Nicol's Prism, Applications of Polarization.

UNIT-II:
Introduction to Quantum Mechanics and Free Electron Theory:
Classical free electron Theory, Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfeld theory (Qualitative).Introduction to quantum physics: Black body radiation and Planck's Law(Qualitative), wave-particle duality, de-Broglie hypothesis of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, time independent Schrodinger equation, Born interpretation of wave function, particle in an infinite potential well (one dimension).

UNIT-III:
Band theory of Solids and Semiconductors:
Kronig-Penny model(Qualitative), E-k diagram, Energy bands in solids, classification of materials into metals, semiconductors, and insulators, Effective mass, Density of States, Fermi distribution function, Fermi level and its importance. Intrinsic semiconductors, carrier concentration in intrinsic semiconductors, energy band diagram and position of Fermi level in intrinsic semiconductors, equation for electrical conductivity of semiconductors, extrinsic semiconductors.

UNIT-IV:
Semiconductor Devices:
Direct and indirect band-gap semiconductors, Formation of p-n junction, energy diagram of PN junction, I-V characteristics of PN junction diode, Photo diode, solar cell-efficiency, light emitting diode and their characteristics, semiconductor laser: device structure and characteristics, Hall effect and its applications.

UNIT-V:
Fiber Optics and Lasers:
Introduction, total internal reflection, acceptance angle and numerical aperture, losses associated with optical fibers, step and graded index fibers, applications of optical fibers. Introduction to interaction of radiation with matter: stimulated absorption, spontaneous emission and stimulated emission, Einstein's coefficients and their relations, characteristics of a laser, important components of a laser: active medium, pumping source, optical resonator. Population inversion, Ruby laser, He-Ne laser, applications of lasers.

Textbooks:

1. Engineering Physics, P K Palanisamy, Scietech publication.
2. Engineering Physics, V Rajendran, McGraw Hill Education.

Reference Books:

1. Engineering Physics, S O Pillai, Sivakami, New Age International (P) Limited.
2. Physics Volume I & II, Resnick and Halliday, John Wiley and sons, Inc.

APPLIED PHYSICS LAB

I Year I Semester

L	T	P	C
0	0	3	1.5

Course Outcomes:

1. Apply optical phenomena to characterize optical sources and components.
2. Determine the energy gap of a semiconductor diode and time constant of RC circuit
3. Describe the electrical characteristics of PN junction diode, photodiode, LED and solar cell.
4. Demonstrate the resonance in mechanical and electrical waves.
5. Identify the magnetic Induction along the axis of current carrying coil.

List of Experiments

1. Newton's rings: Determination of the radius of curvature of the lens by forming Newton's rings.
2. Diffraction grating: To determine the number of lines per inch of the grating.
3. Dispersive power: To determine the dispersive power of prism by using spectrometer.
4. Single Slit Diffraction using Lasers- Determination of wavelength of a Monochromatic Source (LASER).
5. Energy gap of P-N junction diode: Determination of the energy gap of a semiconductor diode.
6. Photo diode: Study the V-I Characteristics of Photo diode.
7. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
8. Solar cell: Study the V-I Characteristics of Solar cell.
9. Stewart & Gee's experiment - Determination of magnetic Induction along the axis of current carrying coil.
10. LCR Circuit- Determination of the Resonance frequency of forced electrical oscillator.
11. RC- Circuit – Determination of the time constant of RC-circuit.
12. Optical fiber: Determination of the Numerical aperture of Optical fiber.

Note: Any 10 experiments are to be performed.

BASIC ELECTRICAL ENGINEERING

L	T	P	C
3	0	0	3

I Year I Semester

Course Outcomes:

1. Understand the fundamentals of basic circuit components and their characteristics.
2. Analyze basic electrical circuits with A.C excitation.
3. Understand the concepts of magnetic circuits and transformers.
4. Acquire the basic concepts of electrical motors.
5. Understand the concept of A.C generator and low voltage electrical installations.

UNIT I:

Introduction to Electrical Engineering and DC Circuits:

Basic definitions, types of elements, types of sources, Kirchhoff's Laws, resistive networks, inductive networks, series, parallel circuits, Star- Delta and Delta- Star transformation, Network theorems- Superposition, Thevenin's - simple problems.

UNIT II:

AC Circuits:

Representation of sinusoidal waveforms, peak, RMS and average values **-** Elementary treatment of single-phase AC circuits consisting of R, R-L, R-C, R-L-C combinations (series and parallel) **-** Phase representation, real power, reactive power, apparent power, resonance concept. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT III:

Magnetic Circuits &Transformers:

Magnetic Circuits: Magnetic materials, Faraday's laws of Electromagnetic Induction, BH characteristics, Magnetic Circuits - concept of Self & Mutual Inductance.

Transformers: Ideal and practical single phase transformer, OC-SC tests, equivalent circuit, losses in transformer, regulation and efficiency - simple problems.

UNTI IV:

DC Machines and Induction Motors:

DC Machines: Construction, Principle and Operation of DC Motor, Voltage- torque equations - simple problems.

Three Phase Induction Motor: Construction, Principle and working of three phase Induction Motor, torque slip characteristics, - simple problems.

Single Phase Induction Motor: Single phase Induction Motor construction and working principle, capacitor start - applications

UNIT V:

AC Generator & Electrical Installation:

AC Generator: Construction, Principle of operation of Synchronous Generator, Pitch Factor- Distribution Factor (or winding factor) - EMF equation – simple problems.

Electrical Installation: Fuse, Circuit breakers, difference between fuse and circuit breaker, Types of Batteries, battery backup.

Textbooks:

1. Basic Electrical Engineering, D.P Kothari & I.J Nagrath, Tata McGraw Hill Publishing Company Limited, 2nd Edition.
2. Basic Electrical Engineering, T.K. Nagsarkar and M.S. Sukhija, Oxford University Press, 3rd Edition.

Reference Books:

1. Circuits and Networks, A.Sudhakar & Shyam Mohan.S, Tata McGraw Hill Publishing Company limited, 5th Edition.
2. Basic Electrical Engineering, K.Uma Rao and A.Jayalakshmi, Pearson Publications.
3. Basic Electrical Engineering by D C Kulshreshtha, McGraw Hill Education Private limited, 1st Edition.

BASIC ELECTRICAL ENGINEERING LAB

L	T	P	C
0	0	2	1

I Year I Semester

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters.
4. Understand the performance characteristics of D.C electrical machines.
5. Understand the performance characteristics of A.C electrical machines.

List of experiments/ demonstrations:
Any 5 experiments from Part-A and Part-B should be conducted (Total 10 Experiments)

Part A

1. Verification of Ohms law.
2. Verification of KVL and KCL.
3. Verification of Thevenin‘s Theorem
4. Verification of Superposition Theorem.
5. Transient Response of Series R- L and R - C circuits using DC excitation.
6. Determination and Verification of Impedance and Current of RL and RC series circuits.

Part B

1. Transient Response of R-L-C Series circuit using DC excitation.
2. Load Test on Single Phase Transformer. (Calculate Efficiency and Regulation)
3. OC & SC Test on Single phase transformer
4. Brake test on DC shunt motor
5. Brake test on Three Phase Squirrel cage induction motor.
6. OCC of Three phase alternator.

Reference Books:

1. Circuits and Networks, A.Sudhakar & Shyam Mohan.S, Tata McGraw Hill Publishing Company Limited, 5th Edition.
2. Basic Electrical Engineering, T.K. Nagsarkar and M.S. Sukhija, Oxford University Press, 3rd Edition
3. Basic Electrical Engineering, D.P Kothari & I.J Nagrath, Tata McGraw Hill Publishing Company Limited, 2nd Edition

ENGINEERING GRAPHICS & MODELING

I Year I semester

L	T	P	C
1	0	3	2.5

Course Outcomes:

1. Understand the concepts of engineering drawing of planes, solids and the CAD drawing software.
2. Applying the principles of engineering graphics while drawing the engineering components.
3. Analyze the sectional views for their configurations.
4. Evaluate the surfaces of solids developed for further processing in the engineering applications.

UNIT– I:

Introduction to Engineering Drawing: Principles of engineering graphics and their significance, usage of drawing instruments, conic sections, including the rectangular hyperbola- General method only. Cycloid, Epicycloid, Hypocycloid. Scales – Plain & Diagonal only.

Introduction to CAD: Introduction to CAD software and its importance, standard toolbar/menus and navigation tools used in the software, using basic commands limits ,units, grid, test , move, offset ,mirror, rotate, trim, extend, fillet etc. drawing lines using line command. Drawing spline, ellipse, circle, rectangle etc.. Concept of layers and dimensioning.

UNIT-II:

Principles of Orthographic Projections: Conventions, projections of points, projections of lines (first angle projection) inclined to both planes (traces and midpoint problem to be excluded).

Implementation of CAD: Drawing orthographic projections of points and lines using a CAD package.

UNIT – III:

Projections of the Planes: Projections of regular planes inclined to both the planes.

Projections of Solids: Projections of regular solids inclined to both the planes (prisms, pyramids, cones and cylinders, change of potion method only).

Implementation in CAD: Drawing orthographic projection of planes and regular solids using a CAD package.

UNIT – IV:

Sections and Sectional Views of Right Angular Solids: Prism, Cylinder, Pyramid, Cone. Development of surfaces of right regular solids - Prism, Pyramid, Cylinder and Cone.

Implementation in CAD: Concept of hatching, drawing sectional views of solids and the development of right regular solids using a CAD package.

UNIT-V:

Principles of Isometric projection: Isometric scale, isometric views, conventions, isometric views of lines, planes, simple solids, conversion of isometric views to orthographic views and vice-versa, conventions.

Implementation in CAD: Drawing isometric views of simple solids. Drawing isometric views from giving orthographic views and vice-versa using a CAD package.

Note: Implementation in CAD (For Internal Evaluation Weightage Only)

Textbooks:

1. Engineering Drawing, Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Charotar Publishing House.

Reference Books:

1. Engineering Graphics, Agrawal B. & Agrawal C. M. (2012), TMH Publication, Text book on Engineering Drawing, Narayana, K.L. & P Kannaiah(2008), Scitech Publishers.
2. Engineering Drawing and Computer Graphics, Shah, M.B. & Rana B.C. (2008), Pearson Education.
3. http://docs.autodesk.com/ACDMAC/2013/ENU/PDFs/acdmac_2013_users_guide.pdf

ENGLISH LANGUAGE SKILLS LAB

I Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Reproduce speech sounds and improve fluency in language.
2. Understand syllables and consonant clusters for appropriate pronunciation.
3. Exhibit effective professional skills with rhetoric eloquence.
4. Deliver enthusiastic and well-practiced presentation.
5. Learn Task-Based Language Learning (TBLL) through various language learning activities effectively.

Exercise- I:
CALL Lab:
Introduction to Pronunciation- Speech Sounds, Vowels and Consonants- Practice for Listening.
ICS Lab:
Ice-Breaking activity and JAM session.

Exercise-II:
CALL Lab:
Silent Letters, Consonant Clusters, Homographs.
ICS Lab:
Common Everyday Situations: Conversations and Dialogues.

Exercise-III:
CALL Lab:
Syllables.
ICS Lab:
Communication at Workplace, Social and Professional Etiquette.

Exercise-IV:
CALL Lab:
Word Accent and Stress Shifts.
ICS Lab:
Formal Presentations, Visual Aids in Presentations.

Exercise-V:
CALL Lab:
Intonation, Situational dialogues for practice.
ICS Lab:
Interviews, Types of Interviews.

Reference Books:

1. A Textbook of English Phonetics for Indian Students, T. Balasubramanian, Macmillan Publishers, 2010.
2. Speaking English Effectively, Mohan, Macmillan Publishers, 2010.

PROGRAMMING FOR PROBLEM SOLVING-I

I Year I Semester

L	T	P	C
2	0	0	2

Course Outcomes:

1. Design Algorithms and Flowcharts for real world applications using ‘C’.
2. Know the usage of various operators in Program development.
3. Design programs involving decision and iteration structures.
4. Apply the concepts code reusability using Functions.
5. Analyze various searching and sorting techniques using Arrays.

UNIT-I:

Problem Solving Using Computers: Introduction, Algorithms, Flowcharts and Pseudo code, Applications of C language.

Overview of C Language: Introduction, Salient Features of C Language, Structure of a “C” Program.

C Language Preliminaries: Keywords and Identifiers, Constants, Variables, Data Types, and Input / Output Statements with suitable illustrative “C” Programs.

UNIT-II:

Operators: Assignment Operators, Relational and Logical Operators, Increment and Decrement Operators, Bitwise Operators, Ternary Operator, Type Conversion, Precedence and Associativity with suitable illustrative “C” Programs.

UNIT-III:

Statements in C:

Conditional/Decision Statements: if, if-else, Nested if-else, else-if ladder, and Switch-Statement with suitable illustrative “C” Programs.

Loop Control Statements: while, do-while and for with suitable illustrative “C” Programs.

UNIT-IV:

Functions: Introduction to Functions, benefits of functions, types of functions, Function calls, return vs exit( ), Parameter Passing mechanism: Call-by-Value, Recursion, Storage Classes.

UNIT-V:

Arrays: Introduction to Arrays, One-Dimensional Arrays, Two-Dimensional Arrays, Arrays and Functions.

Searching and Sorting: Linear Search, Binary Search, Bubble Sort, Insertion Sort.

Textbooks:

1. COMPUTER SCIENCE: A Structured Programming Approach Using C, B.A. Forouzon and R.F. Gilberg, Third edition, CENGAGE Learning, 2016.
2. C and Data Structures, Ashok N. Kamthane, Pearson Education. 2010.

Reference Books:

1. Problem Solving Using C, M.T. Somashekara, PHI, 2nd Edition 2009.
2. Computer Fundamentals and Programming in C, A.K.Sharma, 2nd Edition,University Press.
3. Programming in C 2/e, Pradip Dey and Manas Ghosh, Oxford University Press, 2nd Edition 2011.
4. The Fundamentals of Computers, Rajaraman V., 4th Edition, Prentice Hall of India,2006.
5. Programming in C, R S Bichker, University Press, 2012.

PROGRAMMING FOR PROBLEM SOLVING LAB – I

I Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Apply the specification of syntax rules for numerical constants and variables, data types.
2. Know the Usage of various operators and other C constructs.
3. Design programs on decision and control constructs.
4. Develop programs on code reusability using functions.
5. Implement various searching and sorting techniques using arrays.

Week 1
Ubuntu and Linux Commands.

Week 2
Designing of flowcharts and algorithms using raptor tool.
1. Areas of Polygons.
2. Calculation of Simple and Compound Interest.
3. Swapping of Two numbers with and without temporary variable.
4. Checking whether a number is even or odd.
5. Sum of first ‘n’ natural numbers.
6. Checking a number whether it is divisible by any given number.
7. Evaluation of mathematical expressions.
8. Programs using scanf( ) and printf( ) statements.

Week 3
Programs on operators. (Minimum 4 Programs)

Week 4, 5 & 6
Programs on Conditional Statements. (Minimum 12 Programs)

Week 7,8 & 9
Programs on Control Statements. (Minimum 12 Programs)

Week 10 &11
Programs on Functions. (Minimum 6 Programs)

Week 12
Programs on One Dimensional Arrays. (Minimum 3 Programs)

Week 13
Programs on Two Dimensional Arrays. (Minimum 2 Programs)

Week 14
Implementation of Linear Search and Binary Search.

Week 15
Implementation of Bubble Sort and Insertion Sort.

Week 16
Review

MATHEMATICS - II
(Ordinary Differential Equations and Vector Calculus)

L	T	P	C
3	1	0	4

I Year II Semester

Course Outcomes:

1. Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real-world problems.
2. Solve higher order differential equations and apply the concepts of differential equations to the real-world problems.
3. Find the Laplace Transform of various functions and apply to find the solutions ofdifferential equations.
4. Evaluate the multiple integrals and identify the vector differential operators physicallyin engineering problems.
5. Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.

UNIT-I:
First order Ordinary Differential Equations and their Applications:
Formation of Differential equations, Differential equations of first order and first degree: exact, linear and Bernoulli, Applications of ODE: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II:
Higher Order Linear Differential Equations:
Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) $= e^{ax}, \sin ax, \cos ax \; and \; x^k, e^{ax}V(x), x^kV(x)$. Method of variation of parameters

UNIT-III:
Laplace transforms:
Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

UNIT-IV:
Multiple Integrals & Vector Differentiation:
Multiple integrals - double and triple integrals – change of order of integration (Only Cartesian form)- change of variables (Cartesian to Polar for double integral, Cartesian to Spherical for triple integral). Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-V:
Vector Integration:
Line integral, work done, Surface and Volume integrals. Vector integrals theorems: Green's, Stoke's and Gauss Divergence Theorems (Only Statements & their Verifications).

Textbooks:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010.
2. Advanced Engineering Mathematics, Jain & Iyengar Narosa Publications.

Reference Books:

1. Calculus and Analytic Geometry, G.B. Thomas and R.L. Finney, 9th Edition, Pearson,Reprint, 2002.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 9^{th} Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2^{nd} Edition), Michael D. Greenberg.

CHEMISTRY

I Year II Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Acquire knowledge of atomic, molecular and electronic changes related to conductivity.
2. Apply the various processes of treatment of water for both domestic and industrial purpose.
3. Apply the knowledge of electrode potentials for the protection of metals from corrosion.
4. Analyze the major chemical reactions that are used in the synthesis of compounds.
5. Apply the knowledge of polymers in every day's life.

UNIT- I:
Atomic and Molecular Structure:
Introduction, Concept of atomic and molecular orbitals, LCAO, Molecular orbitals of di-atomic molecules, Molecular orbital energy level diagrams of diatomic molecules (N_2, O2 & F_2). Pi-molecular orbitals of butadiene and benzene.
Crystal field theory (CFT): Crystal field theory, Crystal field splitting patterns of transition metal ion d- orbital- tetrahedral, octahedral and square planar geometries.

UNIT- II:
Water Technology:
Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (ion –exchange process).

UNIT- III:
Electrochemistry and Corrosion:
Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, types of electrodes (Calomel electrode and Quinhydrone electrode), Determination of P^H using quinhydrone electrode. Nernst equation, Numerical problems.Batteries: Introduction to cell and battery, Primary (lithium cell) and secondary cells, (lead-Acid cell, and Lithium ion cells). Fuel cells Hydrogen Oxygen fuel cell, advantages and engineering applications of fuel cells.
Corrosion: Introduction, types of corrosion: chemical and electrochemical corrosion, factors affecting the rate of corrosion: nature of the metal, position of metal in galvanic series, purity of metal, nature of corrosion product, nature of environment: effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protectivecoatings: metallic coatings (anodic and cathodic), methods of application on metals, electroplating (of copper), electroless plating (of Ni), organic coatings-paints.

UNIT-IV:
Stereochemistry:
Structural isomers and stereoisomers, configurations, symmetry and chirality, enantiomers, diastereomers, optical activity. Conformations of cyclic (cyclohexane) and acyclic systems (Ethane).
Organic Seactions and Synthesis of a Drug Molecule:
Introduction to reactions involving substitution (SN1 & SN2), addition (addition of HBr to propene, Markownikoff and Anti Markownikoff addition), elimination, oxidation (oxidation of alcoholsusing $KMnO_4$& CrO_3), reduction (reduction of carbonyl compounds by $LiAlH_4$& $NaBH_4$). Synthesis of a commonly used drug molecule- paracetamol and Asprin.

UNIT-V:

Polymer Chemistry:

Introduction, classification of polymers, types of polymerization (addition and condensation, mechanisms not included). Plastics- types of plastics -thermoplastics and thermosetting plastics. Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna-S, Butyl rubber & Thikol rubber. Conducting polymers: classification and applications.
Biodegradable polymers:Types, examples: Polyhydroxy butyrate (PHB) ,Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA), Polylactic acid (PLA),Poly (Î-caprolactone) (PCL). Applications of biodegradable polymers.

Textbooks:

1. Engineering Chemistry, P.C Jain & Monica Jain, Dhanpat Rai Publications, 2017.
2. Engineering Chemistry, Bharathi Kumari. Y, VGS Publications, 2018.

Reference Books:

1. March's Advanced Organic Chemistry, Smith, Wiley publications, 2017.
2. Engineering Chemistry, Shiva Sankar, TMH Publications, 2010.

CHEMISTRY LAB

I Year II Semester

L	T	P	C
0	0	3	1.5

Course Outcomes:

1. Determination of parameters like hardness, alkalinity and chloride content in water.
2. Estimation of rate constant of a reaction from concentration-time relationships.
3. Determination of physical properties like adsorption, surface tension and viscosity.
4. Synthesize a small drug molecule and analyze a salt sample.
5. Calculation of strength of compound using instrumentation techniques.

Choice of 10-12 experiments from the following:

1. Estimation of total hardness of water by EDTA method.
2. Determination of alkalinity of water.
3. Determination of chloride content of water.
4. Estimation of HCl by conductometric titration.
5. Estimation of mixture of acids by conductometric titration.
6. Estimation of HCl by potentiometric titration.
7. Estimation of Fe^{2+} by potentiometry using $KMnO_4$.
8. Determination of the rate constant of a reaction.
9. Determination of surface tension.
10. Determination of viscosity of a lubricant.
11. Chemical analysis of a salt.
12. Synthesis of a polymer/drug.
13. Adsorption of acetic acid by charcoal.
14. Determination of Saponification /acid value of an oil.

Reference Books:

1. Practical Engineering Chemistry, Mukkanti, B.S. Publications, 2010.
2. Volga's Qualitative Inorganic Chemistry, PEAR Publications 2010.

ENGLISH

I Year II Semester

L	T	P	C
2	0	0	2

Course Outcomes:

1. Infer the importance of scientific discoveries in promoting social responsibilities.
2. Comprehend the given texts and respond appropriately for technical and professional purposes.
3. Communicate confidently and transfer information into various forms of writing.
4. Understand the importance of health and nutrition for a better society.
5. Present various forms of business writing skills for successful careers.

UNIT-I:

'The Raman Effect' from the prescribed textbook **'English for Engineers'**

Grammar :Articles & Prepositions
Reading : Reading and Its Importance- Techniques for Effective Reading.
Writing : Organizing principles of paragraphs in documents.
Vocabulary : The concept of word Formation, synonyms, antonyms, and standard abbreviations.

UNIT-II:

'Ancient Architecture in India' from the prescribed textbook **'English for Engineers'**

Reading : Improving Comprehension Skills – Techniques for good comprehension
Writing:Sentence Structures, Use of phrases and clauses in sentences
Writing Formal Letters-Eg. Letter of Complaint, Letter of Requisition,
Job Application with Resume.
Vocabulary : Root words and acquaintance with prefixes and suffixes from foreign languages in English, to form derivatives

UNIT-III:

'Blue Jeans' from the prescribed textbook **'English for Engineers'**

Grammar: Tenses: Types and uses.
Reading : Sub-skills of Reading- Skimming and Scanning
Writing : Identifying Common Errors in Writing Subject-Verb agreement in number, gender and personInformation Transfer-Processwriting.

UNIT-IV:

'What Should You Be Eating' from the prescribed textbook **'English for Engineers'**

Reading : Intensive Reading and Extensive Reading
Writing : Nature and Style of Sensible WritingDescribing & DefiningIdentifying common errors in writing

UNIT-V:

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook **'English for Engineers'**

Vocabulary : Technical Vocabulary and their usage
Reading : Reading Comprehension-Exercises for Practice
Writing :Cohesive DevicesPrécis WritingTechnical Reports-Introduction, Characteristics of a Report – Categories of Reports, Formats- Structure of Reports (Manuscript Format) –Types of Reports - Writing a Report.

Textbooks:

1. English for Engineers,Sudarshana, N.P. and Savitha, C. Cambridge University Press, 2018.

Reference Books:

1. Effective Technical communication, Muhammed Rizvi, TMH, 2008.
2. Advanced English Grammar, Hewings, Cambridge University Press, 2010.

ENGLISH COMMUNICATION SKILLS LAB

I Year II Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Understand the variants in pronunciation.
2. Identify the diverse purposes of listening and speaking.
3. Discuss ideas in diverse communicative settings.
4. Exhibit increased confidence in public speaking.
5. Display critical thinking, problem solving and decision making skills through GD's

Exercise-I:
CALL Lab:
Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.
ICS Lab:
Spoken vs. Written language-Formal and Informal English- Introducing Oneself and Others.

Exercise-II:
CALL Lab:
Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.
ICS Lab:
Features of Good Conversation – Strategies for Effective Communication Role-Play- Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise-III:
CALL Lab:
Information Transfer.
ICS Lab:
Descriptions-Narrations-Giving Directions and Guidelines-Giving Instructions-Seeking Clarifications-Asking for and Giving Directions-Thanking and Responding-Agreeing and Disagreeing-Seeking and Giving Advice-Making Suggestions.

Exercise-IV:
CALL Lab:
Past Tense Marker and Plural Marker.
ICS Lab:
Public Speaking- Exposure to Structured Talks - Non-verbal Communication- Making a Short Speech – Extempore.

Exercise-V:
CALL Lab:
Intonation- Sentence Stress -Weak Forms and Strong Forms.
ICS Lab:
Group Discussion, Mock Group Discussion sessions

Reference Books:

1. A Textbook of English Phonetics for Indian Students, T. Balasubramanian, Macmillan Publishers, 2010.
2. Speaking English Effectively, Mohan, Macmillan Publishers, 2010.

PROGRAMMING FOR PROBLEM SOLVING-II

L	T	P	C
2	0	0	2

I Year II Semester

Course Outcomes:

1. Identify various string handling functions in 'C'.
2. Develop programs with user defined data types.
3. Use Dynamic memory allocation functions with pointers.
4. Distinguish between Stacks and Queues.
5. Analyze various Dynamic Data Structures.

UNIT – I:
Overview of Arrays and Functions.
Strings: Introduction to Strings, String I/O, String Operations with and without built-in functions (strlen( ), strcmp( ), strcat( ),strcpy( ) and strrev( )).

UNIT -II:
Structures: Definition and Initialization of Structures, Accessing structure members, Nested Structures, Array of Structures, Structures and Functions, Unions, typedef, Enumerated Data types.

UNIT-III:
Pointers: Introduction to Pointers, Pointer Arithmetic, Pointers and Arrays, Pointer to Structure, Pointers and Strings, Parameter passing mechanism: Call by Reference, Pointer to Pointer, Dynamic Memory Allocation.

UNIT-IV:
Introduction to Data Structures: Lists and Operations, Linear and Non linear Data structures.
Stacks- Introduction to Stacks, Operations, Implementation of Stack using Arrays.
Queues- Introduction to Queues, Operations, Implementation of Queue using Arrays.

UNIT-V:
Linked Lists: Introduction to Linked List, Operations on Single Linked List (search, Insertion & Deletion).
Files: Introduction to Files, File Operations (Open, Close, read & Write).

Textbooks:

1. COMPUTER SCIENCE: A Structured Programming Approach Using C, B.A.Forouzon and R.F. Gilberg, Third edition, 2016.
2. C and Data Structures, Ashok N. Kamthane, Pearson Education.

Reference Books:

1. Problem Solving Using C, M.T. Somashekara, PHI, 2^{nd} Edition 2009.
2. Computer Fundamentals and Programming in C, A.K.Sharma, 2nd Edition, University Press.
3. Programming in C 2/e, PradipDey and Manas Ghosh, Oxford University Press, 2nd Edition 2011.
4. The Fundamentals of Computers, Rajaraman V., 4th Edition, Prentice Hall of India, 2006.
5. Programming in C, R S Bichker, University Press, 2012.

PROGRAMMING FOR PROBLEM SOLVING LAB – II

L	T	P	C
0	0	2	1

I Year II Semester

Course Outcomes:

1. Build programs on various string handling functions.
2. Develop applications on user defined data types.
3. Apply dynamic memory allocation through pointers.
4. Implement linear data structures through stacks and queues.
5. Create linked list dynamically through stacks and queues.

Week 1:
Programs on Arrays and Functions. (Minimum 3 Programs)

Week 2 & 3:
Programs on Strings with and without string built-in Functions. (Minimum 6 Programs)

Week 4:
Programs on Accessing Structures and Nested Structures. (Minimum 3 Programs)

Week 5 & 6:
Programs on Array of Structures, Structures and Functions. (Minimum 5 Programs)

Week 7:
Programs on Unions, typedef and enum. (Minimum 4 Programs)

Week 8:
Programs on Pointers, pointer arithmetic, pointer expression, One Dimensional and Two dimensional arrays. (Minimum 4 Programs)

Week 9:
Programs on Pointer to structure, Call by Reference, Pointer to Pointer. (Minimum 3 Programs)

Week 10:
Programs on Dynamic Memory Allocation Functions. (Minimum 3 Programs)

Week 11:
Programs on Stacks and Queues using Arrays.

Week 12 & 13:
Programs on Single Linked List.

Week 14 & 15:
Programs on File Operations. (Minimum 6 Programs)

Week 16:
Review.

ENGINEERING WORKSHOP

I Year II Semester

L	T	P	C
0	1	3	2.5

Course Outcomes:

1. Understanding the tools and methods of using to fabricate engineering components
2. Applying the measuring techniques to verify the dimensional accuracy
3. Evaluating various methods and trades of workshop in the component building

(i) Lectures & videos:
Detailed contents

1. Manufacturing Methods- Metal Forming, Machining, Advanced manufacturing methods (2 lectures)
2. CNC machining, Additive manufacturing (2 lectures)
3. Fitting operations & power tools (1 lecture)
4. House wiring (1 lecture)
5. Carpentry (1 lecture)
6. Plastic moulding (1 lecture)
7. Metal casting (1 lecture)
8. Welding (1 Lecture)

(ii) Workshop Practice:
Detailed contents:

1. Machine shop (Lathe machine)
2. Fitting shop
3. Carpentry
4. House Wiring
5. Welding shop (Arc welding)
6. Tin Smithy

Reference Books:

1. Elements of Workshop Technology, Hajra Choudhury S.K., Hajra Choudhury A.K. Nirjhar Roy S.K., Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Manufacturing Engineering and Technology, Kalpakjian S. And Steven S. Schmid, 4th edition, Pearson Education India Edition, 2002.

COURSE STRUCTURE FOR B.TECH II YEAR

II B.Tech I Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS-1	Complex Analysis and Fourier Transforms	3	0	0	3.0
2.	ES-1	OOP Through JAVA	3	0	0	3.0
3.	PC-1	Electronic Devices and Circuits	3	0	0	3.0
4.	BS-2	Probability Theory and Stochastic Processes	3	0	0	3.0
5.	PC-2	Signals and Systems	3	0	0	3.0
6.	PC – 3	Network Analysis and Transmission Lines	3	0	0	3.0
7.	PC Lab-1	Electronic Devices and Circuits Laboratory	0	0	2	1.0
8.	PC Lab-2	Basic Simulation Laboratory	0	0	2	1.0
9.	MC-1	Gender Sensitization	2	0	0	0
		Total	**20**	**0**	**4**	**20**

II B.Tech II Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	PC-4	Switching Theory and Logic Design	2	1	0	3.0
2.	ES-2	Electrical Technology	3	0	0	3.0
3.	H&S-1	Professional Communications	2	0	0	2.0
4.	PC-5	Analog and Digital Communications	3	1	0	4.0
5.	PC-6	Analog and Pulse Circuits	3	0	0	3.0
6.	PC-7	Electromagnetic Waves	3	0	0	3.0
7.	PC Lab-3	Analog & Digital Comm. Laboratory	0	0	2	1.0
8.	PC Lab-4	Analog and Pulse Circuits Laboratory	0	0	2	1.0
9.	MC-2	Environmental Science	2	0	0	0
		Total	**18**	**2**	**4**	**20**

COMPLEX ANALYSIS AND FOURIER TRANSFORM

II Year I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

1. Work with the functions of complex variables and evaluation of complex differentiation.
2. Acquire the knowledge of complex power series and integration.
3. Apply the knowledge of contour integration to evaluate real integrals in engineering problems and acquire the knowledge of evaluating of conformal mapping and bilinear transformations.
4. Studying of Fourier series and defining it for various types of functions.
5. Apply Fourier sine and cosine integral theorems for a given function f(x) evaluate Fourier transforms, sine and cosine transforms.

UNIT-I:
Functions of Complex Variables:
Introduction, Complex functions - limits and Continuity-Differentiability, Analytic functions and Properties, Cauchy-Riemann Equations (Cartesian and Polar), Harmonic functions, Construction of analytic functions.

UNIT-II:
Complex Integration:
Introduction, Complex integration-Line integral, Cauchy's integral theorem, Cauchy's integral formula, Generalized Cauchy's integral formula, Power series: Taylor's series, Laurent series, Singular points, Types of Singularities, Residue, Cauchy's Residue theorem.

UNIT-III:
Evaluation of Integrals & Conformal Mapping:

Introduction,Evaluation of improper real integrals of the type (a) $\int_{\infty}^{\infty} f(x)dx$

(b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$ -Conformal Mapping,-Critical Points-Bilinear transformation – fixed point – cross ratio - properties - invariance of circles.

UNIT-IV:
Fourier series:
Introduction- Periodic functions- Fourier series of periodic function- Dirichlet's conditions- Even and odd functions- Change of interval- Half-range sine and cosine series.

UNIT-V:
Fourier Transforms:
Introduction- Fourier integral theorem (without proof)- Fourier integrals in complex form- Standard results- Fourier sine and cosine integrals- Fourier Transforms- Infinite and finite Fourier Transforms-Properties- Fourier sine and cosine transforms- inverse transforms, Finite Fourier transforms.

Textbooks:

1. Higher Engineering Mathematics, Grewal B S, Khanna Publishers, 2014.
2. A text book of Engineering Mathematics, Bali N P, Manesh Goyal, Laxmi Publications, 2011.

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Herbert Kreyszig, Edward J. Norminton, Wiley, 2011
2. Fundamentals of Complex Analysis, Saff E B, Arthur David Snider, Pearson, 1993.
3. Functions of Complex Variables, Sharma J N , Prakashan, 1991.

OBJECT ORIENTED PROGRAMMING through JAVA

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Able to solve real world problems using OOP techniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using inheritance, polymorphism.
4. Able to develop multithreaded applications with synchronization.
5. Able to handle run time errors while applying exception handling

Unit-I:
Fundamentals of Object Oriented Programming:
Object-Oriented Paradigm, Basic Concepts of Object Oriented Programming- Objects and Classes, Data abstraction and encapsulation, inheritance, Polymorphism, Data binding, Message Communication, Benefits of OOP, Applications of OOP.

Java Basics:
History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and type casting, simple java program.

Unit-II:
Concepts of classes and objects:
Classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, Strings.

Unit-III:
Inheritance:
Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, Objectclass.

Unit-IV:
Packages:
Defining a Package, CLASSPATH, Access protection, importing packages.

Interfaces:
Defining an interface, implementing interfaces, variables in interfaces and extending interfaces.
Stream based I/O (java.io):
The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, The Console class, Serialization, Enumerations, auto boxing, generics.

Unit V:
Exception handling:
Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multithreading:
Difference between multitasking and multithreading, Thread Lifecycle, Thread class, Runnable interface, Thread priorities, Daemon threads

TEXTBOOKS:

1. Herbert Schildt , The Complete Reference Java, Tata Mc Graw Hill, 2002
2. Budd T , Understanding Object Orient Programming with Java, Pearson.2002

REFERENCE BOOKS:

1. Jaime Nino, Frederick A. Hosch, An Introduction to programming and object oriented design using java, Wiley, 2009
2. Budd T, An Introduction to Object Orient Programming, Pearson, 2008
3. Daniel Liang Y, Introduction to JAVA Programming comprehensive Programming, Pearson, 2014.

ELECTRONIC DEVICES AND CIRCUITS

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Demonstrate the concepts of semiconductor theory.
2. Interpret the characteristics of different semiconductor devices with its applications.
3. Apply different biasing techniques of transistors for amplification.
4. Analyze transistor amplifiers using small signal model.
5. Ability to describe the behavior of special purpose diodes.

UNIT I:
Diode:
PN junction Diode – Characteristics, Current equation, Temperature dependence, Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances,
Diode Applications:
Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Clippers, Clampers.

UNIT II:
Bipolar Junction Transistor (BJT):
Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III:
Transistor Biasing and Stabilization:
Bias Stability, Fixed Bias, and Collector to Base bias, Self-Bias, Bias compensation using Diodes and Transistors.
Analysis and Design of Small Signal Low Frequency BJT Amplifiers:
Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV:
Junction Field Effect Transistor:
Construction, Principle of Operation, Pinch-Off voltage, Volt-Ampere characteristic, comparison of BJT and FET, Biasing of FET, FET as voltage variable resistor, MOSFET construction and its characteristics in enhancement and depletion modes.

UNIT V:
FET Amplifiers:
Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers. Basic Concepts of MOSFET Amplifiers.
Special Purpose Devices:
Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXTBOOKS:

1. Millman & Halkias, Electronic devices and circuits, McGraw Hill , 2007
2. Boylestad R L & Louis Nashelsky Electronic Devices and Circuits, Prentice Hall India, 2006.

REFERENCES:

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj , Electronic Devices and Circuits, Tata Mc Graw Hill , 2008.
2. Gupta J B, Electronic Devices and Circuits, S. K. Kataria, 2009
3. Lal Kishore K, Electronic Devices and Circuits, BSP , 2005

PROBABILITY THEORY AND STOCHASTIC PROCESSES

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to

1. Demonstrate knowledge in Probability theory, Single and multiple random variables and Random processes and their characteristics
2. Analyze operations on single and multiple random variables and processes.
3. Compute Simple probabilities using an appropriate sample space, Expectations from probability density functions, Least-square & maximum likelihood estimators for engineering problems mean and Covariance functions for simple random processes.
4. Designsolutionsforcomplexengineeringproblemsinvolvingrandomprocesses.
5. Understand how random variables and stochastic processes can be described and analyzed

UNIT-I:

Probability & Random variables:

Probability:

Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events.

Random Variable:

Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT-II:

Operations on single & multiple random variables– expectations:

Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two and more Random Variables, Central Limit Theorem, Equal and UnequalDistribution. Expected Value of a Function of Random Variables- Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions

UNIT-III:

Random processes – Temporal characteristics:

The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide- Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross- Correlation Function and Its Properties,RandomSignalResponseofLinearSystems:SystemResponse–Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT-IV:

Random processes – Spectral characteristics:

The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum, Properties, Relationship between Cross – Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

UNIT-V:

Noise sources:

Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties.

TEXT BOOKS:

1. Peyton Z. Peebles, Probability, Random Variables & Random Signal Principles, Tata McGraw Hill, 2001.
2. Taub and Schilling , Principles of Communication systems , Tata McGraw Hill,2008

REFERENCE BOOKS:

1. Athanasios Papoulis and S. Unnikrishna Pillai, Probability, Random Variables and Stochastic Processes, Prentice Hall India, 2002.
2. Murugesan K, Guruswamy P, Probability, Statistics & Random Processes, Anuradha Publications, 2003.
3. Lathi B P, Signals, Systems & Communications, B.S. Publications, 2003.

SIGNALS AND SYSTEMS

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand the Mathematics, operations and classification of signals and systems
2. Apply the transform on standard and arbitrary signals
3. Infer the signal transmission through linear systems
4. Interpret the concepts of sampling and role of Z-Transform in analysis of systems.
5. Understand the process of sampling and the effects of under sampling.

UNIT I:
Signal Analysis:
Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Classification of Signals and systems, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT-II:
Fourier series &Fourier Transforms:
Representation of Fourier series, Continuous time periodic signals - Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.
Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal - standard signals - Periodic Signals – Properties - Introduction to Hilbert Transform.

UNIT III:
Signal Transmission through Linear Systems:
Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filter characteristic of Linear System, Distortion less transmission through a system, Signal bandwidth, System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and rise time.

UNIT IV:
Laplace Transforms:
Laplace Transforms (L.T), Inverse Laplace Transform, and Concepts of Region of Convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

UNIT-V:
Sampling Theorem and Z–Transforms:
Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band PassSampling.
Concept of Z-Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties ofZ-transforms.

TEXT BOOKS:

1. Lathi B P, Signals, Systems & Communications, B.S. Publications, 2003.
2. Alan V. Oppenheim, Alan S. Willsky, Syed Hamid Nawab, Signals and Systems, Prentice Hall India,1997.

REFERENCE BOOKS:

1. Simon S. Haykin, Barry Van Veen , Signals and Systems, Wiley, 2003
2. Rama Krishna Rao A, Signals and Systems, 2008, Tata McGraw Hill, 2008.
3. Deergha Rao K, Signals and Systems, Springer, 2018.

NETWORK ANALYSIS AND TRANSMISSION LINES

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:
1. Recite basic concepts of network parameters, theorems and transmission line theory.
2. Differentiate the changes of transient networks using Laplace transform
3. Compare and contrast the parameters, functions and synthesis of the network
4. Apply the concepts of theorems on networks and transmission line theory to solve impedance matching issues.
5. Solve the transmission lines and matching circuits problems using Smith chart

UNIT-I:
Network Theorems:
Source transformation - Superposition Theorem - Thevenin's theorem - Norton's theorem - Reciprocity theorem - Maximum power transfer theorem

UNIT-II:
Transient Analysis:
Transient response of RL, RC, RLC Circuits (Series and Parallel combinations) for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method. Transient response for different inputs such as step, ramp, pulse and impulse by using Laplace transforms method.

UNIT – III:
Two Port Networks:
Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, ***g*** parameters, Conversion of one of Parameter to another, Conditions for Reciprocity and Symmetry, Inter Connection of Two Port networks in series, Parallel and Cascaded configurations, Image Parameters, Illustration problems.

UNIT – IV:
Transmission Lines - I:
Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless / Low Loss Characterization, Types of Distortion, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.

UNIT- V:
Transmission Lines – II:
Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations, Smith Chart – Configuration and Applications, Single Stub Matching.

TEXT BOOKS:
1. Van Valken Burg, Network Analysis, Pearson, 2016
2. Ryder J D, Networks, Lines and Fields, Prentice Hall India, 1999.

REFERENCE BOOKS:
1. Edminister J and Nahvi, Electric Circuits, Mcgraw Hill,1999.
2. William Hayt and Jack E Kemmerly, Engineering Circuit Analysis, Tata Mcgraw Hill, 1993.
3. John Kraus and Daniel Fleisch, Electromagnetics with Applications, Tata Mcgraw Hill, 2017.

ELECTRONIC DEVICES AND CIRCUITS LABORATORY

II B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Identify and use the basic components and instruments in electronics laboratory
2. Outline the characteristics of different semiconductor devices.
3. Interpret the ripple factor, regulations of rectifiers.
4. Sketch the frequency response of small signal amplifiers.
5. Understand the concepts of SCR & UJT and observe its characteristics.

PART A:

(Only for Viva-voce Examination):
Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards and PCBs
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR and UJT.
3. Study and operation of
   a. Multimeters (Analog and Digital)
   b. Function Generator
   c. Regulated Power Supplies
   d. CRO.

PART B:
(For Laboratory Examination – Minimum of 12 experiments):

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. Lissajous patterns using CRO
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier.
12. SCR characteristics.
13. UJT Characteristics
14. Clippers
15. Clampers

BASIC SIMULATION LABORATORY

II B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Evaluate the operation on signals and systems using arithmetic operations and transforms
2. Application of correlation and transforms on noise removal and signal extraction
3. Compute various statistical properties of a random noise and verify whether it is stationary
4. Determine the correlation & Convolution between Signals and sequences.
5. Validate the properties and waveform synthesis of various transforms

Minimum 12 experiments to be Simulated Using MATLAB:

1. Generation of various signals and sequences (Periodic and A periodic), such as Unit Impulse, Unit step, square, saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
2. Operations on Signals and Sequences such as Addition, multiplication, scaling, Shifting, Folding, computation of Energy and average power.
3. Finding the Even and Odd parts of Signal/sequence and Real and imaginary parts of signal.
4. Convolution between signals and sequences.
5. Auto correlation and cross correlation between signals and sequences.
6. Verification of Linearity and Time Invariance Properties of a given continuous/Discrete system.
7. Gibbs Phenomenon.
8. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
9. Waveform synthesis using Laplace Transform.
10. Locating the Zeros and Poles and plotting the Pole-Zero maps in S plane and Z-plane for the given transfer function.
11. Generation of Guassian noise (Real and complex), Computation of its mean, M.S. value and its Skew, Kurtosis, and PSD, probability distribution function.
12. Sampling Theorem Verification.
13. Removal of noise by Autocorrelation / Cross correlation.
14. Extraction of Periodic signal masked by noise using correlation.

GENDER SENSITIZATION

II Year I Semester

L	T	P	C
2	0	0	0

Course Outcomes:

1. To develop awareness about gender discrimination and take measurable steps to counter it.
2. To identify the basic dimensions of biological, sociological, psychological and legal aspects of gender.
3. To acquire knowledge about gendered division of labour in relation to politics and economics.
4. To prepare the students against gender violence.
5. To prepare the students to work and live together as equals.

UNIT-I:

Understanding Gender:

Gender:

Why Should We Study It?

Socialization:

Making Women, Making Men Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II:

Gender and Biology:

Missing Women:

Sex Selection and Its Consequences Declining Sex Ratio. Demographic Consequences.

Gender Spectrum:

Beyond the Binary Two or Many? Struggles with Discrimination.

UNIT-III:

Gender and Labour:

Housework:

The Invisible Labour “My Mother doesn’t Work.” “Share the Load.”

Women’s Work:

Its Politics and Economics Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV:

Issuesof Violence:

Sexual Harassment:

Say No! Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

Domestic Violence:

Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence Blaming the Victim-“I Fought for my Life….” - Additional Reading: The Caste Face of Violence.

UNIT-V:

Gender: Co- Existence

Just Relationships:

Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.Additional Reading: Rosa Parks-The Brave Heart.

Textbooks:

1. **Towards a World of Equals: A Bilingual Textbook onGender**, A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu, **Telugu Akademi**, **Hyderabad**,Telangana State,**2015**.

Reference Books:

1. Seeing like a Feminist, Menon, Nivedita, New Delhi, Zubaan, Penguin Books, 2012.
2. I Fought For My Life…and Won, Abdulali Sohaila.

SWITCHING THEORY AND LOGIC DESIGN

II B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the basic theorems of Boolean algebra, logic gates, combinational and sequentialcircuits and memories.
2. Analyze the combinational and sequential circuits and memories.
3. Design of logic circuits
4. Realization of gates using different logic families.
5. Explain the design and operation of different semiconductor memories

Unit-I:
Number System and minimization techniques:
Number System:
Review of number system and base conversion, complements, signed binary numbers, Floating point number representation, Error detection (parity detection only).
Minimization techniques
Boolean Algebra, postulates ,basic logic gates, Canonical and Standard Form, NAND and NOR implementation, Minimization of switching function using theorem, The Karnaugh Map Method-Up to Five Variable Maps, Tabular Method.

UNIT-II:
Combinational Circuits:
Adders & Subtractor, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparators, Multiplexers, De-multiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III:
Sequential circuits-I:
Basic Architectural Distinctions between Combinational and Sequential circuits, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop, Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.

Unit-IV:
Sequential Circuits-II:
Synchronous – Asynchronous – Comparison, Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register, MOD Counters. Finite state machine-capabilities and limitations, Mealy and Moore models.

UNIT-V:
Logic Families and Semiconductor Memories:
Logic Families:
DCTL, RTL, DTL, TTL and CML Logic –gate realization - Comparison,
Semiconductor Memories:
Introduction to ROM, PAL, PLA, CPLD, FPGA.

TEXT BOOKS:

1. Zvi Kohavi & Niraj K. Jha, Switching and Finite Automata Theory, Cambridge, 2010.
2. Jain N P, Modern Digital Electronics, Tata McGraw Hill, 2007.

REFERENCE BOOKS:

1. Morris Mano , Digital Design, Prentice Hall India, 2006
2. Fredriac J. Hill, Gerald R. Peterson, Introduction to Switching Theory and Logic Design Wiley, 1981.
3. Charles H. Roth, Fundamentals of Logic Design, Cengage Learning, 2004.

ELECTRICAL TECHNOLOGY
(B. Tech. Electronics and Communication Engineering)

II Year B. Tech II semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the concept of network topology
2. Apply the concepts of the filters, attenuators to real-world problems.
3. Able to synthesize the electrical networks using different techniques.
4. Analyse the basic concepts of DC machines & AC Machines.
5. Understand the basic concepts of some special machines.

UNIT I:
Network topology:
Definitions, Graph, Tree, Basic cutest and Basic Tie set Matrices for Planar Networks, Loop and Nodal methods for analysis of Networks with Dependent & Independent Voltage and Current Sources, Duality & Dual Networks.

UNIT II:
Filters and attenuators:
Filters:
Classification of Filters, Filter Network, Classification of Pass band and Stop Band, Characteristic Impedance in the Pass and Stop bands, Constant-k Low Pass Filter, High Pass Filter, m-derived T-Section, Band Pass Filter and Band Elimination filter, Illustrative problems. Attenuators: T-Type Attenuator, p-Type Attenuator, Bridged T-Type Attenuator, Lattice Attenuator.

UNIT III:
Network synthesis:
Reliability Concept, Hurwitz Property, Positive Realness, Properties of positive real functions, Synthesis of R-L, R-C and L-C driving point functions, Foster and Cauer forms.

UNIT IV:
Dc generators and dc motors:
DC Generators:
Principle of Operation, EMF equation, Introduction to armature reaction and commutation, Types of Generators, Magnetization (OCC) characteristics - critical field resistance and critical speed, Applications.
DC Motors:
Principle of operation - Back E.M.F. - Torque equation, Types of DC Motors, Losses and Efficiency, Brake Test, Speed control of DC Motor - Flux and Armature Voltage control methods, Applications.

UNIT V:
Special machines:
Synchros, Principles of operation of Reluctance Motors, Stepper Motors, Universal Motors, Permanent magnet Brushless DC Motors

TEXT BOOKS:

1. Chakrabarti A, Circuit Theory: Analysis & Synthesis, Dhanpat Rai & Sons, 2008.
2. Gupta J B, Theory and performance of Electrical machines, S K Kataria, 2009.

REFERENCE BOOKS:

1. William Hayt, Jack Kemmerly, Jamie Phillips and Steven Durbin, Engineering Circuits Analysis, McGraw Hill Company, 2019.
2. Bimbra P S, Electric Machinery-, Khanna Publishers, 2010
3. Bhatta Charya S K, Electrical Machines, McGraw Hill Companies, 2007.

PROFESSIONAL COMMUNICATION

II Year II Semester

L	T	P	C
2	0	0	2

Course Outcomes:

1. Acquire enhanced personality
2. Exhibit appropriate professional etiquette
3. Practice team building with strong communication skills
4. Develop problem solving skills and decision-making
5. Demonstrate effective presentation skills

UNIT-I:
Self-Appraisal:
Self-Introspection/ Self Retrospection
Introducing self & others
Goal setting
SWOT Analysis,

UNIT- II:
Professional Etiquette:
Etiquette-Telephone Etiquette- Netiquette
Email, Social Network
Behavioural Traits
Case study

UNIT-III:
Team Building:
Leadership skills-Case Studies
Team Essentials
Negotiation Skills
Group Discussion-Functional Aspects

UNIT-IV:
Logical Thinking and Analytical Reasoning:
Decision Making
Problem Solving
Conflict management
Case Study

UNIT-V:
Presentation Skills:
Poster Presentation
Oral Presentation-Individual Presentation, Team Presentation, Thematic Presentation

Textbooks:

1. Effective Technical Communication, Ashrif Rizvi, Tata Mc Graw Hill, 2011

Reference Books:

1. Speaking and Writing for Effective Business, Soundarajan, Mcmillan, 2010.
2. English for Professional Success, Hector Sanchez,Thomson, 2010.

ANALOG AND DIGITAL COMMUNICATIONS

II B.Tech II Semester

L	T	P	C
3	1	0	4

COURSE OUTCOMES:

After going through this course the student can

1. Demonstrate fundamental knowledge in Elements of Analog and Digital Communication systems.
2. Analyze different types of analog and digital modulation systems and calculate total power & bandwidth.
3. Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities.
4. Formulate and solve engineering problems in the core area of analog and digital communications in developing information transmitting systems and telemetry system.
5. Illustrate the impact of noise in analog communication systems and computation of Probability of error in digital modulation techniques.

UNIT-I:
Amplitude Modulation:
Review of signals and systems, Amplitude Modulation: Time and Frequency domain representations Power and Bandwidth, AM Generators: Square law modulator Switching modulator, AM Detectors: Square law detector Envelope detector,DSBS Modulation: Time domain and frequency domain representations, DSB-SC Generators: Balanced Modulators Ring Modulator, DSB-SC Detectors: Coherent detector COSTAS Loop, SSB Modulation: Time and Frequency domain representations SSB Generators and Detectors, VSB Modulation: Time and Frequency domain representation Envelope detection of a VSB wave, Comparison andApplications of different AM Systems, Frequency Division Multiplexing.

UNIT-II:
Frequency Modulation:
Angle Modulation: Time domain representation - Single tone FM wave - NBFM and WBFM - Spectral analysis of single tone FM Wave - Power and Bandwidth, FM Generators: Indirect FM and Direct FM Generators, FM Detectors: Balanced Frequency discriminator - Ratio detector, Pre-emphasis & De-emphasis, Threshold effect, Comparison of FM between AM.

UNIT-III:
Pulse and Base Band Digital Modulations:
Pulse Analog Modulation:
Sampling process, Pulse Amplitude Modulation and Demodulation, Pulse Width Modulation and demodulation, Pulse Position Modulation and Demodulation, Time Division Multiplexing.
Pulse Digital Modulation:
Quantization process, Pulse Code Modulation (PCM), Differential PCM (DPCM), Delta Modulation (DM), Inter Symbol Interference (ISI) - Nyquist criterion, Optimal detection of digital signals

UNIT-IV:
Pass band Digital Modulations:
Pass-band Digital Modulation Schemes:
ASK – PSK – DPSK - FSK – QAM, Probability of error, Optimal Coherent detection of PSK and FSK

UNIT-V:
Noise in Communication Systems:
Output SNR& Noise Figure in Analog modulation systems: AM – DSBSC - SSB - FM, Output SNR in PCM and DM systems, Comparison of PCM and DM systems.

TEXT BOOKS:

1. Haykin S, Communications Systems, Wiley, 2001.
2. Sam Shanmugam, Digital and Analog Communication Systems, Wiley, 2006.

REFERENCE BOOKS:

1. Proakis J G, Digital Communications, McGraw Hill, 2000.
2. Wozencraft J M & Jacobs I M, Principles of Communication Engineering, Wiley, 1965.
3. Simon Haykin, Digital communications, Wiley, 2005.

ANALOG AND PULSE CIRCUITS

II B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand the concepts of amplifiers, feedback, large signal model and time base generators.
2. Utilize the Concepts of feedback to improve the stability in amplifiers and oscillators.
3. Analyze different multistage amplifiers, multivibrators and time base generators.
4. List different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications
5. Design RC and LC Oscillators for different frequencies and analyze them for frequency and amplitude stability.

UNIT I:

Multistage Amplifiers:

Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage cascade amplifiers, Cascode amplifier, Darlington pair.

Transistor at High Frequency:

Hybrid - model of Common Emitter transistor model, fα, β and unity gain bandwidth, Gain bandwidth product.

UNIT II:

Feedback Amplifiers:

Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations.

UNIT III:

Oscillators:

Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

UNIT IV:

Large Signal Amplifiers:

Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class C Amplifiers.

Tuned Amplifiers:

Single Tuned Amplifiers – Q-factor, frequency response of tuned amplifiers, Concept of stagger tuning and synchronous tuning.

UNIT V:

Multivibrators:

Analysis and Design of AstableMultivibrators,Types of Triggering, MonostableMultivibrators, BistableMultivibrators and Schmitt trigger using Transistors.

Time Base Generators

General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias , Integrated Electronics, , McGraw Hill, 2010
2. Millman J, Taub H and Mothiki S. Prakash Rao, Millman's Pulse, Digital and Switching Waveforms, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. David A. Bell, Electronic Devices and Circuits, Oxford, 1986.
2. Robert L. Boylestead, Louis Nashelsky, Electronic Devices and Circuits theory, Pearson, 2009.
3. Thomas L. Floyd, Electronic Devices Conventional, Pearson, 2015.

ELECTROMAGNETIC WAVES

II B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the EM Field Characteristics – divergence and curl of fields
2. Interpret the Maxwell's equations for static Electric and Magnetic fields and dynamic Electromagnetic fields
3. Analyze the behavior of EM waves in different media
4. Apply the knowledge of EM Wave Propagation at microwaves
5. Explain the wave equations and mode analysis of rectangular and circular wave guides

UNIT I:
Electrostatics:
Introduction to coordinate system- Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relation between E and V,Maxwell's Two Equations for Electrostatic Fields, Energy Density, Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitors – Parallel Plate, Coaxial, Spherical.

UNIT II:
Magneto statics:
Biot-Savart's Law, Ampere's Circuit Law and Applications, Magnetic Flux Density, Maxwell's two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law.

UNIT III:
Maxwell's Equations (Time Varying Fields):
Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Forms, Conditions at a Boundary Surface -Dielectric-Dielectric and Dielectric-Conductor Interfaces.

UNIT IV:
EM Wave Characteristics:
Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves –Definitions, Relation between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization. Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

UNIT V:
Waveguides:
Electromagnetic Spectrum and Bands. Rectangular Waveguides – Solution of Wave Equationsin Rectangular Coordinates, TE/TM mode analysis, Expressions for Fields, CharacteristicEquation and Cut-off Frequencies, Dominant and Degenerate Modes, Sketches of TE and TMmode fields in the cross-section, Phase and Group Velocities, Wavelengths and ImpedanceRelations, Equation of Power Transmission, Impossibility of TEM Mode. Microstrip Lines – ZoRelations, Effective Dielectric Constant, Circular waveguides.

TEXT BOOKS:

1. William H. Hayt & John A. Buck, Engineering Electromagnetics, McGrawHill, 2014
2. Matthew N.O. sadiku and S.V. Kulkarni, Principles of Electromagnetics, Oxford University Press, 2015.

REFERENCE BOOKS:

1. Jordan E C and Balman K G, Electromagnetic Waves and Radiating Systems, Prentice Hall India, 2000.
2. Nathan Ida, Engineering Electromagnetics, Springer, 2005.
3. Bhag Singh Guru and Huseyin R. Hiziroglu, Electromagnetic Field Theory Fundamentals, Cambridge University Press, 2006.

ANALOG AND DIGITAL COMMUNICATIONS LABORATORY

II B.Tech II Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate knowledge in different Analog and Digital Communication Systems.
2. Compare the characteristics of various Analog and Digital modulation schemes and analyze their performances.
3. Develop various analog and digital modulation and demodulation systems
4. Explain how Pulse code modulation is applied to transform an analog signal into a digital one and transmitted through the digital communication network.
5. Design the shift keying based digital modulation techniques for the transmission of digital information

Note: Any 10 experiments to be conducted

1. Amplitude modulation and demodulation
2. DSBSC modulation and demodulation
3. SSB modulation and demodulation
4. Frequency modulation and demodulation
5. Pulse Amplitude Modulation and demodulation
6. Pre-emphasis and De-emphasis
7. Verification of Sampling Theorem
8. Pulse code modulation and demodulation
9. Delta modulation and demodulation
10. PSK Modulation and demodulation
11. FSK Modulation and demodulation
12. DPSK and QPSK Modulation and demodulation

ANALOG AND PULSE CIRCUITS LABORATORY

II B.Tech II Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the Course, the student will be able to:

1. Compare the frequency response of tuned, MOS, Darlington amplifier.
2. Sketch the sustained waveforms of oscillators, multi-vibrators and sweep circuits.
3. Interpret the efficiency of power amplifiers.
4. Explain the characteristics of Boot strap sweep circuit, Miller sweep circuit and UJT relaxation oscillator
5. Design LC Oscillators for different frequencies and analyze them for frequency and amplitude stability.

Note: Any 12 experiments to be conducted

1. Class A Power Amplifier (With Transformer Load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley Oscillators
5. Colpitts Oscillators
6. Darlington Pair
7. MOS Amplifier
8. Design a Bistable Multi vibrator and draw its waveforms
9. Design aMonostable Multi vibrator and draw its waveforms
10. Design an Astable Multi vibrator and draw its waveforms
11. Response of Schmitt Trigger circuit for loop gain less than and greater one
12. The output – voltage waveform of Boot strap sweep circuit
13. The output – voltage waveform of Miller sweep circuit
14. UJT relaxation oscillator

ENVIRONMENTAL SCIENCE
(Common to all Branches)

II B.Tech II Semester

L	T	P	C
2	0	0	0

COURSE OUTCOMES:

At the end of the Course, the student will be able to:

1. Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.
2. Explain the limitations of the resources and impacts of over utilization of all natural resources.
3. Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution.
4. Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, environmental audit and list the EIA methods.
5. Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.

UNIT- I:
Ecosystem:
Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification.
Biodiversity and Biotic Resources:
Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT- II:
Natural Resources:
Classification of Resources,
Water resources:
Use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting;
Energy resources:
Growing energy needs, Renewable and Non Renewable Energy resources.
Land resources:
land degradation – Landslide and Soil Erosion;
Forest Resources:
Uses and Exploitation.

UNIT- III:
Environmental Pollution and Control:
Types of Pollution, Sources, Effects and Control measures of Air Pollution, WaterPollution, Soil Pollution and Noise Pollution.

UNIT- IV:
Global Environmental Problems and Global Efforts:
Greenhouse effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Aid Rains.
Environmental Impact Assessment (EIA):
Scope of EIA and EIA methods, scope of Environmental audit and Environmental Management Plan.

UNIT- V:

Environmental Policy, Legislation, Rules and Regulations:

Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act-1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste, Radioactive waste Rules.

Towards Sustainable Future:

Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

TEXT BOOKS:

1. Anubha Kaushik, Text Book of Environmental Studies, New age International, 2006.
2. Erach Bharucha, Environmental studies, University Press, 2005.

REFERENCE BOOKS:

1. Anji Reddy M, Environmental Science and Technology, B S Publications, 2007
2. Richard T. Wright , Environmental Science: Towards a Sustainable Future, Prentice Hall India, 2008

COURSE STRUCTURE FOR B.TECH III YEAR

III B.Tech I Semester:

S.No	Course Category	Course Title	L	T	P	Credits
1	ES – 3	Control Systems	3	0	0	3
2	PC – 8	Microprocessors & Microcontrollers	2	1	0	3
3	PC – 9	Linear & Digital IC Applications	3	0	0	3
4	PC – 10	Antenna And Propagation	3	0	0	3
5	PE-1	**Professional Elective-1** 1. Computer Architecture 2. Information Theory and Coding 3. Introduction to Mems	3	0	0	3
6	OE-1	**Open Elective-1** 1. Introduction to Microcontrollers 2. Basic Electronics	3	0	0	3
7	PC Lab-5	Microprocessor and Microcontrollers Laboratory	0	0	2	1
8	PC Lab-6	Linear & Digital IC App. Laboratory	0	0	2	1
9	MC – 3	Personality Development & Behavioral Skills	2	0	0	1
		Total	**19**	**1**	**4**	**21**

III B.Tech II Semester:

S.No	Course Category	Course Title	L	T	P	Credits
1	H&S	Managerial Economics & Financial Analysis	3	0	0	3
2	PC-11	Digital Signal Processing	2	1	0	3
3	PC-12	Microwave Engineering	2	1	0	3
4	PC-13	Data Communication and Networking	2	1	0	3
5	PE-2	**Professional Elective-2** 1. Digital Signal Processors and Architectures 2. Modelling and Simulation using MATLAB 3. Optical Communications	3	0	0	3
6	OE – 2	**Open Elective-2** 1. Basic Electronic Instrumentation 2. Consumer Electronics	3	0	0	3
7	PC Lab-7	Digital Signal Processing Laboratory	0	0	2	1
8	H&S	Adv. Communication Skills Laboratory	0	0	2	1
9	MC – 4	Quantitative Methods & Logical Reasoning	2	0	0	1
Total Number			**17**	**3**	**4**	**21**

COURSE STRUCTURE FOR B.TECH III YEAR (FAST TRACK)

III B.Tech II Semester:

S.No	Course Category	Course Title	L	T	P	Credits
1	H&S	Managerial Economics & Financial Analysis	3	0	0	3
2	PC-11	Digital Signal Processing	2	1	0	3
3	PC-12	Microwave Engineering	2	1	0	3
4	PC-13	Data Communication and Networking	2	1	0	3
5	PE-2	**Professional Elective-2**	3	0	0	3
		1. Digital Signal Processors and Architectures				
		2. Modelling and Simulation using MATLAB				
		3. Optical Communications				
	PC-16	**Fast Track**		0	0	
6	OE – 2	**Open Elective-2**	3	0	0	3
		1. Basic Electronic Instrumentation				
		2. Consumer Electronics				
7	PC Lab-7	Digital Signal Processing Laboratory	0	0	2	1
8	H&S	Adv. Communication Skills Laboratory	0	0	2	1
9	MC – 4	Quantitative Methods & Logical Reasoning	2	0	0	1
Total Number			**17**	**3**	**4**	**21**

CONTROL SYSTEMS
(B.Tech. Electronics and Communication Engineering)

L	T	P	C
3	0	0	3

III B.Tech I semester

COURSE OUTCOMES:

At the end of the Course, the student will be able to:

1. Understand the modeling of linear-time-invariant systems using transfer function.
2. Analyse system response and evaluate error dynamics in time domain.
3. Understand the concept of stability and its assessment for linear-time invariant systems.
4. Design simple feedback controllers.
5. Infer the general concept of state variable, state space and analyse the stability of linear Time discrete systems.

UNIT I
Introduction to control problem:
Industrial Control examples. Mathematical models of physical systems. Control hardware and their models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram algebra.

UNIT II:
Time response analysis of standard test signals:
Time response of first and second order systems for standard test inputs. Application of initial and final value theorem. Design specifications for second-order systems based on the time-response. Concept of Stability. Routh-Hurwitz Criteria. Relative Stability analysis. Root-Locus technique. Construction of Root-loci.

UNIT III:
Frequency-response analysis:
Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.

UNIT IV:
Introduction to controller design:
Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems. Root-loci method of feedback controller design. Design specifications in frequency-domain. Frequency-domain methods of design. Application of Proportional, Integral and Derivative Controllers, Lead and Lag compensation in designs. Analog and Digital implementation of controllers.

UNIT V:
State variable analysis and concepts of state variables:
State space model. Diagonalization of State Matrix. Solution of state equations. Eigen values and Stability Analysis. Concept of controllability and observability. Pole-placement by state feedback.
Discrete-time systems. Difference Equations. State-space models of linear discrete-time systems. Stability of linear discrete-time systems.

TEXT BOOKS:

1. Nagrath I J & Gopal M, Control Systems Engineering, New Age International, 2009.
2. Kuo B. C, Automatic Control Systems, John Wiley, 2003.

REFERENCE BOOKS:

1. Nagoorkani A, Control Systems Engineering, CBS PUB & DIST, 2020.
2. Jagan N.C, Control Systems, BS Publications, 2014.
3. Katsuhiko Ogata, Modern Control Engineering, Prentice Hall of India, 1998.

MICRO PROCESSORS& MICRO CONTROLLERS

III B.Tech I Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Acquire knowledge about Microprocessors, Microcontroller and its need.
2. Ability to identify basic architecture of different Microprocessors & Microcontroller
3. Develop systems for interfacing of different peripheral devices microprocessor& Microcontrollers
4. Compose a program to interface microprocessor and microcontroller for different applications.
5. Develop microcontroller application for different domain

UNIT-I:
8086 Architecture:
8086 Architecture-Functional diagram, Register Organization, Memory Banks, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, Minimum Modes – Maximum Modes, Timing diagrams.

UNIT-II:
Instruction Set and Assembly Language Programming of 8086:
Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT-III:
Interfacing RAM with 8086:
8255PPI – Modes – Interfacing with 8086 – 8251 – Modes, Interfacing with 8086 – Interfacing Structure of 8086 – Interfacing with 8259 – 8257 DMA – Modes, Interfacing 8086 with – Stepper Motor Interfacing – 0800

UNIT-IV:
Introduction to Microcontrollers:
Overview of 8051 Microcontroller, Architecture, I/0 Ports, Memory Organization, Addressing Modes and instruction set of 8051

UNIT-V:
8051 Real Time Control:
Interrupts, Timers/Counters, and Serial Communication, Programming Timer Interrupts, Programming external Hardware Interrupts, Programming the Serial Communication interrupts, Programming 8051 Timers and Counters

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing,Tata McGraw-Hill, 2006
2. Kenneth. J. Ayala, The 8051 Microcontroller ,Cengage Learning, 2005

REFERENCE BOOKS:

1. Ray A K and Bhurchandani K M, Advanced Microprocessors and Peripherals,Tata McGraw-Hill, 2006.
2. Uma Rao K., Andhe Pallavi , The 8051 Microcontrollers, Architecture and Programming and Applications, Pearson, 2009
3. Liu and GA Gibson, Micro Computer System 8086/8088 Family Architecture, Programming and Design, Prentice Hall of India, 1986.

LINEAR & DIGITAL IC APPLICATIONS

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the functioning of OP-AMP, Special function and Digital ICs
2. Analyze the operation, characteristics of OP-AMP, Special Function and Digital ICs
3. Design a logic circuits using digital ICs
4. Devising filters, multivibrators, waveform generators & arithmetic circuits using OP-AMP and Special Function ICs.
5. Analyze and design applications like Counters FlipFlops Shiftregister using Digital integrated circuit.

UNIT-I:

Operational Amplifier:

Introduction, Advantages & Classification of IC's, IC chip size and circuit complexity, Ideal and Practical Op-Amp, Op-Amp Characteristics-DC and AC Characteristics and their compensations, Features of 741 Op-Amp

Applications of Op-Amp:

Inverting, Non-Inverting, Adder, Subtractor , Instrumentation, Sample and Hold Circuit, Differentiator and Integrator, Comparator & its applications, Schmitt Trigger, waveform Generators – Astable multivibrator, Monostable multivibrator,Triangular.

UNIT-II:

Active filters:

Introduction, Butterworth filters-1st order, 2nd order, LPF, HPFfilters (VCVS), Characteristics of Band pass, Band rejects and All Pass Filters.

D to A and A to D Converters:

Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications

UNIT-III:

Timer and Phase Locked Loops:

IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications. IC565 PLL - Block Schematic, Description of Individual Blocks and Applications.

Voltage regulator: Introduction to Voltage Regulators, Features & Internal Operation of 723 Regulator, Design of low voltage and high voltage regulators using IC723 VR.

UNIT-IV:

Digital Integrated Circuits:

Parameters of logic families, Comparison of Various Logic Families, TTL Logic ,CMOS Logic TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD decoders with drivers , Encoder, Multiplexer, Demultiplexer, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT-V:

Sequential Logic IC's:

74XX Series ICs - All Types of Flip-flops, Conversion between Flip-flops, Synchronous and Asynchronous Counters, Mod-N Counters, Shift Registers, Applications of Shift Registers

TEXT BOOKS:

1. Roy Choudhury D, Shail B. Jain, Linear Integrated Circuit,New Age International, 2012
2. Thomas L Floyd, Digital Fundamentals, Pearson Education, 2015.

REFERENCE BOOKS:

1. Ramakant A. Gayakwad, OP-AMP and Linear Integrated Circuits, Prentice HallIndia, 2012.
2. Sergio Franco, Design with Operational Amplifiers and Analog Integrated Circuits, McGraw Hill, 1997.
3. Gray, Meyer, Analysis and Design of Analog Integrated Circuits, Wiley International, 1995.

ANTENNA AND PROPAGATION

III B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand different antennas, field analysis and their applications to antenna elements.
2. Distinguish the mechanism of radiation, different antenna characteristics, mathematical relations their estimates in practical cases.
3. Analyze and design the working of different antenna's and to interpret the radiation pattern of planar arrays from the knowledge of linear arrays.
4. Obtain the capability to differentiate and report the electromagnetic radiation levels in the Atmosphere and any radio transmissions.
5. Design Microwave antenna Systems from specification

UNIT I:

Antenna Basics:

Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height. Fields from Oscillating Dipole, Field Zones, Front - to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem.

Thin Linear Wire Antennas:

Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area and Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths. Loop Antennas - Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small Loops (Qualitative Treatment).

UNIT II:

Antenna Arrays:

Point Sources – Definition, Patterns, and arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, and Uniform Linear Arrays – Broadside Arrays, End fire Arrays.

Antenna Measurements:

Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors. Patterns to be Measured, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods).

UNIT III:

VHF, UHF and Microwave Antennas - I:

Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Horn Antennas – Types, Fermat's Principle, Optimum Horns.

VHF, UHF and Microwave Antennas – II:

Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Reflector Antennas – Introduction, Flat Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features.

UNIT IV:

Wave Propagation:

Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts.

Ground Wave Propagation:
Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections.

Space Wave Propagation:
Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Troposphere Propagation.

UNIT V:
Sky Wave Propagation:
Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multi-hop Propagation.

TEXT BOOKS:

1. Kraus J D, Marhefka R J and Ahmad S. Khan, Antennas and Wave Propagation, Tata McGraw-Hill, 2010.
2. Jordan E C and Balmain K G, Electromagnetic Waves and Radiating Systems,Prentice Hall India, 2000.

REFERENCE BOOKS:

1. Balanis C A, Antenna Theory, John Wiley, 2005.
2. K.D. Prasad & Satya Prakashan, Antennas and Wave Propagation, Tech India Publications, 2001.
3. Keith Henney, Radio Engineering Handbook, Tata McGraw-Hill, 2012.

COMPUTER ARCHITECTURE
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Recall the structure and organization involved in computer design.
2. Identify the different memory and input- output system involved in system design.
3. Analyze computer parallelism and its design on program control and computer arithmetic operations.
4. Comprehend the various details of multiprocessor and multi-core processors in computer design.
5. Illustrate a better way the I/O and memory organization.

UNIT-I:
Structure of Computers:
Computer types, functional units, basic operational concepts, VonNeumann architecture, bus structures, software, performance, multiprocessors and multicomputer, data representation, fixed and floating point and error detecting codes.
Register Transfer and Micro Operations:
Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, shift micro operations, arithmetic logic shift unit

UNIT-II:
Basic Computer Organization and Design:
Instruction codes, computer registers, computer instructions, instruction cycle, timing and control, memory reference instructions, input, output and interrupt.
Central Processing Unit:
Stack organization, instruction formats, addressing modes, data transfer and manipulation, progra m control, reduced instruction set computer (RISC).

UNIT-III:
Computer Arithmetic:
Addition and subtraction, multiplication and division algorithms, floating point arithmetic operation, decimal arithmetic unit, and decimal arithmetic operations.

UNIT-IV:
The Memory System:
Basic concepts, semiconductor RAM types of read only memory (ROM), cache memory, performance considerations, virtual memory, secondary storage raid, direct memory access (DMA).
Processor and Control Unit:
Basic MIPS implementation – Building data path – Control Implementation scheme – Pipelining – Pipelined data path and control – Handling Data hazards & Control hazards – Exceptions.

UNIT-V:
Parallelism:
Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading, Multicore processors, Array Processors: Attached Array Processor- SIMO Array Processor.

Multiprocessors:
Characteristics of multiprocessors, interconnection structures, inter Processor arbitration, inter proce ssor communication and synchronization, and cache Coherence, shared memory multiprocessors.

TEXT BOOKS:

1. Moris Mano M , Computer System Architecture, Pearson, 2006
2. Carl Hamacher, Zvonko Vranesic, Computer Organization, McGraw Hill, 2002.

REFERENCE BOOKS:

1. William Stallings, Computer Organization and Architecture- Designing forperformance, Prentic e Hall,2010.
2. Andrew S. Tanenbaum, Structured Computer Organization, Pearson, 2006.
3. Sivarama P. Dandamudi, Fundamentals of Computer Organization and Design, Springer, 2003.

INFORMATION THEORY AND CODING
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:
At the end of the course, students will be able to:
1. Understand the concept of information theory, coding techniques and errors related to it.
2. Compare the different coding techniques.
3. Formulate codes using different coding techniques
4. Apply different coding techniques to develop an error free communication system.
5. Inspect error detection and correction in various coding technique.

UNIT-I:
Basics of Information Theory:
Entropy, Entropy for discrete ensembles, Information rate, source coding: Shannon's noiseless coding theorem, Shannon's noisy coding theorem, Mutual Information, Shannon- Hartley law

UNIT-II:
Source Coding:
Encoding of the Source Output, Shannon's Encoding Algorithm. Shannon Fano Encoding Algorithm, Huffman codes, Extended Huffman coding, Arithmetic Coding, Lempel – Ziv Algorithm, Calculations of Channel capacity and bounds for Discrete Channel, Applications to continuous channels

UNIT-III:
Information Channels:
Communication Channels, Channel Models, Channel Matrix, Joint probability Matrix, Binary Symmetric Channel, System Entropies, Mutual Information, Channel Capacity, Channel Capacity of : Binary Symmetric Channel, Binary Erasure Channel, Morgan's Theorem, Continuous Channels

UNIT-IV:
Error Control Coding:
Examples of Error control coding, methods of Controlling Errors, Types of Errors, Linear Block Codes: matrix description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes, Single Error Correcting hamming Codes, Binary Cyclic Codes: Algebraic Structure of Cyclic Codes, Encoding using an (n-k) Bit Shift register, Syndrome Calculation, Error Detection and Correction

UNIT-V:
Convolution Arithmetic Codes:
Convolution Encoder, Time domain approach, Transform domain approach, Code Tree, Trellis and State Diagram, The Viterbi Algorithm.

TEXT BOOKS:
1. Abramson N, Information and Coding, McGraw Hill, 1963.
2. Mansurpur M, Introduction to Information Theory, McGraw Hill, 1987.

REFERENCE BOOKS:
1. Ash R B, Information Theory, Prentice Hall, 1970.
2. Shu Lin and D.J. Costello Jr., Error Control Coding, Prentice Hall, 1983.
3. Chitode J S, Information Theory and coding, Technical publication, 2009.

INTRODUCTION TO MEMS

(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After this course students will be able to

1. Understand the basic concepts involved in the design of MEMS devices.
2. Interpret the different properties of MEMS materials
3. Enumerate role of MEMS devices on sensing and Actuation through different mediums.
4. Contrast the types of MEMS devices on different materials through different mediums.
5. Apply the MEMS for different applications.

UNIT-I:

Introduction to MEMS and Micro-fabrication:

History of MEMS Development, Characteristics of MEMS-miniaturization - microelectronics integration - Mass fabrication with precision. Micro fabrication - microelectronics fabrication process- silicon based MEMS processes- new material and fabrication processing- points of consideration for processing.

UNIT-II:

Electrical and mechanical properties of MEMS materials:

Conductivity of semiconductors, crystal plane and orientation, stress and stain – definition – relationship between tensile stress and stain- mechanical properties of silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- deflection of beam-longitudinal stain under pure bending spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

UNIT-III:

Sensing and Actuation:

Electrostatic sensing and actuation-parallel plate capacitor – Application-Inertial, pressure and tactile sensor parallel plate actuator- comb drive. Thermal sensing and Actuations-thermal sensors-Actuators- Applications- Inertial, Flow and Infrared sensors. Piezo resistive sensors- piezo resistive sensor material- stress in flexural cantilever and membrane Application-Inertial, pressure, flow and tactile sensor. Piezoelectric sensing and actuation- piezoelectric material properties-quartz-PZT-PVDF –ZnO Application-Inertial, Acoustic, tactile, flow-surface elastic waves Magnetic actuation- Micro magnetic actuation principle- deposition of magnetic materials-Design and fabrication of magnetic coil.

UNIT-IV:

Bulk and Surface Micromachining;

Anisotropic wet etching, Dry etching of silicon, Deep reactive ion etching (DRIE), Isotropic wet etching, Basic surface micromachining process- structural and sacrificial material, stiction and antistiction methods, Foundry process.

UNIT-V:

Polymer and Optical MEMS:

Polymers in MEMS- polymide-SU-8 liquid crystal polymer (LCP) - PDMS-PMMA – Parylene – Flurocorbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS - passive MEMS optical components – lenses – mirrors - Actuation for active optical MEMS.

TEXT BOOKS:

1. Chang Liu,Foundations of MEMS, Pearson, 2006.
2. Gaberiel M Rebiz, RF MEMS Theory, Design and Technology, John Wiley & Sons,2003.

REFERENCE BOOKS:

1. Charles P.Poole, Frank J.Owens, Introduction to nanotechnology, John Wiley, 2003.
2. Julian W.Gardner, Vijay K Varadhan, Microsensors, MEMS and Smart devices, John Wiley, 2001.
3. Nitaigour Premchand Mahalik, MEMS, Tata Mc graw-Hill, 2007.

INTRODUCTION TO MICROCONTROLLERS
(Open Elective – 1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to;

1. Interpret the internal organization of 8051 with its unique features.
2. Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.
3. Construct the hardware and software interaction with each other using programming.
4. Summarize the features of the advanced architecture using ARM controller.
5. Train their practical knowledge through laboratory experiments.

UNIT-I:

Overview Microcontroller:

Microprocessors & microcontrollers- Comparison -Types – Selection criteria –Architecture – resources – Memory (RAM, ROM, DMA) - Watch dog timer, PWM– Buses- power down modes – EPROM – Interrupts- Serial communication

UNIT-II:

8051 Family Microcontrollers:

Architecture- 8051 microcontroller – Pins- Ports- Registers- Special function registers (SFR's) - Memory Organization- Counters and Timers.

UNIT-III:

Programming the Microcontrollers:

Addressing modes- Instruction Formats- Instruction set- Data transfer -Bit-manipulation – Arithmetic – Logical – Program flow control – Interrupt control flow – Simple Programs illustrating instruction set.

UNIT-IV:

Systems Design and Interfacing Methods:

Switch- Matrix Keypad – LED -7 Segment – LCD – Serial Interface – RS232- Parallel interface – IEEE1284 - IEEE 488 – ADC (0808) - DAC(0800) – Optical motor shaft encoders – Industrial control – Industrial process control system.

UNIT-V:

ARM 32 Bit MCUs:

Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set – Development tools.

TEXT BOOKS:

1. Raj Kamal, Microcontrollers Architecture, Programming, Interfacing and System Design, Pearson, 2005.
2. Mazidi and Mazidi, the 8051 Microcontroller and Embedded Systems, Prentice Hall India, 2000.

REFERENCE BOOKS:

1. Ajay V Deshmukh,Microcontrollers: Theory & Applications, Tata McGraw Hill, 2005.
2. Jenneth J Ayala, 8051 Microcontrollers, Thomson Delmar Learning, 2005.
3. William Hohl, ARM Assembly Language fundamental and Techniques, CRC Press, 2009

BASIC ELECTRONICS
(Open Elective – 1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand and analyze the different types of diodes, operation and its characteristics Design and analyze the DC bias circuitry of BJT and FET Design.
2. To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.
3. Understand the different applications based on operational amplifier
4. Analyze different types of oscillators and multivibrators.
5. Design and analyze any digital logic gate circuits

UNIT-I:
Semiconductor junction diodes and its applications:
Diode:

Introduction to Semiconductor - PN junction Diode – Construction and operation – VI Characteristics of PN Junction diode-Diffusion and Transition Capacitances - Zener diode - Tunnel Diode

Applications:
Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Clippers and Clampers-Zener diode as voltage regulator.

UNIT-II:
Semiconductor junction transistor:
Bipolar Junction Transistor (BJT):
Construction and Operation of NPN and PNP transistors – CE, CB and CC configurations - Input and output characteristics of CE, CB and CC - Transistor biasing – Transistor as an Amplifier - Qualitative explanation of voltage gain, current gain, power gain, input impedance, output impedance, frequency response and bandwidth - Tuned amplifier Introduction to power amplifier

UNIT-III:

Field effect transistor and operational amplifiers:

Field Effect Transistor (FET):
Classification of FETs-JFET, MOSFET, operating principle of JFET. Drain and transfer characteristics of JFET (n-channel and p-channel), CS, CG, CD configurations.
Operational Amplifiers (OP-Amp):
Ideal OPAMP, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable.

UNIT-IV:
Electronic circuits:
RC differentiator and integrators - Oscillators, RC Phase Shift Oscillator, Wien Bridge Oscillator, Hartley Oscillator and Colpitts Oscillator, Applications - Multivibrators, Types, Operation, Waveforms, Applications.

UNIT-V:

Logic gates and its applications:

Logic Gates:

Basic gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR - Building of AND, OR and NOT Gate with diodes.

Applications:

Half adder, Full adder, Half Subtractor, Full Subtractor and Binary parallel adder.

TEXT BOOKS:

1. Satyabrata Jit, Millman's Electronic Devices and Circuits, Tata McGraw Hill, 1998.
2. Millman, Digital and Switching Waveforms, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Boylestad R L and Louis Nashelsky, Electronic Devices and Circuits, Prentice Hall India, 2006.
2. Salivahanan S, Suresh Kumar N, Vallavaraj A, Electronic Devices and Circuits, Tata McGraw Hill, 2008
3. Morris Mano M, Charles R. Kime, Logic and Computer Design Fundamentals, Pearson, 2003.

MICRO PROCESSORS AND MICRO CONTROLLERS LABORATORY

III B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Apply the fundamentals of assembly level programming of microprocessors and microcontrollers.
2. Build a program on a microprocessor using instruction set of 8086 and 8051.
3. Evaluate Assembly language program for 8086 and 8051 microcontroller to interface peripheral devices for simple applications
4. Develop assembly language programs for various applications using 8051 microcontroller
5. Understand the development of prototype using combination of hardware and software.

Note: Minimum 12 Experiments have to be conducted

1. Introduction to MASM.
2. Programs for 16 bit Arithmetic Operations for 8086.
3. Program for sorting an array for 8086.
4. Program for searching a number or character in a string for 8086.
5. Programs for String Manipulations for 8086.
6. Interfacing to 8086 and programming to control Stepper Motor.
7. Interfacing ADC to 8086.
8. Interfacing DAC to 8086.
9. Serial Communication between Two Microprocessors using 8255.
10. Programming using Arithmetic, Logical and Bit Manipulation Instructions of 8051.
11. Program and verify timer/counter in 8051
12. Program and verify interrupt handling in 8051
13. UART operation in 8051
14. Interfacing LCD to 8051.
15. Data transfer from peripheral to memory through DMA Controller 8237/8257.

LINEAR & DIGITAL IC APPLICATIONS LABORATORY

III B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Study the applications of IC's such as 741,555 and 723
2. Design and construct the combinational and sequential circuits using digital IC's
3. Understand and design the adder and subtractor digital circuits.
4. Design and verify the Multiplexer
5. Understand the basics of Op-Amp and to Design, Analyze Adder subtractor and comparator

Note: Minimum 12 Experiments have to be conducted (six from each part)

Part – A: Linear IC Applications:

1. OP AMP Applications-Adder, Subtractor, Comparator Circuits.
2. Integrator and Differentiator Circuits using IC741
3. Active Filter Applications- LPF, HPF [Second Order]
4. IC741 Waveform Generators-Square wave and Triangular waves.
5. Weighted/R-2R Ladder type DAC(Digital to analog converter)
6. IC 555 Timer AstableMultivibrator Circuit.
7. Calculation of Capture Range & Lock Range Using IC 565 PLL
8. Voltage Regulator using IC 723.

Part – B: Digital IC Applications:

1. Design of all logic gates using NAND/NOR gates and verify the truth tables.
2. Design full adder & full subtractor using NAND/NOR gates and verify the truth table.
3. Design T & D flip flops using JK flip flop and verify the truth table.
4. Design any 4 variable functions using 8:1 Multiplexer and verify.
5. Verification of 4-bit Magnitude comparator
6. Design full adder using 3*8 Decoder and verify.
7. Verification of 4-bit Decade counter
8. Verification of Universal Shift Register

PERSONALITY DEVELOPMENT AND BEHAVIOURAL SKILLS

III Year I semester

L	T	P	C
2	0	0	1

Course Outcomes:

1. Practice optimistic attitude for an efficient, socially viable and multi-faceted personality.
2. Demonstrate functions of non-verbal *communication in formal context*.
3. Build effective individual & team dynamics for professional accomplishments.
4. Analyze appropriate strategic Interpersonal Skills for productive workplace relationships.
5. Correspond in multiple contexts, for varied audiences, across genres and modalities.

UNIT – I:
Personality Development:
Definition - Various Aspects of Personality Development - Behavioural Traits. Importance of Soft Skills for personal and professional development - Success stories.

UNIT – II:
Non Verbal Communication:
Kinesics, Haptics, Proxemics, Vocalics, Oculesics Body Language informal contexts such as Group Discussions, Presentations and Interviews.

UNIT – III:
Team Dynamics:
Different Types of Teams– Role of an individual – Communicating as a group or team leader Individual Presentations/Team Presentation-Project Presentations- Case Studies

UNIT-IV:
Interpersonal Skills:
Time Management- Stress Management- Emotional Intelligence- Conflict Management-Relationship Management

UNIT-V:
Digital Correspondence:
Role of Multimedia in Communication - Communication in a Digital Edge (Video Conference Etc.) Social Networking: Importance and Effects.

Textbooks:

1. Personality Development and Soft Skills, Shikha Kapoor, Preparing for Tomorrow, Wiley, 2020.

Reference Books:

1. Personality Development and Soft Skills, Barun K Mitra, Oxford University Press, 2016.
2. Professional Ethics, Subramanian R, Oxford University Press, 2015.

MANAGERIAL ECONOMICS & AND FINANCIAL ANALYSIS

III B.Tech II semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the importance of certain basic issues governing the business operations namely demand and supply, production function, cost analysis.
2. Apply managerial tools and techniques in obtaining optimal solutions for business problems.
3. Differentiate the various forms of business organizations.
4. Evaluate and interpret the financial statements of companies using ratios.
5. Apply the methods of capital budgeting in effective investment decision making.

UNIT –I:

Introduction to Managerial Economics& Demand Analysis:

Definition, Nature and Scope of Managerial Economics.Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT –II:

Production & Cost Analysis:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts (Opportunity cost vs outlay costs, Fixed, variable and semi variable costs, marginal cost vs average cost, out of pocket vs book cost, imputed cost, implicit & explicit cost, incremental and decremental cost, sunk vs future cost, separable and joint costs) Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT –III:

Markets & New Economic Environment:

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

UNIT –IV:

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and Conventions - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).Financial Analysis: Analysis and Interpretation of Liquidity Ratios (current ratio, quick ratio), Activity Ratios(inventory turnover ratio, debtors turnover ratio), and Capital structure Ratios(debt equity ratio, interest coverage ratio) and Profitability ratios(gross profit ratio, net profit ratio, operating profit ratio, P/E ratio, EPS). Du Pont Chart.

UNIT –V:

Capital Budgeting:

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital, Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return

(ARR), Net Present Value Method (simple problems), IRR and PI method.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
2. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.

REFERENCE BOOKS:

1. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
2. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
3. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
4. Dwivedi: Managerial Economics, Vikas, 2012.
5. Kasi Reddy, Saraswathi, MEFA, PHI Learning, 2012.

DIGITAL SIGNAL PROCESSING

III B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Define the concepts of Fourier transforms, digital filters with their effect of errors.
2. Illustrate speed and memory requirements of Fourier transforms on signals.
3. Relate the effects of finite word length on systems.
4. Formulate frequency filtering, impulse response filters with its structure.
5. Ability to understand various applications of DSP such as multi rate signal processing, telecommunication.

UNIT-I:
Introduction to DSP- applications-advantages
Discrete Fourier Transform:
DTFT, DFT-Complexity calculation- Properties of DFT- linear convolution- Circular convolution- Sectioned convolution- Relation between DTFT, DFS, DFT and Z-Transform.

UNIT-II:
Fast Fourier Transform:
Fast Fourier Transform (FFT), Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT- Convolution of sequences using FFT.

UNIT-III:
IIR Digital Filters:
Analog filter approximations –Butterworth and Chebyshev- Design of IIR digital filters from analog filters- Impulse invariant technique – warping effect- bilinear transformation method - Spectral transformations, realization of IIR filters- direct, canonic, cascade and parallel forms.

UNIT-IV:
FIR Digital Filters:
Characteristics of FIR Digital filters - frequency response – Gibbs Phenomenon- Design of FIR filters - window techniques – Frequency Sampling - Comparison of IIR and FIR filters, realization of FIR filters- direct& cascade forms

UNIT-V:
Finite Word Length Effects:
Quantization- Quantization error- Types- Limit cycles- Overflow oscillations –Scaling
Multirate Signal Processing: Introduction - down sampling- Decimation – up sampling – Interpolation -Sampling Rate Conversion

TEXT BOOK:

1. John G. Proakis, Digital Signal Processing, Principles, Algorithms, and Applications, Pearson, 2007.
2. Tarun Kumar Rawat , Digital Signal Processing, Oxford Publications, 2015

REFERENCES BOOKS:

1. Andreas Antoniou, Digital Signal Processing, TATA McGraw Hill , 2006
2. Ashok Ambardar, Digital Signal Processing, Cenage Learning, 2007.
3. Robert J. Schilling, Sandra L. Harris, Fundamentals of Digital Signal Processing using Matlab, Cenage Learning, 2011.

MICROWAVE ENGINEERING

III B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understands the application of 3-D coordinate geometry, calculus and vector geometry to analyze the EM wave transmission at microwave frequencies.
2. Analyze the problem within the Microwave Transmission line by considering the parameters at transmitter and receiver.
3. Design the microwave components and different transmission lines with the given characteristics at microwave frequencies.
4. Apply the knowledge of microwave components and devices in RADAR communication and satellite communication.
5. Able to discriminate different Radars, find applications and use of its supporting systems.

UNIT I:

Microwave Tubes:

Limitations and Losses of conventional Tubes at Microwave Frequencies, Microwave Tubes – O Type and M Type Classifications, O-type Tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for O/P Power and Efficiency. Reflex Klystrons – Structure, Velocity Modulation and Applegate Diagram, Mathematical Theory of Bunching, Power Output, Efficiency, Oscillating Modes and O/P Characteristics.

UNIT II:

Helix TWTs and M-Type Tubes:

Helix TWTs:

Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

M-Type Tubes:

Introduction, Cross-field Effects, Magnetrons Different Types, Cylindrical Traveling Wave Magnetron Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics,

UNIT III:

Microwave Solid State Devices:

Introduction, Classification, Applications. TEDs Introduction, Gunn Diodes Principle, RWH Theory, Characteristics, Modes of Operation Gunn Oscillation Modes, Principle of operation of IMPATT and TRAPATT Devices.

UNIT IV:

Waveguide Components:

Coupling Mechanisms Probe, Loop, Aperture types. Waveguide Discontinuities Waveguide Windows, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators Different Types, Resistive Card and Rotary Vane Attenuators; Waveguide Phase Shifters Types, Dielectric and Rotary Vane Phase Shifters, Waveguide Multiport Junctions E plane and H plane Tees. Ferrites Composition and Characteristics, Faraday rotation, Ferrite Components Gyrator, Isolator.

UNIT V:

Scattering matrix and Microwave Measurements:

Scattering matrix:

Scattering Matrix Properties, Directional Couplers 2 Hole, Bethe Hole, [s] matrix of Magic Tee and Circulator.

Microwave Measurements:

Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions, Measurement of Attenuation, Frequency. Standing Wave Measurements, measurement of Low and High VSWR, Cavity Q, Impedance Measurements.

TEXT BOOK:

1. Samuel Y. Liao, Microwave Devices and Circuits, Pearson, 2003.
2. Herbert J. Reich, J. G. Skalnik, P. F. Ordung and H. L. Krauss , Microwave Principles CBS Publishers, 2004.

REFERENCES BOOKS:

1. David M. Pozar, Microwave Engineering, John Wiley, 2011.
2. Raghuvanshi G S, Microwave Engineering, Cengage Learning, 2012.
3. Peter A. Rizzi, Microwave Engineering Passive Circuits, Prentice Hall India, 1999.

DATA COMMUNICATION AND NETWORKS

III B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate concepts of various types of computer networks, TCP/IP and OSI models.
2. Analyze different LLC multiplexing mechanisms, node-to-node flow and error control
3. Analyze different MAC mechanisms (Aloha, Slotted Aloha, TDMA, FDMA) and understand their pros and cons.
4. Identify and design the different types of network devices and shortest path in a given network & Enable to interconnect various heterogeneous networks.
5. Implement a peer to peer file sharing application utilizing application layer protocols and transportation layer protocol.

UNIT – I:

Introduction to Networks:

Internet, Protocols and Standards, the OSI Model, Layers in OSI Model, TCP/IP Suite, Addressing.

Physical Layer:

Multiplexing, Transmission Media, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

UNIT – II:

Data Link Layer:

Introduction, Checksum, Framing, Flow and Error Control, Noiseless Channels, Noisy Channels, Random Access Controlled Access, Channelization, IEEE Standards, Ethernet, Giga-Bit Ethernet, Wireless LANs, SONET-SDH, Frame Relay and ATM.

UNIT – III:

Network Layer:

Logical Addressing, Internetworking, Tunneling, Address Mapping, ICMP, IGMP, Forwarding, Routing-Flooding, Bellman& Ford, Disjkstra's routing protocols, RIP, OSPF, BGP,- and Multicast Routing Protocols. Connecting Devices-Passive Hubs, Repeaters, Active Hubs, Bridges, Routers.

UNIT – IV:

Transport Layer:

Process to Process Delivery, UDP, TCP and SCTP Protocols, Congestion, Congestion Control, Quality of Service

Application Layer:

Domain Name Space, DNS in Internet, Electronic Mail, File Transfer Protocol, WWW, HTTP, SNMP, Multi-Media.

UNIT – V:

Network Security:

Security services, mechanisms and attacks, IPSec, SSL, VPN, Firewall, IPv4, IPv6.

TEXT BOOKS:

1. James F. Kurose, K. W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Pearson, 2013.
2. Behrouz A. Forouzan, Data Communications and Networking, Mc Graw Hill, 2006.

REFERENCE BOOKS:

1. William Stallings, Data communications and Networks, Pearson, 2007.
2. Bhusan Trivedi, Data communication and Networks, Oxford university press, 2016.
3. Keshav S,an Engineering Approach to Computer Networks, Pearson, 1997.

DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to
1. Understand signal processing principles, interfacing strategies and the different architectural features of DSP processors.
2. Differentiate the architectural features of various DSP processors.
3. Illustrate the methodology of writing programs for TMS32OC54xx.
4. Explain the system development using DSP Processors for various applications.
5. Able to introduce architectural features of analog devices family of DSP devices i.e. ADSP 2100, ADSP 2181 and blackfin processor

UNIT –I:
Introduction to Digital Signal Processing:
Digital signal processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), LTI systems, Digital filters, Decimation and interpolation.
Computational Accuracy in DSP Implementations:
Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT —II:
Architecture for Programmable DSP Devices:
Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT –III:
Programmable Digital Signal Processors:
Commercial Digital signal- processing Devices, Data Addressing modes of TMS32OC54XX DSPs, TMS32OC54XX Processors- Data Addressing modes, Memory space, Program Control, instructions and Programming, On-Chip Peripherals, Interrupts, Pipeline Operation.

UNIT –IV:
Analog Devices Family of DSP Devices:
Analog Devices Family of DSP Devices —ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.
Introduction to Blackfin Processor:
The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V:
Interfacing Memory and I/O Peripherals to Programmable DSP Devices:
Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Avatar Singh & S. Srinivasan, Digital Signal Processing, Thomson Publications, 2004.
2. Padmanabhan K, Vijayarajeswaran R, Ananthi S, A Practical Approach To Digital Signal Processing, New Age International, 2009.

REFERENCE BOOKS:

1. Venkataramani B and Bhaskar M, Digital Signal Processors, Architecture, Programming and Applications, Tata, Mc Graw Hill, 2002.
2. Jonatham Stein, Digital Signal Processing, John Wiley, 2005.
3. Phil Lapsley, Jeff Bier, Amit Shoham, Lee Ea, Edward A. Lee, DSP Processor Fundamentals, Architectures & Features, Wiley, 1997.

MODELING AND SIMULATION USING MATLAB
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Develop codes on various domains of Electronics and Communication Engineering
2. Handle the advanced commands in appropriate fields of engineering
3. Visualize the impact of parameters during simulation
4. Cater the industrial needs pertaining to the semiconductor technologies.
5. Students will be able to implement simulation models using the tool Simulink.

UNIT-I:
Introduction to MATLAB:
Components of MATLAB desktop-Types of files- Variables and Arrays Handling ArraysOperators and Special Characters- Input/ Output commands File handling-Data types Functions Built-in and user defined functions passing arguments Cell arrays &Structures Strings2D strings-String comparing - Concatenation.

UNIT- II:
Programming:
Introduction - Control Flow Conditional Control if, else, switch -Loop Control for, while, continue, break , Program Termination return- TRY & CATCH - Error trapping - Writing programs with logic and flow control - Differentiation & Integration using MATLAB-, Debugging methods -

UNIT-III:
Plotting in MATLAB & GUI:
Introduction-The plot command-Formatting Plot-Multiple Plots-Adding legend to the plot-Subplot-Plotting complex data-Basic 2D plots, Labels, Line style, Markers,Grid axis- Log, Log-Log, Semilog-Polar, fplot, ezplot, ezpolar, Hold, Stem, Bar, Hist, Interactive plotting - 3D plots – Mesh - Contour - Example programs- Fundamentals of GUI Creation

UNIT-IV:
Application Programs:
Diode Characteristics-BJT characteristics-Half wave and Full wave Rectifier-Open Loop gain of OPAMP-Signal generation-Frequency response of FIR & IIR filters

UNIT-V:
Simulink & applications:
Introduction-Getting Simulink-Creating and Simulating a Simulink model-Creating a subsystem in Simulink- Data import and export-Simulink solution of Differential equations- Using Simulink generating an AM, PCM, DPCM-Designing of FWR & HWR using Simulink.

TEXT BOOKS:

1. RudraPratap, Getting Started with MATLAB 6.0, Oxford University Press, 2004.
2. **Sanjeevan Kapshe, Shailendra Jain**, Modeling and Simulation Using Matlab – Simulink, Wiley, 2016.

REFERENCE BOOKS:

1. William J.Palm, Introduction to MATLAB 6.0 for Engineers, McGraw Hill, 2001
2. Herniter M, Programming in MATLAB, Thomson Learning, 2001
3. John Okyere Attia, John O. Attia, Electronics and circuit analysis using MATLAB, CRC press, 1999.

OPTICAL COMMUNICATIONS
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Gain Knowledge in optical communication, components, Mode theory, sources & detectors and Losses in optical fibers.
2. Analyze single & multimode fibers and analog & digital links.
3. Design and develop Optical sources, Detectors and links
4. Develop Multi-Channel Optical Systems
5. Discuss the elements of WDM networks and its potential applications.

UNIT-I:
Introduction to optical fiber waveguides:
Introduction, vector nature of light: linear polarization-elliptical polarization andcircularpolarization - the quantum nature of the light, optical fiber modes and configurations: fiber types-rays and modes- step index fiber structure-ray optic representation - wave representation

UNIT-II:
Optical fibers and fiber losses:
Optical Fibers:
Types of optical fibers: Step-Index Fibers - Graded-Index Fibers, Fiber Modes: Single-Mode Fiber, Dispersion in Single-Mode Fibers - Group-Velocity Dispersion - Material Dispersion - Waveguide Dispersion - Higher-Order Dispersion - Polarization-Mode Dispersion.
Fiber Losses:
Attenuation, absorption, scattering losses, bending losses, core and cladding losses.

UNIT III:
Optical sources and detectors:
Optical Sources:
Light Emitting Diodes: Structures - Light Source Materials - Quantum Efficiency and LED Power - Modulation of LED, Laser Diodes: Laser Diode Modes and Threshold Conditions - Laser Diode Rate Equations - External Quantum Efficiencies - Resonant Frequencies.
Optical Detectors:
Physical Principles of Photo Diodes, Photo Detector Noise, Detector Response Time, Avalanche Multiplication Noise, Structures for InGaAs& APDs, Temperature Effect on Avalanche Gain, Comparisons of Photo Detectors.

UNIT-IV:
Optical links:
Fundamental receiver operation: Digital signal transmission ErrorSourcesReceiverConfiguration, Digital Links: Point-to-Point Links: System consideration Link power budget Rise time budget Line coding: NRZ Codes RZ Codes Block Codes, Noise effect on systemPerformance: Modal Noise Mode-Partition Noise Chirping Refection Noise, Analog Links: Overview, Carrier to Noise Ratio: Carrier Noise Photo detector nose & Preamplifier noiseRelative Intensity Noise (RIN) Reflection Effects on RIN, Multi-channel Transmission Techniques: Multichannel Amplitude Modulation Multichannel Frequency Modulation Subcarrier Multiplexing.

UNIT-V:

Optical amplifiers and multichannel systems:

Optical Amplifiers:

Basic Concepts: Gain Spectrum and-Gain Saturation-Amplifier Noise Amplifier Applications, Raman Amplifiers: Raman Gain and Bandwidth - Amplifier Characteristics - Amplifier Performance, Erbium-Doped Fiber Amplifiers: Pumping Requirements - Gain Spectrum - Simple Theory - Amplifier Noise - Multichannel Amplification - Distributed-Gain Amplifiers.

Multichannel Systems:

WDM Light wave Systems: High-Capacity Point-to-Point Links - Wide-Area and Metro-Area Networks - Multiple-Access WDM Networks, WDM Components: Tunable Optical Filters - Multiplexers and Demultiplexers - Add–Drop Multiplexers - Star Couplers - Wavelength - Optical Cross - Wavelength Converters - WDM Transmitters and Receivers

TEXT BOOKS:

1. Keiser J, Fibre Optic communication, McGraw-Hill, 2013.
2. Tamir T, Integrated optics, (Topics in Applied Physics Vol.7), Springer-Verlag, 1975.

REFERENCE BOOKS:

1. Max Ming-Kang Liu, Principles and Applications of Optical Communications, Tata McGraw Hill, 2010.
2. Gupta S C, Optical Fiber Communication and its Applications, Prentice Hall India, 2005.
3. Allard F C, Fiber Optics Handbook for engineers and scientists, McGraw Hill, 1990.

BASIC ELECTRONIC INSTRUMENTATION
(Open Elective – 2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, the students should be able to

1. Comprehend the basics of instrumentation system and its static and dynamic characteristics.
2. Classify and describe resistive, inductive, capacitive and other transducers which are used for measuring various parameters.
3. Understand the working principles of oscilloscopes, signal generators and analyzers.
4. Explain about different types of signal analyzers
5. Apply the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the field of science, engineering and technology

UNIT I:
Basics of Instrumentation and Its Characteristics:
Functional Elements of Measurement Systems - Classification of errors, Limiting error and probable error –Error analysis –Static characteristics– accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, input impedance, loading effect etc– generalized mathematical model of measurement systems – dynamic characteristics.

UNIT II:
Electronic Instruments and Bridges:
Electronic Instruments for Measuring Basic Parameters: DC Volt meter, AC Voltmeter, DC Ammeter, Ohm meter, Electronic multi-meter, Digital voltmeter.
Bridge Measurement: DC bridges- Wheatstone, Kelvin Bridge, AC bridges –Hay, Maxwell, Schering and Wien bridges.

UNIT III:
Oscilloscopes:
Oscilloscopes:
Block diagram of CRO, Cathode Ray Tube, Vertical and Horizontal Deflection Systems, Delay lines, Probes, Specification of an Oscilloscope. Oscilloscope measurement Techniques, Special Oscilloscopes – Storage Oscilloscope, Sampling Oscilloscope.

UNIT IV:
Signal Generators and Analyzers:
Signal Generators: Sine wave generator, Frequency – Synthesized Signal Generator, Sweep frequency Generator. Pulse and square wave generators. Function Generators.
Signal Analysis: Wave Analyzer, Spectrum Analyzer. Frequency Counters: Simple Frequency Counter; Distortion Analyzer.

UNIT V:
Transducers:
Transducers: Definition-classification-characteristics-Selection Principle of operation, construction, characteristics and application of semiconductor strain gauge, LVDT, Capacitive transducer-Digital transducers- Introduction to Smart sensors and MEMS.

TEXT BOOKS:

1. Albert D Helstrick and William D Cooper, Modern Electronics Instrumentation & Measurement Techniques, Pearson, 2011.
2. Carr, Elements of Electronics Instrumentation and Measurement, Pearson, 1996.

REFERENCE BOOKS:

1. Doebelin E A, Measurement Systems – Applications and Design, Tata Mc Graw Hill, 2012
2. John P. Bentley, Principles of Measurement Systems, Pearson Education, 2005.
3. Ranganathan S, Transducer Engineering", Allied Publishers, 2003.

CONSUMER ELECTRONICS
(Open Elective – 2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand electronics engineering concepts used in consumer electronics systems.
2. Identify the need of preventive maintenance in various electronic appliances.
3. Evaluate and analyze different electronic products and systems based on specifications.
4. Use different product safety, compliance standards and techniques associated with electronic products.
5. Identify the need of preventive maintenance in various electronic appliances.

UNIT –I:

Audio systems:

Audio System : Microphones, loudspeakers baffle and enclosure, Acoustics, mono, stereo, Quad, Amplifying System, Equalizers and Mixers Synthesizers, Commercial Sound, Theater Sound System.

UNIT -II:

Video Systems:

Video Systems and Displays: Monochrome, Color TV standards, TFT, Plasma, HDTV, LCD, LED TV, Direct-To-Home (DTH- Set Top Box), Video Telephone and Video Conferencing

UNIT – III:

Domestic & Consumer Appliances I:

Washing machines, Microwave Oven,Air-conditioners and Refrigerators, Computers office System, Telephone & Mobile Radio System

UNIT-IV:

Domestic & Consumer Appliances II:

Power Supplies SMPS/UPS and Preventive Maintenance and others systems such as Remote controls, Bar codes, RFID Product

UNIT – V:

Safety & Liability Issues:

Product Compliance: Product safety and liability issues; standards related to electrical safety and fire hazards, EMI/EMC requirements, design techniques for ESD, RF interference and immunity, line current harmonics and mains voltage surge.

TEXT BOOKS:

1. Bali S P, Consumer Electronics, Pearson, 2007
2. Chitode J S, Consumer Electronics: A Conceptual Approach, Technical Publications, 2007.

REFERENCE BOOKS:

1. Philip Hoff, Philip Herbert Hoff, Consumer Electronics for Engineers , Cambridge University Press,1998
2. Douglas Kinney, A Beginners Guide to Consumer Electronics Repair: Hand Book and Tutorial, iUniverse, 2006
3. Sridhar Canumalla, Puligandla Viswanadham, Portable Consumer Electronics Packaging, Materials, and Reliability, PennWell, 2010.

DIGITAL SIGNAL PROCESSING LABORATORY

III B.Tech II semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Formulate programs for performing time & frequency operation on signals and systems.
2. Design and implement impulse response filters and Multirate system for a given sequence
3. Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters
4. Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques
5. Develop various DSP Algorithms using MATLAB Software package.

Note: Minimum 12 Experiments have to be conducted

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations.
2. To find DFT / IDFT of given DT Signal.
3. To find Frequency Response of a System given in Transfer Function/ Differential equation form.
4. Implementation of FFT of given Sequence.
6. Determination of Power Spectrum of a given Signal(s).
7. Implementation of LP FIR Filter for a given Sequence/Signal.
8. Implementation of HP IIR Filter for a given Sequence/Signal.
9. Generation of Narrow Band Signal through Filtering.
10. Generation of DTMF Signals.
11. Implementation of Decimation Process.
12. Implementation of Interpolation Process.
13. Implementation of I/D Sampling Rate Converters.
14. Step and Ramp Response of First order and Second Order Systems.

ADVANCED COMMUNICATION SKILLS LAB

III Year II semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Develop sound communication skills in various situations with the help of enriched vocabulary.
2. Practice reading techniques for a faster and better comprehension.
3. Exhibit strong writing skills to express ideas effectively.
4. Demonstrate effective presentation skills.
5. Use appropriate verbal and non-verbal skills for a successful career.

UNIT-I:

Activities on Fundamentals of inter-personal Communication and Building Vocabulary: Starting a conversation responding appropriately and relevantly – using the right body language Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

UNIT-II:

Activities on Reading Comprehension:
General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

UNIT-III:

Activities on Writing Skills:
Structure and presentation of different types of writing – letter writing/ Resume writing/ Statement of purpose - E-correspondence/ Technical report writing / Portfolio writing – planning for writing – improving one's writing.

UNIT-IV:

Activities on Presentation Skills:
Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.

UNIT-V:

Activities on Group Discussion and interview Skills:
Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video – conference and Mock Interviews.

Reference Books:

1. Technical Communication by Meenakshi Raman &Sangeeta Sharma, Oxford University, 2^{nd} Edition, 2011.
2. Functional English for Success, Orient Longman, 2014.

QUANTITATIVE METHODS & LOGICAL REASONING
(From Training and Placement Dept.)

III B.Tech II semester

L	T	P	C
2	0	0	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. To perform well in various competitive exams and placement drives.
2. To solve basic and complex mathematical problems in short time.
3. To become strong in Quantitative Aptitude and Reasoning which can be applied for GRE, GATE, GMAT or CAT exam also.
4. To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.

UNIT – I:
Number System:
Speed Maths, Numbers, Factors, Prime & Co Primes, LCM & HCF, Divisibility Rules, Finding Unit Place Digit and Last Two Digits of an Expression

Ratio, Proportion and Variations:
Definition of Ratio, Ratio of Proportion, Comparison of Ratios, Compound ratio, Direct and Indirect Proportion

Percentages:
Converting Fractions and Decimal into Percentages, Successive Percentage, Populations, Expenditure and Savings

Profit and loss:
Relation between Cost Price and Selling Price, Discount and Marked Price, Gain or Loss Percentages on Selling Price

Simple and Compound Interest:
Problems on Interest (**I**), Amount (**A**), Principal (**P**) and Rate of Interest (**R**) difference between the Simple Interest and Compound Interest for 2 and 3 years.

UNIT – II:
Partnership:
Relation between Partners, Period of Investment and Shares

Averages, Ages and Allegation:
Average of Different Groups, Change in Averages by Adding, Deleting and Replacement of Objects, Problems on ages, Allegation Rule, Mean Value of the Mixture, Replacement of Equal Amount of Quantity.

Time and Work:
Men and Days, Work and Wages, Pipes and Cisterns, Hours and Work, Alternate Days Concept,

Time and Distance:
Difference between the Average and Relative Speeds, Reaching the Destination Late and Early, Stoppage Time Per Hour, Time and Distance between Two Moving Bodies : Train Crossing Man - same and opposite directions, Speed of Boat and Stream,

UNIT – III:

Progressions and Quadratic Equations:

Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their Relations. General form of Quadratic Equation, Finding the Roots of Quadratic Equation, Nature of the Roots.

Permutation and Combination:

Fundamental Rules, Problems on Permutations & combinations.

Probability:

Definition of probability, Notations and Formulae, Problems on Probability.

Data Interpretation and Data Sufficiency: Tabular and Pie-charts, Bar and Line Graphs, Introduction to Data Sufficiency, Problems on Data Sufficiency.

UNIT – IV:

Deductions:

Statements and conclusions using Venn diagram and Syllogism Method

Series completion:

Number series, Alphabet series, Letter Series.

Coding and Decoding:

Letter coding, Number coding, Number to letter coding, Matrix Coding, Substitution, Mixed Letter Coding, Mixed Number Coding, Deciphering Individual Letter Codes by Analysis.

Analytical Reasoning Puzzles:

Problems on Linear, Double line-up and Circular Aarrangements, Selections and Comparisons.

Blood Relations:

Defining the various Relations among the Members of a Family, Solving Blood Relation Puzzles by using Symbols and Notations. Problems on Coded Relations.

UNIT – V:

Direction sense Test:

Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

Clocks:

Relation between Minute-Hour Hands, Angle vs Time, Exceptional Cases in Clocks

Calendars:

Definition of a Leap Year, Finding the Odd days, Finding the Day of any Random Calendar Date, repetition of Calendar Years.

Cubes and Dices:

Finding the Minimum and Maximum Number of Identical Pieces and Cuts, Painting of Cubes and cuts, Problems on Dice.

Venn Diagrams:

Circular Representation of given words, Geometrical Representation of Certain class, Set theory based Problems.

TEXT BOOKS:

1. Philip Geer, Verbal Reasoning, Barrons Educational Series, 2019
2. Agarwal R S, A Modern Approach to Logical Reasoning & Quantitative Aptitude, S. Chand, 2019.

REFERENCE BOOKS:

1. R. V. Praveen, Quantitative Aptitude, Prentice Hall India, 2016
2. Abhijit Guha , Quantitative Aptitude, Mc Graw Hill, 2019
3. Mohan Rao U, Quantitative Aptitude, SCITECH, 2012.

COURSE STRUCTURE FOR B.TECH IV YEAR

IV B.Tech I Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1	PC – 14	Embedded System Design	2	1	0	3.0
2	PC – 15	VLSI Design	2	1	0	3.0
3	PE-3	**Professional Elective-3** 1. Digital Image Processing 2. Cellular and Mobile Communications 3. Radar Engineering	3	0	0	3.0
4	PE-4	**Professional Elective-4** 1. Biomedical Instrumentation 2. Satellite Communications 3. Telecommunication Switching Systems and Networks	3	0	0	3.0
5	OE-3	**Open Elective-3** 1. Automotive Electronics 2. Introduction to Communication Engineering	3	0	0	3.0
6	PC Lab-8	Embedded & VLSI Laboratory	0	0	2	1.0
7	PC Lab-9	Antenna and Microwave Engineering Laboratory	0	0	2	1.0
8	Mini P	Mini Project	0	0	0	3.0
		Total	**13**	**2**	**4**	**20**

IV B.Tech II Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1	PC-16	Electronic Measurements & Instrumentation	3	0	0	3.0
2	PC-17	Wireless Communications and Networks	3	0	0	3.0
3	TS	Technical Seminar	0	0	0	2.0
4	CVV	Comprehensive Viva Voce	0	0	0	2.0
5	MP	Major Project	0	0	0	10.0
		Total	**6**	0	0	**20**

COURSE STRUCTURE FOR B.TECH IV YEAR (FAST TRACK)

IV B.Tech I Semester:

S.No.	Course Category	Course Title	L	T	P	Credits
1	PC – 14	Embedded System Design	2	1	0	3.0
2	PC – 15	VLSI Design	2	1	0	3.0
3	PE-3	**Professional Elective-3**	3	0	0	3.0
		1. Digital Image Processing				
		2. Cellular and Mobile Communications				
		3. Radar Engineering				
4	PE-4	**Professional Elective-4**	3	0	0	3.0
		1. Biomedical Instrumentation				
		2. Satellite Communications				
		3. Telecommunication Switching Systems and Networks				
	PC-17	**Fast Track**		0	0	
5	OE-3	**Open Elective-3**	3	0	0	3.0
		1. Automotive Electronics				
		2. Introduction to Communication Engineering				
6	PC Lab-8	Embedded & VLSI Laboratory	0	0	2	1.0
7	PC Lab-9	Antenna and Microwave Engineering Laboratory	0	0	2	1.0
8	-	Mini Project	0	0	0	3.0
		Total	**13**	**2**	**4**	**20**

EMBEDDED SYSTEM DESIGN

IV B.Tech I-Semester

L	T	P	C
2	1	0	3

Course Outcomes:

At the end of the course the student should be able to

1. Expected to understand the selection procedure of Processors in the embedded domain.
2. Design Procedure for Embedded Firmware.
3. Expected to visualize the role of Real time Operating Systems in Embedded Systems
4. Expected to evaluate the Correlation between task synchronization and latency issues
5. To enumerate the need for Task Communications in a Multiprocessor Environment.

UNIT I:
Introduction to Embedded Systems:
Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II:
Typical Embedded System:
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III:
Embedded Firmware:
Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT IV:
RTOS Based Embedded System Design:
Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT V:
Task Communication:
Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1. Shibu K V, Introduction to Embedded Systems, McGraw-Hill Education, 2009.
2. Raj Kamal, Embedded Systems: Architecture, Programming and Design, Tata McGraw-Hill, 2011.

REFERENCE BOOKS:

1. Raj Kamal , Embedded systems architecture, programming and design, McGraw-Hill Education, 2003
2. Frank Vahid, Tony Givargis , Embedded System Design A Unified Hardware/Software Introduction, John Wiley, 2003
3. Lyla B. Das, Embedded Systems: An Integrated Approach, Pearson, 2012.

VLSI DEISGN

IV B.Tech I-Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Enumerate different steps involved in Integrated Circuits technology for MOS transistor and explain the primary and secondary effects of MOSFET and BICMOS.
2. Summarize the fabrication process involved in VLSI circuits
3. Outline the design process involved in VLSI design flow for design of MOS transistors.
4. Understand and apply the concepts of memories in design.
5. Design digital circuits using Verilog HDL.

UNIT-I:
Introduction:
Introduction to IC Technology MOSFET CMOS - BiCMOS
Basic Electrical Properties:
Electrical PropertiesMOS- primary characteristics - threshold Voltage – Secondary characteristics-Ratioed Circuits- CMOS, BiCMOS Inverter – analysis- design.

UNIT-II:
VLSI Circuit Design Processes:
VLSI Design Flow - MOS Layers - Stick Diagrams - Design rules - wires – Contacts – Transistors-Layout Diagrams – NMOS – PMOS - CMOS Inverters – Gates - Scaling of MOS circuits.

UNIT-III:
Gate Level Design:
Logic Gates – Pass transistors, Transmission gate- Switch logic - Alternate gate circuits, Latches-Time delays - Driving large capacitive loads - Wiring capacitance, Fan — in, Fan — out, Choice of layers.
Programmable Logic Devices:
ROM – PLA - PAL-Design Approach - CPLDs – FPGA -Parameters influencing low power design.

UNIT-IV:
Introduction to Verilog HDL:
Overview of Digital Design with Verilog HDL, typical HDL-flow, Concurrency, Simulation and Synthesis, Functional verification;
Gate Level Modeling:
Introduction, Modeling using basic Verilog gate primitives, description of AND, OR, NOT type gates, Design of Flip – Flops with Gate Primitives, Delays

UNIT-V:
Dataflow Modeling:
Continuous assignments, delay specification, expressions, operators, operands, operator types;
Behavioral Modeling:
Structured procedures, initial and always, blocking and non-blocking statements, The Case Statement, for Loop, While Loop, Design of Flip flop, Shift register

TEXT BOOKS:

1. Kamran Eshraghian, Douglas A. Pucknell, Sholeh Eshraghian, Essentials of VLSI Circuits and Systems, Prentice, 2005.
2. Neil H. E Weste, David Harris, Ayan Banerjee, CMOS VLSI Design — A Circuits and Systems Perspective, Pearson, 2009.

REFERENCE BOOKS:

1. John P. Uyemura, CMOS logic circuit Design, Springer, 1999.
2. Lal Kishore K, Prabhakar V S V, VLSI Design, I.K International, 2010.
3. Mead & Convey, Introduction to VLSI, BS Publications, 2010.

DIGITAL IMAGE PROCESSING
(Professional Elective-3)

IV B.Tech I-Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. State the Digital Image Fundamentals and operation associated with various stages of image processing.
2. Illustrate the mathematics involved in various stages of image processing.
3. Demonstrate the operations various stages of image processing.
4. Contrast the different types of operation and its impact on images.
5. Understand the anatomy of image compression in Image Transmission.

UNIT-I:
Fundamentals of Image Processing:
Elements of Digital Image Processing Systems – Image sensing and Acquisition- Elements of Visual Perception – structure of human eye – light- luminance- brightness and contrast- image formation-Basic steps of image processing- Sampling -Quantization and Digital Image representation - Basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures..

UNIT-II:
Image Enhancement in Spatial & frequency domain:
Image Enhancement in Spatial domain:
Introduction-Point Processing-Histogram processing- Arithmetic and logical operations-Fundamentals of Spatial filtering-masking-Spatial filters for Smoothing - Spatial filters for Sharpening.
Image Enhancement in Frequency domain:
Need for transform-Basics of filtering in frequency domain-Image smoothing in frequency domain-Image sharpening in frequency domain

UNIT-III:
Image Restoration:
Introduction- Degradation model –Noise models-Spatial domain filtering for restoration- Mean Filters – Order Statistics filters – Adaptive filters –frequency domain filtering for noise removal -Band reject Filters – Band pass Filters – Notch Filters –Degradation function estimation– Inverse filtering – Wiener filter.

UNIT-IV:
Image Segmentation and Morphological processing:
Image Segmentation:
Segmentation concepts - Point - Line - Edge Detection-Thresholding based segmentation- Local-Global and Adaptive Thresholding- Region based segmentation-Region growing-Region splitting and merging.
Morphological processing:
Introduction- structuring element – erosion – dilation – Opening - closing.

UNIT-V:

Image Compression:

Introduction-Redundancy in images-Fidelity Criteria-Image compression model-Lossless compression-Huffman coding -Lossless Predictive coding- Lossy compression– lossy predictive coding- Transform coding –Image compression standards- JPEG and JPEG 2000.

TEXT BOOKS:

1. Rafael C. Gonzales, Richard E. Woods, Digital Image Processing, Pearson, 2010.
2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2005.

REFERENCE BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, Richard Eugene Woods, Steven L. Eddins, Digital Image processing using MATLAB, Tata McGraw Hill, 2010.
2. William K Pratt, Digital Image Processing, John Wiley & Sons, 2002.
3. Jayaraman S, Esakkirajan S, Veerakumar T, Digital Image processing, Tata McGraw Hill, 2011.

CELLULAR AND MOBILE COMMUNICATIONS
(Professional Elective-3)

IV B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:
At the end of the course the student should be able to

1. Understand the principles of mobile communications, radio models, Antennas for Mobile communication, Equalization and applications.
2. Interpret the propagation models of Mobile and its effect on Antenna, Diversity and applications.
3. Relate the concepts of propagation models with channel interference
4. Explain the propagation models, channel interference, antenna design for the recent mobile systems
5. Recite the Handoff and Dropped calls in Cellular mobile communications.

UNIT I:
Introduction to Cellular Mobile Radio Systems:
Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading -Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time.

Fundamentals of Cellular Radio System Design:
Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, System Capacity Improving Coverage and Capacity in Cellular Systems- Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT II:
Co-Channel Interference:
Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Antenna Parameters and Their Effects, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity.

Non-Co-Channel Interference:
Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Effects of Cell Site Components.

UNIT III:
Cell Coverage for Signal and Traffic:
Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model.

Cell Site and Mobile Antennas:
Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

UNIT IV:

Frequency Management and Channel Assignment:
Numbering And Grouping, Setup Access And Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT V:
Handoffs and Dropped Calls:
Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Intersystem Handoff, Introduction to Dropped Call Rates and their Evaluation.

TEXT BOOKS:

1. Lee W.C.Y. , Mobile Cellular Telecommunications, Mc Graw Hill, 1989.
2. Theodre S Rappaport, Wireless Communications, Principles, Practice, Pearson Education India, 2009.

REFERENCE BOOKS:

1. Gordon L. Stuber, Principles of Mobile Communications, Springer, 2001.
2. Simon Haykin, Michael Moher, Modern Wireless Communications, Pearson, 2005.
3. Vijay Garg, Wireless Communications and Networking, Elsevier, 2007.

RADAR ENGINEERING
(Professional Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the concepts of radar fundamentals, noise analysis and evaluation of radar.
2. Differentiate various types of radar transmitters and receivers.
3. Relate the different types of radar transmitter and receiver.
4. Categorize the type of radar system and noise analysis based on applications.
5. Correlate the different methods of Radar Reception and Receivers.

UNIT – I:
Basics of Radar:
Introduction- Maximum Unambiguous Range- Radar Waveforms-- Radar Block Diagram and Operation- Radar Frequencies and Applications. Prediction of Range Performance - Minimum Detectable Signal- Receiver Noise.
Radar Equation:
Simple and Modified form of Radar Range Equation with Illustrative Problems - SNR- Envelop Detector-False Alarm Time and Probability- Integration of Radar Pulses- Radar Cross Section of Targets (simple targets - sphere- cone-sphere)- Transmitter Power- PRF and Range Ambiguities- System Losses (qualitative treatment)- Illustrative Problems.

UNIT – II:
CW and Frequency Modulated Radar:
Doppler Effect- CW Radar – Block Diagram- Isolation between Transmitter and Receiver- Non-zero IF Receiver- Receiver Bandwidth Requirements- Applications of CW radar- Illustrative Problems.
FM-CW Radar:
Range and Doppler Measurement- Block Diagram and Characteristics- FM-CW altimeter- Measurement Errors- Multiple Frequency CW Radar.

UNIT – III:
MTI and Pulse Doppler radar:
Introduction- Principle- MTI Radar with Power Amplifier Transmitter and Power Oscillator Transmitter- Delay Line Cancellers – Filter Characteristics- Blind Speeds- Double Cancellation- Staggered PRFs- Range Gated Doppler Filters- MTI Radar Parameters- Limitations to MTI Performance- MTI versus Pulse Doppler Radar.

UNIT – IV:
Tracking Radar:
Tracking With Radar- Sequential Lobing- Conical scan-Mono pulse Tracking Radar-Amplitude Comparison Mono pulse (One-And Two-Coordinates)-Phase Comparison Monopulse- Tracking In Range- Acquisition and Scanning Patterns- Comparison Of Trackers.

UNIT – V:
Detection of Radar Signals in Noise:
Introduction- Matched Filter Receiver-Response Characteristics and Derivation- Correlation Function and Cross-Correlation Receiver- Efficiency of Non-Matched Filters- Matched Filter with Non-White Noise.

Radar Receivers:
Noise Figure and Noise Temperature- Display-Types- Duplexers-Branch types And Balanced type- Circulators as Duplexers. Introduction to Phased Array Antennas-Basic concepts- Radiation Pattern- Beam Steering and Beam Width changes- Advantages and Limitations- Applications.

TEXT BOOKS:

1. Merrill I. Skolnik, Introduction to radar systems, Tata McGraw Hill special Indian edition, 2007.
2. Kulkarni M, Microwave and Radar Engineering, UMESH Publications, 2003.

REFERENCE BOOKS:

1. Byron Edde, Radar: Principles, Technology, Applications, Pearson, 2004.
2. Peyton Z. Peebles, Radar Principles, Wiley, 1998.
3. Mark A. Richards, James A. Scheer, William A. Holm-Yesdee, Principles of Modern Radar: Basic Principles, Institution of Engineering and Technology, 2013.

BIOMEDICAL INSTRUMENTATION
(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Summarize the requirement of biomedical instrumentation and adversity involved in human measurement.
2. Understand the concept of Bio Potentials in a Human Body
3. Utilize the concept of electrode and its responses used in real time.
4. Outline the divergent responses involved in cardiovascular and respiratory system.
5. Compare the various processes involved in bio telemetry.

UNIT-I:
Introduction:
The age of Biomedical Engineering, Development of Biomedical Instrumentation, Man–Instrumentation system, Components, Physiological system of the body, Problem encountered in measuring a living system. Transducers & Electrodes: The Transducers & Transduction principles, Active transducers, Passive Transducers, Transducer for Biomedical Applications.

UNIT-II:
Sources of Bioelectric potentials:
Resting & Action potentials, propagation of active potential, The Bioelectric potentials-ECG, EEG, EMG, and Invoked responses Electrodes: Electrode theory, Biopotential Electrodes–Microelectrodes Body surface electrodes, Needle Electrodes, Biochemical Transducers, Reference electrodes, PH electrodes, Blood Gas electrodes.

UNIT-III:
Cardiovascular Measurements:
Electrocardiography – ECG amplifiers, Electrodes & leads, ECG recorders - Three channel, Vector Cardiographs, ECG system for stress testing, Continuous ECG recording (Holterrecording), Blood pressure measurement, Blood flow measurement, Heart sound measurements. Patient Care & Monitoring- Elements of Intensive Care monitoring, patient monitoring displays, Diagnosis, Calibration & Reparability of patient monitoring equipment, pacemakers & Defibrillators.

UNIT-IV:
Measurements in Respiratory system:
Physiology of respiratory system Measurement of breathing mechanics- Spiro meter, Respiratory Therapy equipment's: Inhalators ventilators & Respirators, Humidifiers, Nebulizers & Aspirators. Diagnostic Techniques: Ultrasonic Diagnosis Echocardiography, Echo Encephalography, Ophthalmic scans, X-Ray & Radio-isotope Instrumentation, Computerized Axial Tomography Scanners

UNIT-V:
Bio Telemetry:
The components of Biotelemetry system Implantable units, Telemetry for ECG measurements during exercise, for Emergency patient monitoring. Physiological Effects of Electric Current Safety of Medical Electronic Equipments, Shock hazards from Electrical equipment and prevention against THEM.

TEXT BOOKS:

1. Leslie Cormwell, Biomedical Instrumentation and Measurements, Prentice Hall India,1980
2. Arumugam M, Biomedical Instrumentation, Anuradha Publications, 1994

REFERENCE BOOKS:

1. Khandpur R.S, Biomedical Instrumentation, Tata McGraw-Hill, 2003.
2. Willis J Tompkins, Biomedical DSP: C Language Examples and Laboratory Experiments for the IBM PC, Prentice Hall India, 2006.

SATELLITE COMMUNICATIONS
(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the historical background, basic concepts and frequency allocations for satellite communications.
2. Compare and contrast between various multiple accesses systems for satellite communication system.
3. Understand the propagation effects of signal in Satellite transmission
4. Design of satellite links for specified CNR.
5. Visualize satellite subsystems like telemetry, tracking, command and monitor power systems etc.

UNIT-I:
Introduction to Satellite Communication:
Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication.
Orbital Mechanics:
Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit, Evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day. Placement of Satellite in a Geo-stationary orbit

UNIT-II:
Satellite sub systems:
Attitude and orbit control system, TT& C subsystem, control subsystem, power systems, communication subsystems, satellite antenna equipment
Satellite link:
Basic Transmission Theory, System noise temperature and G/T ratio, Basic link analysis, Interference analysis , Design of satellite links for a specified C/N (with and without frequency reuse), Link budget

UNIT – III:
Propagation effects:
Introduction, Atmospheric Absorption, Cloud attenuation, Tropospehericand Ionospheric scintillation, and low angle fading, Rain induced attenuation, Rain induced cross polarization interference.
Multiple Access:
Frequency division multiple access(FDMA), inter modulation, calculation of C/N, Time division multiple access(TDMA) – frame structure, Burst structure, Satellite switched TDMA, on-board processing, Demand Assignment multiple Access (DAMA), CDMA spread spectrum transmission and reception.

UNIT – IV:
Earth station Technology:
Transmitters, Receivers, Antenna, Tracking systems, Terrestrial interface, Power test methods, Lower orbit considerations. Satellite Navigation and Global Positioning systems: radio and satellite navigation, GPS position location principles, GPS receivers

UNIT – V:

Typical Phenomena in Satellite Communication:

Solar Eclipse on satellite and its effects, Remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.

TEXT BOOKS:

1. Timothy pratt, Charles Bostian, Jeremy Allnutt , Satellite communications, John Wiley, 2003
2. Pritchand, Satellite communications engineering, Pearson, 1993.

REFERENCE BOOKS:

1. Madhavendra Richharia, Satellite communications: Design principles, Macmillan,2017
2. Tri T. Ha , Digital satellite communications, McGraw-Hill , 1990
3. Raja Rao K N, Fundamentals of satellite communications, Prentice Hall India, 2004

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Professional Elective-4)

IV B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand different switching system methodologies, network traffic, networks and its applications.
2. Explain different signaling methods used in Telecommunication Networks.
3. Enumerate traffic in telecommunications network
4. Relate different data communication networks.
5. Demonstrate the applications of modern telecommunication concepts.

UNIT – I:

Telecommunication Switching Systems:

Introduction, Elements of switching systems, switching network configuration, Rotary switches, Uni selector, Two motion selector, Trucking principle ,principles of cross bar switching, Crossbar Switch Configuration, Cross point Technology, Crossbar Exchange Organization

UNIT – II:

Electronic Space Division Switching:

Stored Program Control, Centralized SPC, Distributed SPC, Software Architecture, Application Software, Enhanced services, Two-Stage Networks, Three-Stage Networks, n-Stage Networks.

Time Division Switching:

Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching, Time Multiplexed Time Switching, Combination Switching, Three Stage Combination Switching, n - Stage Combinational Switching.

UNIT - III:

Telecommunications Traffic:

Introduction, The Unit of Traffic, Congestion, Traffic Measurement, A Mathematical Model, Lost-Call Systems-Theory, Traffic Performance, Loss Systems in Tandem, Use of Traffic Tables, Queuing Systems-The Second Erlang Distribution, Probability of Delay, Finite Queue Capacity, Systems with a Single Server, Queues in Tandem, Delay Tables, Applications of Delay Formulae.

UNIT – IV:

Telephone Networks:

Subscriber loop systems, switching hierarchy and routing, transmission plan, transmission systems, numbering plan, charging plan, Signaling techniques: In channel signaling, common channel signaling, Cellular mobile telephony.

Data Networks:

Data transmission in PSTNs, Switching techniques for data transmission, data communication architecture, link to link layers, end to end layers, satellite based data networks, LAN, MAN, Internetworking

UNIT – V:

Integrated Services Digital Network (ISDN):

Introduction, motivation, new services, Network and protocol architecture, Transmission channels, User-Network interfaces, functional grouping, reference points, signaling, numbering, addressing, BISDN.

SONET:

Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries, and Higher rate of service.

TEXT BOOKS:

1. ThiagarajanViswanathan, Telecommunication Switching Systems and Networks, Prentice Hall of India, 2010.
2. Flood J E, Telecommunications Switching, Traffic and Networks- Pearson, 2016.

REFERENCE BOOKS:

1. John. C. Bellamy, Digital Telephony, John Wiley, 2010.
2. Roger L. Freeman, Telecommunication System Engineering, John Wiley, 2010.
3. Achyut S. Godbole, Data Communications & Networks, Tata McGraw Hill, 2005

AUTOMOTIVE ELECTRONICS
(Open Elective-3)

IV B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the working principles, characteristics and troubleshoot of automotive subsystem and its electronic engine control
2. Recite the basic idea behind Sensors and Actuators in Automotive Control System
3. Enumerate Digital Engine Control systems for Automobiles
4. Realization of Digital Engine Control Systems and control units in automotive systems
5. Interpret the concepts of Automotive Networking and Automotive Diagnostics

UNIT -1:
Automotive Fundamentals Overview:
Evolution of Automotive Electronics, Automobile Physical Configuration, Survey of Major Automotive Systems, The Engine – Engine Block, Cylinder Head, Four Stroke Cycle, Engine Control, Ignition System - Spark plug, High voltage circuit and distribution, Spark pulse generation, Ignition Timing, Diesel Engine, Drive Train - Transmission, Drive Shaft, Differential, Suspension, Brakes, Steering System , Starter Battery –Operating principle

The Basics of Electronic Engine Control:
Motivation for Electronic Engine Control – Exhaust Emissions, Fuel Economy, Concept of an Electronic Engine control system, Definition of General terms, Definition of Engine performance terms, Engine mapping, Effect of Air/Fuel ratio, spark timing and EGR on performance, Control Strategy, Electronic Fuel control system, Analysis of intake manifold pressure, Electronic Ignition.

UNIT-II:
Automotive Control System applications of Sensors and Actuators:
Typical Electronic Engine Control System, Variables to be measured

Automotive Sensors:
Airflow rate sensor, Strain Gauge MAP sensor, Engine Crankshaft Angular Position Sensor, Magnetic Reluctance Position Sensor, Hall effect Position Sensor, Shielded Field Sensor, Optical Crankshaft Position Sensor, Throttle Angle Sensor (TAS), Engine Coolant Temperature (ECT) Sensor, Exhaust Gas Oxygen (O2/EGO) Lambda Sensors, Piezoelectric Knock Sensor.

Automotive Actuators:
Solenoid, Fuel Injector, EGR Actuator, Ignition System

UNIT –III:
Digital Engine Control Systems:
Digital Engine control features, Control modes for fuel Control (Seven Modes), EGR Control, Electronic Ignition Control - Closed loop Ignition timing, Spark Advance Correction Scheme, Integrated Engine Control System - Secondary Air Management, Evaporative Emissions Canister Purge, Automatic System Adjustment, System Diagnostics.

Control Units:
Operating conditions, Design, Data processing, Programming, Digital modules in the Control unit, Control unit software.

UNIT –IV:

Automotive Networking:

Bus Systems – Classification, Applications in the vehicle, Coupling of networks, Examples of networked vehicles , Buses - CAN Bus, LIN Bus, MOST Bus, Bluetooth, Flex Ray, Diagnostic Interfaces

Vehicle Motion Control:

Typical Cruise Control System, Digital Cruise Control System, Digital Speed Sensor, Throttle Actuator, Digital Cruise Control configuration, Cruise Control Electronics (Digital only), Antilock Brake System (ABS)

UNIT –V:

Automotive Diagnostics:

Timing Light, Engine Analyzer, On-board diagnostics, Off board diagnostics, Expert Systems, Occupant Protection Systems – Accelerometer based Air Bag systems.

Future Automotive Electronic Systems:

Alternative Fuel Engines, Electric and Hybrid vehicles, Fuel cell powered cars, Collision Avoidance Radar warning Systems, Low tire pressure warning system, Heads Up display, Speech Synthesis, Navigation – Navigation Sensors - Radio Navigation, Signpost navigation, dead reckoning navigation, Voice Recognition Cell Phone dialing, Advanced Cruise Control, Stability Augmentation, Automatic driving Control

TEXT BOOKS:

1. William B. Ribbens, Understanding Automotive Electronics an Engineering Perspective, Elsevier Science, 2017.
2. Robert Bosch Gmbh, Bosch Automotive Electrics and Automotive Electronics Systems and Components, Networking and Hybrid Drive, Springer Fachmedien Wiesbaden, 2013.

REFERENCE BOOKS:

1. Babu A K, Automotive Electrical and Electronics, Khanna Publishing, 2018
2. William B. Ribbens, Norman P. Mansour, Charles W. Battle, Understanding Automotive Electronics Radio Shack, 1980
3. Graham Stoakes , Automotive Master Technician: Advanced Light Vehicle Technology , Graham Stoakes, 2015

INTRODUCTION TO COMMUNICATION ENGINEERING
(Open Elective -3)

IV B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the working principles, characteristics and applications of different modulation techniques
2. Recite the basic concepts behind the satellite communications
3. Enumerate the principles of Cellular mobile communications
4. Realization of the principle of operation and its applications of radar systems
5. Interpret the concept of Wireless LAN technologies which support for wireless communication

UNIT- I:
Basics of Communication Engineering:
Introduction to communication systems – Need for modulation – AM – FM - PM modulation – Digital modulation fundamentals – PCM-DPCM- Delta Modulation – properties -PSK,FSK,ASK – types techniques –properties

UNIT -II:
Satellite communication:
Satellite Orbits and Trajectories: Definition, Basic Principles, Orbital parameters, Types of Satellite orbits, Orbital perturbations, Satellite stabilization, Orbital effects on satellite's performance, Eclipses, Look angles: Azimuth angle, Elevation angle.
Satellite subsystem: Power supply subsystem, Attitude and Orbit control, Tracking, Telemetry and command subsystem, Payload.
Earth Station: Types of earth station, Architecture, Design considerations, Testing, Earth station Hardware, Satellite tracking.

UNIT-III:
Cellular and Mobile communications:
The cellular concept – Frequency reuse – Interference and system capacity – Trunking and Grade of service – Improving coverage and capacity in cellular systems - Handoff - Roaming management - Handoff detection – channel Assignment techniques - GSM Network signaling - GSM Mobility management GSM short message service - International roaming for GSM - GSM operation, Mobile number Mobile number portability's, VoIP service for mobile networks.

UNIT-IV:
Radar Engineering:
Introduction, Maximum Unambiguous Range, Radar Waveforms, Definitions with respect to pulse waveform - PRF, PRI, Duty Cycle, Peak Transmitter Power, Average transmitter Power. Simple form of the Radar Equation, Radar Block Diagram and Operation, Radar Frequencies, Applications of Radar, The Origins of Radar,

UNIT –V:
Wireless Networks:
Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation

TEXT BOOKS:

1. Kennedy, Electronic Communication Systems, Tata McGraw-Hill – 1999.
2. Yi-Bing Lin and Imrichchlantae, ―Wireless and Mobile Network Architecture‖, John Wiley 2006.

REFERENCE BOOKS:

1. Satellite Communications, by Dennis Roddy (Fourth edition), McGraw Hill.
2. Yi-Bing Lin and Imrich Chlantae, Wireless and Mobile Network Architecture, John Wiley, 2006
3. Haykin S, Digital Communications, John Wiley, 2005

EMBEDDED& VLSI LABORATORY

IV B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Code the ARM cortex M0+ processor instruction set.
2. Articulate the concept of interfacing I/O devices with FRDM kit.
3. Synthesize a Verilog code for digital circuits
4. Devise the digital circuit in CPLD/FPGA
5. Formulate a system design using Embedded and VLSI technologies

Perform any 10 Experiments from each lab:

Embedded System Design Lab:

1. Blinking of LED : Hello World
2. Breath out 2 LEDs
3. Color Circle
4. ADC Potentiometer
5. Analog serial plotter
6. Interface to Accelerometer sensor using FRDM kit
7. Serial port communication using FRDM kit
8. Interface to touch sensor using FRDM kit
9. Radio frequency transmission operation using FRDM kit
10. LED intensity control using touch sensor using FRDM kit
11. Interface and plot LDR using FRDM kit
12. Interface and plot temperature sensor using FRDM kit

VLSI lab:

1. Verification of Logic Gates
2. Verification of Demorgon's Law
3. Design of 8 to 1 multiplexer
4. Design of 1 to 8 Demultiplexer
5. Design of 2 to 4 Encoder
6. Design of 4-bit comparator
7. Design of 4 bit binary to gray converter
8. Design of full adder using 3 modeling styles
9. Design of flip flops SR, D, JK, and T
10. Design Ripple Counter
11. Design Modulo Counter
12. Design Shift Register
13. Design Inverter using PMOS / NMOS
14. Design of full adder using decoder and multiplexer
15. Design System using finite state Machine

ANTENNA AND MICROWAVE ENGINEERING LABORATORY

IV B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Contrast the different ways of measuring antenna parameters.
2. Differentiate the different Radiation pattern of the antennas
3. Study the characteristics of various microwave components
4. Articulate the performance of Microwave components
5. Formulate a antenna design using Antenna and Microwave technologies

PART — A: (SOFTWARE) (ANY 6 EXPERIMENTS):

1. Measurement of Radiation pattern and gain of simple Dipole antenna
2. Measurement of Radiation pattern and gain of Half wave Dipole antenna
3. Measurement of Radiation pattern and gain of folded dipole antenna
4. Measurement of Radiation pattern and gain of horn antenna
5. Measurement of Radiation pattern and gain of microstrip patch antenna
6. Measurement of Radiation pattern and gain of Yagi - Uda antenna
7. To study and plot the radiation pattern of cut parabolic antenna with simpledipole feed
8. To study various types of parabolic reflectors and their feed systems

PART — B: (HARDWARE) (ANY 6 EXPERIMENTS):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Scattering parameters of a Magic Tee
7. Measurement of Scattering parameters of a Circulator
8. Attenuation Measurement

INDUSTRY ORIENTED MINI PROJECT

IV B.Tech I semester

L	T	P	C
0	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the working environment of an Industry
2. Create an avenue in the industry in terms of a mini project
3. Predict a timeline for the project
4. Evaluate the requirements of the projects in terms of different subsystems
5. Create a dissemination report for the mini project

METHOD OF EVALUATION:

The students in a group of 4 to 5 works on an industry oriented topic approved by the head of the department and prepare a comprehensive mini project report after completing the work to the satisfaction. The progress of the project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A mini project report is required at the end of the semester. The mini project work is evaluated based on oral presentation and the mini project report jointly by external and internal examiners constituted by the Head of the Department.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

IV B.Tech II semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Acquire knowledge in Characteristics of Instruments, measurement on non-electrical quantities
2. Analyze the performance of various measuring systems based on the response to the given inputs.
3. Design electronic instrumentation systems according the required specifications
4. Apply different principles to measure a quantity and to provide wide range of solutions for the problems in real time world
5. Recite the acquisition of Non Electrical quantities in a system.

UNIT-I:
Measurements and measuring systems:
Functional Diagram of Instrumentation System, Static characteristics: Accuracy Precision Resolution Sensitivity measurement Errors, Dynamic Characteristics: Speed of response fidelity Lag - Dynamic error Statistical Analysis, Basic meter movement, Ammeters: Multi-range Universal Shunt, DC voltmeters: Multi-range Range extension Loading Transistorized Voltmeter, AC voltmeters: Rectifier type Thermocouple Type, Ohmmeters: Series type and Shunt type, Multimeter: Voltage Current Resistance measurements.

UNIT-II:
Oscilloscopes and signal generators:

Oscilloscopes:
Oscilloscope block diagram, Cathode Ray Tube, Vertical Deflection System, Delay Line, Horizontal Deflection System: Triggered Sweep - Delayed sweep, CRO Probes, Dual Beam CRO, Dual Trace CRO, Measurements with CRO: Amplitude – Time period - Frequency – Phase, Lissajous patterns, Sampling Oscilloscope, Analog Storage Oscilloscope, Digital Storage Oscilloscope.

Signal Generators:
Fixed and variable AF generators, AF Sine & Square wave generator, Function generators, Fixed and variable RF signal generators, Sweep frequency generator.

UNIT-III:
Signal analyzers:
Wave analyzers: Frequency Selective Wave Analyzer - Heterodyne Wave Analyzer - Application of Wave Analyzers, Harmonic Distortion Analyzers: Total Harmonic Distortion, Spectrum Analyzer.

UNIT-IV:
Bridges and transducers:
Bridges:
Wheat Stone Bridge, Kelvin Bridge, Maxwell Bride, Schering Bridge and Wien Bridge.

Transducers:
Classification of Transducers, Potentiometers, Strain gauges, Capacitive Transducers, Linear Variable Differential Transducer (LVDT), Piezoelectric Transducer, Thermocouple, Thermistor, Resistance Thermometer.

UNIT-V:

Measurement of Non Electrical Quantities Data Acquisition Systems:
Measurement of Displacement, Velocity, Acceleration, Vibration, Force, Pressure, Fluid Flow, Liquid Level and Temperature. Data Acquisition System: Generalized Data Acquisition System - Configuration of DAS Single Channel & Multi Channel DAS, Strip Chart Recorder, X-Y Recorder

TEXT BOOKS:

1. Albert D. Helfrick, Cooper William D, Modern Electronic Instrumentation and Measurement Techniques, Prentice-Hall of India, 1997.
2. Sawhney A K, Puneet Sawhney , A Course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Company, 2016

REFERENCE BOOKS:

1. David A. Bell, Electronic Instrumentation & Measurements, Prentice-Hall, 2003.
2. Kalsi H S, Electronic instrumentation, Tata Mcgraw Hill, 2015.
3. Lal Kishore K, Electronic Measurements and Instrumentation, Pearson, 2009.

WIRELESS COMMUNICATIONS AND NETWORKS

IV B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Infer the basic concepts of different Access techniques, data service, technology and standards associated with wireless communication networks
2. Distinguish the multiple access techniques, standards, Technology used in wireless Communication and networks
3. Interpret the recent wireless standards on communications and networks.
4. Appraise the various wireless networks in communication systems.
5. Distinguish the different wireless networks.

UNIT –I:

Cellular Concept-System Design Fundamentals:

Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference, Channel planning for Wireless Systems, Adjacent Channel interference, Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring .

UNIT –II:

Mobile Radio Propagation and Large-Scale Path Loss:

Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Log-distance path loss model

UNIT –III:

Mobile Radio Propagation:

Small –Scale Fading and Multipath Small Scale propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading,

UNIT –IV:

Equalization and Diversity:

Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Nonlinear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration- Selection Diversity, Feedback or Scanning Diversity, Frequency Diversity, Time Diversity.

UNIT –V:

Wireless Networks:

Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper LAN, WLL.

TEXT BOOKS:

1. Theodre S Rappaport , Wireless Communications, Principles, Practice, Pearson Education India, 2009

2. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2005.

REFERENCE BOOKS:

1. Kamilo Feher, Wireless Digital Communications, Prentice-Hall,1999.
2. William Stallings, Wireless Communication and Networking, Pearson Education, 2003.
3. KavehPah Laven and P. Krishna Murthy, Principles of Wireless Networks, Wiley, 2002.

TECHNICAL SEMINAR

IV B.Tech II Semester

L	T	P	C
0	0	0	2

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Synthesizing information on any one specialized topic from text books, peer revised journals, hand books and other technical resources.
2. Accumulate information regarding the topic
3. Create a presentation to disseminate the accumulated data as presentation
4. Generation a technical seminar report comprising of all relevant information with stipulated standards.
5. Evaluate the intensity of topic in real time

METHOD OF EVALUATION:

During the seminar session each student is expected to prepare and present a topic on engineering/ technology, for duration of about 8 to 10 minutes. In a session of three periods per week, 15 students are expected to present the seminar. Each student is expected to present at least twice during the semester and the student is evaluated based on that. At the end of the semester, he / she can submit a report on his / her topic of seminar and marks are given based on the report. A Faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also. Evaluation is 100% internal.

COMPREHENSIVE VIVA VOCE

IV B.Tech II Semester

L	T	P	C
0	0	0	2

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Remember the basics of Electronics and communication Engineering
2. Understand the different methods of analyzing the circuits
3. Recite the importance of Electronics and communication in terms of application
4. Recap the knowledge of the subjects through modern applications
5. Comprehensive understanding of the subject

METHOD OF EVALUATION:

Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department along with an external examiner. The Comprehensive Viva-Voce is intended to assess the student's understanding of the subjects he/she studied during the B. Tech. course of study. The Comprehensive VivaVoce is evaluated by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

MAJOR PROJECT

IV B.Tech II Semester

L	T	P	C
0	0	0	10

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the basics of project management
2. Identify an area of project work through extensive literature survey
3. Formulation of Ideas from the survey
4. Presentation of ideas in terms of presentation
5. Create a dissemination report for the project done

METHOD OF EVALUATION:

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepare a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY
An Autonomous Institution
Aziznagar Gate, C.B. Post, Hyderabad - 500 075, Telangana.

ACADEMIC REGULATIONS & SYLLABI (R15)

for

B.Tech (ECE & EEE) First Year

(Applicable for the batches admitted from the Academic Year 2017-2018 onwards)

Course Structure & Syllabi
of
B.Tech., I Year I Semester
(ECE and EEE)

ECE & EEE

I YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A11001	English-I	2	0	0	2	2	100
A11002	Mathematics - I	4	1	0	3	4	100
A11003	Engineering Physics-I	3	1	0	3	4	100
A11502	C Programming – I	3	1	0	3	4	100
A11004	Engineering Chemistry	3	1	0	3	4	100
A11303 /A11201	Engineering Graphics / Electrical circuits	2	0	3	3	5	100
A11081	English Language Communication Skills Lab-I	0	0	3	2	3	75
A11582	C Programming Lab – I	0	0	3	2	3	75
A11083	Engineering Physics and Chemistry Lab	0	0	3	2	3	75
A11084	IT & Engineering Workshop	0	0	3	2	3	75
	Total	**17**	**7**	**15**	**25**	**35**	**900**

I YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A12005	English-II	2	0	0	2	2	100
A12202/ A12306	Electrical Circuits Theory / Engineering Graphics	3	1	0	3	4	100
A12007	Engineering Physics-II	3	1	0	3	4	100
A12503	C Programming – II	3	1	0	3	4	100
A12006	Mathematics – II	4	1	0	3	4	100
A12009	Mathematics – III	3	1	0	3	4	100
A12085	English Language Communication Skills Lab-II	0	0	3	2	3	75
A12584	C Programming Lab –II	0	0	3	2	3	75
A12088	Engineering Physics Lab	0	0	3	2	3	75
	Total	**18**	**5**	**9**	**23**	**31**	**825**

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Lecture **T – Tutorial** **P – Practical** **D – Drawing**

L T/P/D C
2 0 0 2

ENGLISH-I

(COMMON TO ALL BRANCHES)

MAIN OBJECTIVES:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

B Tech I Year I Semester

Unit-I: 'Wit and Humor' from 'Skills Annexe' -Functional English for Success

Objectives:

- To enable students to develop their listening skills to improve their pronunciation

L-Listening For Sounds, Stress and Intonation

- To make students aware of the role of speaking in English and its contribution to their success.

S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations).

- To develop an awareness in the students about the significance of silent reading for subject and theme.

R- Reading for Subject/ Theme

- To equip the students with the components of different forms of writing

W- Writing Paragraphs

Unit –II: 'Mokshagundam Visvesvaraya' from "Epitome of Wisdom

Objectives:

- To enable the students to use phrasal verbs, expressions, idioms, collocations, pre-fixes and suffixes, and linking words.

G-Types of Nouns and Pronouns

V-Homonyms, homophones synonyms, antonyms

Unit-III: **'Cyber Age'** from "Skills Annexe -Functional English for Success

Objectives:

- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

L – Listening for themes and facts

- To enable students to express themselves fluently and appropriately in social and professional contexts

S -Apologizing, Interrupting, requesting and making polite conversation

- To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

R - For theme and gist

- To equip them with the components of different forms of writing.

W - Describing People, Places, Objectives, Events,

Unit-IV: **'Three Days to See'** from "Epitome of Wisdom

Objective:

- To enable the Students to use a wide range of grammatical structures appropriately and accurately in written and spoken English including vocabulary

G- Verb &Verb forms

V- Adjective and Adverb

Unit-V: **Human Values & Professional Ethics** from "Skills Annexe

Objective:

- To equip the students with the components of different forms of writing..

W- Note-Making, Note-Taking

TEXTBOOKS PRESCRIBED:

For Detailed study:

First Textbook: "*Skills Annexe -Functional English for Success*",
Published by Orient Black Swan, Hyderabad

For Non-detailed study:

Second text book ***"Epitome of Wisdom"***, Published by Maruthi Publications, Guntur.

MATHEMATICS-I

L	T/P/D	C
4	1/-/-	3

(COMMON TO CE, EEE, ME, ECE, CSE & IT)

UNIT-I: Matrices and System of Linear Equations

Matrices and Systems of Linear Equations: Real matrices Symmetric, Skew symmet*ric,* Orthogonal, Complex matrices: Hermitian, Skew Hermitian and Unitary Elementary transformations-Rank-Echelon form, Normal form System of Linear equations Direct Methods (Gauss Elimination, Gauss Jordan).

UNIT-II: Eigen Values and Eigen Vectors

Eigen values, Eigen vectors properties, Clayey-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Clayey-Hamilton theorem Diagonolization of matrix. Linear Transformation Orthogonal Transformation, Quadratic forms-Nature, Index and Signature.

UNIT-III: Functions of Single Variable and Functions of several variables

Rolle's Theorem Lagrange's Mean Value Theorem Cauchy's mean value Theorem Generalized Mean Value theorem (all theorems without proof) Geometrical interpretation of Mean value theorems. Functions of several variables Partial Differentiation and total differentiation (left as an exercise to student) Functional dependence-Jacobian Determinant-Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-IV: Improper Integration and Multiple Integrals:

Gamma and Beta Functions-Relation between them, their properties evaluation of improper integrals using Gamma / Beta functions. Multiple integrals - double and triple integrals – change of order of integration- change of variables

UNIT-V: Laplace transform and its applications to Ordinary differential equations:

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Srimanta Pal, Subodh C. Bhunia, (2015) ,Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House
3. Ramana B.V (2010), Engineering Mathematics, New Delhi, Tata McGraw Hill Publishing Co. Limited
4. Mathematical Methods: S.R.K. Iyengar and R.K. Jain, Narosa Publishing House.

OBJECTIVES:

1. This course helps in translating a physical or other problem in mathematical model.
2. The course intends to provide an overview of Matrices which occur in physical and engineering problems.
3. To provide an overview of discovering the experimental aspect of modern applied mathematics.
4. This course creates the ability to model, solve and interpret any physical or engineering problem.
5. To gain knowledge about Laplace Transforms, Double integrals and Triple integrals to apply in engineering and technologies.

L	T	C
3	1	3

ENGINEERING PHYSICS – I
(COMMON TO ALL BRANCHES)

OBJECTIVES:

1. To know about crystals, their structures, properties and applications.
2. Able to understand light and LASER phenomena and their applications.
3. To know the fundamentals of Statistical Mechanics and understand about Dielectric and Magnetic materials.

OUTCOMES:

1. Students analyze and apply the studies for scientific applications of crystal in various fields.
2. Ability to interpret the applications of Dielectric and Magnetic materials in technology and daily life.
3. Able to experiment on nature of light and applications of LASER in various fields.

UNIT- I

Crystal Structures

Inter atomic force Cohesive energy of diatomic molecule (Qualitative), Space lattice, unit cell and Lattice parameters, Crystal systems Bravais lattices. Structures, Atomic radius, co-ordination number and packing fractions of Simple Cubic, Body Centered Cubic, Face Centered Cubic lattices, Structure of Diamond.

Crystal directions, planes and X- Ray diffraction

Crystal planes and directions – Miller Indices, Inter planar spacing of orthogonal crystal systems, X-ray Diffraction: Bragg's law, Determination of lattice constant by XRD (Powder method), Crystal defects: Point and Line defects (Qualitative) Burger's Vector.

UNIT- II

Interference, Diffraction and Polarization

Superposition principle, Interference, Coherence, Interference in thin films, Newton's Rings –Experiment, determination of wavelength of monochromatic source. Diffraction Fraunhofer and Fresnel diffraction, Diffraction due to single slit, Diffraction grating (Qualitative). Polarization- Double refraction, Nicol's Prism, applications of Polarization.

UNIT – III

Elements of statistical mechanics

Introduction, Phase space, Definition of Ensembles, Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (Qualitative), Planck's law of black body radiation Deduction of Wien's law and Rayleigh-Jeans law from Planck's law.

Lasers

Characteristics of Lasers, Spontaneous and Stimulated Emission of radiation, meta stable state, Population inversion, lasing action, Einstein's coefficients and relation between them, Ruby Laser, Helium-Neon Laser, applications of Lasers.

UNIT – IV

Magnetism and Magnetic materials

Introduction – Basic definitions, Origin of magnetic moment, Bohr magneton, Dia, Para, Ferro, Antiferro and Ferri magnetism, Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials and their applications.

UNIT- V

Dielectric Properties

Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Ionic and Electronic Polari abilities, Internal Fields in Solids, Clausius Mossotti Equation. Piezo, Pyro and Ferro electricity, applications of ferroelectric materials.

TEXT BOOKS:

(1) Engineering Physics by P K Palanisamy: Scietech publication.
(2) Solid State Physics by M Armugam; Anuradha Publications.

REFERENCE BOOKS:

(1) Introduction to Solid State Physics by Charles Kittel: John Wiley & Sons.
(2) Engineering Physics by R.K. Gaur and S.L. Gupta; Dhanpat Rai and Sons.
(3) Engineering Physics by V Rajendran; McGraw hill education private ltd.
(4) A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar: S Chand.
(5) Engineering Physics by K Malik, A K Singh: Tata McGraw hill book publishers.
(6) Engineering Physics by M.R. Srinivasan, New Age Publishers.

L T/P/D C
3 1/-/- 3

C PROGRAMMING –I
(ECE, EEE)

OBJECTIVES:

- To understand the various steps in program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write Programs in C to solve programs using structured programming approach.
- To introduce the students the basic concepts as input output statements, loops, functions, arrays.

OUTCOMES:

- Students will demonstrate a depth of knowledge and apply the methods of C Language to solve the mathematical problems.
- Ability to apply and develop logical skills and problem solving using C Programming Language.

UNIT-I
Introduction to Computers: Computer System, Computing Environments, Generations of Computer Languages, Software Development Life Cycle, Algorithms and Flowchart.
Data Representation: Decimal, Binary, Octal, Hexadecimal number systems and Inter-Conversions, ASCII values.

UNIT-II
Introduction to C language: Background, Structure of C program, Creating and Running a C-Program, Input/ Output statements, C tokens, Data types, Operators, Operator Precedence and Associatively, Expression evaluation, Type Casting and Type Conversion, C Programming examples.

UNIT-III
Control Structures: Selection Statements: if and switch statements, Iterative Statements/Loops: while, for, do-while statements, goto, break and continue statements, C Programming examples.

UNIT-IV
Arrays: Introduction to one dimensional and two dimensional Arrays- Declaration, Initialization and Accessing array elements, Array applications, C programming examples.
Strings: Introduction, String Input/output functions, Declaration, Initialization and Accessing Strings, Array of Strings, String Manipulation functions- strlen(), strcat(), strcmp(), strcpy(), strrev(), C programming examples.

UNIT- V
Functions: Introduction to functions, Types of functions, Categories of functions, Recursion, Scope and Extent, Storage classes- auto, register, static, extern, Parameter passing techniques, Preprocessor Directives, C programming examples.

TEXT BOOKS

1. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F.Gilberg, Third Edition, Cengage Learnimng.

REFERENCE BOOKS

1. Let Us C, Yashavant P. Kanetkar, BPB Publications.
2. Computer System & Architecture, M. Marris Mano , 3 rd Edition , Pearson Education.
3. Programming in C Reema Thareja, 2 nd Edition Oxford University Press 2015.

L	T/P/D	C
3	1/-/-	3

ENGINEERING CHEMISTRY

Course objectives:
To appraise the students about the importance and role of chemistry in the field of Engineering by explaining the relevant topics. To enable students to apply the knowledge acquired in improving the properties of engineering materials. To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines. To equip the students with the required fundamentals of engineering chemistry carry out in the interdisciplinary research such that the finding benefit the common man. After the completion of the course, the student would understand about the important chemistry of water, corrosion and its control, polymer chemistry, electro chemistry (including batteries) and advanced engineering materials.

UNIT I: WATER: Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler troubles: priming and foaming, boiler corrosion, scales, sludges and caustic embrittlement. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (zeolite process and ion exchange process), Numerical problems on softening of water.

UNIT II: ELECTROCHEMISTRY: Conductance and its types. Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, types of electrodes (Normal Hydrogen Electrode , calomel electrode, glass electrode and quinhydrone electrode), Nernst equation Numerical problems. Potentiometric titrations. Concentration cells, classification with examples.
BATTERIES: Introduction to cell and battery, characteristics of a cell. Primary (dry cell and lithium cell) and secondary cells, (lead-Acid cell, Ni-Cd cell and Lithium ion cells,). Solar battery, engineering applications of batteries. Fuel cells Hydrogen Oxygen fuel cell, advantages and engineering applications of fuel cells.

UNIT III: CORROSION AND ITS CONTROL Introduction, types of corrosion : chemical and electrochemical corrosion, mechanism of chemical and electrochemical corrosion, galvanic, water line and pitting corrosion, factors affecting the rate of corrosion: nature of the metal , galvanic series, purity of metal, nature of corrosion product , nature of environment : effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protective coatings: metallic coatings (anodic and cathodic), methods of application on metals, hot dipping (galvanizing), cladding, cementation, electroplating (of copper) electroless plating (of nickel). Organic coatings paints, its constituents and their functions.
UNIT IV: POLYMER CHEMISTRY: Introduction, classification of polymers, types of polymerization (addition and condensation, *mechanisms not included*). Plastics- types of plastics-thermoplastics and thermosetting plastics. Compounding and moulding of plastics. Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna-S, butyl rubber, Thikol rubber. Conducting polymers: classification, mechanism of conduction, Poly acetylene preparation and effects of doping on conduction. Applications of conducting polymers.

UNIT V: ADVANCED ENGINEERING MATERIALS: Biodegradable polymers, types, examples: Polyhydroxy butyrate (PHB) ,Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA) , Polylactic acid (PLA), Poly (Î-caprolactone) (PCL). Applications of biodegradable polymers. Composite materials: Constituents of composite materials. Types of composite materials. Advantages and engineering applications of composite materials. Nano materials: Introduction, basic methods of preparation and applications of nano meterials. Insulators- Classification, characteristics of thermal & electrical insulators and applications. Biofuels biodiesel, general methods of preparation and advantages.

Text Books:
1. Engineering Chemistry by NYS.Murthy, Pearson, India.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpat Rai Publishing Company

Reference Books:
1. Text Book of Engineering Chemistry by Shasi Chawla, Dhantpat Rai publishing Company,
2. Engineering Chemistry by C.Daniel Yesudian , Anuradha publications

L	T/P/D	C
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ELECTRICAL CIRCUITS
(For ECE Branch Only)

Objective:
This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes single phase circuits, magnetic circuits and network theorems.

UNIT –I:
Introduction to Electrical Circuits: Circuit Concept, R-L-C Parameters, Voltage and Current Sources, Independent and Dependent Sources, Source Transformation, Voltage Current relationship for Passive Elements (for different input signals Square, Ramp, Saw tooth and Triangular). Kirchhoff's Laws, Network Reduction Techniques Series, Parallel, Series Parallel, Star –to-Delta or Delta-to-Star Transformations, Nodal Analysis, Mesh Analysis, Super node and Super mesh for DC Excitations.

UNIT –II:
Single Phase A.C. Circuits: R.M.S. and Average values and form factor for different periodic wave forms, Steady State Analysis of R, L and C (in Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase and Phase difference, Concept of Power Factor, Real and Reactive powers, J-notation, Complex and Polar forms of representation, Complex power.

UNIT –III:
Locus diagrams & Resonance: Locus diagrams - series R-L, R-C, R-L-C and parallel combination with variation of various parameters - Resonance-series, parallel circuits, concept of band width and Q factor.

UNIT –IV:
Magnetic circuits-Faraday's laws of electromagnetic induction-concept of self and mutual inductance-dot convention-coefficient of coupling-composite magnetic circuit-analysis of series and parallel magnetic circuits.

UNIT –V:
Network Theorems (With A.C. & D.C): Tellegen's, Superposition, Reciprocity, Thevinin's, Norton's, Maximum Power Transfer, Milliman's and Compensation theorems for D.C and A.C excitations.

TEXT BOOKS:

1. Electric Circuits - A.Chakrabarhty, Dhanipat Rai & Sons.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.

REFERENCE BOOKS:

1. Engineering Circuit Analysis - William Hayt,Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuit Analysis - K.S.Suresh Kumar, Pearson Education.
3. Electrical Circuits - David A.Bell, Oxford University Press.
4. Network Analysis and Circuits - M.Arshad, Infinity Science Press.
5. Network Analysis and Synthesis –Ravish R Singh, Mc Graw Hill Education.
6. Electrical Circuits: An Introduction - KCA Smith & RE Alley, Cambridge University Press.

L	T/P/D	C
2	**-/ 3**	**3**

ENGINEERING GRAPHICS
(C.S.E, IT, E.C.E & E.E.E)

1. Objectives: To know about different types of Drawing Instruments and about different types of lines.
2. To know about different types of curves and projections.
3. To know projections of points, straight lines, solids etc.
4. To analyze the conversion of isometric projection to orthographic projection and vice versa.

Outcomes:

1. Student gets knowledge on various drawing instruments and its usage.
2. Students capable to draw various curves like conic curves, cycloid curves and involutes. Student can understand about orthographic projection and able to draw points, lines, planes and solids according to orthographic projections.
3. Student can convert and draw the given orthographic view to isometric view and vice versa.

UNIT - I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning. Construction of polygons: Inscription and superscription of polygons given the diameter of circle. Curves used in Engineering Practice and their Constructions: Conic Sections: Ellipse, Parabola, Hyperbola including the Rectangular Hyperbola General method only. Cycloidal curves Cycloid, Epicycloid and Hypocycloid Involutes.

UNIT - II

Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only): Principles of Orthographic Projections Conventions First and Third Angle Projections, Projection of Points, Projection of Lines inclined to both planes, True lengths. (Mid points & Traces are eliminated).

UNIT - III

Projections of Planes: Projections of regular Planes – Inclined to both planes. Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes – Change of position.

UNIT –IV

Isometric Projections/views: Principles of Isometric Projection Isometric Scale Isometric Views Conventions Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

UNIT –V

Conversion of Orthographic Views to Isometric Views of simple objects. Transformation of Projections: Conversion of isometric views to orthographic views of simple objects.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing, K.L.Narayana and Kannaiah / Scietech publishers.

REFERENCES:

Engineering Drawing, N.S. Parthasarathy/Vela Murali, Oxford University Press.
Engineering Drawing, Basant Agarwal, TMH

L P C
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English Language Communication Skills Lab-I

Objectives

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussion and public speaking.

Learning Outcomes:

1. Better Understanding of nuances of language through audio-visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking with clarity and confidence thereby enhancing employability skills of the students.

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab:

Exercise-I

CALL Lab: Introduction to Phonetics
Speech Sounds
Vowels and Consonants

Exercise-II

ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise-III

CALL Lab: Structure of Syllables
Past Tense Marker and Plural Marker
Weak Forms and Strong Forms
Consonant Clusters.

Exercise-IV

ICS Lab: Situational Dialogues -Role-Play- Self-introduction and introducing others-Greetings- Apologies- Requests.

Exercise-V

ICS Lab: Social and Professional Etiquette and Telephone Etiquette-Tenses-Non-Verbal Communications.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
4. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
5. **Lab Manual:** A Manual entitled "**English Language Communication Skills (ELCS) Lab Manual- cum- Work Book**", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

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C PROGRAMMING LAB – I
(ECE, EEE)

OBJECTIVES:

- To provide and understanding the concept of programming Languages.
- To write programs in C to solve the mathematical problems.
- To understand how to use the input output statements, loops, functions, arrays
- To learn debugging concepts.

OUTCOMES:

- Understand and analyze different syntax of C.
- Design a program for a given Problem.
- To analyze and design C Program for a particular problem.

Week 1:
Familiarity with Basic Linux Commands
Week 2:
Using vi editor – Creation of text files
Week 3:
Write simple programs using scanf() and printf() functions and familiarity with format strings.
Week 4:
Write programs to illustrate Operators
Week 5:
Write programs to illustrate If statements

- **a)** To find largest and smallest of given numbers
- **b)** To find the roots of the quadratic equation.

Week 6:

- **a)** Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
- **b)** Write a C program to calculate the following Sum:
  $Sum=1-x^2/2! + x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

Week 7:
Write programs on while and do..while loops

- **a)** Program to find the sum of the individual digits of a given positive integer.
- **b)** Program to generate the first n terms of the Fibonacci sequence
- **c)** Program to check the given no is Palindrome or not

Week 8:
Write programs on for loop and nested loops.

- **a)** To generate sum of n natural numbers
- **b)** To generate Pascal triangle
- **c)** To generate all the prime numbers between 1 and n

Week 9 & 10:

- **a)** Program to find the minimum and maximum element of an array.
- **b)** Program to search for given element in an array.
- **c)** Program to convert Binary number to Decimal number and vice-versa.

Week 11:

- **a)** Program to perform Addition of Two Matrices
- **b)** Program to perform Multiplication of Two Matrices

Week 12:

- **a)** Implement string manipulation functions
- **b)** Write a C program to accept a string of any characters and display the number of vowels in that string
- **c)** Display number of words and characters in a string.

Week 13 & 14:

- a) Implement categories of user defined functions
- b) Implement recursive and non recursive functions
  - i. To find the factorial of a given integer.
  - ii. To find the GCD (greatest common divisor) of two given integers.

Week 15:
Implementation of parameter passing Techniques

- a) Call by value
- b) Call by reference

Week 16:

Review and Revision

TEXT BOOKS:

1. C Programming & Data Structures, E. Balagurusamy, 4th Edition, TMH.
2. A Structured Programming Approach using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. Let Us C, Yashavant P. Kanetkar, BPB Publications.
2 Computer System & Architecture, M.Morris Mano, 3rd Edition 2006.
3. Programming in C, Reema Thareja , 2nd Edition Oxford University Press 2015.

L	P	C
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ENGINEERING PHYSICS AND CHEMISTRY LAB

(EEE, ECE, CSE and IT)

Engineering Physics Lab:

Any Five Experiments from the following:

1. Torsional Pendulum Experiment – Determination of rigidity modulus of material of wire
2. Melde's experiment
3. Newton's Rings
4. Dispersive Power of the material of a Prism using Spectrometer
5. Stewart & Gee's experiment
6. LED Characteristics
7. Diffraction Grating – Determination of wavelength of monochromatic light
8. RC Circuit – Decay of Charge

ENGINEERING CHEMISTRY LAB

Any six_experiments are to be performed

1. Fundamentals of volumetric analysis : (a) Determination of strength of an acid (HCl)
2. Estimation of ferrous iron by dichrometry
3. Estimation of hardness of water by EDTA method.
4. Determination of alkalinity of water.
5. Determination of free chlorine or chlorides in water.
6. Estimation of copper by colorimetric method.
7. Estimation of HCl by conductometry using standard NaOH solution.
8. Estimation of HCl by potentiometry using standard NaOH solution.
9. Determination of viscosity of sample oil by Redwood/Oswald's viscometer
10. Determination surface tension of lubricants.

TEXT BOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis.
2. Essentials of experimental engineering chemistry, Shashi Chawla, Dhanpat Rai & Co.
3. Laboratory manual of engineering chemistry, S.K.Bhasin and Sudha Rani , Dhanpat Rai & Co.
4. A text book on experiments and calculations. S.S. Dara, S. Chand & Co.

L	T/P/D	C
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IT & Engineering Workshop
(ECE, EEE, ME & CIV)

Objectives:
The IT Workshop for engineers is a training lab course spread over 20 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations. (**Recommended to use Microsoft office 2007 in place of MS Office 2003)**

OUTCOMES:
- Getting enough knowledge to assemble a computer and identifying various components.
- To get hands on experience in software installation.
- Ability to understand the troubleshooting problems.
- To learn the tools PowerPoint, documentation, tabulation and calculations.
- To get exposure how to use internet and World Wide Web.

PC Hardware
Task 1: Identify the peripherals of a computer, components in a System Cabinet and its functions. Block diagram of the computer along with peripherals.
Task 2: Disassemble and assembling the PC.

MS Word
Task 3: Microsoft (MS) word 2007: Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word. Give a task covering to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Inserting table, using Drawing toolbar in word.

MS Excel
Task 4: MS office 2007 Excel as a Spreadsheet tool covering Accessing, overview of toolbars, saving excel files, Using help and resources., Also give a task that is covering the features like Gridlines, Format Cells, Summation, auto fill, Formatting Text.

MS Power Point
Task 5: MS power point:- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point.

REFERENCES:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech.
2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and A+Handbook Kate J. Chase PHI (Microsoft).
5. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. CISCO Press, Pearson Education.

L	T/P/D	C
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ENGINEERING WORKSHOP

Objective: To impart basic knowledge of various tools and their use in different sections of manufacture such as carpentry, Tin-smithy and house wiring.

1. **TRADES FOR EXERCISES:**

   At least two exercises from each trade:

   1. Carpentry
   2. Tin-smithy and development of jobs carried out and soldering.
   3. House-wiring

2. **TRADES FOR DEMONSTRATION & EXPOSURE:**

   1. Plumbing
   2. Power tools in construction, wood working, electrical engineering and mechanical engineering.

TEXT BOOKS:

1. Work shop manual P.Kannaiah / K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy.

Part – C

Syllabi of

B.Tech., I Year II Semester

(ECE and EEE)

English– II

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(COMMON TO ALL BRANCHES)
Semester II

Unit –I: **Last Leaf** by O Henry
G –Tense & Aspect
V – Synonyms and Antonyms

Unit-II G: **Risk Management** from Skills Annex -Functional English for Success L -
Listening for specific details and information
S- Narrating, expressing opinions and telephone
interactions R -Reading for specific details and information

W- Writing formal letters and CVs
Unit-III: The Secret of Work by Swami Vivekananda from "Epitome of Wisdom"
G- Prepositions and Concord, Voice and Reported Speech
V-Collocations and Technical Vocabulary

Unit-IV: **Sports and Health** from "Skills Annex -Functional English for Success
Critical Listening and Listening for speaker's tone/ attitude
S- Group discussion and Making presentations
R- Critical reading, reading for reference
W-Project proposals; Technical Reports, Project Reports and Research Papers

Unit-V: **Convocation Speech** by Narayan Murthy, from "Epitome of Wisdom"
G- Writing Memos, Minutes of Meeting, Transcription (Translating from the mother tongue to English), V-Vocabulary -idioms and Phrasal verbs, One-Word Substitutes

REFERENCES:

1. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
2. Technical Communication, Meenakshi Raman, Oxford University Press
3. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
4. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.

ELECTRICAL CIRCUIT THEORY
(For EEE students only)

Objective:

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic concepts of circuits which includes single phase circuits, resonance, magnetic circuits, network topology and network theorems.

UNIT –I:
Introduction to Electrical Circuits: Circuit Concept, R-L-C Parameters, Voltage and Current Sources, Independent and Dependent Sources, Source Transformation, Voltage – Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular). Kirchhoff's Laws, Network Reduction Techniques – Series, Parallel, Series Parallel, Star –to-Delta or Delta-to-Star Transformations, Nodal Analysis, Mesh Analysis, Super node and Super mesh for DC Excitations.

UNIT –II:
Single Phase A.C. Circuits: R.M.S. and Average values and form factor for different periodic wave forms, Steady State Analysis of R, L and C (in Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase and Phase difference, Concept of Power Factor, Real and Reactive powers, J-notation, Complex and Polar forms of representation, Complex power.

UNIT –III:
Resonance, Locus diagrams& Magnetic circuits-: Resonance-series, parallel circuits, concept of band width and Q factor. Locus diagrams - series R-L, R-C, R-L-C and parallel combination with variation of various parameters. Magnetic circuits-Faraday's laws of electromagnetic induction-concept of self and mutual inductance-dot convention-coefficient of coupling-composite magnetic circuit-analysis of series and parallel magnetic circuits.

UNIT –IV: Network Topology: Definitions, Graph, Tree, Basic cutest and Basic Tie set Matrices for Planar Networks, Loop and Nodal methods for analysis of Networks with Dependent & Independent Voltage and Current Sources, Duality & Dual Networks.

UNIT –V:
Network Theorems (With A.C. & D.C): Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation theorems for D.C and A.C excitations.

TEXT BOOKS:

1. Circuit Theory(Analysis&Synthesis) A.Chakrabarhty, Dhanipat Rai & Sons.2014,6th Edition
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.2011
3. Network Analysis –M.E.Van Valkenburg,PMI Publication.2014,3rd Edition

REFERENCE BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.2011, 8th Edition.
2. Electric Circuit Analysis - K.S.Suresh Kumar, Pearson Education.2013
3. Fundamentals of Electrical Circuits - David A.Bell, Oxford University Press. 2009, 7th Edition.
4. Network Analysis and Circuits - M.Arshad, Infinity Science Press.2010
5. Network Analysis and Synthesis –Ravish R Singh, Mc Graw Hill Education.2013
6. Electrical Circuits: An Introduction - KCA Smith & RE Alley, Cambridge University Press.1992.

Outcome:
After studying this course the student gets a thorough knowledge on basics of circuit concepts, electrical parameters, single phase AC circuits, magnetic circuits, resonance, Network topology which is important in modeling of power system components and network theorems which he/she can apply to the conceptual things in real-world problems and applications.

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ENGINEERING PHYSICS – II
(COMMON TO ALL BRANCHES)

OBJECTIVES:

1. To know fundamentals of Quantum Mechanics, Free Electron Theory of Metals and Band Theory of solids.
2. To know basics of semiconductors and semiconductor devices.
3. To understand superconductivity, applications of optical fibers and fundamentals of Nanoscience.

OUTCOMES:

1. To get an idea to apply Classical and Quantum mechanics in various engineering fields.
2. Able to construct circuits with semiconductor devices and consolidate applications of Nanoscience in the field of Engineering and Technology.
3. To interpret the importance of superconductivity and applications of Optical fiber.

UNIT – I

Free electron theory of metals

Classical Theory– Explanation of Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfeld theory (Qualitative).

Principles of Quantum Mechanics

Waves and Particles, de-Broglie hypothesis Matter waves, Davisson and Germer experiment, Schrodinger Time Independent Wave Equation Wave function and its Physical Significance, Particle in one dimensional potential box (wave functions, probability densities and energy states), Density of States.

UNIT II

Band theory of solids

Electron in a periodic potential – Bloch Theorem, Kronig-Penney model (Qualitative), Origin of energy band formation in solids, Classification of materials into Conductors, Semiconductors & Insulators. Concept of effective mass of an electron.

Fiber optics

Basic principle of optical fiber, Acceptance angle, Acceptance cone, Numerical aperture (Quantitative), Types of optical fiber, Applications of Optical Fiber.

UNIT III

Semiconductor Physics

Intrinsic and Extrinsic Semiconductors, Fermi level in Intrinsic and Extrinsic semiconductors, Carrier Concentration in Intrinsic and Extrinsic Semiconductors. Hall effect, P-N junction diode, Tunnel diode, LED and Photodiode.

UNIT - IV

Superconductivity

Introduction, Heat capacity, Isotopic effect, Persistent currents, Critical fields, Meissner effect, Type I and Type II superconductors, BCS Theory, Josephson effect SQUIDS, Basics of High Temperature Superconductors, Applications of Superconductors.

UNIT V

Fundamental of Nanoscience:

Introduction Basic definitions: Nanoscale, Nanoscience and Nanotechnology, Types of Nanomaterials, Surface to Volume Ratio, Quantum confinement, Synthesis of Nanomaterials Top down & Bottom up approaches: sol-gel, Ball milling and CVD methods, Applications.

TEXT BOOKS:

1. Engineering Physics by P K Palanisamy: Scietech publication.
2. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

1. Introduction to Solid State Physics by Charles Kittel: John Wiley & Sons.
2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons.
3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand.
5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers.
6. Engineering Physics by M.R.Srinivasan, New Age Publishers.

L	T/P/D	C
3	1/-/-	3

C PROGRAMMING – II
(ECE, EEE)

OBJECTIVES:

- To understand the basic concepts such as Abstract data types Linear and Non Linear Data Structures.
- To understand the notations used to analyze the performance of algorithms.
- To understand the behavior of Data Structures such as Unions, Pointers, Files, Stacks and Queues and their representation.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using Data Structures such as pointers, Strings, Arrays, Searching and sorting and Linear Lists and Linked Lists.

OUTCOMES:

- Learn how to use Pointers, Files and Enumerated data concepts for realistic problems.
- Ability to understand the concept of data structures and its usage.
- Ability to demonstrate the practical applications of Stacks and Queues.
- Ability to solve problems independently and think critically.

UNIT – I

Searching and Sorting – Basic concepts, Searching-Linear and Binary search, Sorting- Selection sort, Bubble sort, & Insertion sort.

UNIT – II

Pointers: Introduction, Declaration and Initialization, Pointer Operators, Pointer to Pointer, Pointer Expressions, Pointers and Arrays- Pointer to Array, Array of Pointers, C programming examples.
Dynamic Memory Allocation Functions- malloc ( ), calloc( ), realloc( ), free()

UNIT – III

Derived types The Type Definition (typedef), Enumerated types, Structures - Declaration, Initialization, Accessing structures, Operations on Structures, Nested Structures, Structures through Pointers, Structures and Functions, Self Referential Structures, Unions ,Bit fields ,C programming examples.

UNIT – IV

File Management Basic concepts, working with text files and binary files, State of a file, Opening and Closing files, File Input / Output functions (standard library input / output functions for files), File status functions (error handling), Positioning functions, Command Line Arguments, C programming examples.

UNIT - V

Linear Data Structures- Stack- Push and Pop operations, Queue- Insertion and Deletion operations, singly linked list- Insertion, deletion operations.

TEXT BOOKS:

1. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F.Gilberg, Third Edition, Cengage Learnimng.

REFERENCE BOOKS:

1. Understanding pointer in C, Yashavant P.Kanetkar, 3rd Edition,BPB Publications 2006.
2. Programming in C, Reema Thareja, 2nd Edition, Oxford University 2015.
3. Theory and Problems of Data Structures, Seymour Lipschutz, Mc Graw Hill, 1986.

MATHEMATICS-II
(COMMON TO CE, EEE, ME, ECE, CSE & IT)

L	T	P	C
4	1	0	3

Pre Requisites: Nil

OBJECTIVES:

1. This course creates the ability to model, solve and interpret any physical or engineering problem
2. To gain knowledge about vector calculus, Fourier series and Fourier transforms to apply in engineering and technologies
3. The course intends to provide an overview of Matrices which occur in physical and engineering problems.
4. This course enhances the conceptual understanding of the learners about the solutions of engineering problems
5. Acquire knowledge about different methods of solution to solve a physical problem.

OUTCOMES:

At the end of the course, the student will be able to:

1. Gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.
2. Become familiar with the application of ordinary differential equations and vector calculus to engineering problems.
3. Verify the integral theorems.

UNIT-I: Differential Equations of first order and their Applications:

Differential equations of first order and first degree: exact, linear and Bernoulli, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II: Higher Order Linear Differential Equations and their Applications:

Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) = $e^{ax}, \sin ax, \cos ax \; and \; x^k, e^{ax}V(x), x^kV(x)$.Method of variation of parameters. Equations reducible to constant coefficients-Cauchy's and Lagrange's differential equations. Applications - Bending of beams, Electrical circuits, simple harmonic motion.

UNIT-III: Fourier series:

Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT-IV: Fourier Transforms:

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms properties inverse transforms Finite Fourier transforms.

UNIT-V: Vector Calculus:

Gradient- Divergence- Curl and their related properties - Potential function Laplacian and second order operators. Line integral work done Surface integrals Flux of a vector valued function and Volume integral. Vector integrals theorems: Green's Stoke's and Gauss's Divergence Theorems (Only Statements & their Verifications).

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Srimanta Pal, Subodh C. Bhunia, (2015), Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Integral Transforms by A.R.Vasista,Krishana Prakashan Private Limited
4. Schaum's outline series on Vector Analysis; Linear Algebra.
5. Larry C. Andrews and Bhimsen K. Shivamoggi, Integral Transforms for Engineers, Prentice – Hall of India Private Limited, New Delhi.

MATHEMATICS-III
(COMMON TO EEE, ECE, CSE & IT)

L	T	P	C
3	1	0	3

Pre Requisites: Nil

OBJECTIVES

1. The objective is to find the relation between the variables x and y out of the given data (x,y).
2. The aim to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
3. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
4. This topic deals with methods to find roots of an equation and solving a differential equation.
5. The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
6. In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
7. The aim at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations

OUTCOMES:

At the end of the course, the student will be able to:

1. Apply the numerical methods to find a root of algebraic and transcendental equations.
2. Apply the numerical methods to find the solutions of ordinary differential equations.
3. Find the solutions of one dimensional wave equation, two dimensional wave equation and one dimensional heat conduction equation.

UNIT-I: Solution of Non- Linear Equations and Linear System of Equations:

Solution of Algebraic and Transcendental Equations the Bisection Method the Method of False Position the Iteration Method Newton-Raphson Method. Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method) Jacobi's and Gauss-Seidel Iteration method,

UNIT-II: Interpolation:

Introduction Errors in Polynomial Interpolation Finite differences Forward Differences Backward differences Central differences Symbolic relations and separation of symbols Newton's formulae for interpolation Central difference interpolation Formulae Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT-III: Numerical Integration & Curve Fitting:

Generalized Quadrature (Newton's Cote's formula), Trapezoidal, Simson's and Weddle's rules andproblems. Curve fitting: Fitting a straight line Second degree curve exponentional curve-power curve by method of least squares.

UNIT – IV: Numerical Solution of IVP's in ODE:

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods.

UNIT-V: Partial Differential Equations:

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations, Charpits Method, Method of separation of Variables for second order equations. Classification of general second order partial differential equations. Applications of Partial Differential Equations One dimensional wave equation, Heat equation.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley Publications.

REFERENCE BOOKS:

1. Srimanta Pal, Subodh C. Bhunia, (2015), Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Introductory Methods of Numerical Analysis. S.S. Sastry, Prentice Hall.
4. Numerical Analysis (Paper IV), First Edition 2010, Telugu Akademi, Hyderabad.
5. Schaum's outline series on Matrices.

6. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

L	T/P/D	C
0	-/ 3	2

English Language Communication Skills Lab-II

Objectives

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence.
5. To train students to use language appropriately for interviews, group discussion and public speaking

Learning Outcomes:

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students

Syllabus: English Language Communication Skills Lab shall have two parts:

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the English Language Communication Skills Lab

Exercise-I

CALL Lab: Minimal Pairs
Word accent and Stress Shifts
Listening Comprehension

Exercise-II

ICS Lab: Descriptions- Narrations- Giving Directions and Guidelines
Question Tags and One-Word Substitutes
Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise-III

CALL Lab: Intonation and Common Errors in Pronunciation.**-**Neutralization of Mother Tongue Influence and Conversation Practice.

Exercise-IV

ICS Lab: Extempore- Public Speaking
Active and Passive Voice,
Common Errors in English,
Idioms and Phrases

Exercise-V

ICS Lab: Information Transfer
Oral Presentation Skills
Reading Comprehension
Job Application with Resume preparation.

Books Suggested

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation.
2. Nambiar, K.C. 2011. Speaking Accurately. A Coursein International Communication.

L	T/P/D	C
0	-/3	2

C PROGRAMMING II LAB
(ECE, EEE)

OBJECTIVES:

- To write and execute programs in C to solve problems using data structures such as Unions, Pointers, Files, Stack and Queue.
- To write and execute programs in C to implement various sorting and searching methods.

OUTCOMES:

- Ability to identify the appropriate data structure for given problem.
- Able to design and analyze the time and space complexity of algorithm and program.
- Ability to effectively use compilers includes library functions, debuggers and trouble shooting.

Week 1:

a) Implementation of Linear Search
b) Implementation of Binary Search.

Week 2:

a) Implementation of Linear Search & Binary Search using Recursion.
b) Implementation of Bubble Sort.

Week 3:

a) Implementation of Selection Sort
b) Implementation of Insertion Sort

Week 4:

Write programs to illustrate pointers
a) To implement pointer arithmetic
b) To implement pointer to pointer
c) To implement array of pointers

Week 5:

Write C program to illustrate String Handling functions using pointers- to copy, concatenate, compare, reverse and length.

Week 6:

Basic programs in structures- student details, employee details, Inventory management using array of structures.

Week 7:

a) Write C program that uses functions to perform the following operations:

- Reading a complex number
- Writing a complex number
- Addition of two complex numbers
- Multiplication of two complex numbers
  (Note: represent complex number using a structure.)

b) Write a C program to illustrate Nested structures

Week 8:

Review and Revision.

Week 9:

a) Write C programs to illustrate Unions
b) Write C programs to illustrate Enumerated data type

Week 10:

a) Write C program to display the contents of a file.
b) Write C program to count the no. of characters ,words and lines of a text file
c) Write C program to implement Command line arguments

Week 11:

a) Write C program to merge two files into a third file (i.e., the contents of the first file Followed by those of the second are put in the third file)
b) Write C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Week 12:

a) Write C program to illustrate Stack operations using arrays
b) Write C program to illustrate Queue operations using arrays

Week 13:

Write C program to implement the operations of Single Linked List

Week 14:

a) Write C program to illustrate Stack operations using Linked List.
b) Write C program to illustrate Queue operations using Linked List

Week 15:

Review and Revision.

TEXT BOOKS:

1. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F.Gilberg, Third Edition, Cengage Learnimng.

REFERENCE BOOKS:

1. Understanding Pointers in C, Yashavant P.Kanetkar, 3rd Edition, BPB Publications. 2006.
2. Programming in C, Reema Tahreja, 2nd Edition,Oxford University Press 2015.
3. Theory and Problems of Data Structures, Seymour Lipschutz, Mc Graw Hill, 1986.

L	P	C
0	3	2

ENGINEERING PHYSICS LAB -II

(EEE and ECE)

The following experiments are to be performed.

1. Numerical Aperture of an Optical Fibre
2. Single slit diffraction – Measurement of wavelength of monochromatic light
3. To determine the diameter of a thin wire by interference in a wedge shape air film.
4. Moment of inertia of fly wheel.
5. Frequency of A.C. mains using sono-meter.
6. Characteristics of Photodiode
7. LCR circuit – Series and Parallel resonance
8. Energy gap of semiconductor

ELECTRONICS AND COMMUNICATION ENGINEERING

II YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A13012	Mathematics – IV	3	1	0	3	4	100
A13401	Electronic Devices and Circuits	3	1	0	3	4	100
A13402	Signals and Systems	4	0	0	4	4	100
A13403	Switching Theory and Logic Design	3	0	0	3	3	100
A13404	Electronic Measurements & Instruments	3	0	0	3	3	100
A13405	Probability Theory and Stochastic Processes	4	0	0	4	4	100
A13481	Electronic Devices and Circuits Lab	0	0	3	2	3	75
A13482	Basic Simulation Lab	0	0	3	2	3	75
MC-I	Mandatory Course-I	2	0	0	0	2	50
	Total	**22**	**2**	**6**	**24**	30	800

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Lecture **T – Tutorial** **P – Practical** **D – Drawing**

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II YEAR B.Tech, I SEMESTER

L	T	P/D	C
3	1	0	3

MATHEMATICS-IV
(SPECIAL FUNCTIONS AND FUNCTIONS OF A COMPLEX VARIABLE)

(COMMON TO EEE & ECE)

Pre Requisites: Nil

COURSE OBJECTIVES: To learn

8. Series solutions for Legendre differential equation, analyzing the properties of Legendre polynomials.
9. Differentiation and Integration of complex valued functions.
10. Evaluation of integrals using Cauchy's integral formula.
11. Taylor's series, Maclaurin's series and Laurent's series expansions of complex functions.
12. Evaluation of integrals using residue theorem.
13. Transform a given function from z - plane to w – plane.
14. Identify the transformations like translation, magnification, rotation and reflection and inversion.
15. Properties of bilinear transformations.

COURSE OUTCOMES: After going through this course the student will be able to:

1. Identify Bessel equation and solve it under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Legendre polynomials.
2. Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem,
3. Expansion of a given function as a Taylor's and Laurent series
4. Solving Real Definite Integrals using Cauchy's Residue Theorem.

UNIT-I

Legendre's Polynomials
Introduction to series solution of differential equations. Legendre's Differential equation, General solution of Legendre's equation, Legendre's polynomials and their Properties: Rodrigue's formula – Recurrence relations, Generating function of Legendre's polynomials – Orthogonality.

UNIT-II
Complex Functions –Differentiation
Complex functions and its representation on argand plane, Concepts of limit Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions– Milne – Thompson method, complex potential functions, stream functions and velocity functions.

UNIT-III

Complex Integration & Complex Power series

Complex Integration:
Line integral evaluation along a path, Cauchy's integral theorem, Cauchy's integral formula – Generalized integral formula.

Complex Power series
Radius of convergence –Expansion in Taylor's series, Maclaurin's series and Laurent's series. Singular point –Isolated singular point – pole of order m – essential singularity.

UNIT-IV

Residue and Contour Integration

Residue – Evaluation of residue by formula and by Laurent's series – Residue theorem. Evaluation of integrals of the type:

(a) $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$ (b) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (c) Indetation by Contour Integration.

UNIT-V

Conformal mapping

Transformation of z-plane to w-plane by a function, Conformal transformation. Standard Transformations-Translation; Magnification and rotation; inversion and reflection, Transformations like e^z , log z, z^2 , and bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given.

TEXT BOOKS

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.
3. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.

REFERENCES

1. Complex Variables Principles and Problem Sessions By A.K.Kapoor, World Scientific Publishers
2. A Text Book Of Engineering Mathematics by N P Bali, Manesh Goyal
3. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edit. 2013, Chapman & Hall/CRC
4. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Person Educations.
5. Schaum's Outline Series on Complex Variables

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE I-Sem

L	T	P	C
3	1	0	3

ELECTRONIC DEVICES AND CIRCUITS

Course Objectives:
This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

1. To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET transistors and amplifier circuits.
2. To understand diode as rectifier. To study basic principle of filter circuits and various types.

UNIT -I: P-N Junction Diode:
Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.
Special Purpose Electronic Devices: Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode, UJT and Characteristics

UNIT-II: Rectifiers and Filters:
The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π- Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

UNIT-III: Bipolar Junction Transistor:
The Junction Transistor, BJT Symbol, Transistor Current Components, Transistor Construction, BJT Operation, Common Base, Common Emitter and Common Collector Configurations, Comparison of CB, CE, and CC Amplifier Configurations, Transistor as an Amplifier, Limits of Operation , BJT Specifications,
BJT Small Signal Model: BJT Hybrid model, Determination of h-parameters from Transistor Characteristics, Analysis of a Transistor Amplifier Circuit using h- Parameters.

UNIT-IV: Transistor Biasing and Stabilization:
Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in V_{be} and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability,

UNIT-V: Field Effect Transistor and Biasing:
Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, FET as Voltage Variable Resistor, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes. Biasing FET, Comparison of BJT and FET.

COURSE OUTCOMES:

1. After going through this course the student will be able to:
2. Understand and Analyze the different types of diodes, operation and its characteristics Design and analyze the DC bias circuitry of BJT and FET Design biasing circuits using diodes and transistors.
3. To analyze and design diode application circuits, amplifier circuits and oscillatorsemploying BJT, FET devices.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

REFERENCES:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2Ed, 2013.
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE I-Sem	L	T	P	C
	4	0	0	4

SIGNALS AND SYSTEMS

Course Objectives:

This is a core subject, basic knowledge of which is required by all the engineers.
This course focuses on:

1. To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

UNIT-I:Signal Analysis and Fourier Series

Signal Analysis: Introduction to signals, types of signals, operations on signals.Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of orthogonal functions, Orthogonality in Complex functions.

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Properties of Fourier Series, Complex Fourier spectrum.

UNIT-II: Fourier Transforms and Sampling

Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function.

Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Types of Sampling - Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT-III: Signal Transmission through Linear Systems:

Introduction to systems, types of systems**,** Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for Physical realization, Relationship between Bandwidth and Rise time.

UNIT-IV: Convolution and Correlation of Signals:

Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function,
Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

UNIT-V: Laplace Transforms and Z-Transforms

Laplace Transforms: Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
2. Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
3. Understands the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.
4. Can design a system for sampling a signal.
5. For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
6. Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.
3. Signals and Systems-P. Ramesh Babu,R.Anadanatarajan,Scitech pub,4^{th} Edition

REFERENCES:

1. Signals & Systems – Sanjay Sharma,6^{th} Revised Edition
2. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed.
3. Signals and Signals – Iyer and K. Satya Prasad, Cengage Learning
4. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
5. Introduction to Signal and System Analysis – K.Gopalan 2009, Cengage Learning.
6. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
7. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE I-Sem	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

SWITCHING THEORY AND LOGIC DESIGN

Prerequisite Subject : None

Course Objectives:
This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits
4. To design combinational logic circuits, sequential logic circuits.
5. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
6. To implement synchronous state machines using flip-flops.

UNIT-I:Number System and Boolean Algebra And Switching Functions:
Review of number systems, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes.
Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT-II: Minimization and Design of Combinational Circuits:
Introduction, The Minimization of switching function using theorem, The Karnaaugh Map Method-Up to Five Variable Maps, Don't Care Map Entries, Tabular Method, Design of Combinational Logic: Adders, Subtractors, comparators, Multiplexers, Demultiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III: Sequential Machines Fundamentals and Applications:
Introduction: Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop , Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.
Registers and Counters: Shift Registers, Data Transmission in Shift Registers, Operation of Shift Registers, Shift Register Configuration, Bidirectional Shift Registers, Applications of Shift Registers, Design and Operation of Ring and Twisted Ring Counter, Operation Of Asynchronous And Synchronous Counters.

UNIT-IV: Sequential Circuits-I:
Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Synthesis of Synchronous Sequential Circuits, Serial Binary Adder, Sequence Detector, Parity-bit Generator, Design of Asynchronous Counters, Design of Synchronous Modulo N –Counters.

UNIT-V: Sequential Circuits-II:
Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.
Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
2. Manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

TEXT BOOKS:

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge.
2. Digital Design-Morris Mano, Machael Cilette, Pearson Education, 2013.
3. Switching Theory and Logic Design – A Anand Kumar, PHI,2013.

REFERENCES:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
3. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
4. Digital Logic Design - Ye Brian and HoldsWorth, Elsevier
5. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
6. DigitalLogic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
7. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

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II Year B.Tech. ECE I-Sem

L	T	P	C
3	0	0	3

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

1. To introduce the basic concepts related to the operation of electrical & electronic measuring instruments.
2. To understand operational and application aspects of CRO (normal and storage).
3. To analyze and apply various AC bridges for the measurements of various physical quantities minimizing errors by following proper precautions.
4. To study the principles behind various transducers and their applications in the measurement of various parameters in electrical and mechanical engineering fields.
5. To effectively integrate hardware and software for the design of computer controlled processes and/or systems.

UNIT - I:

Block Schemantics of Measuring Systems: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT - II:

Signal Analyzers: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video Signal Generators, and Specifications.

UNIT - III:

Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT - IV:

Transuducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT - V:

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acquisition Systems.

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

- Describe the fundamental concepts and principles of instrumentation.
- Explain the operations of the various instruments required in measurements.
- Apply the measurement techniques for different types of tests.
- To select specific instrument for specific measurement function.
- Understand principle of operation, working of different electronic instruments like digital multi meter, vector voltmeter.
- Learners will apply knowledge of different oscilloscopes like CRO, DSO.
- Students will understand functioning, specification, and applications of signal analysing instruments.

TEXTBOOKS:

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCES:

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
5. Industrial Instrumentation: T. R. Padmanabham Spiriger 2009.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE I-Sem	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

PROBABILITY THEORY AND STOCHASTIC PROCESS

PREREQUISITES: A Course on engineering mathematics containing elementary probability theory, ordinary and partial differential equations and linear algebra.

Course Objectives:

The primary objective of this course is:

1. To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in signal processing and Communication Engineering.
2. To introduce students to the basic methodology of “probabilistic thinking” and to apply it to problems.
3. To understand basic concepts of probability theory and random variables, how to deal with multiple random variables, Conditional probability and conditional expectation, joint distribution and density functions.
4. Statistical Independence and mean square estimation.
5. To understand the difference between time averages and statistical averages.
6. Analysis of random process and application to the signal processing in the communication system.
7. To teach students how to apply sums and integrals to compute probabilities, means, and expectations.

UNIT- I : Probability

Probability Introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes’ Theorem, Independent Events, Bernoulli’s trials.

Random Variable:

Definition of a Random Variable, Types of Random Variables, Conditions for a Function to be a Random Variable, Continuous, Discrete and Mixed Random Variables .

UNIT II :Distribution & Density Functions And Operations On One Random Variable:

Distribution and Density functions, and their Properties- Binomial, Poisson, Uniform, Exponential Gaussian, Rayleigh and Conditional Distribution, Methods of defining Conditional Event, Conditional Density function and its properties, problems.

Operations On One Random Variable-Expectation:

Introduction, Expected Value of a Random Variable, Function of a Random Variable ,Moments about the Origin, Central Moments, Variance and Skew, , Chebychev’s Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Non monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT III: Multiple Random Variables And Operations On Multiple Random Variables:

Vector Random Variables, Joint Distribution Function and its Properties, Joint density Function and its Properties, Marginal Distribution and density Functions and its Properties, Conditional Distribution and Density – Point Conditioning and Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

Operations On Multiple Random Variables:

Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT IV: Stochastic Processes- Temporal Characteristics:
The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second-Order and Wide-Sense Stationary, Nth Order and Strict-Sense Stationary, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and its Properties, Covariance and Its Properties, Linear system Response:Mean and Mean-squared value, Autocorrelation, Cross-Correlation Functions. Gaussian Random Processes, Poisson Random Process .

UNIT V: Stochastic Processes – Spectral Characteristics:
Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.
Spectral Characteristics Of System Response: Power Density Spectrum of Response, Cross-Power Spectral Density of Input and Output of a Linear System.

COURSE OUTCOMES:
After going through this course the student will be able to:
1. Demonstrate knowledge in
    - Probability theory
    - Single and multiple random variables
    - Random processes and their characteristics
2. Analyze operations on single and multiple random variables and processes.
3. Will be able to compute:
    - Simple probabilities using an appropriate sample space.
    - Expectations from probability density functions
    - Least -square & maximum likelihood estimators for engineering problems.
    - Mean and covariance functions for simple random processes.
4. Design solutions for complex engineering problems involvingrandom processes.

TEXT BOOKS

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.TMH.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.

REFERENCES

1. Probability and random processes with stochastic processes- Mallikarjuna Reddy, Cengae Learning
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W.Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, Oxford,3rd Edition, 1999.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003
5. Theory of Probability and Stochastic Processes- Pradip Kumar Gosh, University Press

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE/EEE I-Sem	**L**	**T**	**P**	**C**
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ELECTRONIC DEVICES AND CIRCUITS LAB
(ECE & EEE)

PART A: (Only for Viva-voce Examination)

Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
    a. Multimeters (Analog and Digital)
    b. Function Generator
    c. Regulated Power Supplies
    d. CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. Lissajous patterns using CRO
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier .
12. SCR characteristics.
13. UJT Characteristics

Equipment required for Laboratories:

1. Regulated Power supplies (RPS) -0-30 V
2. CRO's -0-20 MHz.
3. Function Generators -0-1 MHz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) -0-20 μA, 0-50μA, 0-100μA, 0-200μA, 0-10 mA.
8. Voltmeters (Analog or Digital) -0-50V, 0-100V, 0-250V
9. Electronic Components -Resistors, Capacitors, BJTs,

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE I-Sem

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0	0	3	2

BASIC SIMULATION LAB

Minimum number of experiments: 15

1. Basic operations on Matrices
2. Generation of various signals and sequences (Periodic and Aperiodic), such as Unit Impulse, Unit step, square, saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, multiplication, scaling, Shifting, Folding, computation of Energy and average power.
4. Finding the Even and Odd parts of Signal/sequence and Real and imaginary parts of signal.
5. Convolution between signals and sequences.
6. Auto correlation and cross correlation between signals and sequences.
7. Verification of Linearity and Time Invariance Properties of a given continuous/Discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
9. Gibbs Phenomenon.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S plane and Z-plane for the given transfer function.
13. Generation of Guassian noise (Real and complex), Computation of its mean, M.S. value and its Skew, Kurtosis, and PSD, probability distribution function.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic signal masked by noise using correlation.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationary in Wide sense.

ELECTRONICS AND COMMUNICATION ENGINEERING

II YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A14211	Principles of Electrical Engineering	3	1	0	3	4	100
A14409	Electronic Circuit Analysis	4	0	0	4	4	100
A14410	Pulse and Digital Circuits	4	0	0	4	4	100
A14411	Electromagnetic Theory and Transmission Lines	4	0	0	4	4	100
A14412	Digital System Design	3	1	0	3	4	100
A14016	Environmental Science	2	0	0	2	4	100
A14485	ECA Lab	0	0	3	2	3	75
A14486	PDC Lab	0	0	3	2	3	75
MC-II	Mandatory Course-II	2	0	0	-	2	50
	Total	**22**	**2**	**6**	**24**	32	800

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Lecture **T – Tutorial** **P – Practical** **D – Drawing**

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

L	T	P	C
3	1	0	3

PRINCIPLES OF ELECTRICAL ENGINEERING

Course Objectives:
This course introduces the basic concepts of transient analysis of the circuits, the basic two-port network parameters and the design analysis of the filters and attenuators and their use in the circuit theory. The emphasis of this course is laid on the basic operation of DC machines and transformers which includes DC generators and motors, Single-Phase transformers.

UNIT - I:
Transient Analysis (First and SecondOrder Circuits): Transient response of RL, RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method

UNIT - II:
Two Port Networks: Impedance Parameters, Admittance Parameters,HybridParameters, Transmission (ABCD) Parameters, Conversion of one of Parameter to another, Conditions for Reciprocity and Symmetry, InterConnection of Two Port networks in series, Parallel and Cascaded configurations, Image Parameters,Illustration problems

UNIT - III:
Filters and Symmetrical Attenuators: Classification of Filters, Filter Network, Classification of Pass band and Stop Band, Characteristic Impedance in the Pass andStop bands, Constant-k Low Pass Filter, High Pass Filter,m-derived T-Section, Band PassFilter and Band Elimination filter,Illustrativeproblems,Symmetrical Attenuators - T-Type Attenuator, p-Type Attenuator, Brided T-Type Attenuator,Lattice Attenuator

UNIT - IV:
DC Machines: Principle Of Operation Of DC Machines, EMF equation, Types of Generators, Magnetisation and Load Characteristics of DC Generators, DC Motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency,Swinburne's Test, Speed control of DC Shunt Motor, Flux and Armature Voltage control methods.

UNIT - V:
Transformers and Their Performance: Principle of Operation of Single Phase Transformer, Types, Constructional Features, Phasor Diagram on No Load and Load,Equivalent Circuit, Losses and Efficiency of Transformer and Regulation, OC and SC test(SimpleProblems), Synchros, Stepper Motors.

COURSE OUTCOMES:
After going through this course the student gets a thorough knowledge on transient analysis of circuits, filters, attenuators, the operation of DC machines and transformers, with which he/she can be able to apply the above conceptual thins to real-world problems and applications.

TEXT BOOKS:

1. Electrical Circuits - A. Chakrabarthy, DhanipatRai& Sons.
2. Basic Concepts of Electrical Engineering - PS Subramanyam, BS Publications.

REFERENCE BOOKS:

1. Engineering Circuits Analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition.
2. Basic Electrical Engineering - S.N. Singh PUI
3. Electrical Circuits - David A. Bell, Oxford Printing Press.
4. Electrical Circuit Analysis - K.S. Suresh Kumar, Pearson Education.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

L	T	P	C
4	0	0	4

ELECTRONIC CIRCUIT ANALYSIS

Course Objectives:

1. To introduce circuit realizations with components such as diodes, BJTs and transistors studied earlier.
2. To give understanding of various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
3. To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

UNIT – I:

Single Stage and Multi Stage Amplifiers

Single Stage Amplifiers: Classification of Amplifiers – Distortion in amplifiers, Analysis of CE, CC, and CB Amplifiers and CE Amplifier with emitter resistance, Miller's Theorem and its dual.

Multi Stage Amplifiers: Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier, Darlington pair,and Different coupling schemes used in amplifiers- RC Coupled amplifiers, Transformer Coupled amplifiers and Direct Coupled amplifiers.

UNIT – II:

BJT Amplifiers and FET Amplifiers

BJT Amplifiers: Logarithms, Decibels, General frequency considerations, Frequency response of BJT amplifier – Analysis at low and high frequencies,effect of coupling and bypass capacitors, The Hybrid- pi (π) – Common Emitter transistor model, CE short circuit current gain, current gain with resistive load, Single stage CE transistor amplifier response, Gain-bandwidth product, Equivalent Circuit of Emitter Follower at higher frequencies.

FET Amplifiers: Basic Concepts, Analysis of CS, CD, CG JFET Amplifiers, Common Source Amplifier with Source resistance.

UNIT –III:

Feedback Amplifiers And Oscillators

Feedback Amplifiers: Classification of amplifiers, Concepts of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.

Oscillators: Classification of oscillators, Condition for oscillations, RC-phase shift and Wien-bridge oscillators. Generalized analysis of LC oscillators- Hartley and Colpitts Oscillators, Crystal Oscillator, stability of oscillators

UNIT – IV:

Large Signal Amplifiers:

Classification of Power Amplifiers, Class A Power Amplifier, Maximum Value of Efficiency of Class – A Amplifier, Transformer Coupled Amplifier, Class B Power Amplifier, Efficiency of Class B Amplifier, Push Pull and Complimentary Symmetry Class B and Class AB Power Amplifiers – Principle of operation of class – C Amplifier, Distortion in power amplifiers, Transistor Power Dissipation, Heat Sinks.

UNIT – V:

Tuned Amplifiers

Introduction, Q-Factor, Small Signal Tuned Amplifiers with coupling techniques, Effect of Cascading single Tuned amplifiers on Bandwidth, Effect of Cascading Double Tuned amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned amplifiers

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
2. Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
3. Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.

TEXT BOOKS:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, TMH
2. Electronic Devices and Circuits, David A. Bell – 5^{th} Edition, Oxford.
3. Electronic Devices and Circuits, S. Salivahanan, N.Suresh Kumar, AVallvaraj, 2^{nd} Edition, TMH.

REFERENCES:

1. Introductory Electronic Devices and Circuits (Conventional flow version) – Robert T. Paynter, 7^{th} Edition, 2009, PEI.
2. Microelectronic Circuits – Sedra / Smith – 5^{th} Edition – Oxford, 2009
3. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.
4. Electronic Devices and Circuits, Anil.K. Maini, Varsha Agrawal, 1^{st} Edition, WILEY.
5. Electronic Devices and Circuit Theory, Robert L.Boylestad, Louis Nashelsky, 9^{th} Edition, Pearson Education.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

L	T	P	C
4	0	0	4

PULSE AND DIGITAL CIRCUITS

Course Objectives

1. To understand the concepts of wave shaping and switching characteristics of diodes and transistors .
2. To analyze clippers and clampers.
3. To analyze and design different types of multivibrators and
4. To analyze time base generators, sampling gates
5. To analyze and design various digital circuits.

UNIT - I
Linear Wave Shaping
High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, and ramp inputs. High pass RC circuit as differentiator and Low pass RC circuit as integrator, attenuators, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT II
Non-Linear Wave Shaping
Diode clippers, Transistor clippers, clipping at two independent levels, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, Clamping circuit theorem, clamping circuits taking source and diode resistances into account , practical clamping circuits, effect of diode characteristics on clamping voltage, synchronized clampers.

UNIT III
Switching Characteristics of Devices
Diode as a switch, piece wise linear characteristics of diode, Diode Switching Times, temperature variation of saturation parameters, design of transistor as a switch, transistor-switching times, and transistor in saturation.
Sampling Gates
Basic operating principles of sampling gates, Unidirectional diode gate, Bi-directional sampling gates using transistors, Reduction of pedestal in gate circuit, four diode sampling gate, an alternate form of four diode gate, Applications of sampling gates.

UNIT IV
Multivibrators
Analysis and design of Bistable, Monostable, AstableMultivibrators and Schmitt trigger using transistors.
Time Base Generators
General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators, methods of linearity improvements

UNIT V
Synchronization and Frequency Division
Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits.
Logic Families:
Realization of Logic Gates (OR, AND, NOT) Using Diodes & Transistors, DCTL, RTL, DTL, TTL, ECL logic families ,Characteristics of Logic families and comparison of logic families

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand the applications of diode as integrator, differentiator, clippers, clampler circuits.
2. Learn various switching devices such as diode, transistor, SCR.
3. Difference between logic gates and sampling gates.
4. Design mutivibrators for various applications, synchronization techniques and sweep circuits.
5. Realizing logic gates using diodes and transistors.

TEXT BOOKS:

1. Jacob Millman, Herbert Taub and Mothiki S. Prakash Rao, Millman's Pulse, Digitaland Switching Waveforms, Tata McGraw-Hill,3rd Edition, 2008.
2. David A. Bell, Solidstate pulse circuits, PHI, 4TH Edition, 2002

REFERENCES:

1. .A.Anand Kumar, Pulse and Digital Circuits, 2005, PHI.
2. Motheki S. Prakash Rao, Pulse and Digital Circuits, TMH, 2006.

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II Year B.Tech. ECE II-Sem

L	T	P	C
4	0	0	4

ELECTROMAGENETIC THEORY AND TRANSMISSION LINES

Course Objectives:

1. To introduce the student to the fundamental theory and concept of electromagnetic waves and transmission lines, and their practical applications.
2. To study the propagation, reflection, and transmission of plane waves in bounded unbounded media.

UNIT - I:
Electrostatics:
Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems, Convection and Conduction Current, Dielectric Constant, Iotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance - Parallel plate, Coaxial, Spherical Capacitors, Illustrative Problems.

UNIT - II:
Magnetostatics:
Biot - Savart's Law , Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductance and Magnetic Energy, Illustrative Problem.
Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface: Dielectric - Dielectric and Dielectric - Conductor Interfaces, Illustrative Problems.

UNIT - III:
EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics - Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization, Illustrative Problems.
EM Wave Characteristics - II: Reflection and Refraction of Plane Waves - Normal and Oblique Incidence for both perfect Conductor and perfect Dielectric, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem - Applications, Power Loss in a Plane Conductor., Illustrative Problems.

UNIT - IV:
Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedence, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion - Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.

UNIT - V:
Transmission Lines - II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuits Elements; ?/4, ?/2, ?/8 Lines - Impedance Transformations, Significance of Zmin and Zmax, Smith Chart - Configuration and Applications, Single and Double Stub Matching, Illustrative Problems.

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Study time varying Maxwell's equations and their applications in electromagnetic problems.
2. Determine the relationship between time varying electric and magnetic fields and electromotive force.
3. Analyze basic transmissions line parameters in phasor domain.
4. Use Maxwells equations to describe the propagation of electromagnetic waves in vaccum.
5. Show how waves propagate in Dielectrics and lossy media.
6. Demonstrate the reflection and refraction of waves at boundaries.

TEXT BOOKS:

1. Elements of Electromagnetics - Matthew N. O. Sadiku, 4th., Oxford Univ. Press.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K. G. Balmain, 2nd Ed., 2000, PHI.
3. Transmission Lines and Networks - Umesh Sinha, Satyaprakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES :

1. Engineering Electromagnetics - Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics - William H. Hay Jr. and John A. Buck, 7thEd., 2006, TMH.
3. Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.
4. Networks, Lines and Fields - John D. Ryder, 2ndEd., 1999, PHI.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

L	T	P	C
3	1	0	3

DIGITAL SYSTEM DESIGN

Course Objectives:

This course teaches:

- Designing digital circuits, behaviour and RTL modelling of digital circuits usingverilog HDL, verifying these Models and synthesizing RTLmodels to standard cell libraries and FPGAs.
- Students aim practical experience by designing, modelling, implementing and verifying several digital circuits.

This course aims to provide students with the understanding of the different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided software tools. Design digital components and circuits that are testable, reusable, and synthesizable.

UNIT - I:

IntroductiontoVerilLog HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Function Verification, System Tasks, Programming LanguageInterface, Module, Simulation and Synthesis Tools

Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Operators.

UNIT - II:

Gate Level Modelling: Introduction, AND Gate Primitive, ModuleStructure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances ofPrimitives, Design of Flip-Flops with Gate Primitives, Delay, Strengths and Construction Resolution, Net Types, Design ofBasicCircuit.

Modelling at Dataflow Level: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments,Assignment to Vector, Operators.

UNIT - III:

Behavioural Modelling: Introduction, Operations and Assignments,Functional Bifurcation, 'Initial' Construct, Assignments with Delays, 'Wait'Construct, MultipleAlwaysBlock, Designsat Behavioural Level, Blocking and Non-Blocking Assignments, The 'Case' Statement, Simulation Flow, 'If' an 'if-Else' Constructs, 'Assign- De-Assign' Constructs, 'Repeat' Construct, for loop, 'The Disable' Construct, 'While Loop', Forever Loop, Parallel Blocks, Force-Release, Construct, Event.

UNIT - IV:

Switch LevelModeling: BasicTransistor Switches, CMOS Switches, BiDirectional Gates, Time Delays with Switch Primitives, Instantiation with 'Strengths' and 'Delays' Strength Contention with Trireg Nets.

System Tasks, Functions and Compiler Directives: Parameters, Path Delays, Module Parameters. SystemTasks and Functions,File Based Tasks and Functions, Computer Directives, Hierarchical Access,User Defined Primitives.

UNIT - V:

Sequential Circuit Description: Sequential Models - Feedback Model, Capacitive Model, Implicit Model, Basic Memory Components, Functional Register, Static Machine Coding, Sequential Synthesis.

Components Test and Verification: Test Bench - Combinational Circuits Testing, Sequential Circuit Testing, Test Bench Techiniques,Desin Verification, Assertion Verification.

Course Outcomes:

By the end of this course, students should be able to:

- Describe Verilog hardware description, languages(HDL).
- Design digital circuits.
- Write Behavioural models of digital circuits.
- Write Register Transfer Level (RTL) models of Digital Circuits.
- Verify Behavioural and RTL models.
- Describe standard cell libraries and FPGAs
- Synthesize RTL models to standard cell libraries and FPGAs
- Implement RTL models on FPGAs and Testin and Verification

TEXT BOOKS:

1. T.R. Padmanabhan, B Bala Tripura Sundari, Design through Verilog HDL, Wiley 2009.
2. ZainalabdienNavabi, Verliog Digital System Design,TMH, 2nd Edition.

REFERENCE BOOKS:

1. Fundamentals ofDigital Logic with Verilog Design - Stephen Brown,ZvonkocVranesic, TMH, 2nd Edition.
2. Advanced Digital Logic Design using Verilog, State Machines & Synthesis for FPGA - Sunggu Lee, Cengage Learning, 2012.
3. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.
4. Advanced Digital Design with Verilog HDL - Michel D. Ciletti, PHI,2009.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

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2	0	0	2

ENVIRONMENTAL SCIENCE

(Common to all Branches)

Course Objectives

- Develop an understanding on the importance of environmental protection.
- Understanding the significance of ecological balance for sustainable development.
- The ability to apply quantitative reasoning and practical skills to environmental problems.

Course Outcomes:

At the end of the course, the student will be able to:

- Understand the importance of Ecosystem and its Resources.
- Be aware on the Variety of Living organism and the need to conserve them.
- Understand the impacts of Developmental Activities.
- Understand the Environmental Policies, Management Plan and Regulations.
- Sensitize on a Sustainable Future.

UNIT I:

ECOSYSTEMS:

Definition, Scope and Importance of ecosystem; Classification of ecosystems, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bioaccumulation and Biomagnification; Ecosystem Value services and Carrying Capacity. **BIODIVERSITY AND BIOTIC RESOURCES**: Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT II:

NATURAL RESOURCES: Classification of Resources, **Water resources**: use and over utilization of surface and ground water, Floods and Droughts, Dams: benefits and problems. **Energy resources**: growing energy needs, Renewable Energy Sources – Solar, Hydro-Power, Wind, Tidal, Geo-Thermal, Biomass, Bio-fuels, Hydrogen as a fuel and Biogas and Non Renewable Energy – Coal, Petroleum, LPG, Natural Gas, SNG, CNG. **Land resources**: land as a resource, land degradation – Landslide and Soil Erosion; **Forest Resources – Uses and Exploitation.**

UNIT III:

ENVIRONMENTAL POLLUTION AND CONTROL: Types of Pollution, Sources, Effects and Control measures and Quality Standards for

1. Air Pollution
2. Water Pollution
3. Soil Pollution
4. Noise Pollution

Solid, Hazardous, Biomedical and e-Waste Management and Handling Rules, Nuclear Hazards – Case Studies. **Waste water treatment methods**: Effluent treatment plants (ETP), Sewage treatment plants (STP), Common and combined effluent treatment plants (CETP).

UNIT IV:

GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS: Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Acid Rains, Deforestation and Desertification. **ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**: Definition of Impact: classification of impacts, Methods of baseline data acquisition. Impacts on different environmental components; Environmental

Impact Statement (EIS). Environmental Management Plan (EMP) - Rain Water Harvesting, Water Shed Management and Bioremediation.

UNIT V:

ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS: Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Wildlife Act 1972. **TOWARDS SUSTAINABLE FUTURE**: Concept of Sustainable Development, Threats to Sustainability: Population and its explosion, Crazy Consumerism, Over-exploitation of resources; Environmental Education, Role of Civil Societies, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

TEXT BOOKS:

1. Text Book of Environmental Studies by Anubha Kaushik (4^{th} Edition), New age International Publishers.
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.
3. Environmental studies, From crisis to cure by R.Rajagopalan, 2005

REFERENCE BOOKS:

1. Environmental Science: Towards a Sustainable Future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Science by Daniel B. Botkin & Edward A. Keller, Willey INDIA Edition.
3. Text book of Environmental Science and Technology by M.Anji Reddy 2007

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

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ELECTRONIC CIRCUITS ANALYSIS LAB

SOFTWARE (Minimum eight experiments to be conducted)

1. Common Emitter Amplifier
2. Common Emitter Amplifier
3. Common Source Amplifier
4. Two Stage RC Coupled Amplifier
5. Current Shunt And Voltage Series Feedback Amplifier
6. Cascode Amplifier
7. Wien Bridge Oscillator Using Transistors
8. RC Phase Shift Oscillator Using Transistors
9. Class A Power Amplifier (Transformer Less)
10. Class B Complementary Symmetry Amplifier
11. Common Base (BJT)/ Common Gate (JFET) Amplifier

HARDWARE (Minimum five experiments to be conducted)

1. Class A Power Amplifier (With Transformer Load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley &Colpitt’s Oscillators
5. Darlington Pair
6. MOS Amplifier

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY HYDERABAD

II Year B.Tech. ECE II-Sem

L	T	P	C
0	0	3	2

PULSE AND DIGITAL CIRCUITS LAB

Minimum eight experiments to be conducted.

List of Experiments:

2. Linear Wave Shaping
   a. RC Low Pass Circuit for different time constants
   b. RC High Pass Circuit for different time constants
3. Non-linear wave shaping
   a. Transfer characteristics and response of Clippers:
      i) Shunt and Series Clippers.
      ii) Clipping at two independent levels.
   b. The steady state output waveform of clampers for a square wave input
      i) Positive Clampers.
      ii) Negative Clampers.
4. Switching characteristics of transistor
5. Design a BistableMultivibrator and draw its waveforms
6. Design an AstableMultivibrator and draw its waveforms
7. Design a MonostableMultivibrater and draw its waveforms
8. Response of Schmitt Trigger circuit for loop gain less than and greater one
9. UJT relaxation oscillator
10. The output – voltage waveform of Boot strap sweep circuit
11. The output – voltage waveform of Miller sweep circuit

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(Aziz Nagar, C.B.Post, Hyderabad -500075)

ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR I SEMESTER **COURSE STRUCTURE**

S.No.	Subject Code	Subject Name	Lectures			Credits
			L	T	P	
1	PC	Analog Communications	4	0	0	3
2	PC	Linear & Digital IC Applications	3	1	0	4
3	ES	Control Systems Engineering	3	1	0	3
4	PE1	**Professional Elective – 1:**	4	0	0	3
		1. Computer Organization and Architecture				
		2. Soft Computing				
		3. Biomedical Instrumentation				
5	OE1	**Open Elective – 1:**	4	0	0	3
		1. Introduction to Microcontrollers & Applications				
		2. Basic Electronics & Instrumentation				
6	PC	Analog Communications Lab	0	0	3	2
7	PC	Linear & Digital IC Applications Lab	0	0	3	2
8	BS	Advanced English Language & Communication Skills Lab	0	0	3	2
9	T&P	Training & Placement Subject - I	2	0	0	2
	Total		**20**	**2**	**9**	**24**

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

III Year B.Tech. ECE-I Sem

L	T	P	C
4	0	0	3

ANALOG COMMUNICATIONS

Pre Requisites

- Signals and Systems
- Electronic Devices And Circuits
- Probability Theory and Stochastic Process

Course objectives

In this course it is aimed to introduce to the students with

- To illustrate the types of communication systems and need for Modulation.
- To enumerate the time and frequency domain analysis of basic modulation schemes and their importance.
- To analyze the effect of noise on different modulation techniques.
- To understand the Characteristics of Receiver and its types.

UNIT-I

Amplitude Modulation: Introduction to communication system - Need for modulation - Amplitude Modulation - Time - frequency domain description- power relations. Generation of AM waves - Detection of AM Waves -Double side band suppressed carrier modulators - time - frequency domain description - Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB - SC Modulated waves.

UNIT-II

SSB Modulation: Frequency domain description - Frequency discrimination - Generation of AM SSB Modulated Wave - Time domain description- Demodulation of SSB - Waves Vestigial side band modulation: Frequency description – Generation- Time domain description, Envelope detection - Comparison of AM Techniques - Applications.

UNIT-III

Angle Modulation Concepts: Basic concepts -FM: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave - Narrow band FM - Wide band FM - Constant Average Power - Transmission bandwidth of FM - Wave Generation of FM Waves- direct indirect Method - Detection of FM Waves - FM transmitter block diagram -Comparison of FM & AM.

UNIT-IV

Noise: Noise - Analog noises - Resistive noise (thermal) - shot noise - extraterrestrial noise - white noise - Narrow band noise- arbitrary noise sources - modeling of noise sources- average noise bandwidth - effective noise temperature - average noise figures -cascaded networks. Noise in DSB& SSB System –AM System - Angle Modulation System - Threshold effect - noise triangle -Pre-emphasis - De-emphasis.

UNIT-V

Receivers: Radio Receiver - Receiver Types - RF section - Characteristics - Frequency changing and tracking - Intermediate frequency –AGC - FM Receiver - Comparison with AM Receiver - Amplitude limiting.

Pulse Modulation: Types of Pulse modulation, PAM- PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, Time Division Multiplexing.

TEXT BOOKS

1. Principles of Communication Systems – H Taub& D. Schilling, GautamSahe. TMH, 2007 3rd Edition
2. Principles of Communication Systems - Simon Haykin. John Wiley, 2r" Edition,.

REFERENCES

1. Electronics & Communication System - George Kennedy and Bernard Davis, 4th Edition TMH 2009
2. Analog Communications- KN Hari Bhat & Ganesh Rao, Pearson Publications, 2nd Edition 2008.
3. Communication Systems Second Edition - R.P. Singh. SP Sapre, TMH, 2007
4. Communication Systems - B.P Lathi, BS Publication, 2006

Course Outcomes

At the end of the course the student should be able to
CO1:Understand the importance of probability theory and the properties of Fourier Transformfor the Analysis of Analog Communication Systems.
CO2: Interpret the Time and Frequency domain analysis of different analog modulation schemes.
CO3:Analyze the given communication system for computing the transmission bandwidth, Power requirement based on the used modulation schemes.
CO4:Design and Utilize different modulation and demodulation schemes used in Real time.
CO5: Differentiate the various divergent noise and its effects on analog modulation schemes, also the various types of receiver characteristics.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

III Year B.Tech. ECE-I Sem

L	T	P	C
3	1	0	4

LINEAR AND DIGITAL IC APPLICATIONS

Pre Requisites

- Switching Theory and logic Design
- Pulse and Digital Circuits
- Electrical Circuits

Course Objectives

In this course it is aimed to introduce to the students with

- To introduce the basic building blocks of linear integrated circuits & its applications.
- To elaborate the theory of ADC and DAC with its specifications.
- To explain and develop the applications of Timers (555), PLL (565) and Voltage regulators (78XX, 79XX).
- To relate the various Logic families.
- To summarize the combinational and sequential logic circuits using 74XX IC's.

UNIT-I

Operational Amplifier: Introduction, Classification of IC's, IC chip size and circuit complexity, Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp

Applications of Op-Amp: Inverting, Non-Inverting, Differential modes, Instrumentation, Sample and Hold Circuit, AC Amplifier, Differentiator and Integrator, Comparator, Schmitt Trigger, waveform Generators - Triangular, Saw tooth, Square wave.

UNIT-II

Active filters: Introduction to Active Filters, Characteristics of Band pass, Band rejects and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters,

D to A and A to D Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications

UNIT-III

Timer and Phase Locked Loops: IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications. IC565 PLL - Block Schematic, Description of Individual Blocks, VCO Applications.

Voltage regulator: Introduction to Voltage Regulators, Features & Internal Operation of 723 Regulator, Three Terminal Voltage Regulators (78XX,79XX).

UNIT-IV

Digital Integrated Circuits: Comparison of Various Logic Families, TTL Logic ,CMOS Logic TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD decoders with drivers , Encoder, Multiplexer, Demultiplexer, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT-V

Sequential Logic IC's and Memories: 74XX Series ICs - All Types of Flip-flops, Conversion between Flip-flops Synchronous Counters, Decade Counters, Shift Registers, Applications of Shift Registers

TEXT BOOKS

1. D. Roy Choudhury, Shail B. Jain (2012), Linear Integrated Circuit, 4th edition, New Age International Pvt. Ltd.,
2. Floyd, Jain (2009), Digital Fundamentals, 8th edition, Pearson Education

REFERENCES

1. Ramakant A. Gayakwad, (2012), OP-AMP and Linear Integrated Circuits, 4th edition,.
2. Sergio Franco (1997), Design with Operational Amplifiers and AnalogIntegrated Circuits, McGraw Hill.
3. Gray, Meyer (1995), Analysis and Design of Analog Integrated Circuits, Wiley International.
4. John F. Wakerly (2007), Digital Design Principles and practices, Prentice Hall / Pearson Education.

Course Outcomes

At the end of the course the student should be able to

CO1: Ability to elucidate the characteristics of ideal and practical operational amplifier

CO2: Apply knowledge of mathematics to analyze operational amplifier in inverting and non-inverting configuration modes and develop the applications of IC 741.

CO3: Examine and infer the functionality of 555 timer and 565 PLL Integrated circuits.

CO4: Interpret the concepts and features of Analog to Digital and Digital to Analog converter in Integrated circuits form.

CO5: Evaluate the various Combinational and sequential logic using 74XX Digital Integrated circuits.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

III Year B.Tech. ECE-I Sem

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3	1	0	3

CONTROL SYSTEMS ENGINEERING

Pre Requisites

- Signals & Systems
- Mathematics-I

Course Objective

In this course it is aimed to introduce to the students with

- To introduce the basic concepts of control theory on systems.
- To obtain the basic knowledge on mathematical modelling of systems.
- To contrast the time & frequency domain analysis of control systems.
- To state the effects of stability on Analog systems.
- To understand the modelling of nonlinear control systems using space state approach.

UNIT-I

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

Transfer Function Representation: Transfer Function Representation- Block diagram representation of systems -Block diagram algebra – Representation of System by Signal flow graph - Reduction using mason's gain formula.

UNIT-II

Time Response Analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of Proportional derivative, proportional integral systems, PID Controller

UNIT-III

Stability Analysis in S-Domain: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT-IV

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots, concept of Nyquist Stability Criterion. Introduction to Compensation techniques

UNIT-V

State Space Analysis Of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts ofControllability and Observability

TEXT BOOKS

1. Automatic Control Systems 8th edition – B. C. Kuo 2003– John wiley and son's.,
2. Control Systems Engineering – I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCES

1. Control Systems 2nd Edition, A. Anand Kumar- Prentice Hall of India Pvt. Ltd.,
2. Control Systems Engineering,-Palani 2nd Edition Mcgraw Hill Education
3. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition.
4. Control Systems Engg. by NISE 3rd Edition – John wiley
5. "Modelling& Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

Course Outcomes

At the end of the course the student should be able to

CO1: Demonstrate and understand the fundamentals of control systems.

CO2: Determine and use models of physical systems in different forms suitable for use in the analysis and design of control systems.

CO3: Relate the time and frequency-domain responses of first and second-order systems to step and sinusoidal inputs.

CO4: Examine the stability of a closed-loop control system

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

III Year B.Tech. ECE-I Sem L T P C
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COMPUTER ORGANIZATION AND ARCHITECTURE

(Professional Elective-I)

Pre Requisites

- Switching theory & Logic Design

Course Objectives

In this course it is aimed to introduce to the students with

- To understand the basic structure and operation of a digital computer.
- To Interpret the various memory system and input / output organization involved in system design
- To illustrate the basics of Basic Computer design
- To explain the various features of Microprogrammed control, arithmetic operations and the process involved in Multiprocessor for system design.

UNIT-I

Structure Of Computers: Computer types, functional units, basic operational concepts, VonNeu mann architecture, bus structures, software, performance, multiprocessors and multicomputer , data representation, fixed and floating point and error detecting codes.

Register Transfer and Micro Operations: Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, shift micro operations, arithmetic logic shift unit

UNIT-II

Basic Computer Organization and Design: Instruction codes, computer registers, computer i nstructions, instruction cycle, timing and control, memory reference instructions, input, output and interrupt.

Central Processing Unit: stack organization, instruction formats, addressing modes, data transfe r and manipulation, program control, reduced instruction set computer (RISC).

UNIT-III

MicroProgrammedControl: Control memory, address sequencing, microprogram example, and design of control unit.

Computer Arithmetic: Addition and subtraction, multiplication and divisionalgorithms, floatingpointarithmetic operation, decimal arithmetic unit, and decimal arithmetic operations.

UNIT-IV

The Memory System: Basic concepts, semiconductor RAM types of read only memory (R OM), cache memory, performance considerations, virtual memory, secondary storage raid, direct memory access (DMA).

UNIT-V

Multiprocessors: Characteristics of multiprocessors, interconnection structures, inter Processor arbitration, inter processor communication and synchronization, cache Coherence, shared memory multiprocessors.

TEXT BOOKS

1.M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India

2.Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition , McGraw Hill, New Delhi, India.

REFERENCES

1.William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy.
2.Andrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc, New Jersey.
3.Sivarama P. Dandamudi (2003), Fundamentals of Computer Organization and Design, Spri nger Int. Edition, USA.

Course Outcomes

At the end of the course the student should be able to
CO1: Recall the structure and organization involved in digital computer design.
CO2: Identify the different memory and input- output system involved in system design.
CO3: Understand the basics of computer organization and its design on program control and computer arithmetic operations.
CO4: Comprehend the various details of multiprocessor in computer design

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

III Year B.Tech. ECE-I Sem

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SOFT COMPUTING
(Professional Elective-I)

Pre Requisite

- Switching Theory and Logic Design

Course Objectives

In this course it is aimed to introduce to the students with

- To familiarize with various soft computing frameworks for engineering applications.
- To introduce the ideas of different neural networks and to provide the mathematical model of various networks.
- To illustrate and analyze the concepts of fuzzy logic involved in various systems
- To interpret the various stages involved in optimization of engineering problems using Genetic Algorithm.

UNIT-I

Introduction: Introduction of soft computing - soft computing vs. hard computing- Soft computing techniques- Hybrid Systems-Applications of soft computing.

Biological Neural Network-Neuron- Nerve structure and synapse- Artificial Neuron and its model- - Neural network architecture- single layer and multilayer feed forward networks- Supervised and unsupervised Learning- activation functions-Basic Terminologies of ANNs.

UNIT-II

Artificial Neural Networks: McCulloch Pitts neuron model- Hebb net – Perception - Adaline and Madaline- Radial Basis Function Network- Pattern Association – Hetero Associative neural network – Auto associative net - Hopfield networks – Kohonen's self-organization maps – Counter propagation – Back propagation neural network.

UNIT-III

Introduction to Fuzzy Logic: Introduction to Classical and Fuzzy sets – fuzzy set operations- fuzzy relations – Membership functions Fuzzification- inference and defuzzification – Fuzzy to crisp conversion – fuzzy rules – fuzzy approximate reasoning.

UNIT-IV

Fuzzy Logic Control System: Introduction to fuzzy logic modeling and control- Fuzzy logic controller –- Fuzzy knowledge and rule bases- Fuzzy decision making logic – design of fuzzy logic controller – Fuzzy based Temperature controller –Fuzzy modeling and control schemes for nonlinear systems

UNIT-V

Genetic Algorithm: Introduction –-Biological Background-Basic Operators and Terminologies in GAs –-- Fitness Computations, Encoding, Selection, Cross over, Mutation -– Simple GA - Generational cycle – General Genetic Algorithm – Convergence of GA – Constraints in GA – Classification of Genetic Algorithm –Applications and limitations of GA - Simple problems.

TEXT BOOKS

1. J.S.R.Jang, C.T.Sun and E.Mizutani, Neuro-Fuzzy and Soft Computing, PHI, 2004, Pearson Education.
2. LaureneFausett, Fundamentals of Neural Networks, Prentice Hall, Englewood cliffs.N.J.

3. Timothy J.Ross, Fuzzy logic with Engineering Applications; McGraw Hill, 1997.
4. Goldberg, D.E "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y, 1989.
5. S.N. Sivanandan and S.N. Deepa, Principles of Soft Computing, Wiley India, 2007. ISBN: 10: 81-265-1075-7

REFERENCES

1. Klir G.J. and Yuan B.B, Fuzzy sets and fuzzy logic, Prentice Hall of India, 1997. 2. Kosko.B, "Neural Networks and Fuzzy systems", PHI, 1992.
2. Driankov D., Helledorn H., M.Reinframe, "An Introduction to Fuzzy Control", Narosa Publishing Co., 1996.
3. S. Rajasekaran and G.A.V.Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2003. 2. Timothy J.Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill, 1997.

Course Outcomes

At the end of the course the student should be able to
CO1: Learn about soft computing techniques and their applications
CO2: Analyze various neural network architectures
CO3: Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
CO4: Analyze and apply genetic algorithms to combinatorial optimization
CO5: Assess and compare solutions by various soft computing approaches for a given problem.
CO6: Efficiently utilize existing software tools to solve real time problems using a soft computing approach

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

III Year B.Tech. ECE-I Sem

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BIOMEDICAL INSTRUMENTATION
(Professional Elective-I)

Pre Requisites

- Electronic Measurement and Instrumentation
- Pulse and Digital Circuits

Course Objectives

In this course it is aimed to introduce to the students with

- To explain the need for biomedical instrumentation and difficulties involved in Living system measurement.
- To identify the electrode theory on living system and the responses from it.
- To illustrate the various measurements involved in human cardiovascular and respiratory system.
- To interpret the technique involved in Bio telemetry.

UNIT-I

Introduction: The age of Biomedical Engineering, Development of Biomedical Instrumentation, Man–Instrumentation system, Components, Physiological system of the body, Problem encountered in measuring a living system. Transducers & Electrodes: The Transducers & Transduction principles, Active transducers, Passive Transducers, Transducer for Biomedical Applications.

UNIT-II

Sources of Bioelectric potentials: Resting & Action potentials, propagation of active potential, The Bioelectric potentials-ECG, EEG, EMG, and Invoked responses Electrodes: Electrode theory, Biopotential Electrodes–Microelectrodes Body surface electrodes, Needle Electrodes, Biochemical Transducers, Reference electrodes, PH electrodes, Blood Gas electrodes.

UNIT-III

Cardiovascular Measurements: Electrocardiography – ECG amplifiers, Electrodes & leads, ECG recorders - Three channel, Vector Cardiographs, ECG system for stress testing, Continuous ECG recording (Holter recording), Blood pressure measurement, Blood flow measurement, Heart sound measurements. Patient Care & Monitoring- Elements of Intensive Care monitoring, patient monitoring displays, Diagnosis, Calibration & Reparability of patient monitoring equipment, pacemakers & Defibrillators.

UNIT-IV

Measurements in Respiratory system: Physiology of respiratory system Measurement of breathing mechanics- Spiro meter, Respiratory Therapy equipment's: Inhalators ventilators & Respirators, Humidifiers, Nebulizers & Aspirators. Diagnostic Techniques: Ultrasonic Diagnosis Echocardiography, Echo Encephalography, Ophthalmic scans, X-Ray & Radio-isotope Instrumentation, Computerized Axial Tomography Scanners

UNIT-V

Bio Telemetry: The components of Biotelemetry system Implantable units, Telemetry for ECG measurements during exercise, for Emergency patient monitoring. Physiological Effects of Electric Current Safety of Medical Electronic Equipments, Shock hazards from Electrical equipment and prevention against them.

TEXT BOOKS

1. Cormwell / "Biomedical Instrumentation and Measurements"/ Prentice Hall (India).

REFERENCES

1. Khandpur R.S./ "Biomedical Instrumentation"/ Tata McGraw-Hill.
2. Tompkins / "Biomedical DSP: C Language Examples and Laboratory Experiments for the IBM PC"/ Prentice Hall (India).

Course Outcomes

At the end of the course the student should be able to

CO1: Summarize the requirement of biomedical instrumentation and adversity involved in human measurement.
CO2: Utilize the concept of electrode and its responses used in real time.
CO3: Outline the divergent responses involved in cardiovascular and respiratory system.
CO4: Compare the various process involved in bio telemetry.

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INTRODUCTION TO MICROCONTROLLERS AND APPLICATIONS
(Open Elective – I)

Course Objectives:
In this course it is aimed to introduce to the students with

- To describe the architecture of 8051 with its special function registers.
- To develop and analyze the programming concepts of 8051.
- To understand the various interfacing techniques pertaining to system design.
- To express and infer advanced architectures using ARM Controllers.

UNIT-I
Overview Microcontroller: Microprocessors & microcontrollers- Comparison -Types – Selection criteria –Architecture – resources – Memory (RAM, ROM, DMA)- Watch dog timer, PWM– Buses- power down modes – EPROM – Interrupts- Serial communication

UNIT-II
8051 Family Microcontrollers: Architecture- 8051 microcontroller – Pins- Ports- Registers- Special function registers (SFR'[s]) - Memory Organization- Counters and Timers.

UNIT-III
Programming the Microcontrollers : Addressing modes- Instruction Formats- Instruction set- Data transfer -Bit-manipulation – Arithmetic – Logical – Program flow control – Interrupt control flow – Simple Programs illustrating instruction set.

UNIT-IV
Systems Design and Interfacing Methods: Switch- Matrix Keypad – LED -7 Segment – LCD – Serial Interface – RS232- Parallel interface – IEEE1284 - IEEE 488 – ADC (0808) - DAC(0800) – Optical motor shaft encoders – Industrial control – Industrial process control system.

UNIT-V
ARM 32 Bit MCUs: Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set – Development tools.

TEXT BOOKS
1. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education,2005.
2. The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI, 2000.

REFERENCES
1. Microcontrollers (Theory & Applications) – A.V. Deshmuk, WTMH, 2005.
2. 8051 Microcontrollers – Jenneth J Ayala,3rd , Cenage Learning, 2005.

<u>Course Outcomes</u>

At the end of the course the student should be able to

CO1: Interpret the internal organization of 8051 with its unique features.

CO2: Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.

CO3: Construct the hardware and software interaction with each other using programming.

CO4: Summarize the features of the advanced architecture using ARM controller.

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BASIC ELECTRONICS AND INSTRUMENTATION
(Open Elective-I)

Course Objectives

In this course it is aimed to introduce to the students with

- To interpret the fundamental concepts of different Diodes, Bipolar junction transistor and Field Effect Transistors with its characteristics.
- To illustrate the basic concepts related to the operation of electrical & electronic measuring instruments.
- To classify the types of transducer with its methodology of data collection.
- To list the principles behind various bridges and methodology of physical entity measurement.

UNIT-I

Diodes: Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics. Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, Semiconductor Photo Diode, UJT and its Characteristics, Schottky Diode.

Bipolar Junction Transistor: Construction- Operation- characteristics- configuration

UNIT-II

Field Effect Transistors: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, FET as Voltage Variable Resistor, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes. Biasing FET- Comparison of BJT and FET.

UNIT-III

Block Schematics of Measuring Systems: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT-IV

Transuducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT-V

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acquisition Systems.

TEXTBOOKS

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.

2. Electrical and Electronic Measurement and Instrumentation:A.K.Sawhney-Dhanpat Rai & Sons, 4th Edition
3. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.

REFERENCES

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
4. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
5. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education – 2010.
6. Industrial Instrumentation: T. R. Padmanabham, Spriger 2009.

Course Outcomes

At the end of the course the student should be able to

CO1: Summarize the concepts of different semiconductor devices with its characteristics.
CO2: Describe the fundamental concepts and basic principle of meters.
CO3: Categorize different transducers and their working principles
CO4: Explain different bridges and understand how different physical parameters can be acquired.

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ANALOG COMMUNICATIONS LAB

Note: Minimum 12 Experiments have to be conducted

1. Amplitude Modulation & Demodulation
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector
4. Frequency Modulation & Demodulation
5. Study of Spectrum analyser & analysis of AM & FM Signals
6. Pre-emphasis & De-emphasis
7. Time Division Multiplexing & Demultiplexing
8. Frequency Division Multiplexing & Demultiplexing
9. Verification of sampling theorem
10. Pulse Amplitude Modulation &Demodulation
11. Pulse Width Modulation &Demodulation
12. Pulse Position Modulation &Demodulation
13. Frequency Synthesizer
14. AGC Characteristics
15. PLL as FM Demodulator

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LINEAR & DIGITAL IC APPLICATIONS LAB

Note: Minimum 12 Experiments have to be conducted(six from each part)

Part – A: Linear IC Applications

1. OP AMP Applications-Adder, Subtractor, Comparator Circuits.
2. Integrator and Differentiator Circuits using IC741
3. Active Filter Applications- LPF, HPF [First Order]
4. IC741 Waveform Generators-Sine, Square wave and Triangular waves.
5. IC 555 Timer-Monostable and Astable Multivibrator Circuits
6. Schmitt Trigger Circuits - Using IC 741
7. Calculation of Capture Range & Lock Range Using IC 565 PLL
8. Voltage Regulator using IC 723.

Part – B: Digital IC Applications

1. Verification of all the logic gates
2. Verification of all Flip-Flops(SR,JK,D&T)
3. Verification of Full adder & Full Subtractor
4. Verification of 4X1 Multiplexer & Demultiplexer
5. Verification of 4-bit Magnitude comparator
6. Verification of2X4 Decoder
7. Verification of4-bit Decade counter
8. Verification ofUniversal Shift Register

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ADVANCED COMMUNICATION SKILLS (ACS) LAB
(Common to all branches)

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educational English speakers and respond appropriately in different socio-cultural and professional contexts.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) lab:

1. **Activities on Fundamentals of inter-personal Communication and Building Vocabulary –** Starting a conversation – responding appropriately and relevantly – using the right body language - Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills –** Structure and presentation of different types of writing – letter writing/ Resume writing/ e-correspondence/ Technical report writing / Portfolio writing – planning for writing – improving one's writing.

4. **Activities on Presentation Skills –** Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.
5. **Activities on Group Discussion and interview Skills –** Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video – conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra – structural facilities to accommodate at least 35 minutes in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio – visual aids
- LCD Projector
- Public Address system
- P –IV Processor, Hard Disk – 80 GB, RAM-512 MB Minimum Speed – 2.8 GHZ
- T.V., a digital stereo & Camcorder
- Headphones of High quality

<u>Prescribed Lab Manual: A book titled ***Speak Well*** *published by* Orient Black Swan Pvt. Ltd., Hyderabad.</u>

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learners Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE(KALPAN, AARCO & BARRONA, USA, Cracking GRE by CLIFFS)
- The following Software from 'train2success.com'
    - Preparing for being interviewed
    - Positive Thinking
    - Interviewing Skills
    - Telephone Skills
    - Time Management

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D. Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.

5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. Mc Mahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press. 2009
7. Management Shapers Series by Universities Press (India) Pvt. Ltd. Himayatnagar, Hyderabad. 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanna Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen.PHI Learning Pvt. Ltd. New Delhi. 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanna Buckley Cengage Learning. 2008.
11. Job Hunting by Colm Downess, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill. 2009.
14. Books on TOEFL/GRE/GMAT/ICAT/IELTS by Barron's/DELTA/Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas Macmillan Publishers. 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as External Examiner.

Mini Project: As a part of Internal Evaluation

1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented.
   - Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
   - Not more than two students to work on each mini project
   - Students may be assessed by their performance both in oral presentation and written report.

Learning Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Activities.

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QUANTITATIVE METHODS & LOGICAL REASONING
(CSE, IT & ECE)

Course Objectives :

1. The objective of this course is to enhance the problem solving skills in the areas of **'Quantitative Aptitude'** and **'Reasoning'** which will enable the students to achieve in **Campus Placements** and competitive examinations.
2. To improve the logical thinking and mathematical ability of the students.

Course Outcomes :

At the end of the completion of the course a student is expected –

1. To solve basic and complex mathematical problems in short time.
2. To perform well in various competitive exams and placement drives.

UNIT – I

1. Number System:

Speed maths, Numbers, Factors, prime & Co primes, LCM & HCF, Divisibility rules, finding unit place digit and last two digits of an expression

2. Simple Equations:

Definition of Linear equation, word problems

3. Ratio, Proportion and Variations:

Definition of Ratio, Ratio of Proportion, Comparison of ratios, Compound ratio, Direct and indirect proportion

4. Percentages:

Converting fractions and decimal into percentages, successive percentage, populations, expenditure and savings

5. Profit and loss:

Relation between Cost price and selling price, Discount and marked price, Gain or Loss percentages on selling price

6. Simple and Compound Interest:

Problems on interest (**I**), amount (**A**), Principal (**P**) and rate of interest(**R**)

Difference between the simple interest and compound interest for 2 and 3 years.

UNIT-II

1. Partnership:

Relation between partners, period of investment and shares

2. Averages and Ages:

Average of different groups, change in averages by adding, deleting and replacement of objects,

problems on ages.

3. Allegation and mixtures:

Allegation rule, Mean value of the mixture, Replacement of equal amount of quantity.

4. Time and Work:

Men and Days, Work and Wages, pipes and cisterns, hours and work, Alternate days concept,

5. Time and Distance:

Difference between the average and relative speeds, reaching the destination late and early, Stoppage

time per hour, time and distance between two moving bodies

6. Trains, Boats and Streams:

Train crossing man, same and opposite directions, Speed of boat and stream,

UNIT-III

1. Progressions:

Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic

Mean and their relations.

2. Quadratic Equations:

General form of quadratic equation, finding the roots of quadratic equation, Nature of the Roots.

3. Mensurations:

2D geometry- perimeter, areas, 3D geometry - surface areas, volumes

4. Permutation and Combination:

Fundamental rules, problems on permutations & combinations.

5. Probability

Definition of probability, notations and formulae, problems on probability.

6. Data Interpretation and Data Sufficiency:

Tabular and Pie-charts, Bar and Line graphs, Introduction to data sufficiency, problems on data
sufficiency.

UNIT-IV

1. Deductions:

Statements and conclusions using Venn diagram and Syllogism method

2. Connectives:

Definition of simple and compound statements, Implications and negations for compound statements.

3. Series completion:

Number series, Alphabet series, letter series.

4. Coding and Decoding:

Letter coding, Number coding, Number to letter coding, Matrix coding, Substitution, Mixed letter
coding,
Mixed number coding, Deciphering individual letter codes by analysis.

5. Analytical Reasoning Puzzles:

Problems on Linear, Double line-up and Circular arrangements, Selections and Comparisons.

6. Blood Relations:

Defining the various relations among the members of a family, Solving Blood Relation Puzzles by
using symbols and notations**.** Problems on Coded relations.

UNIT-V

1. Direction sense test:

Sort of directions in puzzles, distance between two points, problems on shadows, Application of
triangular triplets.

2. Clocks:

Relation between minute-hour hands, angle vs. time, exceptional cases in clocks

3. Calendars:

Definition of a Leap Year, Finding the odd days, finding the day of any random calendar date, repetition of calendar years.

4. Cubes and Dices:

Finding the minimum and maximum number of identical pieces and cuts, painting of cubes and cuts,

problems on dice.

5. Venn diagrams:

Circular representation of given words, Geometrical representation of certain class, set theory based

problems.

6. Number, Ranking and Time sequence test:

Number test, Ranking test, Time sequence test.

Text Books:

1. GL Barrons,(author) Mc Graw Hills,(publications) Thorpe's Verbal Reasoning, LSAT Material

(2015)
2. R S Agarwal, (author) S.Chand, (publications) 'A modern approach to logical Reasoning' (Revised edition, 2016)
3. R S Agarwal, (author) S.Chand, (publications) 'Quantitative Aptitude' (Revised edition, 2016)

Reference Books:

1. Quantitative Aptitude-G.L BARRONS (new edition, 2016)
2. Quantitative Aptitude-Abhijit Guha Mc Graw Hills (new edition, 2016)
3. Quantitative Aptitude-U.Mohan Rao SCITECH (new edition, 2016)

ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR II SEMESTER **COURSE STRUCTURE**

S.No.	Subject Code	Subject Name	Lectures			Credits
			L	T	P	
1	BS	Managerial Economics and Financial Analysis	4	0	0	3
2	PC	VLSI Design	3	1	0	3
3	PC	Digital Signal Processing	3	1	0	3
4	PC	Microprocessors and Microcontrollers	4	0	0	3
5	PE2	**Professional Elective – 2:**	4	0	0	3
		1. Optical Communications				
		2. Programming in MATLAB				
		3. Satellite & Wireless Communications				
6	OE2	**Open Elective – 2:**	4	0	0	3
		1. Fundamentals of Embedded Systems				
		2. Principles of Communications				
7	PC	Microprocessors and Microcontrollers Lab	0	0	3	2
8	PC	Digital Signal Processing & e-CAD Lab	0	0	3	2
9	T&P	Training & Placement Subject - II	2	0	0	2
	Total		**24**	**2**	**6**	**24**

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

PRE REQUISITES:

- Probability and statistics
- Operation research
- Mathematics-I
- Environmental studies

Course Objectives:- To enable the student to understand , with a practical insight,

- the importance of certain basic issues governing the business operations namely demand and supply, production function, cost analysis,
- analysis of markets, forms of business organizations,
- significance of capital budgeting and financial accounting and financial analysis.

UNIT –I:

Introduction to Managerial Economics& Demand Analysis:

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT –II:

Production & Cost Analysis:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis**:** Cost concepts (Opportunity cost vs outlay costs, Fixed, variable and semi variable costs, marginal cost vs average cost, out of pocket vs book cost, imputed cost, implicit & explicit cost, incremental and decremental cost, sunk vs future cost, separable and joint costs) Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT –III:

Markets & New Economic Environment:

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

UNIT –IV:

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and Conventions - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).Financial Analysis**:** Analysis and Interpretation of Liquidity Ratios (current ratio, quick ratio), Activity Ratios(inventory turnover ratio, debtors turnover ratio), and Capital structure Ratios(debt equity ratio, interest coverage ratio) and Profitability ratios(gross profit ratio, net profit ratio, operating profit ratio, P/E ratio, EPS). Du Pont Chart.

UNIT –V:
Capital Budgeting:

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital, Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) ,Net Present Value Method (simple problems), IRR and PI method.

Outcomes:- At the end of the course the students is expected

- to understand and enhance the knowledge regarding managerial economics concepts and obtaining optimal solutions.
- to get an idea of analysis of firm's financial position with the techniques of financial analysis and ratio analysis.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
2. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
3. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

REFERENCE BOOKS:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Kasi Reddy, Saraswathi, MEFA, PHI Learning, 2012.
10. Shailaja & Usha : MEFA, University Press, 2012.

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VLSI DEISGN

Prerequisites

- Electronic devices &circuits
- Switching Theory and logic design

Course Objectives

In this course it is aimed to introduce to the students with

- To enumerate different steps involved in Integrated Circuits technology for MOS transistor and explain the primary and secondary effects of MOSFET and BICMOS.
- To outline the design process involved in VLSI design flow for design of MOS transistors.
- To interpret the alternate forms of CMOS gate circuits in combinational, sequential circuit and Data path Design.
- To Understand basic programmable logic devices and testing of CMOS circuits.

UNIT-I

Introduction: Introduction to IC Technology — MOS – PMOS – NMOS – CMOS - BiCMOS

Basic Electrical Properties: Electrical Properties- MOS- primary characteristics - threshold Voltage – Secondary characteristics- Ratioed Circuits- CMOS, BiCMOS Inverter – analysis-design- Pass transistors.

UNIT-II

VLSI Circuit Design Processes: VLSI Design Flow - MOS Layers - Stick Diagrams - Design rules - wires – Contacts – Transistors- Layout Diagrams – NMOS – PMOS - CMOS Inverters – Gates - Scaling of MOS circuits.

UNIT-III

Gate Level Design: Logic Gates – Transmission gate- Switch logic - Alternate gate circuits, Latches- Time delays - Driving large capacitive loads - Wiring capacitance, Fan — in, Fan — out, Choice of layers.

UNIT-IV

Data Path Subsystems: Subsystem Design – Shifters – Adders – ALU^{s}- Multipliers- Parity generators- Comparators - Zero/One Detectors - Counters.

Array Subsystems: SRAM – DRAM –ROM - Serial Access Memories.

UNIT-V

Programmable Logic Devices: ROM – PLA - PAL-Design Approach - CPLDs – FPGA - Parameters influencing low power design.

CMOS Testing: CMOS Testing – Need - Test Principles- Design Strategies - Chip level Test Techniques.

TEXT BOOKS

1. Essentials of VLSI Circuits and Systems — Kamran Eshraghian, EshraghianDougles and A. Pucknell, PHI, 2005 Edition.
2. CMOS VLSI Design — A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.

REFERENCES

1. CMOS logic circuit Design – John .P. Uyemura, Springer, 2007.
2. VLSI Design- K. Lal Kishore, V. S. V. Prabhakar, l.K International, 2009.
3. Introduction to VLSI — Mead & Convey, BS Publications 2010.
4. Fundamentals of Digital Logic with Verilog Design-Stephen Brown,ZvonkoVranesic,ThirdEdition,TMH

Course Outcomes

At the end of the course the student should be able to

CO1: Explain the fabrication process involved in Integrated Circuit Technology and label the effects of current and voltage in MOS transistors.

CO2: Summarize the divergent techniques involved in design of VLSI circuits using Design Rules.

CO3:List various Static and dynamic CMOS gate circuits involved in System design.

CO4: Illustrate the process involved in programmable logic design and testing methods.

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DIGITAL SIGNAL PROCESSING

Pre Requisite

- Signals and Systems
- Mathematics-I

Course objectives

In this course it is aimed to introduce to the students with

- To understand the basic concepts of discrete signals, systems, representations and its application using Z transform.
- To recite the relationship between the various Transforms applied on Discrete Time signals & systems.
- To illustrate Discrete Fourier transform (DFT) and analyze it for faster computation on time and frequency domains.
- To identify, express, design filters (FIR / IIR) and realize its structure
- To define the effects of limit cycle oscillations in feedback systems and apply the concepts of multirate signal processing on signals.

UNIT-I

Introduction to digital signal processing: Discrete time signals – Systems –classification – Analysis of Discrete Time invariant Systems- difference equations- Frequency domain representation.

Realization of Digital Filters: Application of Z-transforms, solution of difference equations of digital filters - system function - stability criterion - frequency response of stable systems

UNIT-II

Discrete Fourier Transform: DTFS- DTFT –DFT-Complexity calculation- Properties of DFT- linear convolution- Circular convolution- Sectioned convolution- Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transform: Fast Fourier Transform (FFT), Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT- Convolution of sequences using FFT.

UNIT-III

IIR DIGITAL FILTERS: Analog filter approximations –Butterworth and Chebyshev- Design of IIR digital filters from analog filters- Impulse invariant technique – warping effect- bilinear transformation method - Spectral transformations, realization of IIR filters- direct, canonic, cascade and parallel forms.

UNIT-IV

FIR DIGITAL FILTERS: Characteristics of FIR Digital filters - frequency response – Gibbs Phenomenon- Design of FIR filters - window techniques – Frequency Sampling - Comparison of IIR and FIR filters, realization of FIR filters- direct& cascade forms

UNIT-V

FINITE WORD LENGTH EFFECTS: Quantization- Quantization error- Types- Limit cycles- Overflow oscillations -Scaling

MULTIRATE SIGNAL PROCESSING: Introduction - down sampling- Decimation – upsampling – Interpolation -Sampling Rate Conversion

TEXT BOOKS

1.Digital Signal Processing_Tarun Kumar Rawat,Oxford Publications-2015

2. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.

3. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI

REFERENCES

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006

2. Digital Signal Processing: Ashok Ambardar , Satya Prasad , Cenage Learning.

3.Fundamentals of Digital Signal Processing using Mat lab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.

Course Outcomes

At the end of the course the student should be able to

CO1: Define the different discrete time signals and show the methods of applying Z-transforms on Discrete Time Linear Time Invariant systems (DTLTI).

CO2: Able to compute the divergence between the transforms (DTFS/DTFT/DFT) and illustrate the effects of each on Discrete time signals.

CO3: Interpret the methodology of Discrete Fourier transform with its properties and methodology of faster computations.

CO4: List, Differentiate Design and implement the different methods involved in Filter design (FIR/IIR).

CO5: State the effects of different quantization noise on recursive systems and enumerate the role of multirate signal processing on discrete time signals.

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MICROPROCESSORS AND MICROCONTROLLERS

Pre Requisite

- Switching Theory and Logic Design

Course Objective

In this course it is aimed to introduce to the students with

- To describe and interpret the 8086 architecture with its internal features.
- To list and analyze the techniques involved in assembly language programming of 8086
- To design various interfacing Peripheral Integrated circuits with 8086 along with their applications.
- To illustrate the basic concepts of 8051 microcontroller and its features

UNIT-I

8086 Architecture: Introduction to 8085 microprocessor- 8086 architecture –Signal descriptions- Minimum- Maximum mode - timing diagrams - memory segmentation- programming model - interrupt structure.

UNIT-II

Assembly language programming using 8086: Instruction formats - addressing modes - instruction set - assembler directives - simple programs- Memory interfacing.

UNIT-III

Concepts, Modes and Interfacing of Peripheral IC'ˢ8086:8255 PPI – 8257 DMA- 8251 USART- 8259 PIC

Interfacing of Peripheral Devices with 8086: Matrix Keyboard- Display- LED – LCD- stepper motor, DAC- ADC.

UNIT-IV

Introduction to microcontrollers: Overview of 8051 microcontroller - architecture – ports - memory organization - addressing modes - instruction set - simple programs.

UNIT-V

8051 real time control: Interrupts - timer/counter - serial communication- SFR'ˢ- programming

TEXT BOOKS

1.DV Hall, Microprocessors and interfacing, TMGH 2nd ed 2006.
2.Kenneth J Ayala, The 8051 microcontroller, 3rd ed, Cengage learning 2010.

REFERENCES

1. Advanced microprocessors and peripherals- A .K Ray and K.M .Bhurchandani TMH, 2nd ed,2006
2. The 8051 microcontrollers, architecture and programming and applications- K. Uma Rao,AndhePallavi,Pearson 2009
3. Micro computer system 8086/8088 family architecture,programming and design,- by Liu and GA Gibson,PHI 2nd ed

4. Microcontrollers and applications, Ajay V Deshmukh , TMGH 2005
5. The 8085 Microprocessor: Architecture ,programming and interfacing- K UdayKumar,BS Umashankar,2008,pearson.

Course Outcomes

At the end of the course the student should be able to

CO1: Memorize the internal organization of 8086

CO2: Apply the divergent techniques involved in assembly level language programming of 8086 for different data manipulation applications.

CO3: Summarize various interfacing integrated circuits for peripheral devices using 8086.

CO4: List and express the internal features of 8051 with its programming.

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OPTICAL COMMUNICATIONS

(Professional Elective-II)

Pre Requisite

- Analog Communications
- Electro Magnetic Waves & Transmission Lines

Course Objective

In this course it is aimed to introduce to the students with

- To explain the theory of optical fiber waveguides and the materials used for its construction.
- To interpret the signal degradation in optical fibers and its connectivity.
- To outline various types of signal sources and coupling required for optical fiber communications.
- To infer the theory behind photodetectors and performance of digital receivers.
- To relate the role of optic fibers in digital system communication with various multiplexing techniques involved in it.

UNIT-I

Introduction: Historical development, the general system, advantages of optical fiber communications.

Optical Fiber Wave Guides: Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fiber - Modes, Mode coupling, Step Index fibers, Graded Index fibers. Single mode fibers- Cut off Wavelength, Mode Field Diameter, and Effective Refractive Index. Graded Index Fiber Structure. Fiber materials.

UNIT-II

Signal Degradation In Optical Fibers: Attenuation, Signal Distortion in Fibers, Characteristics of Single-Mode Fibers.

Optical Fiber Connection: Introduction, Fiber alignment and joint loss, Fiber Splicing, Optical fiber Connectors.

UNIT-III

Optical Sources: Topics from Semiconductor Physics, Light Emitting Diodes, Laser Diodes, Line Coding, Line Source Linearity, Reliability Considerations.

Power Launching and Coupling: Source to Fiber Power Launching, Launching Schemes for Coupling Improvement.

UNIT-IV

Photo Detectors: Physical principles of Photodiodes, Photo detector Noise, Detector response time, Avalanche Multiplication Noise, Structure for In GaAs APDs, Temperature Effect on Avalanche gain, Comparison of Photo detectors.

Optical Receiver Operation: Fundamental receiver operation, Digital receiver performance, Eye Diagrams, Analog receivers.

UNIT-V

Optical Fiber Systems: Introduction, the Optical Transmitter circuit, the Optical Receiver circuit, System design considerations.
Digital Links: Point-to- point links.
Advanced Multiplexing Strategies: Optical time division multiplexing, subcarrier multiplexing, orthogonal frequency division multiplexing, wavelength division multiplexing.

TEXT BOOKS

1. Gerd Keiser (2010), Optical Fiber Communications, 4th edition, McGraw-Hill International Edition.
2. John M. Senior (2005), Optical Fiber Communications, 2nd edition, Prentice Hall of India, New Delhi.

RERFERENCES

1. D. K. Mynbaev, S. C. Gupta, Lowell L. Scheiner (2005), Fiber Optic Communications, Pearson Education, India.
2. S. C. Gupta (2005), Optical Fiber Communication and its Applications, Prentice Hall of India, New Delhi.

Course Outcomes

At the end of the course the student should be able to
CO1: Recognize the constructional materials of Optical fibers and its impact on communications.
CO2: Summarize the channel impairments (like losses and dispersion)that occur in an opticalcommunications.
CO3: Compare the different signal sources used for optical communications with its methodology of coupling.
CO4: Illustrate the methodology and construction of photodetectors and the performance of digital receivers using optic fiber.
CO5: Contrast the communication performed in the optic fiber systems and recall the divergent multiplexing techniques involved in it.

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PROGRAMMING IN MATLAB
(Professional Elective-II)

Pre Requisite
- Programming in C
- Engineering Mathematics
- Probability Theory and Stochastic Process

Course Objective
In this course it is aimed to introduce to the students with
- To illustrate the various parameters for programming in MATLAB
- To elaborate the various loop and control statements involved in MATLAB Programming.
- To interpret the graphical representation, file handling and advanced commands of MATLAB.
- To Understand the need for Simulink in various domains of Electronics and Communication.

UNIT-I
Introduction to MATLAB:Menus & Tool bars, Variables - Matrices and Vectors - initializing vectors - Data types- Functions - User defined functions - passing arguments - writing data to a file-reading data from a file - using functions with vectors and matrices- cell arrays & structures - Strings - 2D strings-String comparing - Concatenation - Input and Output statements - Script files.

UNIT-II
Loops & Control Statements:Introduction; Relational & Logical operations - Example programs - Operator precedence - Control & Decision statements- IF - IF ELSE - NESTED IF ELSE - SWITCH - TRY & CATCH - FOR -WHILE - NESTED FOR - FOR with IF statements, MATLAB program organization, Debugging methods - Error trapping.

UNIT-III
PLOTS IN MATLAB & GUI:Basic 2D plots, Labels, Line style, Markers, plot, subplot, LOG, LOG-LOG, SEMILOG-POLAR-COMET, Grid axis, labeling, fplot, ezplot, ezpolar, polyval, exporting figures, HOLD, STEM, BAR, HIST, Interactive plotting, Basic Fitting Interface – Polyfit - 3D plots – Mesh - Contour - Example programs. GUI - Creation Fundamentals - Capturing mouse actions.

UNIT-IV
MISCELLANEOUS TOPICS:File & Directory management - Native Data Files - Data import & Export - Low Level File I/O - Directory management - FTP File Operations - Time Computations -Date & Time - Format Conversions - Date & Time Functions - Plot labels - Optimization - zero Finding - Minimization in one Dimension - Minimization in Higher Dimensions- Practical Issues. Differentiation & Integration using MATLAB, 1D & 2D Data Interpolation

UNIT-V

SIMULINK & APPLICATIONS: How to create & run Simulink, Simulink Designing - Using SIMULINK Generating an AM signal & 2nd order systems - Designing of FWR & HWR using Simulink - Creating a subsystem in Simulink. Applications Programs - Frequency response of FIR & IIR filters. Open Loop gain of OPAMP, I/P characteristics of BJT, PCM, DPCM.

TEXT BOOKS

1. RudraPratap, "Getting Started with MATLAB 6.0" ,1st Edition, Oxford University Press-2004.
2. Duane Hanselman ,BruceLittleField, "Mastering MATLAB 7" , Pearson Education Inc, 2005

REFERENCES

1. William J.Palm, "Introduction to MATLAB 6.0 for Engineers", Mc Graw Hill & Co, 2001
2. M.Herniter, "Programming in MATLAB", Thomson Learning, 2001
3. John OkyereAltla, "Electronics and circuit analysis using MATLAB" - CRC press, 1999
4. K.K.Sharma, "MATLAB Demustifyied" -Vikas Publishing House Pvt Ltd.

Course Outcomes

At the end of the course the student should be able to

CO1: Develop codes on various domains of Electronics and Communication Engineering
CO2: Handle the advanced commands in appropriate fields of engineering
CO3: Visualize the impact of parameters during simulation
CO4: Cater the industrial needs pertaining to the semiconductor technologies.

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SATELLITE AND WIRELESS COMMUNICATIONS

(Professional Elective-II)

Pre Requisite

- Signals and Systems
- Analog Communications

Course Objective

In this course it is aimed to introduce to the students with

- To explain the types of satellite communication and various orbital aspects involved in it.
- To illustrate the students with the knowledge of sub system design and validate the connectivity using link budget with the techniques in earth tracking.
- To compare the various types of wireless networks involved in communications .
- To interpret the various layers of wireless LAN, WAN standards.

UNIT-I

Introduction: Origin of satellite communication, Historical background, Basic concepts of satellite communications, Frequency allocations for satellite services, Applications, Indian scenario in communication satellites.

Orbital aspects of Satellite Communication: Introduction to geo-synchronous and geo-stationary satellites, Kepler's laws, locating the satellite with respect to the earth, sub-satellite point, look angles, mechanics of launching a synchronous satellite, Orbital effects in communication system performance

UNIT-II

Satellite sub-systems: Attitude and Orbit control systems, Telemetry, Tracking and command control system, Power supply system, Communication subsystems, Space craft antennas.

Satellite link design: Basic transmission theory - system noise temperature - G/T ratio, design of down link – uplink - satellite links - C/N - satellite data communication protocols - Nano satellites - micro satellites

UNIT-III

Earth station Technology: Transmitters – Receiver – Antennas - Tracking systems, Terrestrial interface.

Introduction to wireless communication: Mobile radio communication, Examples of wireless communication systems, Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services.

UNIT-IV

Mobile wireless communication systems: Evolution of 1G/2G/3G/4G – 2G cellular networks – CDMA- GSM - 3G wireless networks, wireless in local loop, wireless local area networks - Wi-Fi, Personal area networks- ZIGBEE – WMAN - Bluetooth.

Wireless LAN: Historical overviews of the land industry, evolution of the wan industry, wireless home networking IEEE 802.11 the PHY layer, Mac layer wireless ATM, Hyperlink, Hyper Lan-2

UNIT-V

Wireless MAN: mechanism to support at mobile environment, communication in the infrastructure , iIS-95 CDMA forward channel, IS-95 CDMA risers channel, packet and frame formats in IS-95,IMT -20000

TEXT BOOKS

1. Satellite communications – Pratt, 2nd ed., 2006, wiley publications
2. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002, PHI
3. Mobile Cellular Communication – GottapuSasibhushana Rao, Pearson Education, 2012.

REFERENCES

1. Satellite communications- Dennis Roddy, 4 edition
2. Principles of Wireless Networks – KavehPahLaven and P. Krishna Murthy, 2002, PE.
3. Wireless Communication and Networking – William Stallings, 2003, PHI.
4. Wireless Communications and Networking – Vijay K. Gary, Elsevier.

Course Outcomes

At the end of the course the student should be able to

CO1: Understand the concepts and orbital aspects of satellite communication.

CO2: Summarize the aspects of subsystem design and its involvement in ground tracking with suitable link margins.

CO3: Outline the fundamentals and principles of wireless communications and networking.

CO4: Relate and contrast the different layers involved in data communication of WLAN and WWAN.

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FUNDAMENTALS OF EMBEDDED SYSTEMS

(Open Elective-II)

Course Objective

In this course it is aimed to introduce to the students with

- To understand the basics of an embedded system with its application area for implementation.
- To demonstrate the components required for the development of embedded systems.
- To infer the different development languages for designing an Embedded System applications.
- To interpret the requirements required for choosing RTOS, concepts and tools.
- To explain the different buses used for distributed embedded systems

UNIT-I

Introduction to Embedded Systems: Embedded Systems- Definition- Embedded Systems Vs General Computing-Systems – Evolution – Classification - Application Areas – Purpose – Characteristics - Quality Attributes.

UNIT-II

Typical Embedded System: Core of the Embedded System: General Purpose - Domain Specific Processors – ASICs - PLDs, Commercial Off The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection - Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT-III

Embedded Firmware: Embedded Firmware Design Approaches and Development Languages, Software, Getting Embedded Software into Target System , Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An example System.

UNIT-IV

RTOS Based Embedded System Design: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing - Multitasking, Semaphores, Task Scheduling,Choose an RTOS - example RTOS like µC-OS (open source) - Embedded software Development Tools for Host and Target Machines.

UNIT-V

Distributed Embedded System Design: Distributed Embedded system - Embedded networking -RS 232 - RS485 - Inter-Integrated Circuit (I^2C) - Serial Peripheral Interface (SPI) - Universal Serial Bus (USB) - Controller Area Network (CAN)- Ethernet.

TEXTBOOKS

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.
2. An Embedded Software Primer - Davia E. Simon, Pearson Education

3. ‘Computer as Components-Principles of Embedded Computing system Design’,WayneWolf,Elsevier(2^{nd} Edition)

REFERENCES

1. Embedded Systems - Raj. Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems - Lyla, Pearson, 2013

Course Outcomes

At the end of the course the student should be able to

CO1: Contrast the basics of embedded system with its application

CO2: Illustrate the components required for embedded system design.

CO3: Summarize the different development tool for embedded system

CO4: Relate the concepts of RTOS in real time programming

CO5: Outline the features of advanced buses for distributed data transfer in system design.

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PRINCIPLES OF COMMUNICATIONS
(Open Elective-II)

Course Objective
In this course it is aimed to introduce to the students with
- To understand the basics of communication.
- Study different analog and digital modulation techniques involved in communication.
- To illustrate the different wired and wireless network fundamentals.
- To outline the basic concepts of satellite and optical communications involved in different digital systems.

Unit – I
Introduction: Communication Systems and types, Modulation, multiplexing, Electromagnetic spectrum, Gain, Attenuation and decibel.

Unit – II
Simple description on modulation: Analog Modulation – AM, FM, PM, Modulation – PAM, PWM, PCM, Digital Modulation Techniques – ASK, FSK, PSK, QPSK, Modulation and Demodulation Schemes.

Unit – III
Telecommunication Systems: Telephones - telephone systems - Telephony.
Networking and Local Area Networks: Network fundamentals, hardware, Ethernet LANs, Token Ring LAN.

Unit – IV
Satellite Communication: Satellite Orbits - satellite communication systems - Satellite sub systems - Ground station satellite Applications - Global positioning systems.
Optical Communication: Optical Principles - Optical communication systems - Fiber Optic cables - Optical Transmitters- Receivers - wavelength division multiplexing.

Unit – V
Multiple Access Techniques: FDMA, TDMA, CDMA, Packet Radio Techniques – ALOHA, Slotted ALOHA.
Cellular and Mobile Communications: Cellular telephone system, AMPS, GSM, CDMA, WCDMA.
Wireless Technologies: Wireless LAN - PANs – Bluetooth – ZigBee - Mesh Wireless Networks – Wimax – MANs - Infrared wireless – RFID - UWB.

Text Books:

1. Principle of Electronic Communication Systems, Louls E. Frenzol, 3e, Mc Graw Hill publications, 2008.
2. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education, 2005.

REFERENCES

1. H.Taub,D L Schilling ,G Saha ,"Principles of Communication"3/e,2007.
2. B.P.Lathi,"Modern Analog And Digital Communication systems", 3/e, Oxford University Press, 2007
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
4. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, PHI, 2002.
5. B.Sklar,"Digital Communication Fundamentals and Applications"2/e Pearson Education 2007.

Course Outcomes

At the end of the course the student should be able to

CO1: Understanding the fundamentals of communications

CO2: Summarize the different modulation techniques involved in analog and digital Communication.

CO3: Identify the applications of various wired and wireless communications in real time.

CO4: Elaborate the fundamentals of satellite and optical communications.

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MICROPROCESSOR AND MICROCONTROLLERS LAB

Note: Minimum 12 Experiments have to be conducted

The following programs/experiments are written for assembler and execute the same with8086 and 8051 kits

1. Programs for 16 bit arithmetic operations for 8086 (using various addressing modes)
2. Program for sorting an array for 8086
3. Program for searching for a number or character in a string for 8086
4. Program for String manipulations for 8086
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC.
15. Data transfer from peripheral to memory through DMA controller 8237/8257

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III Year B.Tech. ECE-II Sem

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DIGITAL SIGNAL PROCESSING & e-CAD LAB

Note: Minimum 12 Experiments have to be conducted (eight from each part)

Part-A: DSP Lab Experiments

1. Generation of Sinusoidal waveform / Signal based on recursive difference equations.
2. To Find DFT/IDFT of given DT signal
3. Implementation of FFT of given sequence
4. Determination of Power Spectrum of a give signal (s)
5. Implementation of LP & HP FIR filter for a given sequence
6. Implementation of LP& HP IIR filter for a given sequence
7. Generation of DTMF signals
8. Implementation of I/D sampling rate converters
9. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
10. Impulse response of first order and second order systems.

Part-B: e-CAD Lab Experiments

1. HDL code to realize all the logic gates
2. Design of the 2 to 4 decoder
3. Design of 8 to 3 encoder (without and with parity)
4. Design of 8 to 1 multiplexer& 1 to 8 Demultiplexer
5. Design of 4 bit binary to gray converter
6. Design of 4-bit comparator
7. Design of full adder using 3 modeling styles
8. Design of flip flops SR, D, JK, and T
9. Design of 4 bit binary, BCD counters (synchronous/asynchronous reset)
10. Finite state machine design

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III Year B.Tech. ECE-II Sem

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Personality Development and Behavioral Skills

(CSE, IT & ECE)

Course Objectives

3. To enable students to communicate with outside and peer group members in an effective manner.
4. To enable the students to give better presentation and explanation on their projects, posters and assignments - this makes them industry ready.
5. To perform better during Campus Recruitment and various interviews they face in their career.

Course Outcomes

At the end of the course a student is expected:

3. To communicate with more confidence using better spoken and written English
4. To give better presentation and explanation with the use of digital inventions
5. To perform well during Campus Drives and different Interviews

Unit – I

Personality Development: Definition - Various Aspects of Personality Development - Behavioural Traits.

Importance of Soft skills-Soft skills for a future Entrepreneur - Qualities of a good leader - Stress Management - Success stories.

Unit – II

Non Verbal Communication: Kinesics- Haptics – Proxemics – Vocalics – Oculesics – Body Language in Interviews.

Unit - III:

Team Dynamics: Different Types of Teams-role of an individual - Communicating as a group or team leader - Individual Presentations/Team Presentation. Case Studies: Project Presentations.

UNIT-IV

Technical Report Writing: Formats - Effective Resume Preparation - Covering Letter - Statement of Purpose (SoP).

UNIT-V

Role of Multimedia in Communication: Communication in a Digital Edge (Video Conference Etc.)

E-Correspondence: Recent Trends in Professional Communication - Social Networking: Importance, Effects.

Blogging: Creating of Blogs - Technical and Non – technical blogs – Success Stories and Case Studies.

Reference Books

1. Barun, K Mitra, Personality Development and Soft Skills, Oxford University Press, 2nd Edition, 2016.
2. Gopalaswamy Ramesh, The Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education, 2013.
3. Krishna Mohan & Meera Banerji, Developing Communication Skills, Macmillan India Ltd, 2008.

4. Krishna Mohan & Meenakshi Raman, Effective English Communication, Tata McGraw-Hill Publishing Company Ltd, 2008.
5. Arati Gurav, 50 Mantra's of Personality Development, Buzzingstock Publishing House, 2013.
6. P. Kiranmai Dutt & Geetha Rajeevan, Basic Communication Skills, Cambridge University Pvt. Ltd2007.
7. S.C. Sood, Mita Bose, Naresh Jain, Developing Language Skills, Manohar Publications, 2007,
8. T.M. Farhathullah, Communication Skills for Technical Students, Orient Longman Pvt Ltd, 2002.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE FOR B.TECH IV YEAR

IV B.Tech I Sem ECE:

S.No.	Subject Code	Subject Name	Lectures			Credits
			L	T	P	
1	A17430	Digital Communication	4	0	0	3
2	A17431	Embedded System Design	4	0	0	3
3	A17432	Antennas & Microwave Engineering	3	1	0	3
4		**Professional Elective – 3:**	4	0	0	3
	A17433	1. Digital Image Processing				
	A17434	2. Spread Spectrum Communications				
	A17435	3. Multimedia and Signal Coding				
5		**Professional Elective – 4:**	4	0	0	3
	A17436	1. DSP Architectures				
	A17437	2. Telecommunication Switching Systems and Networks				
	A17438	3. Low Power VLSI				
6		**Open Elective – 3:**	4	0	0	3
	A17439	1. Introduction to MATLAB				
	A17440	2. Circuit Simulation using PSpice				
7	A17491	Embedded System Design Lab	0	0	3	2
8	A17492	Microwave Engineering & Digital Communications Lab	0	0	3	2
9	MP - I	Industry Oriented Mini-Project	-	-	-	2
	Total		**23**	**1**	**6**	**24**

IV B.Tech II Sem ECE:

S.No.	Subject Code	Subject Name	Lectures			Credits
			L	T	P	
1	A18441	Cellular and Mobile Communications	4	0	0	3
2	A18442	Computer Networks	4	0	0	3
3	A18443	Radar Engineering	3	1	0	3
4	MP - II	Major Project	0	0	15	10
5	SM	Seminar	0	0	6	2
6	CVV	Comprehensive Viva-Voce	-	-	-	3
	Total		**11**	**1**	**21**	**24**

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IV Year B.Tech. ECE-I Sem

DIGITAL COMMUNICATIONS

Pre Requisites

- Analog Communications
- Probability Theory
- Signals and Systems

Course Objectives

In this course it is aimed

- To understand different digital modulation techniques such as PCM, DM and various shift keying techniques.
- To analyze baseband transmission and optimal reception of a digital signal.
- To study about different detectionand correction codes.
- To recite the importance of information theory on signals.

UNIT-I

Elements of Digital Communication Systems: Model of digital communication systems-digital representation of analog signal- certain issues in digital transmission- advantages of digital communication systems- bandwidth-S/N tradeoff- Hartley Shannonlaw- Sampling Theorem.

Pulse Code Modulation: PCM generation and reconstruction- Quantization noise- non uniform quantization and companding- DPCM- adaptive DPCM- DM and adaptive DM- Noise in PCM and DM.

UNIT-II

Digital Modulation Techniques: Introduction- ASK-modulator-Coherent and Non-coherent detector- FSK- bandwidth and frequency spectrum of FSK- Non coherent FSK detector-coherent FSK detector- FSK detection using PLL- BPSK- Coherent PSK detection- QPSK-Differential PSK.

UNIT-III

Baseband Transmission and Optimal Reception ofDigital Signal: Pulse shaping for optimum transmission- A baseband signal receiver- probability of error- optimum receiver- optimal of coherent reception- signal space representation and probability of error- eye diagrams and cross talk.

UNIT-IV

Information Theory: Information and Entropy- conditional entropy and redundancy- Shannon-Fano coding- mutual information- information loss due to noise.

Source Coding - Huffman code- variable length coding- source coding to increase average information per bit- lossy source coding.

UNIT-V

Linear Block Codes: Introduction- Matrix description of Linear Block codes- Error detection and error correction capabilities of linear block codes- Cyclic Codes: Algebraic structure-encoding- syndrome calculation and decoding.

Convolution Codes: Encoding- Decoding using state- tree- trellis diagrams- decoding using viterbi algorithm- comparison of error rates in coded and uncoded transmission- Introduction to Spread Spectrum Modulation.

Text Books

1. Digital communications- John G. Proakis- Masoud Salehi- 5th edition- McGraw-Hill-2008.
2. Principles of Communication systems – H.Taub and D.Schilling- TMH- 2008- 3rd Ed.
3. Digital and Analog Communication Systems – Sam Shanmugam- John Wiley- 2005.

References

1. Digital Communication: Theory,Techniques and Applications- R.N. Mutagi- 2nd Ed. 2013.
2. Digital Communications : Simon Haykin- John Wiley-2005
3. Modern Analog and Digital Communication – B.P.Lathi- Oxford reprint- 3rd Ed. 2004.
4. Digital Communications: Simon Haykin- John Wiley-2005.

Course Outcomes

At the end of the course the student should be able to

CO1. Understand different pulse code modulation techniques.

CO2. Compare the different digital modulation techniques using shift keying.

CO3. Calculate different parameters of base band signal for optimum transmission.

CO4. Analyze theperformance of different information coding techniques.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

EMBEDDED SYSTEM DESIGN

Pre Requisites

- Switching Theory and Logic Design
- Microprocessors and Microcontrollers

Course Objectives

In this course it is aimed

- To learn the fundamentals of embedded system design.
- To illustrate the need for co-design in embedded systems.
- To acquire knowledge on communication protocols.
- To study the overview of RTOS.

UNIT-I

Introduction to Embedded Systems: Embedded Vs General Computing Systems- History-classifications- applications- characteristics- quality attributes- Design metrics - challenges.

Embedded Hardware: Processor embedded into a system- Processor selection- embedded hardware units and devices.

UNIT-II

Embedded Software: An overview of programming languages- challenges and issues related to embedded software development.

Co-design-development process: Design cycle - Embedded software development tools-Target Machines - Linker/Locators - Embedded Software on Target system -Issues in co-design

UNIT-III

ARM® Cortex™-M0+ processor: Overview- Architecture- Features- interfaces- configurable options-Modes of operation and Execution and Instruction Set-FRDM KL25ZArchitecture - Interfacing of I/O devices with FRDM KL25Z- Integration and testing of embedded hardware-testing methods

UNIT-IV

Communication protocols: Network Embedded Systems- Serial Bus Communication Protocols- Parallel Bus Device Protocols, Parallel Communication Network Using ISA, PCI, PIC-X and Advanced Buses- Internet Enabled Systems, Network protocols- Wireless and Mobile System Protocols.

UNIT-V

RTOS based Embedded System Design: Operating system basics – types of operating systems-tasks-process and threads-multiprocessing and multitasking-task scheduling-Communication-shared memory- memory passing-remote procedure calls and sockets-device drivers-how to choose RTOS.

Text Books

1.Raj Kamal- “Embedded Systems-Architecture- Programming and Design-” 3/e-TataMcGraw Hill Education- 2015.

2.Shibu K V- “Introduction to Embedded systems”- 1/e- McGraw Hill Education- 2009.

3.Frank Vahid and Tony Givargis- "Embedded System Design: A Unified Hardware/Software Approach- 1999.

References

1.David E.Simon- “An Embedded software primer”- Pearson Education- 2004.

2.Embedded System Design : A Unified Hardware/ Software Introduction- 1/e- Wiley- John & Sons.

3. The Definitive Guide to ARM® Cortex®-M0 and Cortex-M0+ Processors - Joseph Yiu- Newnes Publications - second edition

Course Outcomes

At the end of the course the student should be able to

CO1: Expressthe fundamentals of the embedded system design.

CO2: Interpret the different issues in co-design.

CO3: Interface serial- parallel and network communication protocols to embedded systems.

CO4: Summarize the concepts of RTOS for Embedded Systems.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

ANTENNAS & MICROWAVE ENGINEERING

Pre Requisites

- Electromagnetic waves and Transmission lines

Course Objectives

In this course it is aimed to introduce to the students with

- To understand basic terminology and concepts of Antennas.
- To interrelate the wave spectrum and propagation of the waves for different antennas.
- To identify the basic principles of microwave components and its transmission.
- To interpret the various microwave solid state devices and their measurements.

UNIT- I

Antenna Basics: Introduction- Radiation Mechanism- Current Distribution on wire antenna- Antenna Parameters - Related Problems- Retarded vector potentials -Dipole – Parameters - Types- Radiation Resistance- Introduction to Loop antennas- comparison of small loop and short dipole.
Antenna Arrays: Two element arrays -Types- Multiplication of patterns- Linear Array with n-isotropic point sources of equal amplitude and spacing

UNIT-II

RF Antennas: Non-Resonant Radiators-Long wire antennas-Types- Design Relations- Travelling wave antenna-Broadband Antennas- The Helical Antennas - Significance- Geometry- helix modes and Practical design considerations-VHF- UHF and Microwave Antennas - Dipole array with Parasitic Elements- Folded Dipoles and their characteristics- Yagi-Uda Antenna- Reflector Antennas -Types- Parabolic Reflectors –parameters -Types- Feed systems Horn Antennas-Types.

UNIT-III

Wave Propagation: Modes of Propagation-Types- Characteristics- Parameters- Mechanism of Reflection and Refraction- Effect of Earth’s Curvature- Duct Propagation (M-curves)
MicrowaveTransmission Lines: Microwave spectrum and bands- Applications- Rectangular waveguides –solution of wave equations in rectangular coordinates- TE/TM/TEM mode analysis- mode characteristics-wavelengths and impedance relations- related problems- Micro strip lines cavity Resonators.

UNIT- IV

Waveguide Components and Microwave Tubes: Waveguide Attenuators –Types- Posts-Screws- Waveguide multiport junctions -Types-Magic Tee-Directional couplers - Types-Ferrites- composition and characteristics- faraday rotation- Ferrite components -Types-Scattering matrix-significance- properties- calculations- related problems.
High frequency limitations of conventional tubes- Bunching and velocity modulation-mathematical theory of bunching- principles and operation of two cavity, multi cavity Klystron-Reflex Klystron and TWT-Theory of crossed field interaction- Magnetrons.

UNIT-V

Microwave Solid State Devices and Measurements: TEDs - Introduction- Gunn Diode - Principle- RWH Theory- Characteristics- Basic Modes of Operation- Avalanche Transit Time Devices.

Description of Microwave Bench – Different Blocks and their Features- Microwave Power Measurement- Measurement of Attenuation-Volatge standing wave Ratio measurements-Impedance Measurements.

Text Books

1.John D. Krauss- Ronald J. Marhefka & Ahmad S. Khan- “Antennas and wave Propagation”- 4/e TMH- 2010.

2.Constantine A. Balanis- Antenna Theory: “Analysis and Design- “3/e- John Wiley- 2005.

3. Samuel Y. Liao-“Microwave Devices and Circuits”- 3/e- Pearson Education- 2003.

4. Rizzi P-“Microwave Devices and Circuits”- 3/e- Pearson Education- 2003.

References

1. E. C. Jordan & Keith G. Balmain-“Electromagnetic Waves andRadiating Systems”-2/e- Pearson Education- 2006.

2. R. E. Collins-“Foundations for Microwave Engineering”- 2/e- Wiley India Pvt. Ltd.- 2012.

COURSE OUTCOMES

At the end of the course the student should be able to
CO1: Understand the different parameters in the antenna design.

CO2: Restate the principles and design issuesof fundamental antennas

CO3: Summarize the wave propagation and significance of various microwavecomponents.

CO4: Explain the various microwave solid state devices and their measurements.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

DIGITAL IMAGE PROCESSING
(Professional Elective - 3)

Pre Requisites

- Signals and Systems
- Digital Signal Processing

Course Objectives

In this course it is aimed to introduce to the students with

- To Understand the basic principles of digital image processing
- To describe the different enhancement and restoration techniques in image processing
- To recite the different image segmentation, compression and morphological processing techniques.
- To illustrate the basics of color image processing.

UNIT-I

Fundamentals of Image Processing: Components of Digital Image Processing Systems – Image sensing and Acquisition- Elements of Visual Perception – structure of human eye – light-luminance- brightness and contrast- image formation- Basic steps of image processing- Sampling - Quantization and Digital Image representation - Basic relationships between pixels.

UNIT-II

Image Enhancement in Spatial domain: Introduction-Point Processing-Histogram processing-Arithmetic and logical operations-Fundamentals of Spatial filtering-masking-Spatial filters for Smoothing - Spatial filters for Sharpening.

Image Enhancement in Frequency domain: Need for transform-Basics of filtering in frequency domain-Image smoothing in frequency domain-Image sharpening in frequency domain-Homomorphic filtering-Selective filtering.

UNIT-III

Image Restoration: Introduction- Degradation model –Noise models-Spatial domain filtering for restoration- Mean Filters – Order Statistics filters – Adaptive filters –frequency domain filtering for noise removal - Band reject Filters – Band pass Filters – Notch Filters –Degradation function estimation– Inverse filtering – Wiener filter.

UNIT-IV

Image Segmentation: Segmentation concepts-Point- Line - Edge Detection-Thresholding based segmentation- Local- Global and Adaptive Thresholding- Region based segmentation-Region growing-Region splitting and merging.

Morphological processing: Introduction- structuring element – erosion – dilation – Opening - closing-Hit or Miss Transform.

UNIT-V

Image Compression: Introduction-Redundancy in images-Fidelity Criteria-Image compression model-Lossless compression-Huffman coding–Bit-plane coding-Lossless Predictive coding-

Lossy compression– lossy predictive coding- Transform coding –Image compression standards- JPEG and JPEG 2000.

Color Image Processing: Color fundamentals-Color models-Pseudo Color Image processing- Fundamentals of Full Color Image Processing.

Text Books

1.Rafael C. Gonzales- Richard E. Woods- “Digital Image Processing”- Third Edition- Pearson Education- 2010.

2. Anil K. Jain- Fundamentals of Digital Image Processing- PHI Learning Private Limited- New Delhi- 2002.

References

1. Rafael C. Gonzalez- Richard E woods and Steven L.Eddins- “Digital Image processing using MATLAB”- Tata McGraw Hill- Second Edition- 2010.

2. William K Pratt- "Digital Image Processing"- 3rd Edition- John Wiley & Sons- 2002.

3. Jayaramann S- S Esakkirajan- T Veerakumar- “Digital Image processing”- Tata McGraw Hill Education- 2011.

4. Greenberg A.D. and S.Greenberg- "Digital Images: A Practical Guide"- 1st Edition- McGraw Hill- 1995.

5. Edward R Dougherty- "Electronic Imaging Technology"- 1st Edition- PHI- 2005.

6. John C. Russ- The Image Processing Handbook- 6th Edition- CRC Press- Taylor & Francis Group- 2011.

7. Bernd Jähne- Digital Image Processing- 5th Revised and Extended Edition- Springer- 2002.

8. Malay K. Pakhira- “Digital Image Processing and Pattern Recognition”- First Edition- PHI Learning Pvt. Ltd- 2011.

Course Outcomes

At the end of the course the student should be able to

CO1: State the Digital Image Fundamentals.
CO2: Illustrate the quality improvement techniques on images
CO3:label the binary images using segmentation and morphological processing
CO4:interpret the various color models in different applications.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS
IV Year B.Tech. ECE-I Sem

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Professional Elective - 4)

Pre Requisites
- Switching Theory and Logic Design
- Probability Theory and Stochastic Processes
- Analog Communications

Course Objectives
In this course it is aimed to introduce to the students with
- To recite through the evolution of switching systems from manual to automatic controlled digital systems.
- To Understand Switching and Signalling in the context of telecommunication network.
- To study traffic signaling- packet switching and networks.
- To illustrate various telephone networks.

UNIT-I

Basics of Switching Systems: Evolution of Telecommunications- simple telephone communication- Basics of a Switching System- Functions -Manual System- major Telecommunication Networks - Strowger switching systems- Strowger Switching Components- Step by step switching- 1000 line Blocking Exchange- Principles of Crossbar Switching- Configurations - Exchange Organization-Digital switching systems.

UNIT-II
Switching Networks: Single Stage Networks- Link systems- Two Stage Networks- Three Stage Networks- Four Stage Networks- Rearrangeable networks.
Time Division Switching: Time Division Space Switching (TDSS)- Time Division Time Switching (TDTS)- Time Multiplexed Space Switching (TMSS)- Time Multiplexed Time Switching (TMTS)- Combination Switching-Three Stage Switching- n Stage Switching.

UNIT-III

Traffic Engineering: Network traffic load and Parameters – Lost-call system – Grade of Service and Blocking probability – Modeling switching systems – Incoming traffic and service time characterization – Blocking models and loss estimates – Delay systems.

UNIT- IV

Signalling: Customer Line Signalling- Audio-frequency Junctions and Trunk Circuits- FDM Carrier Systems-Outbound signaling- Inband Signalling -PCM Signalling- Inter Register Signalling- Common Channel signaling principles- CCITT Signalling System- Digital Customer line Signalling.

UNIT – V

Packet Switching: Local Area and Wide Area Networks- Bus Networks- Ring Networks- Optical Fiber Networks- Large Scale Networks- Datagrams and Virtual Circuits-Routing- Flow Control- Standards- Frame Relay- Broadband Networks.

Telephone Networks: Analog Networks- Private Networks-Numbering-Charging- Routing- Network management.

Text Books

1. Thiagarajan Viswanathan (2010)-Telecommunication Switching Systems and Networks- Prentice Hall of India- New Delhi- India.
2. J. E. Flood (2016)-Telecommunications Switching- Traffic and Networks-Pearson Education- New Delhi.

References

1. John. C. Bellamy (2010)- Digital Telephony- 3rd edition- John Wiley- India.
2. Roger L. Freeman (2010)-Telecommunication System Engineering- 4th edition- John Wiley & Sons- India.
3. Achyut S. Godbole (2005)-Data Communications & Networks- Tata McGraw Hill- New Delhi.
4. Bosse J G van- Bosse John G (1997) "Signaling in Telecommunication Networks"- Wiley John & Sons.
5. T.N.Saadawi- M.H.Ammar- A.E.Hakeem (1994)- "Fundamentals of Telecommunication Networks"- Wiley Interscience.

Course Outcomes

At the end of the course the student should be able to

- Understand the main concepts of telecommunication signaling and switching in the network.
- Define fundamental telecommunication traffic in systems.
- Interpret the methodologies of packet switching.
- State the different types of telephone networks.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS
IV Year B.Tech. ECE-I Sem

MULTIMEDIA AND SIGNAL CODING
(Professional Elective - 3)

Pre Requisites

- Signals and Systems
- Digital Signal Processing

Course Objectives
In this course it is aimed to introduce to the students with

- To understand the basic principles and techniques in Multimedia signal coding and compression.
- To relate the different techniques related to multimedia networks.
- To outline the current multimedia standards and technologies.
- To illustrate the need for different Multimedia Techniques

UNIT -I
Introduction to Multimedia: Components of Multimedia-Hypermedia-World Wide Web-Overview of Multimedia Software Tools-Multimedia Authoring-Graphics and Image Data Types- File Formats.
Color in Image and Video Processing: Light and Spectra-Human Vision-Image Formation-Camera Systems- Gamma Correction-CIE Chromaticity Diagram-Color Monitor Specifications-Out-of-Gamut Colors-White Point Correction-XYZ to RGB Transform-L*A*B* Color Model-Color Models in Images-RGB- CMY-Transformation from RGB to CMY-Under Color Removal: CMYK System-Printer Gamut- Color Models in Video - Video Color Transforms-YUV-YIQ and YCbCr.

UNIT -II
Fundamentals of Video: Types of Video Signals-Component- Composite and S-Video-- Analog Video-NTSC- PAL and SECAM- Digital Video- Chroma sub sampling-HDTV.
Fundamentals of Digital Audio: Digitization of Sound-MIDI-Quantization and Transmission of Audio.

UNIT -III
Data Compression in Multimedia: Lossless Compression Algorithms-Run Length Coding-Variable Length Coding- Arithmetic Coding- Lossless JPEG Image Compression. Lossy Image Compression Algorithms-Transform Coding- Wavelet Based Coding. Image Compression Standards: JPEG and JPEG2000.

UNIT – IV

Video Compression Techniques: Basics of Video Compression- Video Compression Based on Motion Compensation- Search for Motion Vectors- sequential- logarithmic- and Hierarchical search-H.261- Intra-Frame and Inter-Frame Coding-Quantization-Encoder and Decoder- MPEG video coding-MPEG 1 and MPEG2- MPEG 7 and MPEG 21.

UNIT -V

Audio Compression Techniques: Vocoders-Phase Insensitivity-Channel Vocoder-Formant Vocoder-Linear Predictive Coding- CELP- Hybrid Excitation Vocoders-MPEG Audio — MPEG Layers-MPEG Audio Strategy- MPEG Audio Compression Algorithms-MPEG-2 AAC-MPEG-4 Audio- MPEG 7 and MPEG 21.

TEXT BOOKS

1. Fundamentals of Multimedia — Ze- Nian Li- Mark S. Drew- PHI- 2010.
2. Multimedia Signals & Systems — Mrinal Kumar Mandal- Springer International Edition 1St Edition- 2009

REFERENCES

1. Digital Video Processing — A. Murat Tekalp- PHI- 1996.
2. Video Processing and Communications — Yaowang- Jorn Ostermann- Ya-QinZhang- Pearson-2002
3. Multimedia Communication Systems — Techniques- Standards & Networks KR. Rao- Zorans. Bojkoric- DragoradA.MjIovanj 1st Edition- 2002.
4. Fundamentals of Multimedia Ze- Man Li- Mark S.Drew- Pearson Education (LPE)- 1st Edition- 2009.
5. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE)- 1st Edition- 2003.

Course Outcomes

At the end of the course the student should be able to

CO1: Comprehend the fundamentals behind multimedia signal processing.

CO2: Realize the fundamentals behind multimedia compression.

CO3: Know the basic principles behind existing multimedia compression and communication standards.

CO4: Understand future multimedia technologies.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

DSP ARCHITECTURES
(Professional Elective - 4)

Pre Requisites

- Signals and Systems
- Digital Signal Processing
- Microprocessors

Course Objectives

In this course it is aimed to introduce to the students with

- To understand the architectural features of DSP processors.
- To study the features of TMS320C54x Processors
- To illustrate the various algorithms of DSP on a Programmable device.
- To interrelate the programmable DSP devices with its applications.

UNIT – I

Architectures for Programmable DSP Devices: Basic Architectural features- DSP Computational Building Blocks- Bus Architecture and Memory- Data Addressing Capabilities- Address Generation Unit- Programmability and Program Execution- Speed Issues- Features for External interfacing.

Unit - II

Execution Control and Pipelining: Hardware looping- Interrupts- Stacks- Relative Branch support- Pipelining and Performance- Pipeline Depth- Interlocking- Branching effects- Interrupt effects- Pipeline Programming models.

UNIT – III

Programmable Digital Signal Processors TMS320C54XX: Commercial Digital signal-processing Devices- Data Addressing modes - Memory space - Program Control-instruction set-Simple Programs- On-Chip Peripherals- Interrupts – Pipeline- Memory interface- I/O interface-Multichannel buffered serial port (McBSP)-CODEC interface circuit- CODEC programming- A CODEC-DSP interface example.

UNIT - IV

Implementations of Basic DSP Algorithms: The Q-notation- FIR Filters- IIR Filters-Interpolation Filters- Decimation Filters- PID Controller- Adaptive Filters- 2-D Signal Processing.

Implementation of FFT Algorithms: DFT Computation-Butterfly Computation- Overflow and scaling- Bit-Reversed index generation- implementation on the TMS320C54XX- Computation of the signal spectrum.

UNIT – V

Applications of DSP Devices: DSP system- Biotelemetry receiver- Speech processing system-Image processing system - Position control for hard disk drive- Power Meter - Development Tools - Code Composer Studio - Example

TEXT BOOKS

1. Avtar Singh and S. Srinivasan(2006)- Digital Signal Processing- Thomson Publication- India.
2.Phil Lapsley Jeff Bier- Amit Shoham- Edward A.Lee(2010)-DSP Processor Fundamentals-Architectures & Features- John Wiley & Sons-India.

REFERENCES

1. B. Venkata Ramani and M. Bhaskar-(2004)-Digital Signal Processors- Architecture-Programming and Applications- Tata McGraw-Hill- New Delhi.

2. Jonatham Stein(2005)-Digital Signal Processing- John Wiley- India.

3. Emmaneul C Ifeachor- Barrie W Jrevis- Digital Signal Processing- Pearson Education.

COURSE OUTCOMES:

At the end of the course the student should be able to

CO 1: Define the various features of DSP Processors

CO 2: Recollect the different algorithms on DSP processor.

CO 3: Relate the different applications using DSP processor.

CO 4: Express the Architectural features of TMS320C54XX processor.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

SPREAD SPECTRUM COMMUNICATIONS
(Professional Elective - 3)

Pre Requisites

- Probability Theory and Stochastic Processes
- Analog Communications.

Course Objectives:

The objectives of this course are to make the student to

1. Understand the concept of Spread Spectrum and study various types of Spread Spectrum sequences and their generation.
2. Understand various Code tracing loops for optimum tracking of wideband signals viz Spread spectrum signals
3. Describe the performance of spread spectrum systems in Jamming environment, systems with Forward Error Correction.
4. Commercial Applications of Spread Spectrum

UNIT -I

Introduction to Spread Spectrum Systems: Fundamental Concepts of Spread SpectrumSystems, Applications and Advantages of Spread Spectrum ,Pseudo noise sequence, Pulse -Noise Jamming, Low Probability of Detection, Classifications : Direct Sequence SS, Frequency hopped SS, Hybrid SS. Fast Hopping Versus Slow Hopping- time Hopping SS systems.

Binary Shift Register Sequences for Spread Spectrum Systems:
Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

UNIT -II

Spread Spectrum Technique -Analysis: Synchronization of SS systems - Acquisition, Tracking. Jamming Consideration - Broadband, Partial band, multiple tone, Pulse-repeat band, jamming blade systems.

UNIT –III

Code Tracking Loops: Introduction, Optimum Tracking of Wideband Signals, Base Band Delay-Lock Tracking Loop, Tau-Dither Non- Coherent Tracking Loop, Double Dither Non-Coherent Tracking Loop.

Initial Synchronization of the Receiver Spreading Code: Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

UNIT -IV:

Performance of Spread Spectrum Systems in Jamming Environments: Spread Spectrum Communication System Model, Performance of Spread Spectrum Systems without Coding.

Performance of Spread Spectrum Systems with Forward Error Correction: Elementary Block Coding Concepts, Optimum Decoding Rule, and Calculation of Error Probability, Elementary Convolution Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

UNIT –V

Spread Spectrum Technique Applications: Commercial applications - CDMA, Multipath channels, The FCC Part 15 rules -Direct sequence CDMA, IS-95 CDMA Digital cellular systems. Spread Spectrum applications in cellular, PCS and mobile communication.

TEXT BOOKS:

1. Rodger E Ziemer, Roger L. Peterson and David E Borth - “Introduction to Spread Spectrum Communication- Pearson, 1st Edition, 1995.
2. Mosa Ali Abu-Rgheff – “Introduction to CDMA Wireless Communications.” Elsevier Publications, 2008.
3. M.K. Simon, J.K. Scholtz abd B.K. Levitt - 'Spread Spectrum Communications Vol-1, Vol-2, Vol-3', Computer Science Press Inc, 1985

REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem - “Modern Communication and Spread Spectrum,” McGraw Hill, 1986.
2. Andrew j. Viterbi - “CDMA: Principles of spread spectrum communication,” Pearson Education, 1st Edition, 1995.
3. Kamilo Feher - “Wireless Digital Communications,” PHI, 2009.
4. Andrew Richardson - “WCDMA Design Handbook,” Cambridge University Press, 2005.
5. Steve Lee - Spread Spectrum CDMA, McGraw Hill, 2002.

Course Outcomes:

On completion of this course student will be able to

1. Understand about spread spectrum system various types of Spread spectrum sequences.
2. Analyze the performance of Spread spectrum systems in Jamming environment and systems with Forward Error Correction.
3. Understand about Code Tracking Loops and Initial Synchronization of the Receiver Spreading Code.
4. Describe about Commercial Applications of Spread Spectrum.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

LOW POWER VLSI
(Professional Elective - 4)

Pre Requisites

- VLSI Deign

Course objectives:

In this course it is aimed to introduce to the students with

- To discuss various causes of power dissipation in VLSI circuits.
- To explain the impact of technology scaling on performance of CMOS design.
- To find suitable techniques to reduce the power dissipation in VLSI circuits.
- To describe design of adders, multipliers and memory circuits with low power dissipation.

Unit-I

Low power VLSI Design: Overview-Need for low power VLSI chips- Charging and discharging capacitance- Short circuit current in CMOS- CMOS leakage current- static current-basic principles of low power design.

Unit-II

Impact of Device & Technology in VLSI Design: Introduction- Dynamic dissipation in CMOS- Effects of $V_{dd}$and $V_t$on speed- constraints on reduction- Impact of Transistor sizing and optimal gate oxide thickness- Technology Scaling- Technology and Device innovations for low power design.

Unit-III

Power Estimation: SPICE basics- Gate level logic simulation: capacitive power dissipation-Static state power- Gate level capacitance estimation- gate level power analysis- Architecture level analysis- Probabilistic power analysis- Techniques.

Unit-IV

Low Power TechniquesCircuit level: Transistor and Gate Sizing- Equivalent Pin Ordering-Network Restructuring and Reorganization- Special Latches & Flip- Flops- Low Power Digital Cell Library.

Logic level: Gate Reorganization- Signal Gating- Logic Encoding- State Machine Encoding-Pre-computation Logic.

Unit-V

Low Power Memory Design

Introduction- sources and reduction of power dissipation in memory subsystem- Sources of power dissipation in SRAM andDRAM -Low power SRAM circuits -Low power DRAM circuits.

TEXT BOOKS

1. Gary K. Yeap- Practical Low Power Digital VLSI Design- KAP- 2002
2. Rabaey- Pedram- Low power design methodologies- Kluwer Academic- 1997

REFERENCES

1. Kaushik Roy- Sharat Prasad- Low-Power CMOS VLSI Circuit Design- Wiley- 2000
2. Sung-Mo kang- Yusuf Leblebici- CMOS Digital Integrated Circuits- Analysis and Design- TMH- 2011.
3. A. Bellamour- M. I. Elamarsi- Low Power CMOS VLSI Circuit Design- Kluwer Academic Press- 1995.
4. J. M. Rabaey- Anatha Chandrakasan- B. Nikolic- Digital Integrated Circuits- A Design Perspective- PHI.

Course Outcomes

At the end of the course the students should be able to

CO1:understand the need for low power VLSI design.

CO2: clearly find the various sources of power dissipation in a given VLSI circuits.

CO3: describe the relationship of probability while finding power dissipation of VLSI circuits.

CO4: design low power arithmetic circuits and systems.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

INTRODUCTION TO MATLAB
(Open Elective - 3)

Pre Requisites

- Programming in C

Course objectives:

In this course it is aimed to introduce to the students with

- To enable the students to understand the fundamentals and programming knowledge in MATLAB.
- To provide the deeper understanding of the tools and processes that enable students to use MATLAB for the engineering problems.
- To assist the students with computational tools to design their own analysis and interpretation strategies when facing different engineering applications.

UNIT-I

Introduction to Matlab: Introduction-environment-Advantages – file types –Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions – Load and Save – Matlab File Processing – File Opening and Closing –Input and output statements-Function files.

UNIT- II

Control Structures in Matlab: Data types-Operators – Hierarchy of operations- Loops- for - nested for - while –Branching structures- If- switch- break- continue- error- try-catch-Debugging methods in Matlab.

UNIT-III

Matlab Plotting: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots- STEM- BAR- HIST- Pi-stairs- rose- LOG-LOG- SEMILOG-POLAR-COMET- 3D plots: – Mesh - Contour –Surf-Stem3.

UNIT- IV

Matlab Programming: Nodal analysis-loop analysis- Laplace transform- inverse Laplace transform- partial fraction expansion- transfer function representation –zeros and poles – roots-polyval-residue- Time response of control system-ordinary differential equation-ODE solver-Polynomials.

UNIT-V

Introduction to Simulink: Introduction-simulink modeling-simulating a model-using variable from matlab-Data import and export-State space modeling-Simulation of non linear system-Creating a sub system-Creating a masked sub system- Introduction-Creating and displaying GUI-GUI components-Panel and button groups-Dialogue boxes and button groups-menus-Creating efficient GUIS.

Text Books

1. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015.

2. R.K.Bansal- A.K.Goe- M.K.Sharma- "MATLAB and Its Applications in Engineering"- Pearson Education India- 2009.

References

1. Amos Gilat-"MATLAB: An Introduction With Applications"- John Wiley & Sons- 2009.
2. Edward B. Magrab-"An Engineer's Guide to MATLAB: With Applications from Mechanical-Aerospace-Electrical- Civil- and Biological Systems Engineering"-3rd Edition- Prentice Hall-2011.
3. Rudra Pratap- "Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers"-Oxford University Press- 2010.
4. D. M. Etter- "Introduction to MATLAB 7"- Pearson education-2009.
5. William J.Palm III- "Introduction to MATLAB for Engineers"- 3 rd Edition- McGraw-Hill-2010.
6. M.Herniter- “Programming in MATLAB”- Thomson Learning- 2001.

Course Outcomes

At the end of the course the student should be able to

CO1: Break down computational problems into a series of simple steps.

CO2: Create programs in the MATLAB language for engineering applications..

CO3: Appraise and get familiarized with the visualization techniques.

CO4: Familiarized with Different application tools required for different area of domain.

CO5: Expose to the common algorithms and techniques that are the building blocks of MATLAB.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

CIRCUIT SIMULATION USING PSPICE
(Open Elective - 3)

Pre Requisites

- Basic Electrical and Electronics

Course objectives:

In this course it is aimed to introduce to the students with

- To develop a simulation circuit for different domain.
- To Develop and understand the types of the Pspice
- To Perform the DC analysis of the circuit such as operating point small signal transfer function and DC sweep.
- To motivate the students to analyze the frequency response of the circuit.

UNIT-I

Introduction to Pspice: Introduction-Description of Spice-Types- input files-Element values-Nodes-Circuit Elements-Sources-Types of Analysis-Output Variables-Pspice Output Commands – structure of Pspice programs-Limitations of Pspice--Examples.

UNIT-II

DC Circuit Analysis: Introduction-Resistors-Operating Temperature-Modeling of Elements-Independent DC Sources-Dependent Sources-D C Output Variables-Example problems-Types of Output-Types of DC Analysis-Finding the thevenin's equivalent-transfer function-DC transfer characteristics with varying resistors.

UNIT-III

Transient Analysis: Introduction- AC Output Variables- Capacitors and Inductors- Modeling of Transient Sources-transient source-transient output commands-Transient response-switches-Example.

UNIT-IV

AC Circuit Analysis: Introduction- AC Output Variables - Independent AC Sources-AC analysis- Magnetic Elements - Transmission Lines- Multiple Analyses – Examples.

Advanced Pspice Commands: Table- Laplace – freq – ends - PARAM-Fourier analysis-Noise analysis-Subckt.

UNIT-V

Application of Pspice: Introduction- Pspice model for -Diode- BJT-FET and MOSFET -VI characteristics of Diode-zener diode-CB- CC- CE characteristics-Drain- Transfer characteristics-Introduction to Orcad capture.

Text Books

1. Muhammad H. Rashid- Introduction to PSpice® Using OrCAD® for Circuits and Electronics- third edition-Pearson 2004.
2. Paul W. Tuinenga-A guide to circuit simulation and analysis using spice- Pearson Education-1995.

References

1. Nillson Introduction to PSpice Using OrCad Release 16.2: Electric Circuits 9th Edition - 2011
2. L. H. Fenical- PSpice@: A Tutorial-Prentice Hall- Prentice Hall -1992
3. John O Attia Pspice and Matlab for Electronics CRC Publication 2002.
4. James W.Nilson Introduction to PSpice for Electric Circuits Aug 2007.
5. James A.svaboda Wiley PSpice for Linear Circuits (uses PSpice version 15.7)- 2nd Edition

Course Outcomes

At the end of the course the student should be able to

CO1: Describe circuits for PSpice simulation.

CO2: Understand the types of dc - ac and their output variables analysis

CO3: Understand the response of Transient analysis and obtain their output variables.

CO4: Students can able to analyze and develop simulation circuit for different applications.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-I Sem

EMBEDDED SYSTEM DESIGN LAB

Course Objectives:

1. To illustrate the basic programming concepts of ARM cortex M0+ processor using simple programs.
2. To transfer programs into FRDM kit.
3. To communicate among different processors with FRDM kit
4. To interface I/O devices with FRDM kit.

List of Experiments

1. Blinking of LED : Hello World
2. Breath out 2 LEDs
3. Color Circle
4. ADC Potentiometer
5. Analog serial plotter
6. Interface to Accelerometer sensor using FRDM kit
7. Serial port communication using FRDM kit
8. Interface to touch sensor using FRDM kit
9. Radio frequency transmission operation using FRDM kit
10. LED intensity control using touch sensor using FRDM kit
11. Interface and plot LDR using FRDM kit
12. Interface and plot temperature sensor using FRDM kit

Course Outcomes:

Students can able to

1. Write programs using ARM cortex M0+ processor instruction set.
2. Transfer programs into FRDM kit.
3. Communicate among different processors with FRDM kit.
4. Interface I/O devices with FRDM kit.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS
IV Year B.Tech. ECE-I Sem

MICROWAVE ENGINEERING AND DIGITAL COMMUNICATIONS LAB

Course Objectives:

The student should be made to:

1. Know about the behavior of microwave components.

2. Examine microwave measurement procedures

3. Describe the Radiation Pattern of the Horn antenna

4. Illustrates the effects of TDM

5. Explain base band digital modulation schemes (PCM & DM)

6. Compares Pass band digital modulation schemes (ASK-FSK- PSK DPSK and QPSK)

Note: Minimum 12 Experiments to be conducted

Part — A: Microwave Engineering Lab (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Radiation Pattern of Horn Antenna
7. Measurement of Scattering parameters of a Magic Tee
8. Measurement of Scattering parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement

Part — B: Digital Communications Lab (Any 6 Experiments):

1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Time Division Multiplexing of 2 Band Limited Signals
5. Frequency shift keying: Generation and Detection
6. Phase Shift Keying: Generation and Detection
7. Amplitude Shift Keying: Generation and Detection
8. Study of the spectral characteristics of PAM- QAM
9. DPSK :Generation and Detection
10. QPSK: Generation and Detection

Equipment required for the Laboratory:
Microwave Engineering Lab:

1. Microwave Bench set up with Klystron Power Supply
2. Microwave Bench set up with Gunn Power Supply
3. Micro Ammeter
4. Milli Ammeter
5. VSWR meter
6. Microwave Components

Digital Communication Lab

1. RPS: O-30V
2. CR0: O-2OMHz
3. Function Generators: 0-1MHz
4. Experimental Kits

COURSE OUTCOMES:

At the end of the course- the student should be able to:

1. Explain and verify the characteristics of microwave devices
2. Identify and illustrate the scattering parameters of different microwave devices
3. Demonstrate their knowledge in base band signaling schemes through implementation of FSK- PSK and DPSK
4. Understand Multiplexing of two Band limited Signals through TDM.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-II Sem

CELLULAR AND MOBILE COMMUNICATIONS

Pre Requisites

- Analog Communications
- Digital Communications

Course Objectives

In this course it is aimed to introduce to the students with

- To provide the student with an understanding of the Cellular concept- Frequency reuse- Hand-off strategies.
- To enable the student to compare wireless and mobile cellular communication systems over a stochastic fading channel.
- To enable the student to relate Co-channel and Non- Co-channel interference.
- To give the student an outline of frequency management- Channel assignment and types of handoff.

UNIT-I

Introduction to Cellular Mobile Radio Systems: Limitations of Conventional Mobile Telephone Systems- Basic Cellular Mobile System- First, Second, Third and Fourth Generation of Cellular Wireless Systems- Uniqueness of Mobile Radio Environment- Fading- Fundamentals of Cellular Radio System Design- Concept of Frequency Reuse- Cell Splitting- Sectoring- Microcell Zone Concept.

UNIT -II

Channel Interference: Measurement Of Real Time Co-Channel Interference- Design of Antenna System- Diversity Techniques- Non-Co-Channel Interference- Adjacent Channel Interference- Near End, Far End Interference- Cross Talk- Effects on Coverage and Interference by Power Decrease and Antenna Height Decrease- Effects of Cell Site Components.

UNIT -III

Cell Coverage for Signal and Traffic: Signal Reflections in Flat and Hilly Terrain- Phase Difference between Direct and Reflected Paths- Constant Standard Deviation- General formula for Mobile Propagation over water and flat open area- Straight Line Path Loss Slope.

Cell Site and Mobile Antennas: Umbrella Pattern Antennas- Minimum Separation of Cell Site Antennas- Mobile Antennas.

UNIT -IV

Frequency Management and Channel Assignment: Numbering and Grouping- Setup Access and Paging Channels- Channel assignments to cell sites and mobile units-Channel Sharing and Borrowing- Sectorization- Overlaid Cells- Non Fixed Channel Assignment.

UNIT —V

Handoffs and Dropped Calls: Handoff Initiation- Advantages of Handoff -Types of Handoff- Delaying Handoff- Power difference handoff-Forced handoff-Mobile assisted and soft handoff- intersystem handoff- Introduction to Dropped Call Rates and their Evaluation.

TEXT BOOKS

1. Mobile Cellular Telecommunications — W.C.Y. Lee- Mc Graw Hill- 2nd Edn.- 1989.
2. Wireless Communications – Theodore. S. Rapport- Pearson Education- 2nd Edn.- 2002.
3. Mobile Cellular Communication – Gottapu sashibhushana Rao- Pearson- 2012.

REFERENCES

1. Principles of Mobile Communications — Gordon L. Stuber- Springer International- 2nd Edn.- 2001.
2. Modern Wireless Communications-Simon Haykin- Michael Moher-Pearson Education- 2005.
3. Wireless Communications Theory and Techniques- Asrar U. H .Sheikh- Springer- 2004.
4. Mobile Communications, Second Edition Book by Jochen Schiller.
5. Wireless Communications —Andrea Goldsmith- Cambridge University Press- 2005.

Course Outcomes

At the end of the course the student should be able to

CO1: To explain the concept of cell coverage for signal- traffic- and diversity techniques to design an antenna.

CO2: To use frequency management- Channel assignment for the design of a cellular system.

CO3: To analyze and design wireless and mobile cellular systems.

CO4: To classify frequency management- Channel assignment and types of handoff and apply in the design of a cellular system.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-II Sem

COMPUTER NETWORKS

Pre Requisites

- Switching Theory and Logic Devices
- Digital Communications

Course Objectives

In this course it is aimed to introduce to the students with

- To explore the various layers of OSI Model.
- To introduce the fundamental types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To introduce UDP and TCP Models.

UNIT-I

Overview of the Internet: Protocol- Layering Scenario- Internet history standards and administration-The OSI Model-TCP/IP Protocol suite- Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided and wireless transmission media.

Data Link Layer: Design issues- CRC Codes- Elementary Data link Layer protocols- sliding window protocol.

UNIT-II

Multiple Access Protocols: ALOHA- CSMA- Collision free protocols- Ethernet- Physical Layer- Ethernet Mac Sub layer- repeaters- hubs- bridges- learning bridges- spanning tree bridges - switches- routers and gateways- data link layer switching.

UNIT-III

Network Layer: Introduction-Design issues- Packet switching- connection less and connection oriented networks-Tunneling- Encapsulation-Internetwork routing-Packet fragmentation and packet delivery.

Network Layer Protocols: Internet Protocol (IP)- Mobile IP-IPv4- ICMPv4- Transition from IPV4 to IPV6- IPv6- Addressing IPv6 Protocol- ICMPV6 Protocol.

UNIT-IV

Transport Layer: Introduction - Transport Layer Protocols-Bidirectional Protocols- Services - Port Numbers.

Transmission Control Protocol: Services- Features-Segments- Connection- State Transition- Flow and Error Control - Congestion Control- TCP in Wireless Domain.

User Datagram Protocol: Introduction- Services- Applications. The Internet Transport Protocols.

UNIT-V

Application Layer: Introduction –services- Paradigms-Standard client-server model and application-HTTP- FTP- Electronic mail- TELNET- DNS- SSH- Quality of Service- Queue Management.

TEXT BOOKS

1. Data Communications and Networking — Behrouz A. Forouzan- Fifth Edition TMH-2013.
2. Computer Networks — Andrew S Tanenbaum- 4th Edition- Pearson Education.
3. High performance TCP/IP Networking -- Mahbub Hasan & Raj Jain PHI -2005

REFERENCES

1. An Engineering Approach to Computer Networks-S.Keshav- 2nd Edition- Pearson Education.
2. Computer Networks- L.L.Peterson and B.S.Davie-4th edition- ELSE VIER.
3. Internetworking with TCP/IP -- Douglas. E.Comer- Volume I PHI -
4. Computer Networks-Larry L. Perterson and Bruce S.Davie -
5. Mobile Communications - Jochen Schiiler- Pearson - Second Edition

Course Outcomes

At the end of the course the student should be able to

CO1: To understand and explore the basics of Computer Networks and Various Protocols.

CO2: To explain the World Wide Web concepts.

CO3: To administrate a network and flow of information.

CO4: To understand easily the concepts of network security- Mobile and ad hoc networks.

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

IV Year B.Tech. ECE-II Sem

RADAR ENGINEERING

Pre Requisites

- Signal and Systems
- Analog and Digital Communications

Course Objectives:

In this course it is aimed to introduce to the students with

- To understand Radar Fundamentals and illustration of the Radar Equation
- To elaborate various modulation technologies involved in the design of radar transmitter and receivers.
- To Illustrate Various Types Of Radars Like MTI- Doppler And Tracking Radars and Their Comparison.

Unit – I

Basics of Radar: Introduction- Maximum Unambiguous Range- Radar Waveforms- - Radar Block Diagram and Operation- Radar Frequencies and Applications. Prediction of Range Performance- Minimum Detectable Signal- Receiver Noise.

Radar Equation: Simple and Modified form of Radar Range Equation with Illustrative Problems - SNR- Envelop Detector-False Alarm Time and Probability- Integration of Radar Pulses- Radar Cross Section of Targets (simple targets - sphere- cone-sphere)- Transmitter Power- PRF and Range Ambiguities- System Losses (qualitative treatment)- Illustrative Problems.

Unit – II

CW and Frequency Modulated Radar : Doppler Effect- CW Radar – Block Diagram- Isolation between Transmitter and Receiver- Non-zero IF Receiver- Receiver Bandwidth Requirements- Applications of CW radar- Illustrative Problems.

FM-CW Radar: Range and Doppler Measurement- Block Diagram and Characteristics- FM-CW altimeter- Measurement Errors- Multiple Frequency CW Radar.

Unit – III

MTI and Pulse Doppler Radar: Introduction- Principle- MTI Radar with Power Amplifier Transmitter and Power Oscillator Transmitter- Delay Line Cancellers – Filter Characteristics- Blind Speeds- Double Cancellation- Staggered PRFs- Range Gated Doppler Filters- MTI Radar Parameters- Limitations to MTI Performance- MTI versus Pulse Doppler Radar.

Unit – IV

Tracking Radar: Tracking With Radar- Sequential Lobing- Conical scan- Monopulse Tracking Radar-Amplitude Comparison Monopulse(One-And Two-Coordinates)-Phase Comparison Monopulse- Tracking In Range- Acquisition and Scanning Patterns- Comparison Of Trackers.

Unit – V

Detection of Radar Signals in Noise: Introduction- Matched Filter Receiver-Response Characteristics and Derivation- Correlation Function and Cross-Correlation Receiver- Efficiency of Non-Matched Filters- Matched Filter with Non-White Noise.
Radar Receivers-Noise Figure and Noise Temperature- Display-Types- Duplexers-Branch types And Balanced type- Circulators as Duplexers. Introduction to Phased Array Antennas-Basic concepts- Radiation Pattern- Beam Steering and Beam Width changes- Advantages and Limitations- Applications.

TEXT BOOKS

1. Introduction to radar systems-Merrill I.Skolnik- TMH special Indian edition-2nd ed.-2007.

REFERENCES

1. Radar: Principles- Technology- Applications-Byron Edde- Pearson Education- 2004.
2. Radar Principles- Peebles- Jr.- P.Z.- Wiley- New York- 1998.
3. Principles Of Modern Radar: Basic Principles-Mark A. Richards- James A.Scheer-William A.Holm-Yesdee-2013

Course Outcomes

At the end of the course the student should be able to
CO1: Understand the concepts of radar fundamentals and analysis of the radar signals.
CO2: List and differentiate various radar transmitters and receivers.
CO3: Relate and contrast the different types of radars like MTI- Doppler and tracking radars.
CO4: Identify detection process of radar signals in noise.

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

4

ELECTRONICS AND COMMUNICATION ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2013-14)

(I - IV Years Syllabus)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD KUKATPALLY, HYDERABAD - 500 085.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.

B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10003	Mathematical Methods	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics / Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30007	Mathematics - III	4	-	4
A30405	Probability Theory and Stochastic Processes	4	-	4
A30407	Switching Theory and Logic Design	4	-	4
A30204	Electrical Circuits	4	-	4
A30404	Electronic Devices and Circuits	4	-	4
A30406	Signals and Systems	4	-	4
A30482	Electronic Devices and Circuits Lab.	-	3	2
A30481	Basic Simulation Lab.	-	3	2
	Total	**24**	**6**	**28**

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40215	Principles of Electrical Engineering	4	-	4
A40412	Electronic Circuit Analysis	4	-	4
A40415	Pulse and Digital Circuits	4	-	4
A40009	Environmental Studies	4	—	4
A40411	Electromagnetic Theory and Transmission Lines	4	-	4
A40410	Digital Design using Verilog HDL	4	-	4
A40288	Electrical Technology Lab.	-	3	2
A40484	Electronic Circuits and Pulse Circuits Lab.	-	3	2
	Total	**24**	**6**	**28**

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50217	Control Systems Engineering	4	-	4
A50516	Computer Organization and Operating Systems	4	-	4
A50418	Antennas and Wave Propagation	4	-	4
A50422	Electronic Measurements and Instrumentation	4	-	4
A50408	Analog Communications	4	-	4
A50425	Linear and Digital IC Applications	4	-	4
A50482	Analog Communications Lab.	-	3	2
A50488	IC Applications and HDL Simulation Lab.	-	3	2
	Total	**24**	**6**	**28**

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60010	Managerial Economics and Financial Analysis	4	-	4
A600 18 A601 17 A600 17	**Open Elective:** Human Values and Professional Ethics Disaster Management Intellectual Property Rights	4	-	4
A60420	Digital Communications	4	-	4
A60432	VLSI Design	4	-	4
A60430	Microprocessors and Microcontrollers	4	-	4
A60421	Digital Signal Processing	4	-	4
A60494	Microprocessors and Microcontrollers Lab.	-	3	2
A60493	Digital Signal Processing Lab.	-	3	2
	Total	**24**	**6**	**28**

IVYEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70014	Management Science	4	-	4
A70442	Microwave Engineering	4	-	4
A70515	Computer Networks	4	-	4
A70434	Cellular and Mobile Communications	4	-	4
	Elective -I:	4	-	4
A70436	Digital Image Processing			
A70443	Multimedia and Signal Coding			
A70505	Object Oriented Programming through Java			
	Elective -II:	4	-	4
A70447	Television Engineering			
A70444	Optical Communications			
A70440	Embedded Systems Design			
A70086	Advanced Communication Skills Lab,	-	3	2
A70499	Microwave Engineering and Digital Communications Lab	-	3	2
	Total	**24**	**6**	**28**

IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Elective -III:	4	-	4
A80452	Satellite Communications			
A81102	Biomédical Instrumentation			
A80527	Artificial Neural Networks			
	Elective -IV:	4	-	4
A80431	Telecommunication Switching Systems and Networks			
A80450	Radar Systems			
A80449	Network Security			
	Elective -V:	4	-	4
A80454	Wireless Communications and Networks			
A80437	Digital Signal Processors and Architectures			
A80451	RF Circuit Design			
A80087	Industry Oriented Mini Project	-	-	2
A80089	Seminar	-	6	2
A80088	Major Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	Total	**12**	**21**	**28**

Note: All End Examinations (Theory and Practical) are of three hours duration.
T-Tutorial L – Theory P – Practical D-Drawing C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. ECE	**L**	**T/P/D**	**C**
	2	**-/-/-**	**4**

(A10001) ENGLISH

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Objectives:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they

can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe -Functional English for Success)**
- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/ newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

For Detailed study: First Textbook: "Skills Annexe -Functional English for Success", Published by Orient Black Swan, Hyderabad

For Non-detailed study

1. **Second text book "Epitome of Wisdom",** Published by Maruthi Publications, Guntur
   - The course content and study material is divided into Five Units.

Unit –I:

1. Chapter entitled **'Wit and Humour**' from **'Skills Annexe'** -Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'Mokshagundam Visvesvaraya'** from **"Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.

L- Listening For Sounds, Stress and Intonation

S- Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)

R- Reading for Subject/ Theme

W- Writing Paragraphs

G- Types of Nouns and Pronouns

V- Homonyms, homophones synonyms, antonyms

Unit –II

1. Chapter entitled **“Cyber Age”** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad.
2. Chapter entitled **'Three Days To See'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad.

L – Listening for themes and facts

S – Apologizing, interrupting, requesting and making polite conversation

R- for theme and gist

W- Describing people, places, objects, events

G- Verb forms

V- noun, verb, adjective and adverb

Unit –III

1. Chapter entitled **'Risk Management'** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'Leela's Friend'** by R.K. Narayan from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad

L – for main points and sub-points for note taking

S – giving instructions and directions; Speaking of hypothetical situations

R – reading for details

W – note-making, information transfer, punctuation

G – present tense

V – synonyms and antonyms

Unit –IV

1. Chapter entitled **'Human Values and Professional Ethics'** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'The Last Leaf'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad

L - Listening for specific details and information

S- narrating, expressing opinions and telephone interactions

R - Reading for specific details and information

W- Writing formal letters and CVs

G- Past and future tenses

V- Vocabulary - idioms and Phrasal verbs

Unit –V

1. Chapter entitled **'Sports and Health'** from **“Skills Annexe - Functional English for Success”** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'The Convocation Speech'** by N.R. Narayanmurthy' from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad

L- Critical Listening and Listening for speaker's tone/ attitude

S- Group discussion and Making presentations

R- Critical reading, reading for reference

W- Project proposals; Technical reports, Project Reports and Research Papers

G- Adjectives, prepositions and concord

V- Collocations and Technical vocabulary

Using words appropriately

* Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University

Press.

12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

Outcomes:

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

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(A10002) MATHEMATICS -I

Objectives: To learn

- The types of Matrices and their properties.
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1^{st} and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

UNIT-I

Theory of Matrices: Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving m x n and n x n linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation –

Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

UNIT – II

Differential calculus methods: Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

UNIT – III

Improper integration, Multiple integration & applications: Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

UNIT – IV

Differential equations and applications : Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type type f(X) = e^{ax}, Sin ax, Cos ax, and x^n, $e^{ax}V(x)$, $x^nV(x)$, method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V

Laplace transform and its applications to Ordinary differential equations Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem –

Dirac's delta function, Periodic function – Inverse Laplace transform by Partial fractions(Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem –- Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

Outcome:

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

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(A10003) MATHEMATICAL METHODS

Objectives:

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

UNIT – I:

Interpolation and Curve fitting:

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations – Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –

Interpolation with unevenly spaced points-Lagrange's Interpolation formula. B. Spline interpolation – Cubic spline.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – II :

Numerical techniques:

Solution of Algebraic and Transcendental Equations and Linear system of equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method(Crout's Method)Jacobi's and Gauss-Seidel Iteration method

Numerical Differentiation, Integration, and Numerical solutions of First order differential equations: Numerical differentiation, Numerical integration - Trapezoidal rule, Simpson's 1/3rd and 3/8 Rule , Generalized Quadrature.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method –Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods, Predictor –corrector methods(Milne's Method and Adams-Bashforth methods only).

UNIT – III:

Fourier series and Fourier Transforms: Definition of periodic function.

Fourier expansion of periodic functions in a given interval of length 2□

Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT-IV:

Partial differential equations : Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method), Method of separation of variables for second order equations –Applications of Partial differential equations-Two dimensional wave equations, Heat equation.

UNIT – V

Vector Calculus: Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification). Solenoidal and irrotational vectors, Finding Potential function.

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

Outcomes:

From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.

- After studying this unit, one will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

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(A10004) ENGINEERING PHYSICS

Objectives:

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

UNIT-I

Crystallography: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice**,** Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

X-ray Diffraction & Defects in Crystals: Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method **:** Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

UNIT-II

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer' Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

Elements of Statistical Mechanics & Electron theory of Solids: Phase space, Ensembles, Micro Canonical , Canonical and Grand Canonical Ensembles **-** Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, , Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

Magnetic Properties & Superconducting Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

UNIT-IV

Optics: Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment , Double refraction-construction and working of Nicol's Prism.

Lasers & Fiber Optics: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

UNIT-V:

Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. Acoustics of Buildings & Acoustic Quieting: Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies.

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

TEXT BOOKS:

1. Engineering Physics,K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

REFERENCES:

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis FordAddison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Armugam (Anuradha Publications).
5. Modern Physics – R. Murugeshan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd.
8. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

Outcomes:

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

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(A10005) ENGINEERING CHEMISTRY

Objective:

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

UNIT I:

Electrochemistry & Corrosion: Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of P^H using glass electrode-Numerical problems.

Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

Corrosion and its control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Enviornment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

UNIT II:

Engineering Materials: Polymers: Types of Polymerization (Chain & Step growth).**Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding).Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

Fibers- Charcterstics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement:** composition of Portland cement, setting & hardening of cement (reactions), **Lubricants:** Classification with examples- Characterstics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories:** Classification, characteristics of a good refractory and applications.

Nanomaterials: Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

UNIT III:

Water and its Treatment: Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic enbrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

Unit – IV :

Fuels & Combustion: Fuels – Classification – soild fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

Combustion – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

UNIT V:

Phase Rule & Surface Chemistry : **Phase Rule:** Definition of terms: Phase, component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

Surface Chemistry: **Adsorption –** Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

TEXT BOOKS:

1. Engineering Chemistry by R.P. Mani,K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006).
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.

Outcome:

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.

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(A10501) COMPUTER PROGRAMMING

Objectives:

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling),Positioning functions, C program examples.

UNIT – V

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.

9. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.

11. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press.

Outcomes:

Demonstrate the basic knowledge of computer hardware and software.

Ability to apply solving and logical skills to programming in C language and also in other languages.

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(A10301) ENGINEERING DRAWING

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloid and Hypocycloid.

c) Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT – II

Orthographic Projections in First Angle

Projection: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points : including Points in all four quadrants.

Projections of Lines : Parallel, perpendicular, inclined to one plane and inclined to both planes. True length and true angle of a line. Traces of a line.

Projections of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – III

Projections of Solids: Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

Sections and Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

UNIT – IV

Development of Surfaces: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

Intersection of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

Transformation of Projections : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Perspective Projections : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

TEXT BOOKS

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

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	L	T/P/D	C
I Year B.Tech. ECE	**-**	**-/3/-**	**4**

(A10581) COMPUTER PROGRAMMING LAB

Objectives:

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week I

a) Write a C program to find the sum of individual digits of a positive integer.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2

a) Write a C program to calculate the following Sum:

$Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

b) Write a C program to find the roots of a quadratic equation.

Week 3

a) The total distance travelled by vehicle in 't' seconds is given by distance s = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 4

a) Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

Week 5

a) Write a C program to find the largest integer in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices

ii) Multiplication of Two Matrices

Week 6

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Week 7

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

Week 8

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$1+x+x^2+x^3+ .... +x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 13

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

Week 15

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

Week 16

Write a C program that uses functions to perform the following operations:

i) Create a singly linked list of integer elements.

ii) Traverse, the above list and display the elements.

Week 17

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

Week 18

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10

23 4 6 output: 10 23 4 6

Week 19

Write a C program to implement the linear regression algorithm.

Week 20

Write a C program to implement the polynomial regression algorithm.

Week 21

Write a C program to implement the Lagrange interpolation.

Week 22

Write C program to implement the Newton- Gregory forward interpolation.

Week 23

Write a C program to implement Trapezoidal method.

Week 24

Write a C program to implement Simpson method.

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

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(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any TEN experiments compulsory)

Objectives

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech Ist year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance , Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

Outcomes

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following)

Titrimetry:

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

Colorimetry:

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

Conductometry:

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

Physical properties:

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

Preparations:

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

Adsorption:

15. Adsorption of acetic acid on charcoal.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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(A10083) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning.
- To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm.
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.
- To improve the fluency in spoken English and neutralize mother tongue influence.
- To train students to use language appropriately for interviews, group discussion and public speaking.

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the **English Language Communication Skills Lab**.

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab: Ice-Breaking activity and JAM session.

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms.

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies –

Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.

ICS Lab: Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

   The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

(i) P – IV Processor

   a) Speed – 2.8 GHZ

   b) RAM – 512 MB Minimum

   c) Hard Disk – 80 GB

(ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

   The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within

the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
2. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate.* Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced.* Cambridge: CUP
7. Marks, J. 2009. *English Pronunciation in Use. Elementary.* Cambridge: CUP
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication.* New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English. New Delhi: Macmillan*
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
13. **Prescribed Lab Manual:** A Manual entitled "***English Language Communication Skills (ELCS) Lab Manual- cum- Work Book***", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s).

The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Outcomes:

- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

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(A10082) IT WORKSHOP / ENGINEERING WORKSHOP

Objectives:

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. (**Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

Week 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 6 – Task 6 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Week 7 - Task 1 : **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 9 - Task 3 : **Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Week 11- Task 5: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools

LaTeX and Word

Week 12 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1 : Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Week 13 - Task 2: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 14 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 15 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 16 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 17 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 18- Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 19 - Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.

4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition.

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(A30007) MATHEMATICS – III

Objectives: To learn

- Transforming the given variable coefficient equation (Cauchy’s and Lagrange’s) into the one with constant coefficients.
- Identifying ordinary points, singular points and regular singular points for the given ODE.
- Finding the series solution around a regular singular point.
- Solve the given ODE with variable coefficients by Frobenius method and test the convergence of its series solution.
- Series solutions for Legendre and Bessel differential equations, analyzing the properties of Legendre and Bessel polynomials.
- Differentiation and Integration of complex valued functions.
- Evaluation of integrals using Cahchy’s integral formula.
- Taylor’s series, Maclaurin’s series and Laurent’s series expansions of complex functions
- Evaluation of integrals using residue theorem.
- Transform a given function from z - plane to w – plane.
- Identify the transformations like translation, magnification, rotation and reflection and inversion.
- Properties of bilinear transformations.

UNIT – I:

Linear ODE with variable coefficients and series solutions(second order only): Equations reducible to constant coefficients-Cauchy’s and Lagrange’s differential equations. Motivation for series solutions, Ordinary point and Regular singular point of a differential equation , Transformation of non-zero singular point to zero singular point. Series solutions to differential equations around zero, Frobenius Method about zero.

Unit-II

Special Functions : Legendre’s Differential equation, General solution of Legendre’s equation, Legendre polynomials Properties: Rodrigue’s formula – Recurrence relations, Generating function of Legendre’s polynomials – Orthogonality. Bessel’s Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function , Trigonometric expansions involving Bessel functions.

UNIT-III:

Complex Functions –Differentiation and Integration : Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

UNIT-IV:

Power series expansions of complex functions and contour Integration: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$

(b) $\int_{c}^{c+2\square} f(\cos\square, \sin\square)d\square$

UNIT-V:

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation;

Magnification and rotation; inversion and reflection,Transformations like e^z, log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given .

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1) Complex Variables Principles and Problem Sessions By A.K.Kapoor, World Scientific Publishers.
2) Engineering Mathematics-3 by T.K.V.Iyengar and B.Krishna Gandhi Etc.
3) A Text Book of Engineering Mathematics by N P Bali, Manesh Goyal.
4) Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edit. 2013, Chapman & Hall/CRC.

5) Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

6) Mathematics For Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications.

Outcome: After going through this course the student will be able to:

- Apply the Frobenius method to obtain a series solution for the given linear 2nd ODE.
- Identify Bessel equation and Legendre equation and solve them under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Bessel and Legendre polynomials.

After going through this course the student will be able to

a. analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem,

b. Find the Taylor's and Laurent series expansion of complex functions

c. The conformal transformations of complex functions can be dealt with ease.

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(A30405) PROBABILITY THEORY AND STOCHASTIC PROCESSES

Objectives:

The primary objective of this course is:

- To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in signal processing and Communication Engineering.
- To introduce students to the basic methodology of "probabilistic thinking" and to apply it to problems;
- To understand basic concepts of probability theory and random variables, how to deal with multiple random variables, Conditional probability and conditional expectation, joint distribution and independence, mean square estimation.
- To understand the difference between time averages and statistical averages
- Analysis of random process and application to the signal processing in the communication system.
- To teach students how to apply sums and integrals to compute probabilities, means, and expectations.

UNIT-I:

Probability and Random Variable

Probability: Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables

UNIT -II:

Distribution & Density Functions and Operation on One Random Variable – Expectations

Distribution & Density Functions: Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh and Conditional Distribution, Methods of defining Conditional Event, Conditional Density, Properties.

Operation on One Random Variable – Expectations: Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT-III:

Multiple Random Variables and Operations

Multiple Random Variables: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem (Proof not expected), Unequal Distribution, Equal Distributions.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT-IV:

Stochastic Processes – Temporal Characteristics: The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationarity and Statistical Independence, First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance and its Properties, Linear System Response of Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions, Gaussian Random Processes, Poisson Random Process.

UNIT-V:

Stochastic Processes – Spectral Characteristics: Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Spectral Density of Input and Output of a Linear System.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, 4Ed., 2001, TMH.
2. Probability and Random Processes – Scott Miller, Donald Childers, 2 Ed, Elsevier, 2012.

REFERENCE BOOKS:

1. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, 4 Ed., TMH.
2. Theory of Probability and Stochastic Processes- Pradip Kumar Gosh, University Press
3. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, 3 Ed., PE
4. Probability Methods of Signal and System Analysis - George R. Cooper, Clave D. MC Gillem, 3 Ed., 1999, Oxford.
5. Statistical Theory of Communication - S.P. Eugene Xavier, 1997, New Age Publications.

Outcomes:

Upon completion of the subject, students will be able to compute:

- Simple probabilities using an appropriate sample space.
- Simple probabilities and expectations from probability density functions (pdfs)
- Likelihood ratio tests from pdfs for statistical engineering problems.
- Least -square & maximum likelihood estimators for engineering problems.
- Mean and covariance functions for simple random processes.

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	4	**-/-/-**	**4**

(A30407) SWITCHING THEORY AND LOGIC DESIGN

Course Objectives:

This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

UNIT -I:

Number System and Boolean Algebra And Switching Functions: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Alpha Numeric Codes, Error Detecting and Correcting Codes.

Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT -II:

Minimization and Design of Combinational Circuits: Introduction, The Minimization with theorem, The Karnaugh Map Method, Five and Six Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Tabular Method, Partially Specified Expressions, Multi-output Minimization, Minimization and Combinational Design, Arithmetic Circuits, Comparator, Multiplexers, Code Converters, Wired Logic, Tristate Bus System, Practical Aspects related to Combinational Logic Design, Hazards and Hazard Free Relations.

UNIT -III:

Sequential Machines Fundamentals: Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, The Flip-Flop, The D-Latch Flip-Flop, The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration, Clock Skew.

UNIT -IV:

Sequential Circuit Design and Analysis: Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops

Counters - Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register.

UNIT -V:

Sequential Circuits: Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.
2. Digital Design- Morris Mano, PHI, 3rd Edition.

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Digital Logic Design - Ye Brian and HoldsWorth, Elsevier
4. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
5. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
6. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

Course Outcomes:

Upon completion of the course, students should possess the following skills:

- Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyse small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

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	4	**-/-/-**	**4**

(A30204) ELECTRICAL CIRCUITS

Objective:

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course if laid on the basic analysis of circuits which includes single phase circuits, magnetic circuits, theorems and network topology.

UNIT –I:

Introduction to Electrical Circuits: Circuit Concept, R-L-C Parameters, Voltage and Current Sources, Independent and Dependent Sources, Source Transformation, Voltage – Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular). Kirchhoff's Laws, Network Reduction Techniques – Series, Parallel, Series Parallel, Star –to-Delta or Delta-to-Star Transformations, Nodal Analysis, Mesh Analysis, Super node and Super mesh for DC Excitations.

UNIT –II:

Single Phase A.C. Circuits: R.M.S. and Average values and form factor for different periodic wave forms, Steady State Analysis of R, L and C (in Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase and Phase difference, Concept of Power Factor, Real and Reactive powers, J-notation, Complex and Polar forms of representation, Complex power.

UNIT –III:

Locus diagrams, Resonance and Magnetic circuits: Locus diagrams - series R-L, R-C, R-L-C and parallel combination with variation of various parameters - Resonance-series, parallel circuits, concept of band width and Q factor. Magnetic circuits-Faraday's laws of electromagnetic induction-concept of self and mutual inductance-dot convention-coefficient of coupling-composite magnetic circuit-analysis of series and parallel magnetic circuits.

UNIT –IV:

Network Topology: Definitions, Graph, Tree, Basic cutset and Basic Tie set Matrices for Planar Networks, Loop and Nodal methods for analysis of Networks with Dependent & Independent Voltage and Current Sources, Duality & Dual Networks.

UNIT –V:

Network Theorems (With A.C. & D.C): Tellegen's, Superposition, Reciprocity, Thevinin's, Norton's, Maximum Power Transfer, Milliman's and

Compensation theorems for D.C excitations.

TEXT BOOKS:

1. Electric Circuits - A.Chakrabarhty, Dhanipat Rai & Sons.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.

REFERENCE BOOKS:

1. Engineering Circuit Analysis - William Hayt ,Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuit Analysis - K.S.Suresh Kumar, Pearson Education.
3. Electrical Circuits - David A.Bell, Oxford University Press.
4. Network Analysis and Circuits - M.Arshad, Infinity Science Press.
5. Circuits - A.Bruce Carlson, Cengage Learning.
6. Electrical Circuits: An Introduction - KCA Smith & RE Alley, Cambridge University Press.

Outcome:

After going through this course the student gets a thorough knowledge on basics of circuit concepts, electrical parameters, single phase AC circuits, magnetic circuits , resonance, network topology and network theorems with which he/she can able to apply the above conceptual things to real-world problems and applications.

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	4	**-/-/-**	**4**

(A30404) ELECTRONIC DEVICES AND CIRCUITS

Objectives:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET transistors and amplifier circuits.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

UNIT -I:

P-N Junction Diode: Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

Special Purpose Electronic Devices: Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

UNIT-II:

Rectifiers and Filters : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, p- Section Filters, Comparision of Filters, Voltage Regulation using Zener Diode.

UNIT-III:

Bipolar Junction Transistor and UJT: The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

UNIT-IV:

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias,

Bias Stability, Stabilization Factors, Stabilization against variations in VBE and ß, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

UNIT-V:

Field Effect Transistor and FET Amplifiers

Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

FET Amplifiers: FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2Ed, 2013.
4. Electronic Devices and Circuits --K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

Course Outcomes:

At the end of the course, the student will be able to:

- Understand and Analyse the different types of diodes, operation and its characteristics
- Design and analyse the DC bias circuitry of BJT and FET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillatorsemploying BJT, FET devices.

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	4	**-/-/-**	**4**

(A30406) SIGNALS AND SYSTEMS

Objectives:

This is a core subject, basic knowledge of which is required by all the engineers.

This course focuses on:

- To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

UNIT-I:

Signal Analysis and Fourier Series

Signal Analysis: Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

UNIT-II:

Fourier Transforms and Sampling

Fourier Transforms: Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Typers of Sampling - Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT-III:

Signal Transmission Through Linear Systems: Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

UNIT-IV:

Convolution and Correlation of Signals: Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

UNIT-V:

Laplace Transforms and Z-Transforms

Laplace Transforms: Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed.
2. Signals and Signals – Iyer and K. Satya Prasad, Cengage Learning
3. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
4. Introduction to Signal and System Analysis – K.Gopalan 2009, Cengage Learning.
5. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
6. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.

Course Outcomes:

Upon completing this course the student will be able to:

- Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
- Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
- Understands the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.
- Can design a system for sampling a signal.
- For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
- Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform.

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- -/3/- 2

(A30482) ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of

i) Multimeters (Analog and Digital)

ii) Function Generator

iii) Regulated Power Supplies

iv) CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
4. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
5. Half Wave Rectifier with & without filters.
6. Full Wave Rectifier with & without filters.
7. FET characteristics.
8. Design of Self-bias circuit.
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier .
12. SCR characteristics.
13. UJT Characteristics

PART C:Equipment required for Laboratories:

1. Regulated Power supplies (RPS) -0-30 V

2.	CRO's -0-20 MHz.	
3.	Function Generators	-0-1 MHz.
4.	Multimeters	
5.	Decade Resistance Boxes/Rheostats	
6.	Decade Capacitance Boxes	
7.	Ammeters (Analog or Digital)	-0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA.
8.	Voltmeters (Analog or Digital)	-0-50V, 0-100V, 0-250V
9.	Electronic Components	-Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, Diodes- Ge& Si type, Transistors – NPN, PNP type)

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(A30481) BASIC SIMULATION LAB

Note:

- All the experiments are to be simulated using MATLAB or equivalent software
- Minimum of 15 experiment are to be completed

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution between Signals and sequences.
6. Auto Correlation and Cross Correlation between Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

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	4	**-/-/-**	**4**

(A40215) PRINCIPLES OF ELECTRICAL ENGINEERING

Objectives:

This course introduces the basic concepts of transient analysis of the circuits, the basic two-port network parameters and the design analysis of filters and attenuators and their use in circuit theory. The emphasis of this course is laid on the basic operation of the DC machines and transformers which includes DC generators and motors, single-phase transformers.

UNIT –I:

Transient Analysis (First and Second Order Circuits): Transient Response of RL , RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

UNIT –II:

Two Port Networks: Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

UNIT –III:

Filters and Symmetrical Attenuators: Classification of Filters, Filter Networks, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-k Low Pass Filter, High Pass Filter, m-derived T-Section, Band Pass filter and Band Elimination filter, Illustrative Problems. Symmetrical Attenuators – T-Type Attenuator, p–Type Attenuator, Bridged T type Attenuator, Lattice Attenuator.

UNIT –IV:

DC Machines: Principle of Operation of DC Machines, EMF equation, Types of Generators, Magnetization and Load Characteristics of DC Generators. DC Motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne's Test, Speed Control of DC Shunt Motor, Flux and Armature Voltage control methods.

UNIT –V:

Transformers and Their Performance: Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses and Efficiency of Transformer and Regulation, OC and SC Tests (Simple Problems). Synchros, Stepper Motors.

TEXT BOOKS:

1. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
2. Basic concepts of Electrical Engineering - PS Subramanyam, BS Publications

REFERENCE BOOKS:

1. Engineering circuit analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition.
2. Basic Electrical Engineering - S.N. Singh, PHI.
3. Electrical Circuits - David A.Bell, Oxford University Press.
4. Electric Circuit Analysis - K.S.Suresh Kumar, Pearson Education.

Outcome:

After going through this course the student gets a thorough knowledge on transient analysis of circuits, filters, attenuators , the operation of DC machines and transformers, with which he/she can able to apply the above conceptual things to real-world problems and applications.

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	4	-/-/-	4

(A40412) ELECTRONIC CIRCUIT ANALYSIS

Course Objective:

- To familiarize the student with the analysis and design of basic transistor amplifier circuits and their frequency response characteristics, feedback amplifiers, oscillators, large signal amplifiers and tuned amplifiers

UNIT -I:

Single Stage and Multi Stage Amplifiers

Single Stage Amplifiers: Classification of Amplifiers – Distortion in Amplifiers, Analysis of CE, CC, and CB Configurations with simplified Hybrid Model, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Miller's Theorem and its dual, Design of Single Stage RC Coupled Amplifier using BJT.

Multi Stage Amplifiers: Analysis of Cascaded RC Coupled BJT amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers - RC Coupled Amplifier, Transformer Coupled Amplifier, Direct Coupled Amplifier.

UNIT –II:

BJT Amplifiers and MOS Amplifiers

BJT Amplifiers - Frequency Response: Logarithms, Decibels, General frequency considerations, Frequency response of BJT Amplifier, Analysis at Low and High frequencies, Effect of coupling and bypass Capacitors, The Hybrid- pi (p) - Common Emitter Transistor Model, CE Short Circuit Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

MOS Amplifiers [3]: Basic concepts, MOS Small signal model, Common source amplifier with Resistive load.

UNIT –III:

Feedback Amplifiers and Oscillators

Feedback Amplifiers: Concepts of Feedback, Classification of Feedback Amplifiers, General characteristics of Negative Feedback Amplifiers, Effect of Feedback on Amplifier Characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations, Illustrative Problems.

Oscillators: Classification of Oscillators, Conditions for Oscillations, RC Phase Shift Oscillator, Generalized analysis of LC oscillators - Hartley, and

Colpitts Oscillators, Wien-Bridge & Crystal Oscillators, Stability of Oscillators.

UNIT –IV:

Large Signal Amplifiers : Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class-B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Distortion in Power Amplifiers, Thermal Stability and Heat Sinks.

UNIT –V:

Tuned Amplifiers: Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers.

TEXT BOOKS:

1. Integrated Electronics - Jacob Millman and Christos C Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits, B. P. Singh, Rekha Singh, Pearson, 2013.
3. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.

REFERENCE BOOKS:

1. ElectronicCircuit Analysis – Rashid, Cengage Learning, 2013
2. Electronic Devices and Circuit Theory - Robert L.Boylestad, Louis Nashelsky, 9 Ed., 2008 PE.
3. Microelectric Circuits – Sedra and Smith – 5 Ed., 2009, Oxford University Press.
4. Electronic Circuit Analysis – K. Lal Kishore, 2004, BSP.
5. Electronic Devices and Circuits - S. Salivahanan, N.Suresh Kumar, A Vallavaraj, 2 Ed., 2009, TMH.

Course Outcomes:

Upon completion of the subject, students will be able to:

- Design and analyse the DC bias circuitry of BJT and FET.
- Analyse the different types of amplifiers, operation and its characteristics
- Design circuits like amplifiers, oscillators using the transistors diodes and oscillators.

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(A40415) PULSE AND DIGITAL CIRCUITS

Objectives:

The main objectives are:

- To explain the complete response of R-C and R-L-C transient circuits.
- To explain clippers, clampers, switching characteristics of transistors and sampling gates.
- To construct various multivibrators using transistors, design of sweep circuits and sampling gates.
- To discuss and realize logic gates using diodes and transistors.

UNIT-I:

Linear Wave Shaping: High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe, RL and RLC Circuits and their response for Step Input, Ringing Circuit.

UNIT-II:

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, Clipping at two independent levels, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of Diode Characteristics on Clamping Voltage, Synchronized Clamping.

UNIT-III:

Switching Characteristics of Devices : Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Temperature variation of Saturation Parameters, Transistor-switching times, Silicon-controlled-switch circuits, Sampling Gates : Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits

UNIT–IV:

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors, Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, Miller and Bootstrap

Time Base Generators-Basic Principles, Transistor Miller Time Base generator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, Methods of Linearity improvement.

UNIT-V:

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuit, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML Logic Families and its Comparison.

TEXT BOOKS:

1. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 Ed., 2008, TMH.
2. Solid State Pulse Circuits –David A. Bell, 4 Ed., 2002 PHI.

REFERENCE BOOKS:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 Ed., 2008.
3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH.
4. Wave Generation and Shaping - L. Strauss.

Outcomes:

At the end of the course, the student will be able to:

- Understand the applications of diode as integrator, differentiator, clippers, clampler circuits..
- Learn various switching devices such as diode, transistor, SCR.
- Difference between logic gates and sampling gates
- Design mutivibrators for various applications, synchronization techniques and sweep circuits.
- Realizing logic gates using diodes and transistors.

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	4	**-/-/-**	**4**

(A40009) ENVIRONMENTAL STUDIES

Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

UNIT-I :

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II:

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). Towards Sustainable Future: Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development.

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	4	**-/-/-**	**4**

(A40411) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Course Objectives:

The course objectives are:

- To introduce the student to the fundamental theory and concepts of electromagnetic waves and transmission lines, and their practical applications.
- To study the propagation, reflection, and transmission of plane waves in bounded and unbounded media.

UNIT–I:

Electrostatics: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

UNIT–II:

Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces, Illustrative Problems .

UNIT–III:

EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization, Illustrative Problems.

EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect

Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor., Illustrative Problems.

UNIT–IV:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.

UNIT–V:

Transmission Lines – II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; ?/4, ?/2, ?/8 Lines – Impedance Transformations, Significance of Zmin and Zmax , Smith Chart – Configuration and Applications, Single and Double Stub Matching, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics – Matthew N.O. Sadiku, 4thEd., Oxford Univ.Press.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2ndEd., 2000, PHI.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCE BOOKS:

1. Engineering Electromagnetics – Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7thEd., 2006, TMH.
3. Electromagnetic Filed Theory and Transmission Lines – G. Sashibhushana Rao, Wiley Inia, 2013.
4. Networks, Lines and Fields – John D. Ryder, 2ndEd., 1999, PHI.

Course Outcomes:

Upon successful completion of the course, students will be able to:

- Study time varying Maxwell's equations and their applications in electromagnetic problems.
- Determine the relationship between time varying electric and magnetic field and electromotive force.
- Analyze basic transmission line parameters in phasor domain.

- Use Maxwells equations to describe the propagation of electromagnetic waves in vacuum.
- Show how waves propagate in dielectrics and lossy media.
- Demonstrate the reflection and refraction of waves at boundaries.
- Explain the basic wave guide operation and parameters.

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(A40410) DIGITAL DESIGN USING VERILOG HDL

Course Objectives:

This course teaches:

- Designing digital circuits, behavioral and RTL modeling of digital circuits using Verilog HDL, verifying these models, and synthesizing RTL models to standard cell libraries and FPGAs.
- Students gain practical experience by designing, modeling, implementing and verifying several digital circuits

This course aims to provide students with the understanding of the different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided software tools. Design digital components and circuits that are testable, reusable and synthesizable.

UNIT -I:

Introduction to Verilog HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Function Verification, System Tasks, Programming Language Interface, Module, Simulation and Synthesis Tools

Language Constructs and Conventions: Introduction, Keywords, Identifiers, White space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data types, Scalars and Vectors, Parameters, Operators.

UNIT -II:

Gate Level Modeling: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip –Flops with Gate Primitives, Delays, Strengths and Construction Resolution, Net Types, Design of Basic Circuit.

Modeling at Dataflow Level: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vectors, Operators.

UNIT -III:

Behavioral Modeling: Introduction, Operations and Assignments, Functional Bifurcation, 'Initial' Construct, 'Always' Construct, Assignments with Delays, 'Wait' Construct, Multiple Always Block, Designs at Behavioral Level, Blocking and Non- Blocking Assignments, The 'Case' Statement, Simulation Flow 'If' an 'If-Else' Constructs, 'Assign- De-Assign' Construct, 'Repeat' Construct, for Loop, 'The Disable' Construct, 'While Loop', Forever Loop, Parallel Blocks, 'Force- Release, Construct, Event.

UNIT -IV:

Switch Level Modeling: Basic Transistor Switches, CMOS Switches, Bi Directional Gates, Time Delays With Switch Primitives, Instantiation with 'Strengths' and 'Delays', Strength Contention with Trireg Nets.

System Tasks, Functions and Compiler Directives: Parameters, Path Delays, Module Parameters, System Tasks and Functions, File Based Tasks and Functions, Computer Directives, Hierarchical Access, User Defined Primitives.

UNIT -V:

Sequential Circuit Description: Sequential Models – Feedback Model, Capacitive Model, Implicit Model, Basic Memory Components, Functional Register, Static Machine Coding, Sequential Synthesis

Component Test and Verification: Test Bench- Combinational Circuit Testing, Sequential Circuit Testing, Test Bench Techniques, Design Verification, Assertion Verification.

TEXT BOOKS:

1. T R. Padmanabhan, B Bala Tripura Sundari, Design Through Verilog HDL, Wiley, 2009.
2. Zainalabdien Navabi, Verilog Digital System Design, TMH, 2nd Edition.

REFERENCE BOOKS:

1. Fundamentls of Digital Logic with Veilog Design - Stephen Brown, Zvonkoc Vranesic, TMH, 2nd Edition, 2010.
2. Advanced Digital Logic Design using Verilog, State Machine & Synthesis for FPGA - Sunggu Lee, Cengage Learning, 2012.
3. Verilog HDL – Samir Palnitkar, 2nd Edition, Pearson Education, 2009.
4. Advanced Digital Design with the Verilog HDL – Michel D. Ciletti, PHI, 2009.

Course Outcomes:

By the end of this course, students should be able to:

- Describe Verilog hardware description languages (HDL).
- Design digital circuits;
- Write behavioral models of digital circuits;
- Write Register Transfer Level (RTL) models of digital circuits;
- Verify behavioral and RTL models;
- Describe standard cell libraries and FPGAs;
- Synthesize RTL models to standard cell libraries and FPGAs;
- Implement RTL models on FPGAs and testing & verification.

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(A40288) ELECTRICAL TECHNOLOGY LAB

PART –A:

1. Verification of KVL and KCL.
2. Serial and Parallel Resonance.
3. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
4. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
5. Two port network parameters – ABCD and h- Parameters
6. Verification of Superposition and Reciprocity theorems.
7. Verification of maximum power transfer theorem.
8. Verification of Thevenin's and Norton's theorems.

PART –B:

1. Magnetization characteristics of D.C. Shunt generator.
2. Swinburne's Test on DC shunt machine.
3. Brake test on DC shunt motor.
4. OC & SC tests on Single-phase transformer.
5. Load Test on Single Phase Transformer.

Note: Any 12 of the above experiments are to be conducted.

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(A40484) ELECTRONIC CIRCUITS AND PULSE CIRCUITS LAB

List of Experiments (16 experiments to be done):

PART –I: ELCTRONIC CIRCUITS

Minimum eight experiments to be conducted:

I) Design and Simulation in Simulation Laboratory using any Simulation Software (Minimum 6 Experiments):

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Two Stage RC Coupled Amplifier
4. Current shunt and Voltage Series Feedback Amplifier
5. Cascode Amplifier
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. Common Base (BJT) / Common Gate (JFET) Amplifier.

II) Testing in the Hardware Laboratory (Minimum 2 Experiments)

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley & Colpitt's Oscillators
5. Darlington Pair
6. MOS Common Source Amplifier

Equipment required for the Laboratory:

1. For software simulation of Electronic circuits
   - i) Computer Systems with latest specifications
   - ii) Connected in LAN (Optional)
   - iii) Operating system (Windows XP)
   - iv) Suitable Simulations software
2. For Hardware simulations of Electronic Circuits
   - i) Regulated Power Supply (0-30V)
   - ii) CRO's

iii) Functions Generators

iv) Multimeters

v) Components

3. Win XP/ Linux etc.

PART –II: PULSE CIRCUITS

Minimum eight experiments to be conducted:

1. Linear Wave Shaping
   a. RC Low Pass Circuit for different time constants
   b RC High Pass Circuit for different time constants
2. Non-linear wave shaping

a. Transfer characteristics and response of Clippers:
   i) Positive and Negative Clippers
   ii) Clipping at two independent levels

b The steady state output waveform of clampers for a square wave input
   i) Positive and Negative Clampers
   ii) Clamping at reference voltage

3. Comparison Operation of Comparators
4. Switching characteristics of a transistor
5 Design a Bistable Multivibrator and draw its waveforms
6 Design an Astable Multivibrator and draw its waveforms
7. Design a Monostable Multivibrator and draw its waveforms
8. Response of Schmitt Trigger circuit for loop gain less than and greater than one
9. UJT relaxation oscillator
10. The output- voltage waveform of Boot strap sweep circuit
11. The output- voltage waveform of Miller sweep circuit

Equipment required for Laboratories:

Regulated Power Supply	- 0 – 30 V
CRO	- 0 – 20 M Hz.
Function Generators	- 0 – 1 M Hz
Components	
Multi Meters	

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	4	-/-/-	4

(A50217) CONTROL SYSTEMES ENGINEERING

Objective:

- In this course it is aimed to introduce to the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT –I:

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback, Mathematical models – Differential equations, Impulse Response and transfer functions.

Transfer Function Representation: Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT -II:

Time Response Analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT –III:

Stability Analysis in S-Domain: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT –IV:

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots-Nyquist Plots-StabilityAnalysis.Compensation techniques – Lag, Lead and Lead -Lag Controllers design in frequency Domain, PID Controllers.

UNIT –V:

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Control Systems Theory and Applications - S.K Bhattacharya, Pearson.
2. Control Systems - N.C.Jagan, BS Publications.

REFERENCE BOOKS:

1. Control systems - A.Ananad Kumar, PHI.
2. Control Systems Engineering - S.Palani, Tata-McGraw-Hill.
3. Control systems - Dhanesh N.Manik, Cengage Learning.
4. Control Systems Engineering - I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
5. Control Systems - N.K.Sinha, New Age International (P) Limited Publishers.

Outcome:

After going through this course the student gets a thorough knowledge on open loop and closed loop control systems, concept of feedback in control systems, mathematical modeling and transfer function derivations of Synchros, AC and DC servo motors, Transfer function representation through block diagram algebra and signal flow graphs, time response analysis of different ordered systems through their characteristic equation and time-domain specifications, stability analysis of control systems in S-domain through R-H criteria and root-locus techniques, frequency response analysis through bode diagrams, Nyquist, polar plots and the basics of state space analysis, design of PID controllers, lag, lead, lag-lead compensators, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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	L	T/P/D	C
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(A50516) COMPUTER ORGANIZATION AND OPERATING SYSTEMS

Course Objectives:

The course objectives are:

- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system including cache memories and virtual memory.
- To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
- To implement a significant portion of an Operating System.

UNIT-I:

Basic Structure of Computers: Computer Types, Functional UNIT, Basic OPERATIONAL Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating – Point Representation.

Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions– Instruction Cycle.

Memory – Reference Instructions, Input – Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT -II:

Micro Programmed Control: Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control

The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual

Memories Secondary Storage, Introduction to RAID.

UNIT -III:

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input –Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

UNIT -IV:

Operating Systems Overview: Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures-Operating System Services and Systems Calls, System Programs, Operating Systems Generation

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of The Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing Case Studies - UNIX, Linux, Windows

Principles of Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

UNIT -V:

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

File System Implementation: File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson
3. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley.

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings 6th Edition, Pearson
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI
3. Fundamentals of Computer Organization and Design - Sivaraama Dandamudi Springer Int. Edition.
4. Operating Systems – Internals and Design Principles, Stallings, 6th Edition–2009, Pearson Education.

5. Modern Operating Systems, Andrew S Tanenbaum 2nd Edition, PHI.
6. Principles of Operating Systems, B.L.Stuart, Cengage Learning, India Edition.

Course Outcomes:

Upon completion of the course, students will have thorough knowledge about:

- Basic structure of a digital computer
- Arithmetic operations of binary number system
- The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.
- Operating system functions, types, system calls.
- Memory management techniques and dead lock avoidance
- Operating systems' file system implementation and its interface.

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	4	**-/-/-**	**4**

(A50418) ANTENNAS AND WAVE PROPAGATION

Course Objectives:

The main objectives are:

- Understand basic terminology and concepts of Antennas.
- To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
- Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
- To have knowledge on antenna operation and types as well as their usage in real time filed.
- Aware of the wave spectrum and respective band based antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

UNIT -I:

Antenna Basics: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height, Illustrative Problems.

Fields from Oscillating Dipole, Field Zones, Front - to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem

Thin Linear Wire Antennas – Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam W idth, Directivity, Effective Area and Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths, Illustrative Problems. Loop Antennas - Introduction, Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small and Large Loops (Qualitative Treatment).

UNIT -II:

VHF, UHF and Microwave Antennas - I : Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Practical Design Considerations for Monofilar Helical Antenna in Axial and Normal Modes, Horn Antennas – Types, Fermat's Principle, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

UNIT -III:

VHF, UHF and Microwave Antennas - II: Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics, Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features, Illustrative Problems.

Lens Antennas – Introduction, Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications.

UNIT -IV:

Antenna Arrays: Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their Characteristics and Comparison, BSAs with Non-uniform Amplitude Distributions – General Considerations and Binomial Arrays, Illustrative Problems.

Antenna Measurements: Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors. Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods)

UNIT -V:

Wave Propagation – I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts, Ground Wave Propagation (Qualitative Treatment) – Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections. Space Wave Propagation – Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

Wave Propagation – II: Sky Wave Propagation – Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multi-hop Propagation.

TEXT BOOKS:

1. Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCE BOOKS:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd Ed., 2005.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th Edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.

Course Outcomes:

Student will be:

- Aware of the parameter considerations viz. antenna efficiency, beam efficiency, radiation resistance etc. in the design of an antenna.
- Capable to analyze the designed antenna and field evaluation under various conditions and formulate the electric as well as the magnetic fields Equation set for Far field and near field conditions.
- Understand the Array system of different antennas and filed analysis under application of different currents to the individual antenna elements
- Understand the design issues, operation of fundamental antennas like Yagi-Uda, Horn antennas and helical structure and also their operation methodology in practice.
- Design a lens structure and also the bench setup for antenna parameter measurement of testing for their effectiveness.
- Knowledge about the means of propagation of Electromagnetic wave i.e. free space propagation and also about frequency dependent layer selection, its respective issues for an effective transmission of information in the form of EM wave to a remote location and related issues.

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(A50422) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

This course provides:

- An introduction to measurement techniques and instrumentation design and operation.
- The basic concept of units, measurement error and accuracy, the construction and design of measuring devices and circuits, measuring instruments and their proper applications.
- To use different measuring techniques and the measurement of different physical parameters using different transducers.

UNIT -I:

Block Schematics of Measuring Systems: Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag ;Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT -II:

Signal Analyzers: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, Video Signal Generators, and Specifications

UNIT -III:

Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT -IV:

Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance

Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT -V:

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure, Vacuum level, Temperature - Measurements, Data Acquisition Systems.

TEXT BOOKS:

1. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI 5th Edition 2003

REFERENCE BOOKS:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
3. Measurement Systems – Ernest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH,
4. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
5. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

- Describe the fundamental concepts and principles of instrumentation.
- Explain the operations of the various instruments required in measurements.
- Apply the measurement techniques for different types of tests.
- To select specific instrument for specific measurementfunction.
- Understand principle of operation, working of different electronic instruments like digital multi meter, vector voltmeter.
- Learners will apply knowledge of different oscilloscopes like CRO, DSO.
- Students will understand functioning, specification, and applications of signal analyzing instruments.

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(A50408) ANALOG COMMUNICATIONS

Course Objectives:

This course aims at:

- Developing and understanding of the design of Analog communication system.
- Study of analog modulation techniques.
- Subject will develop analytical abilities related to Circuit members.
- Establishing a firm foundation for the understanding of telecommunication systems, and the relationship among various technical factors when such systems are designed and operated.

UNIT –I:

Amplitude Modulation: Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector, Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT –II:

SSB Modulation: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT –III:

Angle Modulation: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

UNIT –IV:

Noise in Analog communication System: Types of Noise: Resistive (Thermal) Noise Source, Shot noise, Extraterrestrial Noise, Arbitrary Noise Sources, White Noise, Narrowband Noise- In phase and quadrature phase components and its Properties, Modeling of Noise Sources, Average Noise Bandwidth, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks.

Noise in DSB and SSB System Noise in AM System, Noise in Angle Modulation System, Noise Triangle in Angle Modulation System, Pre-emphasis and de-emphasis

UNIT –V:

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

Pulse Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Divison Multiplexing.

TEXTBOOKS:

1. Communication Systems–Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication , 2004.

REFERENCE BOOKS:

1. Electronic Communications – Dennis Roddy and John Coolean, 4th Edition,PEA, 2004
2. Electronic Communication Systems – Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication – K. Sam Shanmugam, Willey ,2005
4. Electronics & Communication System – George Kennedy and Bernard Davis , TMH 2004.
5. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 , 3rd Edition

Course Outcomes:

Upon completion of the subject, students will be able to:

- Conceptually understand the baseband signal & system.
- Identify various elements, processes, and parameters in telecommunication systems, and describe their functions, effects, and interrelationship.
- Design procedure of AM Transmission & Reception, analyze, measure, and evaluate the performance of a telecommunication system against given criteria.
- Understand basic knowledge of FM Transmission & Reception
- Understand various types of SSB Transmission & Reception.
- Design typical telecommunication systems that consist of basic and essential building blocks.

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(A50425) LINEAR AND DIGITAL IC APPLICATIONS

Course Objectives:

The main objectives of the course are:

- 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.
- To introduce the concepts of waveform generation and introduce some special function ICs.
- To understand and implement the working of basic digital circuits.

UNIT -I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT -II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators – Triangular, Sawtooth, Square Wave,IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT -III:

Data Converters : Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT -IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing- TTL

Driving CMOS & CMOS Driving TTL, Combinational Logic ICs – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers , Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT -V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.
2. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
3. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCE BOOKS:

1. Op Amps and Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/ Jaico, 2009.
2. Operational Amplifiers with Linear Integrated Circuits by K.Lal Kishore – Pearson, 2009.
3. Linear Integrated Circuits and Applications – Salivahana, TMH.
4. Modern Digital Electronics – RP Jain – 4/e – TMH, 2010.
5. Digital Design Principles and Practices – John. F. Wakerly 3/e, 2005.
6. Operational Amplifiers with Linear Integrated Circuits, 4/e William D.Stanley, Pearson Education India, 2009.

Course Outcomes:

On completion of this course, the students will have:

- A thorough understanding of operational amplifiers with linear integrated circuits.
- Understanding of the different families of digital integrated circuits and their characteristics.
- Also students will be able to design circuits using operational amplifiers for various applications.

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(A50487) ANALOG COMMUNICATIONS LAB

Note:

Minimum 12 experiments should be conducted:

All these experiments are to be simulated first either using MATLAB, Comsim or any other simulation package and then to be realized in hardware

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and analysis of AM and FM Signals
6. Pre-emphasis & de-emphasis.
7. Time Division Multiplexing & De multiplexing
8. Frequency Division Multiplexing & De multiplexing
9. Verification of Sampling Theorem
10. Pulse Amplitude Modulation & Demodulation
11. Pulse Width Modulation & Demodulation
12. Pulse Position Modulation & Demodulation
13. Frequency Synthesizer.
14. AGC Characteristics.
15. PLL as FM Demodulator

Equipment required for the Laboratory:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators - 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Analog Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.
9. Spectrum Analyzer - 60 M Hz.
10. Any one simulation package

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(A50488) IC APPLICATIONS AND HDL SIMULATION LAB

Note: To perform any sixteen experiments (choosing at least seven from each part).

Part-I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators – Sine, Squarewave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits – using IC 741
7. IC 565 – PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators –7805, 7809, 7912.

EQUIPMENT REQUIRED:

1 20 MHz/ 40 MHz/60 MHz Oscilloscope.

2 1 MHz Function Generator (Sine, Square, Triangular and TTL).

3 Regulated Power Supply.

4 Multimeter / Volt Meter.

Part – II: HDL Simulation programs:

Programming can be done using any complier. Down load the programs on FPGA/CPLD boards and performance testing may be done using pattern generator/logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys /Equivalentfront end CAD tools.

1 HDL code to realize all the logic gates

2 Design of 2-to-4 decoder

3 Design of 8-to-3 encoder (without and with Priority)

4 Design of 8-to-1 multiplexer and 1x8 demultiplexer.

5 Design of 4 bit binary to gray code converter

6 Design of 4 bit comparator

7 Design of Full adder using 3 modeling styles

8 Design of flip flops: SR, D, JK, T

9 Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)

10 Finite State Machine Design

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(A60010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Objectives:

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

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(A60018) HUMAN VALUES AND PROFESSIONAL ETHICS

(Open Elective)

Objectives : This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Unit I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human - Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Unit IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order,

b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b) At the level of society: as mutually enriching institutions and organizations

TEXT BOOKS

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications,3rd Edition.

REFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

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(A60117) DISASTER MANAGEMENT

(Open Elective)

Unit-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

Unit –III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters

Infrequent events: Cyclones – Lightning – Hailstorms

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion

Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion

Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation

Biological hazards/ disasters:- Population Explosion.

Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction,CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

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III Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60017) INTELLECTUAL PROPERTY RIGHTS

(Open Elective)

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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III Year B.Tech. ECE-II Sem	L	T/P/D	C
	4	-/-/-	4

(A60420) DIGITAL COMMUNICATIONS

Course Objectives:

The objectives are:

- To understand different digital modulation techniques such as PCM, DM and various shift keying techniques.
- Understand the concepts of different digital modulation techniques.
- To study about different error detecting and error correcting codes like block codes, cyclic codes and convolution codes
- To study the advantages of spread spectrum techniques and performance of spread spectrum, PN codes in jamming, noise etc.

UNIT -I:

Elements of Digital Communication Systems: Advantages of Digital Communication Systems, Bandwidth-S/N Tradeoff, Hartley Shanon Law and Sampling Theorem.

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT -II:

Digital Modulation Techniques: Introduction, ASK,ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Bandwidth and Frequency Spectrum FSK, Non Coherent FSK Detector, Coherent FSK Detector, FSK Detection using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

UNIT -III:

Baseband Transmission and Optimal Reception of Digital Signal: Pulse Shaping for Optimum Transmissions, A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Optimal of Coherent Reception, Signal Space Representation and Probability of Error and Eye Diagrams for ASK, PSK, FSK, Cross Talk.

Information Theory: Information and entropy, conditional entropy and redundancy, Shannon Fano coding, Mutual Information, Information loss due to noise, source codings – Huffman Code, variable length coding, Source coding to Increase average Information per bit, Lossy source coding.

UNIT -IV:

Error Control Codes

Linear Block Codes: Matrix Description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes.

Cyclic Codes: Algebraic Structure, Encoding, Syndrome Calculation, Decoding.

Convolution Codes: Encoding, Decoding using State, Tree and Trellis Diagrams, Decoding using Viterbi Algorithm, Comparison of Error Rates in Coded and Uncoded Transmission.

UNIT -V:

Spread Spectrum Modulation: Use of Spread Spectrum, Direct Sequence Spread Spectrum (DSSS), Code Division Multiple Access, Ranging using DSSS, Frequency Hopping Spread Spectrum, PN - Sequences: Generation and Characteristics, Synchronization in Spread Spectrum Systems

TEXT BOOKS:

1. Principles of Communication Systems - Herbert Taub, Donald L Schiling, Goutam Saha, 3rd Edition, Mcgraw-Hill, 2008.
2. Digital and Analog Communication Systems – Sam Shanmugam, John Wiley, 2005.
3. Digital Communications – John G. Proakis , Masoud Salehi – 5th Edition, Mcgraw-Hill, 2008.

REFERENCE BOOKS:

1. Digital Communication – Simon Haykin, John Wiley, 2005.
2. Digital Communications – Ian A. Glover, Peter M. Grant, 2nd Edition, Pearson Edu., 2008.
3. Communication Systems – B.P. Lathi, BS Publication, 2006.
4. A First course in Digital Communications -Nguyen, Shewedyh, Cambride.
5. Digital Communication- Theory, Techniques, and Applications _ R. N. Mutagi, 2nd Ed. 2013.

Course Outcomes:

At the end of the course, the student will be able to:

- Understand basic components of digital communication systems.
- Design optimum receivers for digital modulation techniques.
- Analyze the error performance of digital modulation techniques.
- Know about different error detecting and error correcting codes like block codes, cyclic codes and convolution codes.
- Understand the advantages of spread spectrum techniques and performance of spread spectrum, PN codes in jamming, noise etc.

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	4	**-/-/-**	**4**

(A60432) VLSI DESIGN

Course Objectives:

The objectives of the course are to:

- Give exposure to different steps involved in the fabrication of ICs using MOS transistor, CMOS/BICMOS transistors and passive components.
- Explain electrical properties of MOS and BiCMOS devices to analyze the behavior of inverters designed with various loads.
- Give exposure to the design rules to be followed to draw the layout of any logic circuit.
- Provide concept to design different types of logic gates using CMOS inverter and analyze their transfer characteristics.
- Provide design concepts to design building blocks of data path of any system using gates.
- Understand basic programmable logic devices and testing of CMOS circuits.

UNIT –I:

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, Figure of merit ?o; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT -II:

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 µm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

UNIT –III:

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

UNIT -IV:

Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories.

UNIT -V:

Programmable Logic Devices: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques.

TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.
3. VLSI Design – M. Michael Vai, 2001, CRC Press.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
4. VLSI Design- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
5. Introduction to VLSI – Mead & Convey, BS Publications, 2010.

Course Outcomes:

Upon successfully completing the course, the student should be able to:

- Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
- Choose an appropriate inverter depending on specifications required for a circuit
- Draw the layout of any logic circuit which helps to understand and estimate parasitics of any logic circuit
- Design different types of logic gates using CMOS inverter and analyze their transfer characteristics
- Provide design concepts required to design building blocks of data path using gates.
- Design simple memories using MOS transistors and can understand Design of large memories.
- design simple logic circuit using PLA, PAL, FPGA and CPLD.
- Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of system

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	L	T/P/D	C
III Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60430) MICROPROCESSORS AND MICROCONTROLLERS

Course Objective:

The course objectives are:

- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

UNIT -I:

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086- Common Function Signals, Timing diagrams, Interrupts of 8086.

UNIT -II:

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT -III:

I/O Interface: 8255 PPI, Various Modes of Operation and Interfacing to 8086, Interfacing Keyboard, Display, D/A and A/D Converter.

Interfacing with advanced devices: Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine.

Communication Interface: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT -IV:

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs

UNIT -V:

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.

2. Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., Cengage Learning.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

Course Outcome:

Upon completion of the course:

- The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
- The student will learn hardware and software interaction and integration.
- The students will learn the design of microprocessors/ microcontrollers-based systems.

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III Year B.Tech. ECE-II Sem	L	T/P/D	C
	4	-/-/-	4

(A60421) DIGITAL SIGNAL PROCESSING

Objectives:

This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous-time and discrete-time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

UNIT -I:

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

Realization of Digital Filters: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

UNIT -II:

Discrete Fourier series: DFS Representation of Periodic Sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N.

UNIT-III:

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

UNIT-IV:

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT-V:

Multirate Digital Signal Processing: Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion.

Finite Word Length Effects: Limit cycles, Overflow Oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round Off Noise, Methods to Prevent Overflow, Trade Off Between Round Off and Overflow Noise, Dead Band Effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCE BOOKS:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. ElAli, CRC press, 2009.
5. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009.
6. Digital Signal Processing - Nagoor Khani, TMG, 2012

Course Outcomes:

On completion of this subject, the student should be able to:

- Perform time, frequency and Z -transform analysis on signals and systems.

- Understand the inter-relationship between DFT and various transforms.
- Understand the significance of various filter structures and effects of roundoff errors.
- Design a digital filter for a given specification.
- Understand the fast computation of DFT and appreciate the FFT processing.
- Understand the tradeoffs between normal and multi rate DSP techniques and finite length word effects.

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	L	T/P/D	C
III Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A60494) MICROPROCESSORS AND MICROCONTROLLERS LAB

Note: Minimum of 12 experiments are to be conducted.

The Following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

1 Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).

2 Program for sorting an array for 8086.

3 Program for searching for a number or character in a string for 8086.

4 Program for string manipulations for 8086.

5 Program for digital clock design using 8086.

6 Interfacing ADC and DAC to 8086.

7 Parallel communication between two microprocessors using 8255.

8 Serial communication between two microprocessor kits using 8251.

9 Interfacing to 8086 and programming to control stepper motor.

10 Programming using arithmetic, logical and bit manipulation instructions of 8051.

11 Program and verify Timer/ Counter in 8051.

12 Program and verify Interrupt handling in 8051

13 UART Operation in 8051.

14 Communication between 8051 kit and PC.

15 Interfacing LCD to 8051.

16 Interfacing Matrix/ Keyboard to 8051.

17 Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

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III Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A60493) DIGITAL SIGNAL PROCESSING LAB

Note:

- Minimum of 12 experiments are to be conducted.
- The programs shall be implemented in software (Using MATLAB / Lab view / C programming/OCTAVE Equivalent) and hardware (Using TI / Analog devices / Motorola / Equivalent DSP processors).

List of Experiments:

1 Generation of Sinusoidal waveform / signal based on recursive difference equations

2 To find DFT / IDFT of given DT signal

3 To find frequency response of a given system given in (Transfer Function/ Differential equation form).

4 Implementation of FFT of given sequence

5 Determination of Power Spectrum of a given signal(s).

6 Implementation of LP FIR filter for a given sequence

7 Implementation of HP FIR filter for a given sequence

8 Implementation of LP IIR filter for a given sequence

9 Implementation of HP IIR filter for a given sequence

10 Generation of Sinusoidal signal through filtering

11 Generation of DTMF signals

12 Implementation of Decimation Process

13 Implementation of Interpolation Process

14 Implementation of I/D sampling rate converters

15 Audio application such as to plot a time and frequency display of microphone plus a cosine using DSP. Read a .wav file and match with their respective spectrograms.

16 Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.

17 Impulse response of first order and second order systems.

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IV Year B.Tech. ECE-I Sem	L	T/P/D	C
	4	-/-/-	4

(A70014) MANAGEMENT SCIENCE

Objectives:

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

UNIT -I:

Introduction to Management and Organisation: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory – Fayal's Principles of Management – Maslow's theory of Hierarchy of Human Needs – Douglas McGregor's Theory X and Theory Y – Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

UNIT -II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT -III:

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity Model (CMM) Levels – Performance Management System.

UNIT -IV:

Project Management (PERT/CPM): Network Analysis, Programme

Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT -V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N.Duening and John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C.Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R.Gupta andWilliam F.Glueck: Business Policy and Strategic Management, Frank Bros. 2012.
9. Aryasri: Management Science, McGraw Hill, 2012

Outcomes:

By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study.
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation.

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IV Year B.Tech. ECE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70442) MICROWAVE ENGINEERING

Course Objectives:

The objectives of the course are:

- To develop the knowledge on transmission lines for microwaves, cavity resonators and wave guide components and applications.
- To enable the students understand and analyze the operation of Microwave tubes like klystron, magnetron, travelling wave tube, etc.,
- To familiarize with microwave solid state devices.
- To understand the scattering matrix parameters and its use.
- To introduce the student the microwave test bench for measure different parameters like attenuation, VSWR, etc.,

UNIT-I:

Microwave Transmission Lines - I: Introduction, Microwave Spectrum and Bands, Applications of Microwaves. Rectangular Waveguides – Solution of Wave Equations in Rectangular Coordinates, TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes, Sketches of TE and TM mode fields in the cross-section, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations, Illustrative Problems.

Rectangular Guides: Power Transmission and Power Losses, Impossibility of TEM Mode, Micro strip Lines– Introduction, Zo Relations, Effective Dielectric Constant, Losses, Q factor.

UNIT-II:

Cavity Resonators– Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies, Q Factor and Coupling Coefficients, Illustrative Problems

Waveguide Components and Applications: Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide Windows, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Different Types, Resistive Card and Rotary Vane Attenuators; Waveguide Phase Shifters – Types, Dielectric and Rotary Vane Phase Shifters, Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee. Directional Couplers – 2 Hole, Bethe Hole types, Illustrative Problems

Ferrites– Composition and Characteristics, Faraday Rotation, Ferrite

Components – Gyrator, Isolator, Circulator.

UNIT-III:

Microwave Tubes: Limitations and Losses of conventional Tubes at Microwave Frequencies, Microwave Tubes – O Type and M Type Classifications, O-type Tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for O/P Power and Efficiency. Reflex Klystrons – Structure, Velocity Modulation and Applegate Diagram, Mathematical Theory of Bunching, Power Output, Efficiency, Oscillating Modes and O/P Characteristics, Effect of Repeller Voltage on Power O/P, Illustrative Problems.

Helix TTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TW T and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

UNIT-IV:

M-Type Tubes:

Introduction, Cross-field Effects, Magnetrons – Different Types, Cylindrical Traveling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics, Illustrative Problems

Microwave Solid State Devices: Introduction, Classification, Applications. TEDs – Introduction, Gunn Diodes – Principle, RWH Theory, Characteristics, Basic Modes of Operation - Gunn Oscillation Modes, LSA Mode, Introduction to Avalanche Transit Time Devices.

UNIT-V:

Microwave Measurements: Scattering Matrix– Significance, Formulation and Properties, S Matrix Calculations for – 2 port Junctions, E plane and H plane Tees, Magic Tee, Circulator and Isolator, Illustrative Problems.

Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions, Microwave Power Measurement, Bolometers Measurement of Attenuation, Frequency Standing Wave Measurements – Measurement of Low and High VSWR, Cavity Q, Impedance Measurements.

TEXT BOOKS:

1. Microwave Devices and Circuits – Samuel Y. Liao, Pearson, 3rd Edition, 2003.
2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.

REFERENCE BOOKS:

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2ndEdition, 2002.

2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, W iley Eastern Ltd.,New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th Ed., 1955.
5. Microwave Engineering – A. Das and S.K. Das, TMH, 2nd Ed., 2009.
6. Microwave Engineering - G. S. Raghuvanshi and K. Satya Prasad, Cengage Learning, 2012.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Understand the significance of microwaves and microwave transmission lines.
- Analyze the characteristics of microwave tubes and compare them.
- Be able to list and explain the various microwave solid state devices.
- Can set up a microwave bench for measuring microwave parameters.

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IV Year B.Tech. ECE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70515) COMPUTER NETWORKS

Objectives:

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

UNIT-I

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, wireless transmission media.

Data Link Layer – design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

UNIT-II

Multiple Access Protocols –ALOHA, CSMA, Collision free protocols, Ethernet-Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters , hubs, bridges , switches, routers and gateways.

UNIT-III

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT-IV

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, Ipv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

UNIT-V

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP

Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer-Introduction ,providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

TEXT BOOKS:

1. Data Communications and Networking – Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L.L.Peterson and B.S.Davie,4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

Outcomes:

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

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IV Year B.Tech. ECE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70434) CELLULAR AND MOBILE COMMUNICATIONS

Course Objectives:

The course objectives are:

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- To provide the student with an understanding of Co-channel and Non-Co-channel interferences
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of handoff.

UNIT -I:

Introduction to Cellular Mobile Radio Systems: Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading -Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time.

Fundamentals of Cellular Radio System Design: Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems- Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT -II:

Co-Channel Interference: Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Antenna Parameters and Their Effects, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity.

Non-Co-Channel Interference: Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Antenna Height Decrease, Effects of Cell Site Components.

UNIT -III:

Cell Coverage for Signal and Traffic: Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model.

Cell Site and Mobile Antennas: Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

UNIT -IV:

Frequency Management and Channel Assignment: Numbering And Grouping, Setup Access And Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT -V:

Handoffs and Dropped Calls: Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Intersystem Handoff, Introduction to Dropped Call Rates and their Evaluation.

TEXT BOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Mc Graw Hill, 2nd Edn., 1989.
2. W ireless Communications - Theodore. S. Rapport, Pearson Education, 2nd Edn., 2002.
3. Mobile Cellular Communication - Gottapu sashibhushana Rao, Pearson, 2012.

REFERENCE BOOKS:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International, 2nd Edn., 2001.
2. Modern W ireless Communications-Simon Haykin, Michael Moher,Pearson Eduction, 2005.
3. Wireless Communications Theory and Techniques, Asrar U. H .Sheikh, Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications, 2007.
5. Wireless Communications – Andrea Goldsmith, Cambridge University Press, 2005.

Course Outcomes:

By the end of the course, the student will be able to analyze and design wireless and mobile cellular systems.

- The student will be able to understand impairments due to multipath fading channel.

- The student will be able understand the fundamental techniques to overcome the different fading effects.
- The student will be able to understand Co-channel and Non-Co-channel interferences
- The student will be able to familiar with cell coverage for signal and traffic, diversity techniques and mobile antennas.
- The student will have an understanding of frequency management, Channel assignment and types of handoff.

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	L	T/P/D	C
IV Year B.Tech. ECE-I Sem	**4**	**-/-/-**	**4**

(A70436) DIGITAL IMAGE PROCESSING
(Elective-I)

Course Objectives:

The objectives of the course are to:

- Provide the student with the fundamentals of digital image processing.
- Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.
- Introduce the students to some advanced topics in digital image processing.
- Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.

UNIT -I:

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels,

Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT -II:

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood Operation, Median Filter, Spatial Domain High-Pass Filtering.

Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Obtaining Frequency Domain Filters from Spatial Filters, Generating Filters Directly in the Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT -III:

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT -IV:

Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, Thresholding, Region Oriented Segmentation.

Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, The Hit or Miss Transformation.

UNIT -V:

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - Scotte Umbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
3. Fundamentals of Digital Image Processing – A.K.Jain , PHI, 1989
4. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
5. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition
6. Introduction to Image Processing & Analysis – John C. Russ, J. Christian Russ, CRC Press, 2010.
7. Digital Image Processing with MATLAB & Labview – Vipula Singh, Elsevier.

Course Outcomes:

Upon successfully completing the course, the student should:

- Have an appreciation of the fundamentals of Digital image processing including the topics of filtering, transforms and morphology, and image analysis and compression.

- Be able to implement basic image processing algorithms in MATLAB.
- Have the skill base necessary to further explore advance d topics of Digital Image Processing.
- Be in a position to make a positive professional contribution in the field of Digital Image Processing.

At the end of the course the student should have a clear impression of the breadth and practical scope of digital image processing and have arrived at a level of understanding that is the foundation for most of the work currently underway in this field.

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IV Year B.Tech. ECE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70443) MULTIMEDIA AND SIGNAL CODING
(Elective-I)

Course Objectives:

The course is designed:

- To provide an introduction to the fundamental principles and techniques in Multimedia Signal coding and compression.
- To give an overview of current multimedia standards and technologies.
- To provide techniques related to computer and multimedia networks.
- To provide knowledge related to Multimedia Network Communications and Applications.

UNIT -I:

Introduction to Multimedia: Multimedia, World Wide Web, Overview of Multimedia Tools, Multimedia Authoring, Graphics/ Image Data Types, and File Formats.

Color in Image and Video: Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut Colors, White Point Correction, XYZ to RGB Transform, Transform with Gamma Correction, L*A*B* Color Model. Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Under Color Removal: CMYK System, Printer Gamuts, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, Ycbcr Color Model.

UNIT -II:

Video Concepts: Types of Video Signals, Analog Video, Digital Video.

Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT -III:

Compression Algorithms:

Lossless Compression Algorithms: Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression.

Lossy Image Compression Algorithms: Transform Coding: KLT And DCT Coding, Wavelet Based Coding.

Image Compression Standards: JPEG and JPEG2000.

UNIT -IV:

Video Compression Techniques: Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and Inter-Frame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

UNIT -V:

Audio Compression Techniques: ADPCM in Speech Coding, G.726 ADPCM, Vocoders – Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithms, MPEG-2 AAC, MPEG-4 Audio.

TEXT BOOKS:

1. Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2. Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st Edition, 2009

REFERENCE BOOKS:

1. Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zorans. Bojkoric, Dragorad A.Milovanovic, 1st Edition, 2002.
2. Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition, 2003.
4. Digital Video Processing – A. Murat Tekalp, PHI, 1996.
5. Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson,2002

Course Outcomes:

- Upon completing the course, the student will be able to:
- Understand the fundamentals behind multimedia signal processing.
- Understand the fundamentals behind multimedia compression.
- Understand the basic principles behind existing multimedia compression and communication standards.
- Understand future multimedia technologies.
- Apply the acquired knowledge to specific multimedia related problems and projects at work.
- Take advanced courses in this area.

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(A70505) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Elective-I)

Learning Objectives:

- To understand object oriented programming concepts, and apply them in problem solving
- To learn the basics of java Console and GUI based programming

UNIT -I:

Object Oriented Thinking and Java Basics: Need for OOP Paradigm, Summary of OOP Concepts, Coping with Complexity, Abstraction Mechanisms, A Way of Viewing World – Agents, Responsibility, Messages, Methods, History of Java, Java Buzzwords, Data Types, Variables, Scope and Life Time of Variables, Arrays, Operators, Expressions, Control Statements, Type Conversion and Casting, Simple Java Program, Concepts of Classes, Objects, Constructors, Methods, Access Control, This Keyword, Garbage Collection, Overloading Methods and Constructors, Method Binding, Inheritance, Overriding and Exceptions, Parameter Passing, Recursion, Nested and Inner Classes, Exploring String Class.

UNIT -II:

Inheritance, Packages and Interfaces: Hierarchical Abstractions, Base Class Object, Subclass, Subtype, Substitutability, Forms of Inheritance-Specialization, Specification, Construction, Extension, Limitation, Combination, Benefits of Inheritance, Costs of Inheritance. Member Access Rules, Super Uses, Using Final with Inheritance, Polymorphism- Method Overriding, Abstract Classes, The Object Class.

Defining, Creating and Accessing a Package, Understanding Classpath, Importing Packages, Differences between Classes and Interfaces, Defining an Interface, Implementing Interface, Applying Interfaces, Variables in Interface and Extending Interfaces, Exploring Java.IO.

UNIT -III:

Exception Handling and Multithreading: Concepts of Exception Handling, Benefits of Exception Handling, Termination or Resumptive Models, Exception Hierarchy, Usage of Try, Catch, Throw, Throws and Finally, Built in Exceptions, Creating Own Exception Sub Classes.

String Handling, Exploring Java.Util, Differences between Multi-Threading and Multitasking, Thread Life Cycle, Creating Threads, Thread Priorities, Synchronizing Threads, Interthread Communication, Thread Groups, Daemon Threads.

Enumerations, Autoboxing, Annotations, Generics.

UNIT -IV:

Event Handling: Events, Event Sources, Event Classes, Event Listeners, Delegation Event Model, Handling Mouse and Keyboard Events, Adapter Classes.

The AWT Class Hierarchy, User Interface Components- Labels, Button, Canvas, Scrollbars, Text Components, Check Box, Check Box Groups, Choices, Lists Panels – Scrollpane, Dialogs, Menubar, Graphics, Layout Manager – Layout Manager Types – Border, Grid, Flow, Card and Grid Bag.

UNIT -V:

Applets: Concepts f Applets, Differences between Applets and Applications, Life Cycle of an Applet, Types of Applets, Creating Applets, Passing Parameters to Applets.

Swing: Introduction, Limitations of AWT, MVC Architecture, Components, Containers, Exploring Swing- Japplet, Jframe and Jcomponent, Icons and Labels, Text Fields, Buttons – The Jbutton Class, Check Boxes, Radio Buttons, Combo Boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java the Complete Reference, 7th Editon, Herbert Schildt, TMH.
2. Understanding OOP with Java Updated Edition, T. Budd, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to Programming and OO Design using Java, J.Nino and F.A. Hosch, John wiley & Sons.
2. An Introduction to OOP, Third Edition, T. Budd, Pearson Education.
3. Introduction to Java Programming, Y. Daniel Liang, Pearson Education.
4. An Introduction to Java Programming and Object Oriented Application Development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education

Expected Outcome:

The student is expected to have

- Understanding of OOP concepts and basics of java programming (Console and GUI based)
- The skills to apply OOP and Java programming in problem solving
- Should have the ability to extend his knowledge of Java programming further on his/her own.

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	4	-/-/-	4

(A70447) TELEVISION ENGINEERING

(Elective-II)

Course Objectives:

The objectives of the course are:

- To familiarize the students with Television transmitters and receivers and TV signal transmission.
- To make them understand different signal processing steps monochrome television.
- To introduce colour television transmitters and receivers.

UNIT –I:

Introduction: TV transmitter and receivers, synchronization. Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal, TV standards. Camera tubes: image Orthicon, Plumbicon, vidicon, silicon Diode Array vidicon, Comparison of camera tubes, Monochrome TV camera,

TV Signal Transmission and Propagation: Picture Signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW,TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT –II:

Monochrome TV Receiver: RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM detection, FM Sound detectors, and typical applications.

UNIT -III:

Sync Separation and Detection: TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection **Oscillators:** Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit, Deflection Oscillators, deflection drive ICs, Receiver Antennas, Picture Tubes,

UNIT –IV:

Color Television: Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes.

Color Signal Encoding and Decoding: NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder, chrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, U& V demodulators.

UNIT –V:

Color Receiver: Introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

Digital TV: Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

TEXT BOOKS:

1. Television and Video Engineering- A.M.Dhake, 2nd Edition.
2. Modern Television Practice – Principles, Technology and Service- R.R.Gallatin, New Age International Publication, 2002.
3. Monochrome and Colour TV- R.R. Gulati, New Age International Publication, 2002.

REFERENCE BOOKS:

1. Colour Television Theory and Practice-S.P.Bali, TMH, 1994.
2. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Understand TV standards and picture tubes for monochrome TV.
- Distinguish between monochrome and colour Television transmitters and receivers.
- Analyze and Evaluate the NTSC and PAL colour systems.

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(A70444) OPTICAL COMMUNICATIONS

(Elective-II)

Course Objectives:

The objectives of the course are:

- To realize the significance of optical fibre communications.
- To understand the construction and characteristics of optical fibre cable.
- To develop the knowledge of optical signal sources and power launching.
- To identify and understand the operation of various optical detectors.
- To understand the design of optical systems and WDM.

UNIT -I:

Overview of Optical Fiber Communication: - Historical development, The general system, Advantages of Optical Fiber Communications, Optical Fiber Wave Guides- Introduction, Ray Theory Transmission, Total Internal Reflection, Acceptance Angle, Numerical Aperture, Skew Rays, Cylindrical Fibers- Modes, Vnumber, Mode Coupling, Step Index Fibers, Graded Index Fibers.

Single Mode Fibers- Cut Off Wavelength, Mode Field Diameter, Effective Refractive Index, Fiber Materials Glass, Halide, Active Glass, Chalgenide Glass, Plastic Optical Fibers.

UNIT -II:

Signal Distortion in Optical Fibers: Attenuation, Absorption, Scattering and Bending Losses, Core and Cladding Losses, Information Capacity Determination, Group Delay, Types of Dispersion - Material Dispersion, Wave-Guide Dispersion, Polarization Mode Dispersion, Intermodal Dispersion, Pulse Broadening, Optical Fiber Connectors- Connector Types, Single Mode Fiber Connectors, Connector Return Loss.

UNIT -III:

Fiber Splicing: Splicing Techniques, Splicing Single Mode Fibers, Fiber Alignment and Joint Loss- Multimode Fiber Joints, Single Mode Fiber Joints, Optical Sources- LEDs, Structures, Materials, Quantum Efficiency, Power, Modulation, Power Bandwidth Product, Injection Laser Diodes- Modes, Threshold Conditions, External Quantum Efficiency, Laser Diode Rate Equations, Resonant Frequencies, Reliability of LED & ILD.

Source to Fiber Power Launching: - Output Patterns, Power Coupling, Power Launching, Equilibrium Numerical Aperture, Laser Diode to Fiber Coupling.

UNIT -IV:

Optical Detectors: Physical Principles of PIN and APD, Detector Response Time, Temperature Effect on Avalanche Gain, Comparison of Photo Detectors, Optical Receiver Operation- Fundamental Receiver Operation, Digital Signal Transmission, Error Sources, Receiver Configuration, Digital Receiver Performance, Probability of Error, Quantum Limit, Analog Receivers.

UNIT -V:

Optical System Design: Considerations, Component Choice, Multiplexing, Point-to- Point Links, System Considerations, Link Power Budget with Examples, Overall Fiber Dispersion in Multi-Mode and Single Mode Fibers, Rise Time Budget with Examples.

Transmission Distance, Line Coding in Optical Links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye Pattern.

TEXT BOOKS:

1. Optical Fiber Communications – Gerd Keiser, TMH, 4th Edition, 2008.
2. Optical Fiber Communications – John M. Senior, Pearson Education, 3rd Edition, 2009.

REFERENCE BOOKS:

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Introduction to Fiber Optics by Donald J.Sterling Jr. – Cengage learning, 2004.
5. Optical Communication Systems – John Gowar, 2nd Edition, PHI, 2001.

Course Outcomes:

At the end of the course, the student will be able to:

- Understand and analyze the constructional parameters of optical fibres.
- Be able to design an optical system.
- Estimate the losses due to attenuation, absorption, scattering and bending.
- Compare various optical detectors and choose suitable one for different applications.

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	4	-/-/-	4

(A70440) EMBEDDED SYSTEMS DESIGN

(Elective – II)

Course Objectives:

For embedded systems, the course will enable the students to:

- Understand the basics of an embedded system
- Program an embedded system
- To learn the method of designing an Embedded System for any type of applications.
- To understand operating systems concepts, types and choosing RTOS.
- Design, implement and test an embedded system.

UNIT -I:

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT -II:

Typical Embedded System: Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT -III:

Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT -IV:

RTOS Based Embedded System Design: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT -V:

Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/ Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOK:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

REFERENCE BOOKS:

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013
4. An Embedded Software Primer - David E. Simon, Pearson Education.

Course Outcomes:

Upon completion of this course, the student will be able to:

- Understand and design embedded systems.
- Learn basic of OS and RTOS
- Understand types of memory and interfacing to external world.
- Understand embedded firmware design approaches

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	-	**-/3/-**	**2**

(A70086) ADVANCED COMMUNICATION SKILLS (ACS) LAB

Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. Activities on Fundamentals of Inter-personal Communication and

Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. Activities on Reading Comprehension –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing – planning for writing – improving one's writing.
4. Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. Activities on Group Discussion and Interview Skills – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

Prescribed Lab Manual: A book titled A Course Book of Advanced Communication Skills (ACS) Lab published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from 'train2success.com'
  - Ø Preparing for being Interviewed
  - Ø Positive Thinking
  - Ø Interviewing Skills
  - Ø Telephone Skills
  - Ø Time Management

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.

11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented.
    - Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
    - Not more than two students to work on each mini project.
    - Students may be assessed by their performance both in oral presentation and written report.

Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

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(A70499) MICROWAVE ENGINEERING AND DIGITAL COMMUNICATIONS LAB

Note: Minimum 12 Experiments to be conducted

Part – A: Microwave Engineering Lab (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Impedance of a given Load
7. Measurement of Scattering parameters of a Magic Tee
8. Measurement of Scattering parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement

Part – B: Digital Communication Lab (Any 6 Experiments):

1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Time Division Multiplexing of 2 Band Limited Signals
5. Frequency shift keying: Generation and Detection
6. Phase Shift Keying: Generation and Detection
7. Amplitude Shift Keying: Generation and Detection
8. Study of the spectral characteristics of PAM, QAM
9. DPSK :Generation and Detection
10. QPSK : Generation and Detection

Equipment required for the Laboratory:

Microwave Engineering Lab:

1. Microwave Bench set up with Klystron Power Supply
2. Microwave Bench set up with Gunn Power Supply
3. Micro Ammeter
4. VSWR meter

5. Microwave Components

Digital Communication Lab:

1. RPS: 0-30V
2. CRO: 0-20MHz
3. Function Generators: 0-1MHz
4. RF Generators: 0-100MHz
5. Experimental Kits /Modules

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(A80452) SATELLITE COMMUNICATIONS

(Elective –III)

Course Objectives:

The course objectives are:

- To prepare students to excel in basic knowledge of satellite communication principles
- To provide students with solid foundation in orbital mechanics and launches for the satellite communication
- To train the students with a basic knowledge of link design of satellite with a design examples.
- To provide better understanding of multiple access systems and earth station technology
- To prepare students with knowledge in satellite navigation and GPS & and satellite packet communications

UNIT -I:

Communication Satellite: Orbit and Description: A Brief history of satellite Communication, Satellite Frequency Bands, Satellite Systems, Applications, Orbital Period and Velocity, effects of Orbital Inclination, Azimuth and Elevation, Coverage angle and slant Range, Eclipse, Orbital Perturbations, Placement of a Satellite in a Geo-Stationary orbit.

UNIT -II:

Satellite Sub-Systems: Attitude and Orbit Control system, TT&C subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment.

Satellite Link: Basic Transmission Theory, System Noise Temperature and G/T ratio, Basic Link Analysis, Interference Analysis, Design of satellite Links for a specified C/N, (With and without frequency Re-use), Link Budget.

UNIT -III:

Propagation effects: Introduction, Atmospheric Absorption, Cloud Attenuation, Tropospheric and Ionospeheric Scintillation and Low angle fading, Rain induced attenuation, rain induced cross polarization interference.

Multiple Access: Frequency Division Multiple Access (FDMA) - Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) - Frame Structure, Burst Structure, Satellite Switched TDMA, On-board Processing, Demand Assignment Multiple Access (DAMA) – Types of Demand Assignment, Characteristics, CDMA Spread Spectrum Transmission and Reception.

UNIT -IV:

Earth Station Technology: Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Power Test Methods, Lower Orbit Considerations.

Satellite Navigation and Global Positioning Systems: Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers, GPS C/A Code Accuracy, Differential GPS.

UNIT -V:

Satellite Packet Communications: Message Transmission by FDMA: M/G/1 Queue, Message Transmission by TDMA, PURE ALOHA-Satellite Packet Switching, Slotted Aloha, Packet Reservation, Tree Algorithm.

TEXT BOOKS:

1. Satellite Communications –Timothy Pratt, Charles Bostian, Jeremy Allnutt, 2nd Edition, 2003, John Wiley & Sons.
2. Satellite Communications Engineering – Wilbur, L. Pritchand, Robert A. Nelson and Heuri G. Suyderhoud, 2nd Ed., Pearson Publications.
3. Digital Satellite Communications-Tri.T.Ha, 2nd Edition, 1990, Mc.Graw Hill.

REFERENCE BOOKS:

1. Satellite Communications-Dennis Roddy, 2nd Edition, 1996, McGraw Hill.
2. Satellite Communications: Design Principles – M. Richcharia, 2nd Ed., BSP, 2003.
3. Digital Satellite Communications – Tri. T. Ha, 2nd Ed., MGH, 1990.
4. Fundamentals of Satellite Communications – K. N. Raja Rao, PHI, 2004.

Course Outcomes:

At the end of the course,

- Students will understand the historical background, basic concepts and frequency allocations for satellite communication

- Students will demonstrate orbital mechanics, launch vehicles and launchers
- Students will demonstrate the design of satellite links for specified C/N with system design examples.
- Students will be able to visualize satellite sub systems like Telemetry, tracking, command and monitoring power systems etc.
- Students will understand the various multiple access systems for satellite communication systems and satellite packet communications.

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(A81102) BIOMEDICAL INSTRUMENTATION

(Elective–III)

Course Objectives:

The following are the course objectives:

- To study bioamplifier, biosignals and measurement of physiological parameters.
- To know about different bioelectrodes and activities of heart.
- To understand therapeutic and cardic instrumentation.
- To study EEG and EMG machines, recordings and interpretations.

UNIT -I:

Components of Medical Instrumentation System: Bioamplifier, Static and Dynamic Characteristics of Medical Instruments, Biosignals and Characteristics, Problems encountered with Measurements from Human beings.

Organization of Cell, Derivation of Nernst equation for Membrane Resting Potential Generation and Propagation of Action Potential, Conduction through Nerve to Neuromuscular Junction.

UNIT -II:

Bio Electrodes: Biopotential Electrodes-External Electrodes, Internal Electrodes, Biochemical Electrodes.

Mechanical Function, Electrical Conduction System of the Heart, Cardiac Cycle, Relation between Electrical and Mechanical Activities of the Heart.

UNIT -III:

Cardiac Instrumentation: Blood Pressure and Blood Flow Measurement, Specification of ECG Machine, Einthoven Triangle, Standard 12-Lead Configurations, Interpretation of ECG waveform with respect to Electro Mechanical Activity of the Heart.

UNIT -IV:

Therapeutic Equipment: Pacemaker, Defibrillator, Shortwave Diathermy, Hemodialysis Machine.

Respiratory Instrumentation: Mechanism of Respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT -V:

Neuro-Muscular Instrumentation: Specification of EEG and EMG

Machines, Electrode Placement for EEG and EMG Recording, Interpretation of EEG and EMG.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements – by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.

REFERENCE BOOKS:

1. Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 2003.
3. Biomedical Telemetry – by Mackay, Stuart R., John Wiley.

Course Outcomes:

At the end of the course, the student will be able to:

- The concept of biomedical instrumentation.
- Understand bioelectrodes and activities of heart.
- Analyse ECG, EEG and EMG recordings for disorder identification.

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(A80527) ARTIFICIAL NEURAL NETWORKS

(Elective-III)

Course Objectives:

The objectives of this course are to:

- Understand the basic building blocks of artificial neural networks (ANNs)
- Understand the role of neural networks in engineering and artificial intelligence modelling
- Provide knowledge of supervised/unsupervised learning in neural networks
- Provide knowledge of single layer and multilayer perceptrons.
- To know about self-organizational maps and Hopfield models.

UNIT -I:

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

UNIT -II:

Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment

Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

UNIT -III:

Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT -IV:

Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self-Organization Map, SOM Algorithm, Properties of Feature Map, Computer

Simulations, Learning Vector Quantization, Adaptive Patter Classification

UNIT -V:

Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, Computer Experiment

TEXT BOOK:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

REFERENCE BOOKS:

1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Inteligance, Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

Course Outcomes:

After the course the student should be able to:

- Explain the function of artificial neural networks of the Back-prop, Hopfield and SOM type
- Explain the difference between supervised and unsupervised learning
- Describe the assumptions behind, and the derivations of the ANN algorithms dealt with in the course
- Give example of design and implementation for small problems
- Implement ANN algorithms to achieve signal processing, optimization, classification and process modeling

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(A80431) TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(Elective-IV)

Course objectives:

The following are the course objectives:

- To learn Switching, Signaling and traffic in the context of telecommunication network.
- To expose through the evolution of switching systems from manual and electromechanical systems to stored-program-controlled digital systems.
- To study signaling, packet switching and networks.

UNIT -I:

Switching Systems: Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Digital Switching Systems.

Telecommunications Traffic: Introduction; The Unit of Traffic; Congestion; Traffic Measurement; A Mathematical Model; Lost-Call Systems-Theory; Traffic Performance; Loss Systems in Tandem; Use of Traffic Tables; Queuing Systems-The Second Erlang Distribution; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

UNIT -II:

Switching Networks: Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four Stage Networks

Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching.

Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control; Reliability; Availability and Security; Stored Program Control.

UNIT -III:

Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems-Outband Signaling; Inband (VF)

Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCITT Signaling System Number 6; CCITT Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT -IV:

Packet Switching: Introduction; Statistical Multiplexing; Local Area And Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT -V:

Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent Networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

TEXT BOOKS:

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

REFERENCE BOOKS:

1. John C Bellamy, "Digital Telephony," John Wiley International Student Edition,3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi," Introduction to Data Communication and Networking," Pearson Education, 1st Edition, 2007.

Course outcomes:

On completion of this course, it is expected that the student will be able to:

- Understand the main concepts of telecommunication network design
- Analyze and evaluate fundamental telecommunication traffic models.
- Understand basic modern signaling system.
- Solve traditional interconnection switching system design problems.
- Understand the concept of packet switching

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(A80450) RADAR SYSTEMS

(Elective-IV)

Course Objectives:

The objectives of the course are:

- Radar fundamentals and analysis of the radar signals.
- To understand various technologies involved in the design of radar transmitters and receivers.
- To learn various radars like MTI, Doppler and tracking radars and their comparison.

UNIT –I:

Basics of Radar : Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

Radar Equation : SNR, Envelope Detector – False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Illustrative Problems.

UNIT –II:

CW and Frequency Modulated Radar : Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar. Illustrative Problems

FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics, FM-CW altimeter, Multiple Frequency CW Radar.

UNIT -III:

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

UNIT –IV:

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT –V:

Detection of Radar Signals in Noise : Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

Radar Receivers – Noise Figure and Noise Temperature, Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

TEXT BOOK:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Ed., 2007.

REFERENCE BOOKS:

1. Radar: Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.
2. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.
3. Principles of Modern Radar: Basic Principles – Mark A. Richards, James A. Scheer, William A. Holm, Yesdee, 2013

Course Outcomes:

After completion of the course, the student will be able to:

- Understand radar fundamentals and analysis of the radar signals.
- Understand various radar transmitters and receivers.
- Understand various radars like MTI, Doppler and tracking radars and their comparison.

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(A80449) NETWORK SECURITY

(Elective-IV)

Course Objectives:

The main objectives are:

- To acquire an understanding of network security and its changing character.
- To understand how network security is conceptualized and carried out.
- To examine conventional encryption and cryptography techniques.
- To articulate informed opinion about issues related to network IP security.
- To identify and investigate web security requirements.
- To appreciate the concepts of SNMP and design principles of firewall.

UNIT –I:

Security Attacks: (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT –II:

Conventional Encryption: Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT –III:

Public Key Cryptography: principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

Email Privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT –IV:

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

Web Security Requirements: Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT –V:

Basic Concepts of SNMP: SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats.

Firewall: Design principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

REFERENCE BOOKS:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third Edition, Stallings, PHI/ Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.
7. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
8. Information Systems Security,Godbole,Wiley Student Edition.
9. Cryptography and network Security, B.A.Forouzan, D.Mukhopadhyay, 2nd Edition,TMH.

Course Outcomes:

Upon completion of the course, the student will be able to:

- Acquire an understanding of network security and its changing character.
- Understand conventional encryption and cryptography techniques.
- Analyze issues related to network IP security.
- Identify and investigate web security requirements.
- Know the concepts of SNMP and design principles of firewall.

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	4	-/-/-	4

(A80454) WIRELESS COMMUNICATIONS AND NETWORKS

(Elective-V)

Course objectives:

The course objectives are:

- To provide the students with the fundamental treatment about many practical and theoretical concepts that forms basic of wireless communications.
- To equip the students with various kinds of wireless networks and its operations.
- To prepare students to understand the concept of frequency reuse, and be able to apply it in the design of mobile cellular system.
- To prepare students to understand various modulation schemes and multiple access techniques that are used in wireless communications,
- To provide an analytical perspective on the design and analysis of the traditional and emerging wireless networks, and to discuss the nature of, and solution methods to, the fundamental problems in wireless networking.
- To train students to understand the architecture and operation of various wireless wide area networks such as GSM, IS-95, GPRS and SMS.
- To train students to understand wireless LAN architectures and operation.
- To prepare students to understand the emerging technique OFDM and its importance in the wireless communications.

UNIT -I:

The Cellular Concept-System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference and system capacity, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring .

UNIT –II:

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to

Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models- Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model, Indoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model, Ericsson Multiple Breakpoint Model, Attenuation Factor Model, Signal penetration into buildings, Ray Tracing and Site Specific Modeling.

UNIT –III:

Mobile Radio Propagation: Small –Scale Fading and Multipath: Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, spectral shape due to Doppler spread in Clarke's model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT -IV:

Equalization and Diversity: Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration-Selection Diversity, Feedback or Scanning Diversity, Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

UNIT -V:

Wireless Networks: Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper Lan, WLL.

TEXT BOOKS:

1. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002, PHI.
2. Wireless Communications-Andrea Goldsmith, 2005 Cambridge University Press.
3. Mobile Cellular Communication – Gottapu Sasibhushana Rao, Pearson Education, 2012.

REFERENCE BOOKS:

1. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, 2002, PE
2. Wireless Digital Communications – Kamilo Feher, 1999, PHI.
3. Wireless Communication and Networking – William Stallings, 2003, PHI.
4. Wireless Communication – Upen Dalal, Oxford Univ. Press
5. Wireless Communications and Networking – Vijay K. Gary, Elsevier.

Course Outcomes:

Upon completion of the course, the student will be able to:

- Understand the principles of wireless communications.
- Understand fundamentals of wireless networking
- Understand cellular system design concepts.
- Analyze various multiple access schemes used in wireless communication.
- Understand wireless wide area networks and their performance analysis.
- Demonstrate wireless local area networks and their specifications.
- Familiar with some of the existing and emerging wireless standards.
- Understand the concept of orthogonal frequency division multiplexing.

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(A80437) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

(Elective – V)

Course Objectives:

The objectives of the course are:

- To recall digital transform techniques.
- To introduce architectural features of programmable DSP Processors of TI and Analog Devices..
- To give practical examples of DSP Processor architectures for better understanding.
- To develop the programing knowledge using Instruction set of DSP Processors.
- To understand interfacing techniques to memory and I/O devices.

UNIT –I:

Introduction to Digital Signal Processing: Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II:

Architectures for Programmable DSP Devices: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III:

Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT –IV:

Analog Devices Family of DSP Devices: Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V:

Interfacing Memory and I/O Peripherals to Programmable DSP Devices: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing – Jonatham Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI
5. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997

6. Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes , ISBN 0750679123, 2005.

Course Outcomes:

Upon completion of the course, the student

- Be able to distinguish between the architectural features of General purpose processors and DSP processors.
- Understand the architectures of TMS320C54xx and ADSP 2100 DSP devices.
- Be able to write simple assembly language programs using instruction set of TMS320C54xx.
- Can interface various devices to DSP Processors.

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IV Year B.Tech. ECE-II Sem	L	T/P/D	C
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(A80451) RF CIRCUIT DESIGN

(Elective-V)

Course Objectives:

The course objectives are:

- To educate students fundamental RF circuit and system design skills.
- To introduce students the basic transmission line theory, single and multiport networks, RF component modelling.
- To offer students experience on designing matching and biasing networks & RF transistor amplifier design.

UNIT -I:

Introduction: Importance of RF Design-Dimensions and Units-Frequency Spectrum-RF Behavior of Passive Components: High Frequency Resistors, High Frequency Capacitors, High Frequency Inductors.-Chip Components and Circuit Board Considerations: Chip Resistors, Chip Capacitors, and Surface Mount Inductors.

Review of Transmission Lines: Types of Transmission Lines-Equivalent Circuit representation-R, L, C, G parameters of Different Line configurations-Terminated Lossless Transmission Lines-Special Terminations: Short Circuit, Open Circuit and Quarter Wave Transmission Lines- Sourced and Loaded Transmission Lines: Power Considerations, Input Impedance Matching, Return Loss and Insertion Loss.

UNIT -II:

Single and Multi-Port Networks: The Smith Chart: Reflection Coefficient, Normalized Impedance-Impedance Transformation: Standing wave Ratio, Special Transformation Conditions-Admittance Transformation-Parallel and Series RL & RC Connections-Basic Definitions of Single and Multi-Port Networks-Interconnecting Networks.

RF Filter Design: Scattering Parameters: Definition, Meaning, Chain Scattering Matrix, Conversion Between S- and Z-parameters, Signal Flow Chart Modeling, Generalization-Basic Resonator and Filter Configurations: Low Pass, High Pass, Band Pass and Band Stop type Filters-Filter Implementation using Unit Element and Kuroda's Identities Transformations-Coupled Filters.

UNIT -III:

Active RF Component Modelling: RF Diode Models: Nonlinear and Linear Models-Transistor Models: Large Signal and Small Signal BJT Models, Large Signal and Small Signal FET Models- Scattering Parameter, Device Characterization.

UNIT -IV:

Matching and Biasing Networks: Impedance Matching Using Discrete Components: Two Component Matching Networks, Forbidden Regions, Frequency Response and Quality Factor, T and Pi Matching Networks-Amplifier Classes of Operation and Biasing Networks: Classes of Operation and Efficiency of Amplifiers, Biasing Networks for BJT, Biasing Networks for FET.

UNIT -V:

RF Transistor Amplifier Design: Characteristics of Amplifiers- Amplifier Power Relations: RF Source, Transducer Power Gain, Additional Power Relations-Stability Considerations: Stability Circles, Unconditional Stability, And Stabilization Methods-Unilateral and Bilateral Design for Constant Gain-Noise Figure Circles- Constant VSWR Circles.

RF Oscillators and Mixers: Basic Oscillator Model: Negative Resistance Oscillator, Feedback Oscillator Design, Design steps, Quartz Oscillators-Fixed Frequency High Frequency Oscillator -Basic Characteristics of Mixers: Concepts, Frequency Domain Considerations, Single Ended Mixer Design, Single and Double Balanced Mixers.

TEXT BOOKS:

1. RF Circuit Design – Theory and Applications - Reinhold Ludwig, Pavel Bsetchko – Pearson Education India, 2000.
2. Radio Frequency and Microwave Communication Circuits – Analysis and Design - Devendra K.Misra – Wiley Student Edition – John Wiley & Sons, Inc.

REFERENCE BOOKS:

1. Radio Frequency and Microwave Electronics – Matthew M. Radmanesh – PEI.
2. RF Circuit Design – Christopher Bowick, Cheryl Aljuni and John Biyler, Elsevier Science, 2008.
3. Secrets of RF Circuit Design - Joseph J.Carr, TMH, 2000.
4. Design of RF and Microwave Amplifiers and Oscillators - Peter L.D. Abrif, Artech House, 2000.

5. The Design of CMOS Radio Frequency Integrated Circuits - Thomas H.Lee , 2/e – Cambridge University Press, 2004.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Explore fundamental RF circuit and system design skills.
- Understand the basic transmission line theory, single and multiport networks, RF component modelling.
- Design matching and biasing networks & RF transistor amplifiers.

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(A80087) INDUSTRY ORIENTED MINI PROJECT

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IV Year B.Tech. ECE-II Sem	L	T/P/D	C
	-	-/6/-	2

(A80089) SEMINAR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ECE-II Sem	L	T/P/D	C
	-	-/15/-	10

(A80088) MAJOR PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ECE-II Sem	L	T/P/D	C
	-	-/-/-	2

(A80090) COMPREHENSIVE VIVA