SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)
Sree Sainath Nagar, Tirupati

Department of Electronics and Communication Engineering

Supporting Document for 1.1.3

Courses having focus on

Employability/ Entrepreneurship/ skill Development

Program: B.Tech.- Electronics and Communication Engineering

Regulations : SVEC-14

The Courses (with course outcomes) under SVEC-14 Regulations which focus on ***employability/ entrepreneurship/ skill development*** are highlighted with the following colours.

Skill

Employability

Entrepreneurship

B.Tech I Year

14BT1HS01: TECHNICAL ENGLISH

(Common to All Branches of Engineering)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

Detailed Syllabus:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: **(10 periods)**

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: **(10 periods)**

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: **(10 periods)**

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading– Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: **(10 periods)**

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. **All About English***,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, **Technical Communication**, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, **Effective Technical Communication**, Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, **Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,** Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01: ENGINEERING PHYSICS

(Common to All Branches of Engineering)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

Detailed syllabus:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY (16 periods)

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III :PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS (17 periods)

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS (17 periods)

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V :MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS (17 periods)

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials. **Total :85 periods**

TEXTBOOKS :

1. S. Mani Naidu, **Engineering Physics**, Pearson Education, 2013.
2. P. K. Palaniswamy, **Engineering Physics**, Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta, **Engineering Physics,** DhanpatRai Publications (P) Ltd., 8th Edition, 2001.
2. M. R. Srinivasan, **Engineering Physics,** New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year

14BT1BS02 : ENGINEERING CHEMISTRY

(Common to All Branches of Engineering)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
2	1	-	4

PRE REQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.

6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
    a. Green computing
    b. Green construction
    c. Green manufacturing systems

Detailed syllabus:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, $H_2 - O_2$ fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems. **Total Periods : 85**

TEXT BOOKS:

1. P.C.Jain & Monika Jain, **Engineering Chemistry**, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah **Engineering Chemistry**, Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, **Hand book of Nanostructured materials and Nanotechnology**, New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, **Green Chemistry: Theory and practice,** Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 : ENGINEERING MATHEMATICS

(Common to All Branches of Engineering)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	6

PRE REQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

Detailed syllabus:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, $e^{ax}V(x)$, $x\,V(x)$. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 Periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods : 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, **Engineering Mathematics, Vol. 1**, S. Chand & Company, 12/e ,2013.

REFERENCE BOOKS:

1. Grewal, B.S., **Higher Engineering Mathematics**, Khanna Publishers, 42/e,2012.
2. Kreyszig, E., **Advanced Engineering Mathematics**, John Wiley and Sons, 8/e.2006

B.Tech. I Year

14BT1BS04 : MATHEMATICAL METHODS

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	6

PRE REQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley- Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

Detailed syllabus:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III: NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, **Mathematical Methods**, S.Chand and Company, 8/e, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, **Higher Engineering Mathematics**, Khanna publishers, 42/e, 2012.
2. S.S.Sastry, **Introductory Methods of Numerical Analysis**, Prentice Hall of India, 4/e, 2005.

B.Tech. I Year

14BT1ES01: PROGRAMMING IN C & DATA STRUCTURES

(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	—	6

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
   a. Searching and sorting
   b. File management functions.
   c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS

Unit-I **(15 periods)**

Programming Languages- Compiler, Interpreter, Loader, and Linker- Program execution- Classification of programming-Algorithms and flowcharts .

Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II **(20 periods)**

Input and Output: Basic screen and key board I/O in C , Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.

Unit-III **(20 periods)**

Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV **(25 periods)**

Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.

Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V **(20 periods)**

Linked Lists: Singly Linked Lists, Circular Linked lists, Doubly Linked list Applications of Linked Lists. Stacks and Applications, Queues, Other Variations of Queues, Applications, Tree-Binary tree, Traversals, Kinds of binary tress, Binary Search tree, Application of tree.

Total periods: 100

TEXT BOOK:

1. PradipDey and Manas Ghosh, "**Programming in C**,"Second Edition, Oxford University Press, New Delhi, 2007

REFERENCE BOOKS:

1. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004
2. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**,"Third Edition, Cengage Learning, New Delhi, 2007.

B.Tech. I Year

14BT1ES03: COMPUTER AIDED ENGINEERING DRAWING

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	1	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

Detailed Syllabus:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING

(20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total Periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, **Engineering Graphics with Auto CAD**, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, **Engineering Drawing**, Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, **AutoCAD 2013 For Engineers And Designers**, Dreamtech Press, 2013
2. T Jeyapoovan, **Engineering Drawing and Graphics Using Autocad**, Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, **Engineering Drawing**, Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, **Engineering Drawing**, Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LABORATORY

(Common to All Branches of Engineering)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of P^H of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment
Total periods: 30

TEXT BOOKS:

1. **Physics Laboratory Manual**
2. K. Mukkanti, **Practical Engineering Chemistry**, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, **Chemistry laboratory manual**, S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES04: PROGRAMMING IN C & DATA STRUCTURES LAB

(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:

a. Write a C program to print the string "SVEC" at four corners and center of the screen using single printf statement.

b. Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I=PTR/100)

c. Write a program to exchange the values of two variables without using the third variable.

Week 2:

a. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

b. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

c. Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.

Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.

b. Write a program to print Pythagoras triplets a = m* n , $b=(n^2 + m^2)/2$, $c=(n^2-m^2)/2$ where m = 1,3, 5 ……; n = m + 2, m + 4 ……..

c. Write a program to produce the following pattern:

a. 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1

b. 1 2 3 4 5 6 7 8 9 10
2 3 4 5 6 7 8 9 10
3 4 5 6 7 8 9 10
4 5 6 7 8 9 10
5 6 7 8 9 10
6 7 8 9 10
7 8 9 10
8 9 10
9 10
10

Week-4

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

$$i = p (1 + r)^d - p$$

where:

i is the total interest earned,

p is the principal (the amount originally deposited in the account),

r is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and

d is the number of days the money is earning interest.

Write a program that accepts values for p, r and d and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

c. Write a C program to convert a given decimal number into its equivalent

i. Binary Number
ii. Octal Number
iii. Hexadecimal Number
iv. Quinary Number(base 5)

Week-6

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. 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 program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
   i) Addition of two matrices.
   ii) Multiplication of two matrices.

Week-8

a. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to 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
c. Write a C Program to implement all string operations.
   1. Find the length of string 2. Reverse the string.
   3. Comparing the two strings. 4. Copy the string .

Week -9:

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 10:

a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:

Write a program to perform the following:
   i) Linear search ii) Binary search

Week 12:

Write a program to perform the following:
   i) Selection sort ii) Insertion sort
   iii) merge Sort iv) Quick sort

Week 13:

Write programs to perform the following using recursion

i) To find the factorial of a given integer.

ii)To solve Towers of Hanoi problem

Week-14

a. Write a C Program to return a substring from a main string using pointers.

b. Write a C program to return character frequency count in a text using pointers

Week-15

a. 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.)

b. Write a Program to enter records of students display in sorted order according to ID number.

c. Define a structure to store employee's data with the following specifications:

Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.

If Basic pay <= Rs.5000 then increase it by 15%.

If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.

If Basic pay > Rs.25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week-16

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

c. Consider the following text file:

Input File:

S.No.	Customer_ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	I1	2	10
2.	C02	I2	5	50
3.	C03	I2	5	50
4.	C04	I4	10	10

Write a program to print the output in following format by giving the Customer_ID as an input.

Output:

S.V. PROVISION STORES TIRUPATI Customer_ID: C01		Date: 12-08-2010
Item	Qty	Price
I1	2	20
Total		20

Week - 17:

Write a program to implement the following operations on Singly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -18:

Write a program to implement the following operations on Circular Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -19 :

Write a program to implement the following operations on Doubly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week- 20:

Write a program to implement stack operations using:

i) Arrays ii) Pointers

Week -21 :

Write a program to implement linear queue operations using:

i) Arrays ii) Pointers

Week -22:

a) Write a program to implement circular queue operations using arrays

b) Write a program to implement traversals of a Binary tree

i. Preorder ii. Post order iii. Inorder

Week- 23

Write a program to implement insertion and deletion in a binary search tree.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "**Programming in C**", Second Edition, Oxford University Press, New Delhi, 2007
3. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004.

B.Tech. I Year

14BT1ES06: ENGINEERING & IT WORKSHOP

(Common to All Branches of Engineering)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a)	**Carpentry Shop**	:	Cross lap joint, mortise and tenon, T-joint, dove tail joint.
b)	**Fitting Shop**	:	Square fit and V-fit, semi circular fit, dove tail fit.
c)	**Sheet Metal Shop**	:	Trapezoidal tray, square tin, funnel, cylinder.
d)	**House wiring**	:	Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.
(e)	**Foundry**	:	Preparation of casting using single piece pattern, Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding

b) Metal Cutting

c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

IT WORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.
Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.
Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.
Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.
Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

Total Periods: *48*

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, **Engineering Work shop practice**, VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, **Work shop Manual**, SciTech Publishers, 2009.
3. K. Venkata Reddy, **Workshop Practice Manual**, BS Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, "**Comdex Information Technology Course Tool Kit**," 2nd Edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, "**Introduction to Information Technology**," 2nd Edition, Pearson Education, New Delhi, 2005.
3. **IT Workshop Laboratory Manual**, Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.

6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence
   for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling
   b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes
   c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech
   b. Tenses
   c. Change of Speech
   d. Change of Voice
   e. Word Order and Error Correction
   f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech - I Semester

14BT3BS02: SPECIAL FUNCTIONS AND COMPLEX ANALYSIS

(Common to ECE, EEE, and EIE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Engineering Mathematics.

COURSE DESCRIPTION: Beta, Gamma functions and their properties; Limits continuity and analyticity of complex functions; Integration, power series, singularities, residues; conformal mapping with applications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- (a) Beta and Gamma functions
- (b) Expressing complex functions in power series
- (c) Differentiation and integration of complex functions
- (d) Conformal mappings and bilinear transformations
- (e) Expressing complex functions in terms of graphs and power series

CO2. Develop analytical skills in providing solutions for problems involving
- (a) Fluid, Electrical and Magnetic Potential functions
- (b) Integration of complex functions
- (c) Improper real integrals

CO3. Develop skills in analyzing
- (a) the properties exhibited by complex functions in Argand plane.
- (b) the properties of complex functions by expressing them in power series and graphs.
- (c) properties of improper integrals through residue theory.

DETAILED SYLLABUS:

UNIT-I: SPECIAL FUNCTIONS (10 Periods)

Beta and gamma functions - properties - relationship between beta and gamma functions. Applications - evaluation of improper integrals using beta and gamma functions. Bessel function - generating function (without proof) - recurrence relations - orthogonality.

UNIT-II: ANALYTIC FUNCTIONS (10 Periods)

Function of a complex variable - limits and continuity of functions. Differentiability - analyticity , Cauchy - Riemann equations (both cartesian and polar) . Conjugate and harmonic conjugate functions - Milne Thompson method. Potential functions.

UNIT-III: COMPLEX INTEGRATION AND POWER SERIES (08 Periods)

Line integral - Evaluation of line integrals along curves and closed contours - Cauchy's Integral theorem (without proof) - Cauchy's integral formula - Derivatives of analytic function - Generalized integral formula- Evaluation of integrals using integral formula. Taylor's theorem (without proof) - Laurent's theorem (without proof) - Power series expansion of complex functions.

UNIT-IV: RESIDUE THEOREM - APPLICATIONS (09 Periods)

Zeros and Singularities - Types of singularities - Residues - Evaluation of Residues at poles- Pole of order m and pole at infinity- Residue theorem- Evaluation of integrals using residue theorem - Evaluation of improper and real integrals of the type:

i) $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$ ii) $\int_{-\infty}^{\infty} f(x)\, dx$ iii) $\int_{-\infty}^{\infty} e^{imx} f(x)\, dx$

UNIT-V: CONFORMAL MAPPINGS (08 Periods)

Definition, examples and mappings defined by $w = e^z$, $\log z$, z^2, $\sin z$, $\cos z$. Translation, Rotation, Inversion. Bilinear transformation - Properties - Fixed points, Cross ratio. Invariance of circles under bilinear transformation. Determination of bilinear transformation using three given points.

Total Periods: 45

TEXT BOOKS:

1 T.K.V. Iyenger, B. Krishna Gandhi,. etal, *Text book of Engineering Mathematics*, Vol - III, S. Chand & Company, 8th Edition, 2011.

REFERENCE BOOKS:

1. Grewal, B.S, *Higher Engineering Mathematics*, Khanna Publishers, Delhi, 4/2 Edition, 2012.
2. Shahnaz Bathul, *Special Functions and Complex Variables*, PHI Learning, 2nd Edition, 2010.

II B. Tech - I Semester

14BT3HS01: ENVIRONMENTAL SCIENCES

(Common to ECE, EEE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Engineering Physics and Engineering Chemistry.

COURSE DESCRIPTION: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
   a) diverse components of environment and natural resources
   b) ecosystem and biodiversity & its conservation methods
   c) population growth and human health
   d) green technology

CO2. Identify and resolve the issues related to sources of different types of pollutions.

CO3. Provide solutions to individuals, industries and government for sustainable development of natural resources.

CO4. Create awareness on environmental degradation and to bring best management practices to protect environment.

CO5. Develop skills in analyzing reports on environment for sustainable development.

CO6. Apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES MULTIDISCIPLINARY NATURE OF ENVIRONMENT: (11 Periods)

Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

NATURAL RESOURCES: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources-solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 Periods)

ECOSYSTEMS: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession.

BIODIVERSITY: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity-habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity-in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (08 Periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management-causes, effects and control measures of urban and industrial wastes, hazards and disaster management-floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT
(08 Periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT
(08 Periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. Field work: visit to a local area to document environmental assets-pond/forest/ grassland/hill/mountain/Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total Periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, *Environmental Studies*, New Age International (P) Ltd Publications, 4th Edition, 2014.
2. Erach Barucha, *Environmental Studies*, Orient Blackswan, 2nd Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, *Environmental Studies*, Oxford University Press, 2nd Edition, 2011.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2nd Edition, 2009.
3. Dr. B S Chauhan, *Environmental Studies*, University Science Press, 1st Edition, 2008.
4. M. Anji Reddy, *Textbook of Environmental Sciences and Technology*, BS Publications, 2007.
5. Larry W Canter, *Environmental Impact Assessment*, McGraw-Hill Education, 2nd Edition, 1996.

II B. Tech - I Semester

14BT30401: PROBABILITY AND STOCHASTIC PROCESSES

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on engineering mathematics containing elementary probability theory, ordinary and partial differential equations and linear algebra.

COURSE DESCRIPTION: Probability theory; The Random Variable; Operation on Single and Multiple Random Variables; Stochastic Processes - Temporal and spectral Characteristics; Noise analysis

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

- Concepts of Probability
- Single and multiple random variables
- Operation on Single and multiple random variables
- Random processes and their characteristics
- Electrical noise

CO2. Analyze operation on single and multiple random variables and processes.

CO3. Design solutions for complex engineering problems involving random processes.

DETAILED SYLLABUS :

UNIT-I: PROBABILITY (07 Periods)

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, and Independent Events

UNIT-II: THE RANDOM VARIABLE (12 Periods)

Introduction, Random Variable Concept, Distribution Function, Density Function, Properties, The Gaussian Random Variable, Other distribution and density examples, conditional distribution, Methods of defining Conditioning Event, Conditional Density, Properties.

OPERATIONS ON SINGLE RANDOM VARIABLE: Introduction, Expectation, Moments, Functions that give moments-Characteristic Function, Moment Generating Function, Chebychev's Inequality, Transformations of a random Variable.

UNIT-III: MULTIPLE RANDOM VARIABLES (10 Periods)

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution and density functions, Properties, Marginal Distribution Functions, Conditional Distribution and Density, Statistical Independence, Distribution and density of a sum of random variables, Central Limit Theorem.

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, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT-IV: STOCHASTIC PROCESSES-TEMPORAL CHARACTERISTICS (10 Periods)

Concept of Stochastic process, Stationary and Statistical Independence, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes. Correlation Functions-Auto correlation function and its properties, Cross correlation function and its properties, Covariance Function and its properties, Linear system response of Mean and mean-squared value, Autocorrelation function, and Cross-correlation functions. Gaussian Random Processes, Poisson Random Process.

UNIT-V: NOISE ANALYSIS (06 Periods)

NOISE CLASSIFICATION: uncorrelated noise (external nose: atmospheric noise, extra terrestrial noise, manmade noise. internal noise: shot noise, transit-time nose, thermal noise). Noise power, Noise voltage, correlated noise, impulse noise, interference, signal-to-noise power ratio, Noise factor and Noise Figure, Equivalent noise temperature.

Total Periods: 45

TEXT BOOKS:

1. Peyton Z. Peebles, *Probability, Random Variables & Random Signal Principles*, TMH, 4th Edition, 2002.
2. Wayne Tomasi, *Electronic communications systems*, Pearson Education, 5th Edition, 2004.

REFERENCE BOOKS:

1. Athanasios Papoulis and S. Unnikrishna Pillai, *Probability, Random Variables and Stochastic Processes*, PHI, 4th Edition, 2002.
2. Henry Stark and John W. Woods, *Probability and Random Processes with Application to Signal Processing*, Pearson Education, 3rd Edition, 2002.

II B.Tech - I Semester

14BT30402: SEMICONDUCTOR DEVICES AND CIRCUITS

(Common to ECE, EEE & EIE)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Engineering Physics.

COURSE DESCRIPTION: Characteristics of general and special purpose electronic devices; Rectifiers, filters and regulators; Biasing and small signal analysis of BJT and FET.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate fundamental knowledge in

- p-n junction diode and its characteristics
- Zener diode and its characteristics
- Rectifiers, Filters and Regulators
- Characteristics of BJT, FET, MOSFET and special purpose electronic devices

CO2. Analyze numerical and analytical problems in

- Rectifiers using Filters
- Regulated Power Supplies
- Transistor biasing circuits and stabilization
- Transistor amplifiers
- FET biasing circuits and amplifiers

CO3. Design electronic circuits like

- BJT and FET biasing circuits
- BJT and FET amplifiers

CO4. Solve engineering problems and arrive at solutions pertaining to electronic circuits.

DETAILED SYLLABUS:

UNIT-I: PN JUNCTION DIODE, RECTIFIERS AND REGULATORS (12 Periods)

PN-JUNCTION DIODE: p-n Junction as a diode, p-n Junction diode equation, Volt-Ampere (V-I) characteristics, temperature dependence of p-n characteristics, diode resistance-static and dynamic resistances, transition and diffusion capacitances, break down mechanisms in semiconductor diodes, Zener diode characteristics.

RECTIFIERS AND REGULATORS: Half-Wave rectifier and Full-Wave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, π - section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-II: BIPOLAR JUNCTION TRANSISTOR, BIASING AND STABILIZATION: (09 Periods)

Transistor construction, BJT Operation, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications, Transistor Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Base Feedback Bias, Voltage Divider Bias, Bias Stability, Transistor as an amplifier, Thermal Runaway, Problems on biasing circuits.

UNIT-III: SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS: (10 Periods)

BJT Modeling, Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Millers Theorem, Analysis of CE, CB and CC configurations using simplified Hybrid Model, Comparison of CB, CE and CC configurations.

UNIT-IV: FIELD EFFECT TRANSISTOR: (09 Periods)

Construction, Principle of operation and characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET, Common Source and Common Drain Amplifiers using JFET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison of BJT and FET.

UNIT-V: SPECIAL PURPOSE ELECTRONIC DEVICES: (05 Periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR).Principle of operation of Schottky, Barrier Diode.

Total Periods: 45

TEXT BOOKS:

1. J. Millman, Christos C. Halkias and SatyabrataJit, *Electronic Devices and Circuits*, TMH, 3rd Edition, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, PHI, 10th Edition, 2009.
2. David A. Bell, *Electronic Devices and Circuits*, Oxford University press, 5th Edition, 2014.
3. S. Salivahanan, N. Suresh Kumar, *Electronic Devices and Circuits*, Mc-Graw Hill, 3rd Edition 2013.

II B. Tech - I Semester

14BT30231: ELECTRICAL TECHNOLOGY

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on Network Analysis.

COURSE DESCRIPTION: DC Machines; Three phase systems; operation and performance of a transformer, Three phase induction motor, Alternators and special machines.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

1. Demonstrate knowledge in
   - Construction & operation of various types of electrical machines.
   - Necessity of starter.
   - Three phase circuits.
2. Analyze the characteristics of various electrical machines.
3. Evaluate the performance of electrical machines.
4. Select suitable machines for real time applications.

DETAILED SYLLABUS:

UNIT-I: DC MACHINES (10 Periods)

DC GENERATOR: construction and working principle, types, EMF equation, losses, open circuit and load characteristics, applications - problems.

DC MOTOR: working principle, torque equation, characteristics, applications, speed control of shunt motor, Swinburne's test, three point starter-problems.

UNIT-II: SINGLE PHASE TRANSFORMER (10 Periods)

Working principle of single phase transformer, constructional features, EMF equation, equivalent circuit, losses, efficiency and regulation of transformer, OC and SC test, predetermination of efficiency and regulation - problems.

UNIT-III: THREE PHASE CIRCUITS (08 Periods)

Introduction to polyphase systems, advantages of polyphase system, generation of three phase voltages, phase sequence, star and delta connections, relationship between phase and line quantities in three phase balanced circuits, power measurement in three phase systems using two wattmeter method - problems.

UNIT-IV: THREE PHASE INDUCTION MOTOR AND ALTERNATOR (08 Periods)

INDUCTION MOTOR: principle of operation, construction and types, slip, rotor frequency, torque, torque-slip characteristics-problems.

ALTERNATORS: principle of operation, constructional features, types, EMF equation.

UNIT-V: SPECIAL MACHINES (09 Periods)

Single phase induction motors - construction, principle of operation (double field revolving theory) and applications of split phase induction motor, capacitor motor, shaded-pole motor. Construction, principle of operation and applications of universal motors and stepper motors.

Total Periods: 45

TEXT BOOKS:

1. B.L. Theraja and A.K. Theraja, A *Text Book of Electrical Technology* in S.I.Units, Vol.2, S.Chand Company Ltd, New Delhi, 2012.
2. V.K. Mehta, Rohit Mehta, *Principles of Electrical Engineering and Electonics*,S.Chand Company Ltd, New Delhi, 2010

REFERENCE BOOKS:

1. H.Cotton, *Electrical Technology*, CBS Publishers & Distributors, 2004.
2. M.S. Naidu and S. Kamakshaiah, *Electrical Technology*, Tata McGraw-Hill Publishing company Ltd, New Delhi, 2007.
3. A. Sudhakar and Shyammohan, P*rinciples of Electrical Engineering*, Tata McGraw Hill Education Private Limited, New Delhi. 2012.

II B. Tech - I Semester

14BT30232: NETWORK ANALYSIS

(Common to ECE & EIE)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Engineering Physics and Engineering Mathematics.

COURSE DESCRIPTION: Basic concepts of electric circuits; voltage - current relationship of basic circuit elements; mesh and nodal analysis; AC circuits; transient analysis; two port network parameters; filters; network theorems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- voltage and current relationships for various electric elements.
- network reduction techniques.
- concepts of 1-phase and 3-phase electric circuits.
- concepts of two port networks and filters.
- various network theorems.

CO2. Analyze
- a circuit using mesh and nodal concepts
- a two port network for various network parameters
- various types of filter networks
- the transient behavior of the circuits.

CO3. Design single phase circuits and filters to meet the required specifications

CO4. Solve
- electrical circuits for voltage, current and power using conventional circuit analysis methods and network theorems
- transient responses
- two port networks and filters

DETAILED SYLLABUS:

UNIT-I: INTRODUCTON TO ELECTRICAL CIRCUITS **(10 Periods)**

Concepts of charge, current, voltage, power, circuit elements, Ohm's law, Kirchoff's Laws, network reduction techniques, voltage and current division rules, series-parallel circuits, star-delta and delta-star transformations, source transformation, nodal analysis, mesh analysis- problems.

UNIT-II: SINGLE PHASE AC CIRCUITS (08 Periods)
INTRODUCTION TO AC QUANTITIES, BASIC DEFINITIONS: cycle, time period, frequency, amplitude, determination of average value, rms value, form factor and peak factor for different alternating waveforms, phase and phase difference, phase relation in R, L, C circuits, series and parallel circuits, impedance and power triangle, power factor. Series and parallel resonance-quality factor and bandwidth. Current locus diagram-problems.

UNIT-III: TRANSIENT ANALYSIS (08 Periods)
Transient response of R-L, R-C and R-L-C for DC excitation - transient response of R-L, R-C and R-L-C for sinusoidal excitation, solution by using differential equation and Laplace Transforms method - problems.

UNIT-IV: TWO PORT NETWORKS AND FILTERS (10 Periods)
Impedance parameters, admittance parameters, transmission (ABCD) parameters, hybrid parameters, conversion of one parameter to another, conditions for reciprocity and symmetry, interconnection of two port networks in series, parallel and cascaded configurations - problems.
FILTERS: Classification of filters, filter networks and equations of filter networks, classification of pass band and stop band, characteristic impedance in the pass band & stop bands, constant-k Low pass filter, high pass filter, m-derived high pass and low pass filter, band pass filter and band elimination filter- problems.

UNIT-V: NETWORK THEOREMS (09 Periods)
Superposition, Thevenin's, Norton's, maximum power transfer, Tellegen's, Millman's, reciprocity, compensation theorems for D.C. and sinusoidal excitation- applications and problems.

Total Periods: 45

TEXT BOOKS:

1. A. Sudhakar, S.P.Shyam Mohan, *Circuits and Network analysis and synthesis,* 4th Edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2007.
2. A.Chakrabarthi, *Circuit Theory (analysis and synthesis)*, 6th Edition, Dhanpat Rai & Co, New Delhi, 2014.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis*, Pearson Publications, 3rd Edition, New Delhi 2006.
2. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, *Engineering Circuit Analysis*, 6th Edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2008.

II B. Tech - I Semester

14BT30421: SEMICONDUCTOR DEVICES AND CIRCUITS LAB

(Common to ECE, EEE & EIE)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: A Course on Semiconductor Devices and Circuits.

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; Transistor and FET characteristics; UJT and SCR characteristics; BJT and FET amplifiers.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze the characteristics of different electronic devices, like
- Diode
- Zener Diode
- Transistor
- FET and UJT

CO2. Design and analyze the electronic circuits like transistor and FET amplifiers

CO3. Solve engineering problems and arrive at solutions pertaining to electronics.

LIST OF EXPERIMENTS:

PART A: (Only for viva voce Examination)
Electronic Workshop Practice (in 3 lab sessions):

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

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode characteristics and Zener as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration
5. Halfwave Rectifier with and without filters.
6. Fullwave Rectifier with and without filters.
7. FET characteristics
8. Measurement of h parameters of transistor in CE configurations
9. Frequency response of CE Amplifier.
10. Frequency response of CC Amplifier.
11. Frequency response of Common Source FET Amplifier.
12. SCR Characteristics.
13. UJT Characteristics.

II B. Tech - I Semester

14BT30222: ELECTRICAL TECHNOLOGY LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on Network Analysis and Electrical Technology.

COURSE DESCRIPTION: Determination of Two port network parameters, verification of network theorems; Response of RLC circuits; Performance characteristics of AC and DC Machines.

COURSE OUTCOMES: On successful completion of course, the students will be able to:

CO1. Analyze the performance of electrical machines.
CO2. Design various types of passive filters and resonant circuits.
CO3. Solve complex problems in electrical circuits and machines.

LIST OF EXPERIMENTS: Any SIX experiments from each part to be conducted

Part-A

1. Series and parallel resonant circuits.
2. Time response of first order RL/RC network for periodic non-sinusoidal inputs.
3. Determination of Z and Y parameters for a given Two-port network
4. Determination of ABCD and h-parameters for a given Two-port network
5. Verification of Superposition and Reciprocity theorems
6. Verification of maximum power transfer theorem for both DC and AC excitation.
7. Verification of Thevenin's and Norton's theorems
8. Design of low pass and high pass filters.

Part-B

1. Magnetization characteristic of a DC generator.
2. Swinburne's test on a DC shunt machine.
3. Brake test on a DC shunt motor.
4. Speed control of DC shunt motor by
   a. Field flux control method
   b. Armature voltage control method.
5. OC and SC tests on a single-phase transformer.
6. Load test on a single phase transformer.
7. Brake test on a three-phase induction motor.
8. External characteristics of DC shunt generator.

II B. Tech - II Semester

14BT4HS02: PROFESSIONAL ETHICS

(Common to ECE, EEE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Engineering Ethics, Moral autonomy and Moral dilemmas - Professional and Ideal Virtues, Professional Responsibility and Moral Leadership - Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing - Global Issues, Managerial Ethics.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Apply the principles of ethics to solve engineering problems.
CO2. Analyze the problems in the implementation of moral autonomy and resolve through consensus.
CO3. Responsible to follow the codes of ethics
CO4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
CO5. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams
CO6. Write reports without bias and give instructions to follow ethics

DETAILED SYLLABUS:

UNIT-I: ENGINEERING ETHICS (08 Periods)

Scope and Aim of Engineering Ethics-Senses of Engineering Ethics-Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy,

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES (10 Periods)

Theories about Virtues, Professions, Professionalism - characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion- Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION (09 Periods)

Engineering as experimentation- Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT-IV: RESPONSIBILITIES AND RIGHTS (09 Periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES (09 Periods)

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers - Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, 3rd Edition, Tata McGraw-Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, 2004.
4. R. Subramanaian, *Professional Ethics*, Oxford Higher Education, 2013

II B.Tech - II Semester

14BT40401: ANALOG COMMUNICATIONS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Semiconductor Devices and circuits, Signals and Systems and Probability & Stochastic Processes.

COURSE DESCRIPTION: Continuous Wave Analog Modulations; Pulse Analog Modulations; Modulators and De-Modulators; AM and FM Transmitters and Receivers; Noise performance of AM and FM Systems; TDM and FDM systems; Applications of AM and FM Systems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate fundamental knowledge in
- Elements of Analog Communication systems.
- Generation and Detection of AM, PM, FM and Pulse modulated signals
- Effect of noise on AM and FM transmission
- TDM and FDM systems.

CO2. Analyze different types of analog modulation systems and calculate total power, bandwidth of AM, PM and FM.

CO3. Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities.

CO4. Formulate and solve specific problems in analog communication systems.

DETAILED SYLLABUS:

UNIT-I: AMPLITUDE MODULATION - I (10 Periods)

Introduction to communication system, Need for modulation, Amplitude Modulation: 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 Modulation: Time domain and frequency domain description, Generation of DSB-SC Waves: Balanced Modulators - Ring Modulator, Detection of DSB-SC modulated waves-Coherent detector, COSTAS Loop

UNIT-II: AMPLITUDE MODULATION - II (08 Periods)

AM-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 AM-SSB Waves, Signal to Noise ratio in coherent detection of AM-SSB wave, Vestigial Side Band Modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave plus Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT-III: ANGLE MODULATION (08 Periods)

Concept of instantaneous frequency, Generalized concept of angle modulation, Bandwidth of angle modulated waves - Narrow band frequency modulation (NBFM); and Wide band FM (WBFM), Phase modulation, Verification of Frequency modulation bandwidth relationship, Features of angle modulation, Generation of FM waves -Indirect method, Direct generation; Demodulation of FM, Bandpass limiter, Practical frequency demodulators, Small error analysis, Pre-emphasis & De-emphasis filters, FM receiver, FM Capture Effect.

UNIT-IV: ANALOG COMMUNICATION SYSTEMS (13 Periods)

TRANSMITTERS: Radio Transmitter, Classification of radio transmitters, AM Transmitter, Collector Modulator, Balanced modulator using transistors, FM Transmitter, Reactance FET modulator, Varactor diode modulator, frequency stability in FM Transmitter.

RECEIVERS: Radio Receiver, Classification of radio receivers, Tuned radio frequency receiver, Superheterodyne receiver, Choice of IF, Receiver Characteristics, AGC, FM Receiver, Amplitude limiting, Comparison between AM and FM Receivers.

NOISE: Band-Pass systems, Signal to Noise ratio in coherent detection of DSBSC, SSB, Signal to Noise ratio in envelop detection of AM, Signal to Noise ratio in Angle Modulation System-Narrowband & wideband, Threshold in Angle Modulation System, Pre-emphasis & De-emphasis.

UNIT-V: PULSE ANALOG MODULATION (06 Periods)

Pulse modulation, Pulse Amplitude modulation, Generation & demodulation of PAM, Pulse Width Modulation, Generation & demodulation of PWM, Pulse Position Modulation, Generation and demodulation of PPM. Multiplexing, Time Division Multiplexing, Frequency Division Multiplexing.

Total Periods: 45

TEXT BOOKS:

1. Simon Haykin, *Communication Systems*, John Wiley, 2nd Edition, 1978.
2. B. P. Lathi, *Modern Digital and Analog Communication Sys tems*, Oxford Univ. press, 3rd Edition, 2006.

REFERENCE BOOKS:

1. Sam Shanmugam, *Digital and Analog Communication Systems*, John Wiley, 2006.
2. R. P. Singh, S.P. Sapre, *Communication Systems - Analog and Digital*, TMH, 2nd Edition, 2007.
3. George Kennedy and Bernard Davis, E*lectronics & Communication System*, TMH, 2004.

II B. Tech - II Semester

14BT40402: ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

(Common to ECE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Semiconductor Devices and Circuits

COURSE DESCRIPTION: BJT - Multi Stage amplifiers; Frequency Response; Feedback Amplifiers; Oscillators; Large Signal Amplifiers; Tuned Amplifiers; FET amplifiers.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate knowledge in
- Multi Stage Amplifiers.
- BJT Frequency Response.
- FET Amplifiers.
- Feedback Amplifiers.
- Oscillators.
- Power Amplifiers.
- Tuned Amplifiers.

CO2. Perform analysis of electronic circuits.

CO3. Design and develop electronic sub-systems such as Feedback Amplifiers, Oscillators and Power amplifiers with given specifications.

CO4. Solve problems arising due to poor circuit design by choosing the appropriate design.

DETAILED SYLLABUS:

UNIT-I: MULTI STAGE AMPLIFIERS (08 Periods)

Introduction, Distortion in amplifiers, n-stage cascaded amplifier, Methods of inter-stage coupling, Analysis of RC Coupled Amplifier, Direct and Transformer Coupled Amplifier, Darlington Pair, CE-CC amplifier, Cascode amplifier.

UNIT-II: (11 Periods)

BJT FREQUENCY RESPONSE

Frequency response of BJT amplifier, Analysis at low and high frequencies, Effect of coupling and bypass capacitors, Hybrid-π Common Emitter transistor model, CE short circuit gain, CE current gain with resistive load, Single-stage CE transistor amplifier response, Gain-Bandwidth Product, Multistage Frequency Effects.

FET AMPLIFIERS
FET Small signal Model, Low-frequency Common-Source and Common-Drain Amplifiers, High-frequency Common-Source and Common-Drain Amplifiers.

UNIT-III: BJT FEEDBACK AMPLIFIERS AND OSCILLATORS (10 Periods)
Concept 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.
Conditions for oscillations, Classification of oscillators, RC phase shift oscillator, Wien bridge oscillator, Generalized analysis of LC oscillators - Hartley and Colpitts oscillators, Piezoelectric crystal oscillator, Frequency and Stability of oscillators.

UNIT-IV: POWER AMPLIFIERS (08 Periods)
Classification of power amplifiers, Class A large-signal amplifiers, Series-fed and transformer-coupled Class A audio power amplifier, Efficiency of Class A amplifier, Class B amplifier, Transformer-coupled Class B push-pull amplifier, Complementary symmetry Class B push-pull amplifier, Efficiency of Class B amplifier, Distortion in power amplifiers, Transistor power Dissipation, Thermal stability and Heat sinks.

UNIT-V: TUNED AMPLIFIERS (08 Periods)
Introduction, Q-factor, Small signal single tuned amplifiers, Double-tuned amplifiers, Effect of cascading single and double tuned amplifiers on bandwidth, Stagger-tuned amplifiers, Class-C tuned amplifiers.

Total Periods: 45

TEXT BOOKS:

1. Jacob Millman and Christos C. Halkias, *Integrated Electronics*, Tata McGraw-Hill, 2nd Edition, 2010.
2. Robert L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits Theory*, Pearson Education, 10th Edition, 2009.
3. K. Lal Kishore, *Electronic Circuit Analysis*, BS Publications, 2nd Edition, 2003.

REFERENCE BOOKS:

1. Donald A. Neamen, *Electronic Circuit Analysis and Design*, Tata McGraw-Hill, 3rd Edition, 2007.

II B. Tech - II Semester

14BT40403: ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Engineering Mathematics & Engineering Physics.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

- Electrostatics
- Magnetostatics
- Boundary conditions
- Maxwell's equations
- Poynting theorem
- Transmission line applications
- EM wave's characteristics

CO2. Analyze different electromagnetic problems.

CO3. Design and Develop different impedance transformation techniques.

CO4. Solve engineering problems by proposing Maxwell's equations.

DETAILED SYLLABUS:

UNIT-I: ELECTROSTATICS (12 Periods)

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, Convection and Conduction Currents, Relaxation Time, Isotropic and Homogeneous Dielectrics, Continuity Equation, Poisson's and Laplace's Equations. Maxwell's Two Equations for Electrostatic Fields, Capacitance- Parallel Plate, Coaxial, Spherical Capacitors, illustrative Problems.

UNIT-II: MAGNETOSTATICS (07 Periods)

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.

UNIT-III: MAXWELL'S EQUATIONS (06 Periods)
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-IV: EM WAVE CHARACTERISTICS (10 Periods)
Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media. Conductors & Dielectrics - Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization, Reflection- Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics. Refraction of Plane Waves- Brewster Angle, Total Internal Reflection. Poynting Vector and Poynting Theorem - Applications, illustrative Problems.

UNIT-V: TRANSMISSION LINES (10 Periods)
Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless/Low Loss Characterization, Condition for Distortion less, 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. Introduction to Double Stub Matching, Illustrative Problems.

Total Periods: 45

TEXT BOOKS:

1. Matthew N.O. Sadiku, *Elements of Electromagnetics*, 3rd Edition, Oxford University Press, 2001.
2. Nathan Ida, *Engineering Electromagnetics*, 2nd Edition, Springer (India) Pvt. Ltd., New Delhi, 2005.
3. John D. Ryder, *Networks, Lines and Fields*, 2nd Edition, PHI, 1999.

REFERENCE BOOKS:

1. William H. Hayt Jr. and John A. Buck, *Engineering Electromagnetics*, 7th Edition, TMH, 2006.
2. Schaum's Out-lines, *Electromagnetics*, 2nd Edition, TMH, 2006.
3. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.

II B. Tech - II Semester

14BT40404: SIGNALS AND SYSTEMS

(Common to ECE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Engineering Mathematics and Mathematical Methods.

COURSE DESCRIPTION: Analysis of signals and systems; Representation of signals using Fourier series and Fourier transform and their properties; Time - Domain and Frequency-Domain aspects of signals and systems; concept of convolution and correlation; Sampling and types of sampling; Laplace transform of signals; Z-Transform of sequences and their properties.

COURSE OUTCOMES: On successful completion of the course, students will be able to:

CO1. Demonstrate fundamental knowledge in

- Trigonometric and exponential Fourier series representation of periodic signals
- Fourier transform of signals
- Convolution and correlation of functions
- Sampling Process
- Laplace transforms, ROC for Laplace Transform
- Z-Transform of discrete sequences and ROC for Z-Transform

CO2. Perform time and frequency domain analysis of various continuous and discrete time signals and systems

CO3. Develop solutions to stable and causal systems

CO4. Solve engineering problems critically in the area of signal processing

DETAILED SYLLABUS:

UNIT-I: SIGNALS AND SYSTEMS (10 Periods)

Elementary signals- Unit Impulse and Unit Step Functions, Exponential and Sinusoidal Signals. Classification of Continuous-Time and Discrete-Time Signals, Basic operations on signals, Classification of Continuous-Time and Discrete-Time Systems, Basic System Properties, Linear Time-Invariant Systems - Discrete-Time LTI Systems- The Convolution Sum, Continuous-Time LTI Systems - The Convolution Integral, Properties of Linear Time-Invariant Systems.

UNIT-II: FOURIER SERIES & FOURIER TRANSFORM OF CONTINUOUS-TIME SIGNALS (10 Periods)

The Response of LTI Systems to Complex Exponentials. Fourier Series Representation of Continuous-Time Periodic Signals, Convergence of the Fourier Series, Properties of Continuous-Time Fourier Series Representation of Aperiodic Signals, The Continuous-Time Fourier Transform, The Fourier Transform for Periodic Signals, Properties of the Continuous-Time Fourier Transform, The Convolution Property, Fourier Properties and Basic Fourier Transform Pairs, Systems characterized by Linear constant coefficient differential equations. The Magnitude-Phase Representation of the Fourier Transform, The Magnitude-Phase Representation of the Frequency Response of LTI Systems

UNIT-III: CORRELATION OF SIGNALS & SAMPLING (11 Periods)

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.

SPECTRAL CHARACTERISTICS OF SYSTEM RESPONSE: Power density spectrum of response, Cross-power spectral density of input and output of a linear system.

SAMPLING: Representation of a Continuous-Time Signal by Its Samples - Sampling Theorem, Reconstruction of a Signal from Its Samples Using Interpolation. Effect of under sampling:Aliasing, Discrete-Time Processing of Continuous-Time Signals.

UNIT-IV: LAPLACE TRANSFORMS (07 Periods)

The Laplace Transform, The Region of Convergence for Laplace Transforms, The Inverse Laplace Transform, Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot, Properties of the Laplace Transform, Some Laplace Transform Pairs, Analysis and Characterization of LTI Systems Using the Laplace Transform, System Function Algebra and Block Diagram Representations, Unilateral Laplace Transform.

UNIT-V: Z-TRANSFORMS (07 Periods)

The Z-Transform -Region of Convergence for the z-Transform, The Inverse z-Transform, Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot, Properties of the z-Transform, Some Common z-Transform Pairs, Analysis and Characterization of LTI Systems Using z-Transforms, System Function Algebra and Block Diagram Representations, Unilateral z-Transforms.

Total Periods: 45

TEXT BOOKS:

1. Alan V. Oppenheim, Alan S. Willsky, & S. Hamid, *Signals and Systems*, Pearson Higher Education, 2nd Edition , 2008.
2. B.P. Lathi, *Principles of Linear Systems and Signals*, Oxford University Press, 2nd Edition, 2013.

REFERENCE BOOKS:

1. Simon Haykin and B. Van Veen, *Signals & Systems*, John Wiley, 2nd Edition, 2010.
2. A. Anand Kumar, *Signals & Systems*, PHI, 2011.

II B.Tech - II Semester

14BT40405: SWITCHING THEORY AND LOGIC DESIGN

(Common to ECE, EEE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Basic algebra.

COURSE DESCRIPTION: Number system and Boolean algebra; Minimization; Analysis and synthesis of digital circuits; Asynchronous Sequential Logic & Programmable Memories.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in:

- Conversion of number systems, Binary Codes.
- Basic theorems, properties and postulates of Boolean algebra.
- Minimization of switching functions using Map method and Tabular method.
- Design of combinational and sequential circuits.
- Realization of Boolean functions using PLDs.

CO2. Perform the analysis of reduction of Boolean function and implementation using PLDs.

CO3. Design and develop various combinational and sequential circuits.

CO4. Solve engineering problems and arrive at solutions pertaining to Digital Electronics.

DETAILED SYLLABUS:

UNIT-I: NUMBER SYSTEM & BOOLEAN ALGEBRA (08 Periods)

Digital systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes, Error detection and correction codes. Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, logical operations & Logic gates.

UNIT-II: GATE LEVEL MINIMIZATION (08 Periods)

The map method, four variable, Five variable K-map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Ex-or Function, Tabular Method-Simplification of Boolean function using tabulation Method.

UNIT-III: ANALYSIS AND SYNTHESIS OF COMBINATIONAL CIRCUITS (09 Periods)

Combinational circuits, Analysis & Design procedure, Binary Adder-subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT-IV: ANALYSIS AND SYNTHESIS OF SEQUENTIAL CIRCUITS (11 Periods)

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters - Registers, Shift Registers, Synchronous counters and Asynchronous counters.

UNIT-V: ASYNCHRONOUS SEQUENTIAL LOGIC & PROGRAMMABLE MEMORIES (09 Periods)

Introduction, Analysis procedure, Circuits with Latches, Design Procedure, Reduction of State and flow tables, Race-free State Assignment, Hazards. ROM, PLA, PAL.

Total Periods: 45

TEXT BOOKS:

1. M.Morris Mano, *Digital Design*, Pearson, 3rd Edition, 2001.

REFERENCE BOOKS:

1. ZviKohavi and NirahK.Jha, *Switching theory and Finite Automata Theory*, Tata McGraw-Hill, 2nd Edition, 1978.
2. Charles H. Roth, *Fundamentals of Logic Design*, Thomson Publications, 5th Edition,2004.
3. A Anand Kumar, *Switching Theory and Logic Design*, PHI, 2008.

II B. Tech - II Semester

14BT50201: CONTROL SYSTEMS

(Common to ECE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Network Analysis and Signals & Systems.

COURSE DESCRIPTION: Concepts of control system; transfer function of various physical systems; time response analysis; frequency response analysis; compensators; stability analysis; state space analysis

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- modelling of physical systems
- time and frequency domain specifications used for stability analysis.
- various methods of determining the stability of the system
- realization of various compensators
- concept of controllability and observability.

CO2. Analyze the stability of the system in time and frequency domains.

CO3. Demonstrate problem solving skills in
- deriving the transfer function using block diagram reduction technique and signal flow graph.
- determination of steady state error and static error constants.
- evaluating the system stability in time and frequency domains.
- solving the state equations of a system.
- evaluating controllability and observability of a system.

DETAILED SYLLABUS:

UNIT-I: CONTROL SYSTEMS CONCEPTS (09 Periods)

Classification of control systems, effects of feedback. Mathematical models -mechanical and electrical systems, analogous systems. Block diagram reduction methods, signal flow graph, Mason's gain formula, transfer function of DC servo motor, AC servo motor, synchros.

UNIT-II: TIME RESPONSE ANALYSIS (08 Periods)

Test signals, time response of first and second order systems, transient response of second order systems, time domain specifications, steady state response, steady state error, error constants and generalized error coefficients, response with proportional, integral and derivative controllers.

UNIT-III: STABILITY ANALYSIS IN TIME DOMAIN (09 Periods)

The concept of stability, Routh's stability criterion, difficulties in the formation of Rough table, application of R-H criterion. Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci, relative stability analysis.

UNIT-IV: FREQUENCY RESPONSE ANALYSIS (09 Periods)

Frequency domain specifications, Bode plots, determination of frequency domain specifications and transfer function from the Bode plot, stability analysis from Bode plots, Polar plots, phase margin and gain margin. Nyquist stability criterion, stability analysis. Compensation techniques- realization of Lag, Lead and Lag-Lead compensators.

UNIT-V: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS (10 Periods)

Concepts of state, state variables and state model, derivation of state models from physical systems, diagonalization, solution of state equations- state transition matrix and it's properties. Concept of controllability and observability, Kalman's test only.

Total Periods: 45

TEXT BOOKS:

1. A. Anand kumar, *Control Systems*, PHI learning Pvt Ltd., 2nd Edition, 2014.
2. I. J. Nagrath and M. Gopal, *Control Systems Engineering*, New Age International (P) Limited, 5th Edition, 2007.

REFERENCE BOOKS:

1. K. Ogata, *Modern Control Engineering*, Prentice Hall of India, 4th Edition, 2006.
2. A. NagoorKani, *Control Systems*, RBA Publications, 2nd Edition, 2006.

II B.Tech - II Semester

14BT40421: ELECTRONIC CIRCUIT ANALYSIS AND DESIGN LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on Semiconductor Devices & Circuits and Electronic Circuit Analysis and Design.

COURSE DESCRIPTION: Design, Simulation and Implementation of Single stage & Multistage Amplifiers; Feedback Amplifiers and Oscillators; Power Amplifiers; Tuned BJT Amplifiers and FET Amplifier.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze amplifiers, Oscillator and Tuned circuits.
CO2. Design and develop Multistage & Power amplifiers and Oscillator circuits.
CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid solutions.
CO4. Use PSPICE tools for simulation of amplifier and oscillator circuits.

LIST OF EXPERIMENTS:
(Minimum of Twelve experiments to be conducted)

Part-I: Design and Simulation of the following circuits using simulation software
(Minimum of Six Experiments to be conducted):

1. Common Emitter amplifier
2. Common Source amplifier
3. A Two Stage RC Coupled Amplifier
4. Cascode Amplifier
5. Current shunt and Voltage Series Feedback 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

Part-II: Design and Implementation of the following circuits through hardware
(Minimum of Six Experiments to be conducted):

Any Three circuits from part-I
Any Three of the following

1. Darlington Pair
2. FET Amplifier
3. Hartley and Colpitt's Oscillators
4. Single Tuned Voltage Amplifier
5. Class A Power Amplifier (with transformer load)
6. Class C Tuned Amplifier

II B.Tech - II Semester

14BT40422: SIGNALS AND SYSTEMS LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: A Course on Signals & Systems.

COURSE DESCRIPTION: Generation of various signals and sequences; convolution and correlation; verification of linearity and time invariance properties; sampling theorem verification.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate programming skills in

- Basic Operations on Matrices.
- Generation of Various signals and Sequences.
- Convolution and Correlation of signals and Sequences
- Weiner-Khinchin relation and Sampling Theorem
- Fourier Tranform and Laplace Transform

CO2. Analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

CO3. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

LIST OF EXPERIMENTS:

1. Basic Operations on Matrices.
2. Generation of Various signals and Sequences Such as Unit Impulse, Unit Step, Square, Saw Tooth, Triangular, Sinusoidal, Ramp, Sinc function.
3. Operations on Signals and Sequences (Addition, Multiplication, Scaling, Shifting, Folding), Computation of Energy and Average Power.
4. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of a Signal.
5. Verification of Linearity and Time Invariance Properties of a System.
6. Computation of Unit Sample, Unit Step and Sinusoidal Responses of the Given LTI System and Verifying its Stability.
7. Finding the Fourier Transform of a given Signal and plotting its Magnitude and Phase Spectrum.
8. Convolution of Signals and Sequences.
9. Autocorrelation and Cross correlation of Signals and Sequences.
10. Verification of Weiner-Khinchin Theorem.
11. Removal of Noise by Auto Correlation / Cross correlation in a given signal corrupted by noise.
12. Sampling Theorem Verification.
13. Laplace Transform.
14. Locating Zeros and Poles and plotting the Pole-Zero map in S-Plane and Z-Plane for the given Transfer Function
15. Impulse response of a raised cosine filter.

III B. Tech - I Semester

14BT4HS01: BUSINESS COMMUNICATION AND PRESENTATION SKILLS

(Common to ECE, EEE and EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills.

COURSE DESCRIPTION: Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Resume.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- a) Managerial Communication
- b) Corporate Communication
- c) Business Writing
- d) Presentation Skills
- e) Career Building

CO2. Analyze and judge the situation through non-verbal communication for effective organizational communication.

CO3. Achieve personal excellence and ability to work in groups.

CO4. Develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT-I: NATURE AND SCOPE OF COMMUNICATION **(09 Periods)**

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT-II: NON-VERBAL COMMUNICATION (09 Periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies- Corporate Communication: Introduction - Crisis Management/ Communication - Case Study.

UNIT-III: WRITING BUSINESS DOCUMENTS (10 Periods)

BUSINESS WRITING: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters- Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT-IV: BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 Periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT-V: CAREERS AND RESUME (07 Periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Resume Writing: Resume Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total Periods: 45

TEXT BOOKS:

1. Meenakshi Raman and Prakash Singh, *Business Communication*, Oxford University Press, New Delhi, 2nd Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal, *Business Communication*, Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, *Effective Technical Communication*, Tata McGraw-Hill, 2009.

III B. Tech - I Semester

14BT5HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

(Common to ECE, EEE and EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITE: --

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in
- a) Tools and concepts of Micro Economics.
- b) Basic Principles and concepts of Accountancy.
- c) Provides life skills for effective utilization of scarce resources.
- d) Financial Accounting.
- e) Using advanced tools like tally and SAP.
- f) Significance of Economics and Accountancy.

CO2. Develop skills in analyzing problems for
- a) Managerial decisions of an organization.
- b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

CO3. Develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS: (09 Periods)

Definition, Nature and Scope of Managerial Economics.

DEMAND: Determinants of demand - Demand function - Law of demand, assumptions and exceptions - Elasticity of demand - Types of elasticity of demand - Demand forecasting and methods of demand forecasting, **Supply**- Determinants of Supply and Supply function.

UNIT-II: THEORY OF PRODUCTION AND COST ANALYSIS: (09 Periods)

PRODUCTION FUNCTION: Isoquants and Isocosts - Input-output relationship - Law of returns.

COST CONCEPTS: Total, Average and Marginal Cost - Fixed Vs Variable costs -Opportunity Costs Vs Outlay Costs- Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - Break Even Analysis (BEA)- Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT-III: INTRODUCTION TO MARKETS AND PRICING: (09 Periods)

MARKET STRUCTURE: Types of Markets - Features of perfect competition - Monopoly and Monopolistic competition - Price and Output determination in perfect competition and monopoly.

PRICING: Objectives and policies of pricing - Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration - Market skimming - Block pricing - Peak load pricing - Cross subsidization.

CAPITAL: Significance - Types of capital - Sources of Capital.

UNIT-IV: INTRODUCTION AND PRINCIPLES OF ACCOUNTING: (09 Periods)

ACCOUNTANCY: Introduction - Concepts - Conventions - Accounting Principles - Double Entry Book Keeping - Journal - Ledger- Trial Balance (Simple problems).

UNIT-V: FINAL ACCOUNTS: (09 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).

COMPUTERIZATION OF ACCOUNTING SYSTEM: Manual Accounting Vs Computerized Accounting - Advantages and Disadvantages of Computerized Accounting.

Total Periods: 45

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, Tata McGraw Hill, New Delhi, 3rd Edition, 2007, ISBN 13: 9780070078031.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics*, S. Chand and Company, New Delhi, 2nd Edition, 2010.

REFERENCE BOOKS:

1. Vershaney and Maheswari, *Managerial Economics*, Sultan Chand and Sons, New Delhi, 19th Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, *Managerial Economics*, Pearson Education, 4th Edition, 2009, ISBN-13: 978-0139762833.
3. Lipsy and Chrystel, *Economics*, Oxford University Press, New Delhi, 12th Edition, 2011, ISBN: 978-0-19-956338-8.
4. S.P. Jain and K.L. Narang, *Financial Accounting*, Kalyani Publishers, Ludhiana, 6th Edition, 2002, ISBN: 8127204242.

III B.Tech - I Semester

14BT50401: ANTENNAS AND PROPAGATION

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Electromagnetic Theory and Transmission Lines.

COURSE DESCRIPTION: Antenna Parameters; Wire antennas; Antenna arrays; VHF, UHF and Microwave antennas; Antenna measurements; Wave propagation.

COURSE OUTCOMES: On successful completion of the course, the students will be able to: Demonstrate knowledge on the fundamental principles of antenna theory.

CO1. Analyze complex engineering problems critically for conducting research in antennas design.

CO2. Solve engineering problems with wide range of solutions in antennas and wave propagation.

CO3. Apply appropriate techniques, resources and tools to engineering activities in the field of Antenna Design.

DETAILED SYLLABUS:

UNIT-I: ANTENNA BASICS AND THIN LINEAR WIRE ANTENNAS (09 Periods)

Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective height. Antenna Field Zones, Polarization, 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 Center-fed Antennas of different lengths.

UNIT-II: ANTENNA ARRAYS (09 Periods)

Point sources- Definition, Patterns, arrays of 2 Isotropic sources- Different cases. Principle of Pattern Multiplication, Uniform Linear Arrays - Broadside Arrays, End Fire Arrays, EFA with increased Directivity, Derivation of their characteristics and comparison, BSA with Non-uniform Amplitude Distribution - General considerations and Binomial Arrays, Illustrative problems.

UNIT-III: VHF, UHF AND MICROWAVE ANTENNAS (12 Periods)

Arrays with Parasitic Elements, Yagi-Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas - Helical Geometry, Helix modes, Practical Design considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antenna, 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, Flat sheet and corner reflectors, paraboloidal reflectors - geometry, pattern characteristics, Feed Methods, Reflector Types.

UNIT-IV: ANTENNA MEASUREMENTS (06 Periods)

Introduction, Concepts- Reciprocity, Near and Far Fields, Coordination 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 (09 Periods)

Ground wave propagation, 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, fading and path loss calculations. 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.

Total Periods: 45

TEXT BOOKS:

1. John D. Kraus and Ronald J. Marhefka and Ahmad S.Khan, *Antennas (For All Applications)*, TMH, 3rd Edition, 2006.
2. E.C.Jordon and K.G.Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.

REFERENCE BOOKS:

1. C.A. Balanis, *Antenna Theory*, John Wiley & Sons, 2nd Edition, 1982.
2. E.V.D. Glazier and H.R.L. Lamont, *The Services Text Book of Radio: Transmission and Propagation*, Vol.5, Standard Publishers Distributors, Delhi.
3. G.S.N.Raju, *Antennas and Wave Propagation*, Pearson Education India, 1st Edition, 2006.

III B.Tech - I Semester

14BT50402 : DIGITAL COMMUNICATIONS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Signals and Systems, Analog Communications, Probability and Stochastic Processes.

COURSE DESCRIPTION: Digitization techniques - PCM, DPCM, Delta modulation and Adaptive Delta Modulation; Digital signal transmission through carrier modulation techniques; Detection of baseband signals and error detection; Information Theory and Source and channel coding techniques.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Elements of Digital Communication systems.
- Digitization techniques such as PCM, DPCM, DM and ADM
- Digital carrier modulation techniques such as ASK, PSK, FSK and M-QAM
- Error Probability and detection of Baseband and Bandpass modulated signals
- Measurement of information
- Source and Error Control Coding techniques.

CO2. Analyse different types of digital modulation systems based on power and bandwidth for conducting research.

CO3. Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities for transmitting digital signals.

CO4. Solve engineering problems in the core area of digital communications.

DETAILED SYLLABUS :

UNIT-I: PULSE DIGITAL MODULATION (10 Periods)

Elements of Digital Communication Systems, Advantages Of Digital Communication Systems, Quantization of signals, Quantization error, Pulse Code Modulation (PCM), Electrical representation of binary digits, PCM System, Companding, Differential PCM, Delta Modulation and its drawbacks, Adaptive Delta Modulation.

UNIT-II: NOISE IN PULSE-CODE AND DELTA-MODULATION SYSTEMS (08 Periods)

PCM transmission, Calculation of Quantization noise, Output Signal Power, Effect of thermal noise in PCM, Output Signal To Noise Ratio in PCM, Delta Modulation, Quantization Noise in DM, Output signal power, Effect of thermal noise in DM, Output Signal To Noise Ratio in DM, Comparison of PCM and DM systems.

UNIT-III: DIGITAL MODULATION SCHEMES (12 Periods)

BASE BAND DATA TRANSMISSION: Elements of Baseband Binary PAM Systems, Baseband Shaping, Correlative coding, Eye Pattern.

BAND PASS DATA TRANSMISSION: Introduction, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Quadrature PSK and M-ary PSK, Differential Phase Shift Keying (DPSK), M-ary QAM, Probability of error, Optimum filter, Matched filter, Correlator, Calculation of error Probability of ASK, PSK, FSK and QPSK.

UNIT-IV: INFORMATION THEORY (08 Periods)

Measure of Information, Source Encoding - Huffman coding; Shanon-Fano Coding, Error Free Communication over Noisy Channel, Channel Capacity of Discrete Memoryless Channel, Channel Capacity of Continuous Channel, Practical Communication Systems in light of Shannon's Equation.

UNIT-V: ERROR DETECTION AND CORRECTION CODING SCHEMES (07 Periods)

Introduction, Linear block codes, Cyclic Codes, Burst error detecting and correcting codes, Convolutional Codes, Comparison of Coded and Uncoded Systems.

Total Periods: 45

TEXT BOOKS:

1. H. Taub and D. Schilling, *Principles of Communication Systems*, TMH, 2nd Edition, 2003.
2. B.P. Lathi, *Modern Digital and Analog Communication Systems*, Oxford reprint, 3rd Edition, 2004.
3. Simon Haykin, *Communication Systems*, John Wiley, 2nd Edition, 1978.

REFERENCE BOOKS:

1. R.P. Singh and S.D. Sapre, *Communication Systems Analog and Digital*, TMH, 2nd Edition, 2007.
2. Sam Shanmugam, *Digital and Analog Communication Systems*, John Wiley, 2005.

III B. Tech - I Semester

14BT50403: DIGITAL IC APPLICATIONS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Semiconductor Devices & Circuits and Switching Theory and Logic Design.

COURSE DESCRIPTION: Logic Families-CMOS Bipolar and its Interfacing; Verilog HDL Language Elements and Modelling; IC Level Combinational and Sequential Logic Design; Memories-ROM, SRAM, DRAM.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate knowledge in:

- Classification of integrated circuits.
- Characteristics of integrated circuits.
- MOS, TTL and ECL logic families.
- Interfacing between different logic families.
- Design combinational and sequential circuits using digital ICs such as 74XX.

CO2. Perform analysis of circuits design using MOSFETs.

CO3. Design and develop circuits from simple design to complex designs.

CO4. Solve problems arising due to poor interfacing between ICs by choosing the appropriate IC to develop complex designs.

DETAILED SYLLABUS:

UNIT-I: DIGITAL LOGIC FAMILIES AND INTERFACING (09 Periods)

Introduction to logic families, CMOS logic, CMOS steady state and dynamic electrical behavior, CMOS logic families. Bipolar logic, Transistor-Transistor logic, TTL families, CMOS/TTL interfacing, Low voltage CMOS logic and interfacing, Emitter Coupled Logic.

UNIT-II: HARDWARE DESCRIPTION LANGUAGE (09 Periods)

Introduction, Language Elements, Expressions, Modeling-gate level modeling, data flow modeling, behavioral modeling, structural modeling.

UNIT-III: COMBINATIONAL LOGIC DESIGN (10 Periods)

Adders & Subtractors, Ripple Adders, Carry-Look ahead Adders, MSI Arithmetic and Logic Units, Combinational Multipliers, Excess-3 to BCD code coverter,74x138 3-to-8 Decoder, 74x148 Priority Encoder, Three-State Devices, 74x151 8-to-1 Multiplexer, 74x155 1x2 Demultiplexer, 74x86 Exclusive-OR gates, 74x280 9-Bit Parity Generator, Standard MSI Magnitude Comparators, Barrel Shifter, Simple Floating point Encoder, Dual Priority Encoder, modeling of circuits by using Verilog HDL.

UNIT-IV: SEQUENTIAL LOGIC DESIGN (10 Periods)

Latches and Flip-Flops, Counters-74x163 4-bit binary counters, 74x169 up/down counter, Ring Counters, Johnson Counters. Shift Registers-74x194 4-bit universal shift registers, MSI shift registers. Synchronous Design Methodology, Impediments to Synchronous Design, modeling of circuits by using Verilog HDL.

UNIT-V: MEMORIES (07 Periods)

ROM: Internal structure, 2D-decoding commercial types, timing applications.

STATIC RAM: Internal structure, SRAM timing, standard SRAM, synchronous RAM.

DYNAMIC RAM: Internal structure, timing, synchronous DRAM.

Total Periods: 45

TEXT BOOKS:

1. John F.Wakerly, *Digital Design Principles & Practices*, Pearson Education Asia, 4th Edition, 2008.
2. J.Bhaskar, *A Verilog HDL Primer*, BS Publications, 2nd Edition, 2001.

REFERENCE BOOKS:

1. Charles H.Roth Jr., *Digital System Design Using VHDL*, PWS Publications, 2nd Edition, 2008.
2. Stephen Brown and ZvonkoVramesic, *Fundamentals of Digital Logic with VHDL Design*, McGraw Hill, 2nd Edition, 2005.

III B. Tech - I Semester

14BT50404: LINEAR IC APPLICATIONS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Network Analysis & Pulse and digital Circuits.

COURSE DESCRIPTION: Operational Amplifiers (Op-Amp) basics and its characteristics; Op-Amp Linear and Non Linear Applications; Voltage Regulators and Analog filter Design; study of internal functional blocks and the applications of special ICs like IC 555 Timer; PLL circuits; DAC and ADCs; DAC and ADC Specifications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Op-Amp IC application.
- Waveform generator.
- Voltage Regulator & Filter design.
- IC 555 Timer applications.
- PLL applications.
- ADC and DAC converter.

CO2. Analyze Op-Amp circuits and evaluate its Gain, Bandwidth, Input and Output impedances.

CO3. Design and Develop Linear ICs subsystems and systems.

CO4. Solve engineering problems by proposing potential solutions leading to design better Linear ICs.

DETAILED SYLLABUS:

UNIT-I: OPERATIONAL AMPLIFIER (09 Periods)

Differential amplifier - DC and AC analysis of Dual input balanced output configuration, Properties of other differential amplifier configuration (dual input unbalanced output, single ended input-balanced/unbalanced output), Cascade differential amplifier stages, Level Translator. Basic information of OP-AMP, OP-Amp Block diagram, ideal and practical OP-Amp Specifications, DC and AC characteristics, 741 OP-Amp, OP-Amp parameters and Measurement, input and output offset voltages and currents, slew rate, CMRR, PSRR, drift, Frequency compensation techniques.

UNIT-II: OPERATIONAL AMPLIFIER APPLICATIONS

(09 Periods)

Introduction, Basic Op-Amp applications, Instrumentation Amplifiers, AC Amplifier, V to I and I to V Converters, Op-amp circuits using diodes, Sample and Hold Circuit, Log and Antilog Amplifiers, Differentiator & Integrator, Multivibrators, Triangular Wave Generator.

UNIT-III: VOLTAGE REGULATOR & ANALOG FILTERS

(10 Periods)

VOLTAGE REGULATOR: Introduction, Series Op-amp Regulator, IC Voltage Regulators-Fixed Voltage Series Regulator, Characteristics, Line and Load Regulation, Dual Voltage Supply. 723 General Purpose Regulator.

ANALOG FILTERS: Introduction, RC Active Filters- first order and second order Low pass & High pass, Band pass and Band reject.

UNIT-IV: IC 555 TIMERS AND PLL (10 Periods)

IC 555 TIMER: Introduction to 555 Timer, functional diagram, Monostable Operations, Applications of Monostable - Missing Pulse Detector, Linear Ramp Generator. Astable operation & its applications.

PLL: Introduction, Basic principles, Phase Detector/Comparator, SE/NE 566 Voltage Controlled Oscillator (VCO), Low Pass Filter. Monolithic Phase-Locked Loop IC 566. Applications of PLL- Frequency multiplication & frequency translation.

UNIT V: D-A and A-D CONVERTERS (07 Periods)

D-A CONVERTERS: Introduction, Basic DAC techniques-Weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC and Monolithic DAC (IC1408).

A-D CONVERTERS: Introduction, Direct type ADCs- parallel comparator, Counter, Successive Approximation Converter & Dual slope ADC. DAC and ADC specifications.

Total Periods: 45

TEXT BOOKS:

1. D. Roy Chowdhury, *Linear Integrated Circuits*, New Age International (p) Ltd, 4th Edition, 2011.
2. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, PHI, 3rd Edition, 1998.

REFERENCE BOOKS:

1. David A. Bell, *Operational Amplifiers & Linear ICs*, Oxford University Press, 2nd Edition, 1997.
2. R.F.Coughlin & Fredrick Driscoll, *Operational Amplifiers & Linear Integrated Circuits*, PHI, 6th Edition, 2001.

III B.Tech - I Semester

14BT50405: PULSE AND DIGITAL CIRCUITS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Electronic Devices and Circuits and Network Analysis.

COURSE DESCRIPTION: Analysis of Linear and Non-linear Wave shaping circuits; switching characteristics of Diode and Transistor; Multivibrators; sweep circuits; Pulse synchronization; sampling and logic gates.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

- Responses of High-pass and Low-pass RC circuits for different inputs
- Clipping and Clamping operations.
- Methods of generating the Time-base waveforms
- Operating Principles of Sampling gates
- Realization of logic gates using Diodes and Transistors

CO2. Perform the analysis of Linear and Non-linear wave shaping circuits

CO3. Design and Develop Multivibrator Circuits

CO4. Solve engineering problems pertaining to Pulse and Digital circuits

DETAILED SYLLABUS :

UNIT-I: LINEAR WAVE SHAPING (09 Periods)

High-pass, Low-pass RC circuits, their response for step, pulse, square and ramp inputs. High pass RC network as a Differentiator and Low pass RC network as an Integrator, Parallel RLC circuit and its response for step input, Ringing circuit, attenuators and its application as a CRO probe.

UNIT-II: NON-LINEAR WAVE SHAPING (08 Periods)

Diode Switching times, Diode clippers, Transistor clipper, Clipping at two independent levels, 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: MULTIVIBRATOR CIRCUITS (09 Periods)

Transistor as a switch, Transistor switching times, Analysis and Design of Fixed-Bias Bistable, Monostable, Astable Multivibrators (Collector-Coupled), Symmetrical and Asymmetrical triggering, Schmitt trigger Circuit.

UNIT-IV: (10 Periods)

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 improvements.

SYNCHRONIZATION AND FREQUENCY DIVISION: Pulse Synchronization of Relaxation Devices, Frequency Division in the sweep circuit, Stability of Relaxation Devices, Astable Relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

UNIT-V: SAMPLING GATES AND DIGITAL LOGIC CIRCUITS (09 Periods)

SAMPLING GATES: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Four Diode Sampling gate, Six diode gate, Applications of sampling gates.

DIGITAL LOGIC CIRCUITS: Realization of Logic gates (OR, AND & NOT) using diodes & transistors, Analysis of RTL, DTL, TTL and CMOS Logic families and Comparison between the logic families.

Total Periods: 45

TEXT BOOKS:

1. Jacob Millman, Herbert Taub and Suryaprakash Rao Mothiki, *Pulse, Digital and Switching Waveforms*, TMH, 3rd Edition, 2014.
2. David A. Bell, *Pulse, Switching and Digital Circuits*, Oxford University Press, 5th Edition, 2015.

REFERENCE BOOKS:

1. A. Anand Kumar, P*ulse and Digital Circuits*, PHI, 2nd Edition, 2012.
2. R.Venkataraman, *Pulse, Digital Circuits and Computer Fundamentals*, Dhanapat Rai Publications, 3rd Edition, 2009.

III B. Tech - I Semester

14BT50421: ANALOG & DIGITAL COMMUNICATIONS LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on Analog and Digital Communications.

COURSE DESCRIPTION: Study of various analog and pulse modulation, demodulation and associated circuits; Spectral analysis of AM signals; Study of various digital modulation, demodulation and associated circuits.

COURSE OUTCOMES: On successful completion of the course, students will be able to:

CO1. Analyze circuits pertaining to Communication Systems.
CO2. Design and Develop efficient Communication Systems.
CO3. Solve problems pertaining to Analog & Digital Communications.

LIST OF EXPERIMENTS:

Part - A: Analog Communications

(Any 6 Experiments):

1. Amplitude Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. Spectral analysis of AM signals using spectrum analyzer.
4. Frequency Modulation and Demodulation.
5. Pre-emphasis & De-emphasis.
6. Characteristics of Mixer.
7. PAM Generation and Reconstruction.
8. PWM Generation and Reconstruction.

Part - B: Digital Communications

(Any 6 Experiments):

1. Verification of Sampling Theorem.
2. Time Division Multiplexing.
3. Pulse Code Modulation.
4. Delta Modulation.
5. Frequency shift keying - Modulation and Demodulation.
6. Phase shift keying - Modulation and Demodulation.
7. Differential phase shift keying - Modulation and Demodulation.
8. Frequency Synthesizer.

III B. Tech - I Semester

14BT50422: PDC & IC LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on Pulse and Digital Circuits and Linear IC Applications.

COURSE DESCRIPTION: Linear and Non-linear Wave shaping circuits; generation of sweep signal; sampling and logic gates; design of multivibrator circuits and filters, verification of Op-Amp applications; Timers; Voltage regulator; ADC and DAC.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze Linear, Non-linear Wave shaping circuits and applications of Op-Amp.
CO2. Design different multivibrator circuits and filters.
CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid solutions.

LIST OF EXPERIMENTS:
Minimum Twelve Experiments to be conducted

PART A: Pulse and Digital Circuits Lab: (Minimum of six experiments to be conducted)

1. Linear wave shaping - High Pass and Low Pass RC Circuits.
2. Non-Linear wave shaping - Clippers and Clampers.
3. Bistable Multivibrator.
4. Astable Multivibrator.
5. Schmitt Trigger.
6. Bootstrap sweep circuit.
7. Sampling Gates.
8. Study of Logic Gates & Some applications.

PART B: IC Lab: (Minimum of six experiments to be conducted)

1. Op-Amp Applications-Adder, Subtractor and Comparator circuits.
2. Active Filter Applications-LPF, HPF (first and second order).
3. Function Generator using Op-Amps.
4. IC 555 Timer-Monostable and Astable Multivibrators.
5. IC 566-VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 Bit ADC and DAC.
8. Precision Rectifier using Op-Amp.

III B. Tech - II Semester

14BT60401: DIGITAL SIGNAL PROCESSING

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Signals and Systems.

COURSE DESCRIPTION: Continuous and Discrete signals and sequences; Systems; DFT and FFT algorithms for the analysis of discrete sequences; Design and Realization of Digital IIR and FIR filters; Multirate systems and some of the Signal processing applications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

- Digital signals, sequences and systems.
- DFT and FFT transforms.
- Analog & Digital Filter Design.
- Digital Filter Realization.
- DSP Processors.

CO2. Perform Frequency analysis of discrete time signals in suppressing unnecessary frequency components.

CO3. Design and Develop digital filters to optimize system performance and their realization.

CO4. Solve problems in processing of signals through digital systems and applying them in signal processing.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING (10 Periods)

Review of Discrete-Time signals, systems and their classification. Discrete-Time systems described by difference equations.

FREQUENCY ANALYSIS OF DISCRETE TIME SIGNALS:

Fourier series for DT periodic signal and power density spectrum, the Fourier transform of DT aperiodic signals and energy density spectrum, convergence of Fourier transforms. Review of Z-transforms, Applications, solution for difference equations of digital filters.

UNIT-II: DISCRETE AND FAST FOURIER TRANSFORMS (09 Periods)

DFS representation of periodic sequences, properties of Discrete Fourier Series.

DISCRETE FOURIER TRANSFORMS (DFT): Properties of DFT, Linear filtering methods based on DFT, Relationship of FT to Z Transform, Frequency analysis of signals using DFT.
FAST FOURIER TRANSFORMS (FFT): Radix-2 Decimation In Time (DIT) and Decimation In Frequency (DIF) FFT algorithms, Inverse FFT.

UNIT-III: IIR DIGITAL FILTERS (08 Periods)
Design of IIR digital filters from analog filters-IIR filter design by approximation of derivatives, Impulse Invariance and Bilinear transformation. Characteristics of commonly used analog filters, Frequency transformations. Structural realization of IIR systems-direct, cascade and parallel form structures, Transposed form.

UNIT-IV: FIR DIGITAL FILTERS (08 Periods)
Symmetric and anti-symmetric FIR filters, Design of Linear Phase FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters. Structural realization of FIR filters-direct, cascade-form structures and Linear Phase structures.

UNIT-V: INTRODUCTION TO DSP PROCESSORS (10 Periods)
INTRODUCTION TO PROGRAMMABLE DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in P-DSPs, Multiple access memory, multiported memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.
ARCHITECTURE OF TMS 320C6X: Introduction, Features of 'C6X Processors, Internal Architecture, CPU, General-Purpose Register Files, Functional Units and Operation, Data Paths, Control Register File.

Total Periods: 45

TEXT BOOKS:

1. John G.Proakis, Dimitris G.Manolakis, *Digital Signal Processing*, Principles, Algorithms and Applications, Pearson Education/ PHI, 4th Edition, 2007.
2. Alan.V. Oppenheim, Ronald.W. Schafer, John R Buck, *Discrete Time Signal Processing*, Prentice Hall, 2nd Edition, 2006.
3. B.Venkataramani, M. Bhaskar, *Digital Signal Processors - Architecture, Programming and Applications*, TATA McGraw Hill, 2nd Edition, 2010.

REFERENCE BOOKS:

1. Tarun Kumar Rawat, *Digital Signal Processing*, Oxford University Press, 1st Edition, 2015.

III B.Tech - II Semester

14BT60402: MICROWAVE ENGINEERING

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Electromagnetic Theory and Transmission Lines.

COURSE DESCRIPTION: Rectangular waveguides and its characteristics; Strip lines and Microstrip lines; Waveguide components; Microwave tubes; Microwave solid state devices; and Microwave measurements.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

- Waveguides
- Microwave Components
- Microwave Tubes
- Microwave Measurements

CO2. Perform analysis mathematically the operation and working of the various tubes. Quantify the signal and noise characteristics of microwave systems such as communication networks, Radars, Radiometers and relate this to the design process.

C03. Design microwave components such as power dividers, hybrid junctions, microwave filters, ferrite devices and single stage microwave transistor amplifier.

C04. Solve problems in effects of noise on microwave systems.

DETAILED SYLLABUS:

UNIT-I: MICROWAVE TRANSMISSION LINES (12 Periods)

Introduction, Microwave spectrum and bands, applications of Microwaves. Rectangular Waveguides-solution of wave equation in Rectangular Coordinates, TE and TM mode analysis, Expressions for fields, Characteristic equation and cutoff 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. Power Transmission and Power Losses. Introduction to Circular Waveguides, Cavity resonators- Introduction, rectangular cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients. Micro strip lines- Introduction, Z_0 relations, effective dielectric constant, losses, Q-factor, Illustrative Problems.

UNIT-II: WAVEGUIDE COMPONENTS AND APPLICATIONS (10 Periods)

Waveguide multiport junctions-E plane and H plane Tees, Magic Tee, Directional coupler; Waveguide discontinuities - waveguide windows, tuning screws and posts, matched loads; Coupling mechanisms- probe, loop, aperture types. Ferrites-composition and characteristics, faraday rotation, ferrite components - Gyrator, Isolator and Circulator. Waveguide attenuators- resistive card, rotary vane Attenuators, waveguide phase shifters - dielectric, rotary vane phase shifters; Scattering Matrix- Significance, Formulation and Properties. S Matrix calculations for 2-port junction, E plane and H plane Tees, Magic Tee, Directional coupler, Circulator and Isolator, Illustrative problems.

UNIT-III: MICROWAVE TUBES- I (08 Periods)

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, 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.

UNIT-IV: MICROWAVE TUBES -II (08 Periods)

HELIX TWTS: Significance, 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 travelling wave magnetron - Hull cutoff and Hartree conditions, modes of resonance and PI-mode operation, separation of PI-mode, O/P characteristics, Illustrative Problems.

UNIT-V: MICROWAVE SOLID STATE DEVICES & MEASUREMENTS (08 Periods)

Introduction, classification, applications, Transfer Electronic Devices, Gunn diode- principles, RJWH theory, characteristics, basic modes of operation - Gunn oscillation modes. LSA Mode, Varactor Diode, Parametric Amplifier, Introduction to Avalanche Transit time devices (brief treatment only).

MEASUREMENTS: Description of Microwave bench- different blocks and their features, errors and precautions; Microwave power measurement- Bolometer method, Measurement of attenuation, frequency, low and high VSWR, Q of the cavity and impedance measurements.

Total Periods: 46

TEXT BOOKS:

1. Samuel Y. Liao, *Microwave devices and circuits*, Pearson Education, 3rd Edition, 2003.
2. Matthew N.O.Sadiku, *Elements of Electromagnetics*, Oxford University Press, 4th Edition, 2007.

REFERENCE BOOKS:

1. Sushrut Das, *Microwave Engineering*, Oxford University Press, 2014.
2. R.E.Collin, *Foundations for Microwave Engineering*, IEEE Press, John Wiley, 2nd Edition, 2002.
3. F. E. Terman, *Electronic and Radio Engineering*, McGraw Hill, 4th Edition, 1955.
4. Peter A. Rizzi, *Microwave Engineering Passive Circuits*, PHI, 1999.

III B.Tech - II Semester
14BT60403: VLSI DESIGN

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Switching Theory and Logic Design and Digital ICs and their Applications.

COURSE DESCRIPTION: Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Understanding the Fabrication of MOS Transistors.
- Electrical properties of CMOS and Bi-CMOS Circuits.
- Designing Static Combinational and Sequential logic at transistor level, including Mask layout.
- Estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.
- Design methodology and tools.
- Testing the chip at various abstraction levels.

CO2. Perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions.

CO3. Formulate and solve technology specific problems in developing an IC circuit using EDA tools.

CO4. Use modern design tools to IC devices to create System On-Chip (SOC) designs in FPGAs.

DETAILED SYLLABUS:

UNIT-I: FABRICATION & ELECTRICAL PROPERTIES OF MOS (09 Periods)

Introduction to MOS, CMOS and Bi-CMOS technology, Fabrication of NMOS and CMOS, Basic Electrical Properties of MOS & Bi-CMOS Circuits: I_{ds}-V_{ds} relationships, Threshold Voltage VT, g_m, g_{ds} and ω_0, Pass Transistor, NMOS inverter, pull up to pull down ratio for an NMOS inverter, CMOS & Bi-CMOS Inverters.

UNIT-II: CMOS CIRCUIT DESIGN PROCESS (10 Periods)
VLSI design flow, MOS layers, stick diagrams, n-MOS design style, CMOS design style, lambda based design rules, layouts for inverters, sheet resistance, capacitances of layers, Gate delays, Delay estimation, Driving large capacitive loads, Fan-in and Fan-out, choice of layers, Scaling and limitations of scaling.

UNIT-III: SUBSYSTEM DESIGN - I (09 Periods)
Adders- Transmission based Adder, Carry look-ahead adder, Manchester carry chain adder, Carry Bypass Adder, Carry Skip Adder, Carry Select Adder, Shifters- Barrel Shifter, Logarithmic Shifter, Multipliers- Array Multiplier, Carry Save Multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Zero/One Detectors.

UNIT-IV: SUBSYSTEM DESIGN - II (09 Periods)
Counters- Synchronous & Asynchronous Counter, High Density Memory Elements. Design Approach, PLA, PAL - 22V10 PAL architecture, Programming of PALs, FPGAs, CPLDs, Cell based Design Methodology.

UNIT-V: SYNTHESIS AND CMOS TESTING (08 Periods)
Types of Simulation, VHDL Synthesis, Layout Synthesis, Design Capture tools, Design Verification tools.
CMOS TESTING: CMOS Testing, Need for testing, Test Principles, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

Total Periods: 45

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems*, PHI, 2005 Edition.
2. Weste and EShraghian, *Principles of CMOS VLSI Design*, Pearson Ed, 1999.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective*, 2nd Edition, PHI, 1997.
2. John P. Uyemura, *Introduction to VLSI Circuits and Systems,* John Wiley, 2003.
3. Eugene D. Fabricius, *Introduction to Very Large Scale Integration Design Paperback*, Aug 1990, McGraw Hill Education (ISE Editions).
4. Stephen Brown, Zvonko Vranesic, *Fundamentals of Digital Logic with VHDL Design*, TMH 2007.

III B. Tech - II Semester

14BT60201: MICROPROCESSORS AND MICROCONTROLLERS

(Common to ECE, EEE & EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Switching Theory & Logic Design and Computer Organization.

COURSE DESCRIPTION: Architecture, Instruction set and programming of 8086; Programmable interfacing devices: 8255, 8251, 8259, 8257 - their architecture and programming; Interfacing Memory and I/O devices with 8086; Architecture, Programming, Interrupts and Applications of 8051 Microcontroller.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate potential knowledge in
- Internal hardware details of Intel 8086, 8051 and programmable devices like 8255, 8251, 8259, 8257.
- Interfacing various peripherals to build stand alone systems.

CO2. Critically analyze the requirements to meet the specifications.

CO3. Design suitable interfaces for real time applications.

CO4. Exhibit programming skills, choose suitable hardware and program the devices to solve engineering problems.

DETAILED SYLLABUS:

UNIT-I: 8086 ARCHITECTURE AND PROGRAMMING (10 Periods)

Microprocessor Evolution and types, 8086 internal Architecture - register organization, memory segmentation, memory organization. Introduction to programming the 8086 - Assembler directives, addressing modes, instruction set, simple programs, procedures and macros.

UNIT-II: 8086 INTERFACING AND INTERRUPTS (08 Periods)

Pin description, minimum & maximum mode operation of 8086, timing diagram. Interfacing memory (RAM and EPROM) to 8086. 8086 Interrupts- types and interrupt responses, Interrupt Vector Table, priority of interrupts. 8259 priority interrupt controller - architecture, system connections and cascading, initialization of 8259.

UNIT-III: PROGRAMMABLE DATA COMMUNICATION DEVICES (11 Periods)

Introduction to serial and parallel communication, methods of parallel data transfer. 8255 PPI- internal architecture and system connections, operational modes and initialization, interfacing stepper motor, ADC, DAC. Methods of serial data transfer, 8251 USART- architecture and its initialization, sending and receiving characters. Serial Communication Standard RS232C, USB. Architecture and Operation of 8257 DMA controller.

UNIT-IV: 8051 MICROCONTROLLER AND PROGRAMMING (08 Periods)

Microcontroller Vs general purpose microprocessor. 8051/8052 Microcontroller- architecture, features, register organization, pin diagram, internal and external memories & their interfacing, instruction set, addressing modes, simple programs.

UNIT-V: 8051 INTERFACING (08 Periods)

Timer/Counters- Registers, modes and programming. Serial communication- registers, programming 8051 for serial communication. Interrupts- registers, programming. 8051 Applications- Interfacing key board, LEDs and LCD.

Total Periods: 45

TEXT BOOKS:

1. Douglas V. Hall, *Microprocessors and Interfacing: Programming and Hardware*, Tata McGraw Hill, revised 2nd edition, 2006.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, Prentice Hall of India, 2000.

REFERENCE BOOKS:

1. A.K. Ray and K.M. Bhurchandi, A*dvanced Microprocessors and Peripherals- Architecture*, Programming and Interfacing, Tata McGraw Hill, 2002 reprint.
2. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design*, Prentice Hall of India, 2006.

III B.Tech - II Semester

14BT40501: COMPUTER ORGANIZATION

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITE: A course on Switching Theory and Logic Design.

COURSE DESCRIPTION: Basic structure of a digital computer, Organization of the arithmetic and logical unit, control unit, memory and I/O unit.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in:
- Computer Arithmetic and Register Transfer Language.
- Micro-programmed Control Unit.
- Input Output Organization and Memory system.
- Pipelining, Multiprocessors and interconnection structures.

CO2. Analyze the functioning of Central Processing Unit.

CO3. Design the Micro-programmed Control Unit, memory & I/O.

DETAILED SYLLABUS:

UNIT-I: COMPUTER ARITHMETIC, REGISTER TRANSFER LANGUAGE & MICRO-OPERATIONS (09 Periods)

COMPUTER ARITHMETIC: Data Representation, Fixed Point Representation, Floating Point Representation, Addition and Subtraction, Binary Multiplication Algorithms, Binary Division Algorithms, Floating Point Arithmetic operations.

REGISTER TRANSFER LANGUAGE AND MICRO-OPERATIONS: Register Transfer, Bus and memory transfers, Arithmetic micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

UNIT-II: BASIC COMPUTER ORGANIZATION AND DESIGN, MICRO PROGRAMMED CONTROL (08 Periods)

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output Interrupts.

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

UNIT-III: INPUT-OUTPUT ORGANIZATION (08 Periods)

Input-Output Organization: Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor (IOP), Serial communication, Introduction to Peripheral Component Interconnect (PCI) bus.

UNIT-IV: THE MEMORY SYSTEM (08 Periods)

THE MEMORY SYSTEM: Semiconductor RAM memories, Read-only memories, Cache memory, Performance considerations, Virtual memory, Secondary storage.

UNIT-V: PIPELINE & VECTOR PROCESSING AND MULTI PROCESSORS (09 Periods)

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

MULTIPROCESSORS: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-Processor Communication and Synchronization.

Total Periods: 44

TEXT BOOKS:

1. Morris Mano, *Computer System Architecture*, 3rd Edition, Pearson Education, New Delhi.
2. Carl V Hamacher, Zvonko G. Varanesic and Safat G. Zaky, *Computer Organization*, 5th Edition, McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. W. Stallings, *Computer Organization and Architecture Designing For Performance*, 8th Edition, PHI, 2012.
2. John P.Hayes, *Computer architecture and Organisation*, 3rd Edition, Tata McGraw Hill, New Delhi.

III B. Tech - II Semester

14BT60404: ANALOG IC DESIGN

(PE-I)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Semiconductor Devices and Circuits and Electronic Circuits Analysis and Design.

COURSE DESCRIPTION: MOS & CMOS Devices and Modeling, Current mirrors, Band gap References, Differential Amplifiers, Design of Two-Stage Op-Amps. Open Loop Comparators, Ring Oscillators. Voltage Controlled Oscillators, Non-Ideal Effects in PLLs and Delay Locked Loops.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

- MOS devices and modeling
- Current Mirrors
- Output Amplifiers
- Two stage operational Amplifiers
- Open loop comparators
- Oscillators and Phase locked loop

CO2. Analyze complex engineering problems in any analog circuits in real time applications.

CO3. Design and Develop Analog ICs subsystems and systems.

CO4. Solve engineering problems for feasible and optimal solutions in the core area of analog ICs.

DETAILED SYLLABUS:

UNIT-I: MOS & CMOS DEVICES AND MODELING (08 Periods)

The MOS Transistor, Passive Components- Capacitor & Resistor, Integrated circuit Layout, CMOS Device Modeling- Simple MOS Large-Signal Model, Other Model Parameters, Small-Signal Model for the MOS Transistor, Sub-threshold MOS Model.

UNIT-II: ANALOG CMOS SUB-CIRCUITS (09 Periods)

MOS Switch, MOS Diode/Active Resistor, Current Sinks and Sources, Current Mirrors-basic current mirrors, Source degenerated current mirrors, Cascode current Mirror and Wilson Current Mirror, Current and Voltage References, Band gap Reference.

UNIT-III: CMOS AMPLIFIERS (09 Periods)
Inverters, Differential Amplifiers, Cascode Amplifiers, Current Amplifiers, Output Amplifiers.

UNIT-IV: CMOS OPERATIONAL AMPLIFIERS (09 Periods)
Design of CMOS Op-Amps, Compensation of Op-Amps, Design of Two-Stage Op-Amps, Power Supply Rejection Ratio of Two-Stage Op-Amps, Cascode Op-Amps.

UNIT-V: COMPARATORS AND OSCILLATORS (10 Periods)
COMPARATORS: Characterization of Comparator, Two-Stage Comparator, Open-Loop Comparator, Discrete-Time Comparators.
OSCILLATORS: General Considerations, Ring Oscillators, Voltage Controlled Oscillators.

Total Periods: 45

TEXT BOOKS:

1. Philip E. Allen and Douglas R. Holberg, *CMOS Analog Circuit Design*, Oxford University Press, International 2nd Edition/Indian Edition, 2010.
2. Behzad Razavi, *Design of Analog CMOS Integrated Circuits*, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Paul R. Gray, Paul J. Hurst, S. Lewis and R. G. Meyer, *Analysis and Design of Analog Integrated Circuits*, Wiley India, 5th Edition, 2013.
2. David A.Johns, Ken Martin, *Analog Integrated Circuit Design*, Wiley Student Edn, 1997.

III B.Tech - II Semester

14BT60405: IMAGE PROCESSING

(PE-I)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Digital signal processing, Digital communications.

COURSE DESCRIPTION: Fundamentals of image processing; Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques; Image segmentation techniques; Image compression techniques.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstarte knowledge in
- Image Fundamentals
- Image Enhancement & Restoration Techniques
- Image Segmentation & Compression Techniques
- Color image processing

CO2. Analyze different images using various processing techniques

CO3. Develop various image processing algorithms to process the images in various Real Time Applications.

CO4. Solve problems related to images for feasible and optimal solutions in the core area of Image Processing.

DETAILED SYLLABUS:

UNIT-I: IMAGE FUNDAMENTALS (10 Periods)

Fundamental steps in Image Processing, Image sampling & quantization, some basic relationships between pixels, Arithmetic operations, Logical operations, Spatial operations.

IMAGE TRANSFORMS: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT-II: IMAGE ENHANCEMENT (11 Periods)

Basic Intensity transformation functions, Histogram processing, Fundamentals of spatial filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods. Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-III: IMAGE RESTORATION (07 Periods)

Image degradation/Restoration model, Noise models, Restoration in the presence of Noise only spatial filtering- mean, order-statistic and adaptive filters. Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT-IV: IMAGE COMPRESSION (08 Periods)

Classification of redundancy in Images, Image Compression models, Run length coding, Arithmetic coding, Dictionary based compression, bit-plane coding, Transform based coding, Image compression standards.

UNIT-V: IMAGE SEGMENTATION AND COLOR IMAGE PROCESSING (09 Periods)

Detection of discontinuities- Point, line and edge Detection. Thresholding- global thresholding, adaptive thresholding. Region based Segmentation. Color image fundamentals- RGB, HSI models, Conversions, Pseudo Color Image Processing, Color transformations.

Total Periods: 45

TEXT BOOKS:

1. Rafael C. Gonzalez & Richard E. Woods, *Digital Image Processing*, Pearson Education, 3rd Edition, 2008.
2. Anil K. Jain, *Fundamentals of Digital Image processing*, Prentice Hall, 2007.

REFERENCE BOOKS:

1. William K. Pratt, *Digital Image Processing*, John Wiley and Sons, 3rd ed., 2002.

III B. Tech - II Semester

14BT60406: TV AND RADAR ENGINEERING

(PE-I)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Pulse and Digital Circuits, Analog and Digital Communications.

COURSE DESCRIPTION: Introduction to Television systems, Transmission and Reception of video signals, Composite Video Signal, Color TV, Digital TV, Advanced Television Systems.
Radar equation, classification of radars, MTI and pulsed radar, radar receivers, Echo signal detection in the presence of noise.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate fundamental knowledge in
- Sound and Picture transmission
- Composite Video signals & TV picture tubes
- Digital TV technology & Advanced television systems
- CW and MTI Radars
- Radar Receivers

CO2. Analyze NTSC, SECAM, PAL coder and decoders and Radar signals in the presence of noise.
CO3. Design Matched filter for radar receiver.
CO4. Solve engineering problems with feasible and economical solutions in television and Radar systems.

DETAILED SYLLABUS:

UNIT-I: BASIC TELEVISION SYSTEM AND SCANNING PRINCIPLES (11 Periods)

Elements of Television system, Sound and Picture transmission, scanning process, video signal, transmission & reception of video signals, brightness perception & photometric quantities, aspect ratio & rectangular scanning, persistence of vision & flicker, Kell factor, vertical and horizontal resolution, interlaced scanning, Composite Video Signal: Lines and scanning, video signal components, horizontal sync and blanking standards, vertical sync and blanking standards, video modulation and vestigial side band signal, sound modulation and inter-carrier system. Standard channel characteristics, reception of the vestigial side band signal, television broadcast channels, television camera pick-ups: Vidicon, Plumbicon.

UNIT-II: COLOR TELEVISION SIGNALS AND SYSTEMS (07 Periods)

Colour fundamentals, mixing of colours and colour perception, chromaticity diagram, colour television camera, Principle and working of colour television, colour TV signals and transmission, Principles of NTSC, SECAM and PAL coder and decoder.

UNIT-III: DIGITAL TELEVISION TECHNOLOGY (09 Periods)

Merits of digital technology, fully digital television system, digital television signals, digitized video parameters, digital video hardware, transmission of digital TV signals, bit rate reduction, digital TV receivers. Advanced Television systems: Multiplexed Analog Component Encoding Television System (MAC TV), High Definition Television System (HDTV), LCD and LED Displays.

UNIT-IV: RADAR (12 Periods)

Radar Range Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, SNR, False Alarm Time and Probability, Integration of Radar Pulses, Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment). Doppler Effect, CW Radar- Block Diagram, Applications of CW radar, FM-CW Radar, Multiple Frequency CW Radar. MTI Radar with- Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers.

UNIT-V: RADAR RECEIVERS (06 Periods)

Noise Figure and Noise Temperature, Display types. Duplexers-Branch type and Balanced type, Circulators as Duplexers. 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.

Total Periods: 45

TEXT BOOKS:

1. A.M. Dhake, *Television and Video Engineering*, TMH, 2nd Edition, 2008.
2. Merrill I. Skolnik, *Introduction to Radar Systems*, TMH Special Indian Edition, 2nd Edition, 2007.

REFERENCE BOOKS:

1. R.R. Gulati, *Monochrome and color TV*, New Age International publication, 2nd Edition, 2005.
2. Merrill I. Skolnik, *Introduction to Radar Systems*, TMH, 3rd Edition, 2008.
3. Jiun-Haw Lee, david N.Liu, Shin-Tson Wu, *Introduction to Flat Panel Displays*, John Wiley & Sons, 2008.

III B.Tech - II Semester

14BT41201: OBJECT ORIENTED PROGRAMMING

(PE-I)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Programming in C and Data Structures.

COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in:

- Object Oriented Programming concepts- classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.

CO3. Gain problem solving skills to provide effective solutions for real world problems.

DETAILED SYLLABUS:

UNIT-I: (09 Periods)

OBJECT ORIENTED THINKING: NEED FOR OOP PARADIGM, OOP CONCEPTS

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

CLASSES AND OBJECTS: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-II: INHERITANCE, PACKAGES AND INTERFACES
(09 Periods)

UNDERSTANDING INHERITANCE: Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, method overriding, abstract classes, using final with inheritance.

PACKAGES: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

INTERFACES: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III: EXCEPTION HANDLING AND MULTITHREADING
(09 Periods)

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

Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.

UNIT-IV: APPLETS, EVENT HANDLING AND AWT (09 Periods)

APPLETS: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner 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 - boarder, grid, flow, card and grid bag.

UNIT-V: JDBC and SERVLETS (09 Periods)

DATABASE CONNECTIVITY: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.

SERVLETS: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package.

Total Periods: 45

TEXT BOOKS:

1. Herbert Schildt, *Java the complete reference*, TMH, 7th edition, 2007.
2. Timothy Budd, *Understanding Object-oriented Programming with Java*, Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, *Programming in java*, Oxford university press, 2nd edition, 2014.

III B. Tech - II Semester

14BT60421: DIGITAL IC APPLICATIONS LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: A Course on Digital IC Applications.

COURSE DESCRIPTION: Design, verification, simulation and synthesis of combinational and sequential circuits.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Perform analysis digital system design.
CO2. Acquire skills by solving problems in the domain of digital systems.
CO3. Use modern CAD tools to analyze RTL, Technology schematic and system implementation in digital domain.

LIST OF EXPERIMENTS:

Minimum Twelve Experiments to be conducted

Simulate the internal structure of the following Digital IC's using HDL and verify the operations of the Digital IC's (Hardware) in the Laboratory.

1. Realization of Logic Gates- 74XX.
2. Half Adder, Full Adder & Ripple Carry Adder.
3. Half Subtractor, Full Subtractor.
4. 8-3 Encoder-74x148.
5. 3-8 Decoder-74x138.
6. 8x1 Multiplexer-74x151 and 2x4 Demultiplexer-74x155.
7. 4 Bit Comparator-74x85.
8. D Flip-Flop 74x74 and JK Flip-Flop 74x109.
9. Decade counter-74x90.
10. 4 Bit Counter-74x93.
11. Shift Register-74x95.
12. Universal shift register-74x194/195.
13. RAM (16x4)-74189(read and write operations).
14. ALU.

III B.Tech - II Semester

14BT60222: MICROPROCESSORS AND MICROCONTROLLERS LAB

(Common to ECE, EEE & EIE)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: A course on Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.

CO2. Design and develop microcomputer based system to solve various problems.

LIST OF EXPERIMENTS:

Any **TWELVE** experiments to be conducted.

I Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controller
3. A/D converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

IV Interfacing with 8051

1. Stepper Motor
2. Digital to Analog Converter
3. Square wave generation using Timers in Mode 0 and Mode 1

IV B. Tech – I Semester

14BT70401: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Semiconductor Devices and Circuits, Linear IC Applications.

COURSE DESCRIPTION: Performance Characteristics of Instruments; Indicators; Signal Generators; Analyzers; Oscilloscopes; AC and DC Bridges; Sensors and Transducers; Data Acquisition System.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate Knowledge in
- Working of Instruments
- Various measurement techniques available
- Errors in measurements and their rectification

CO2. Analyze parameters, measuring methods and evaluate errors involved in measurement.

CO3. Solve engineering problems by proposing potential solutions leading to better instruments designs.

DETAILED SYLLABUS:

UNIT-I : (10 Periods)

PERFORMANCE CHARACTERISTICS OF INSTRUMENTS

Static Characteristics, Accuracy, Precision, Resolution, Sensitivity, Errors in Measurement, Dynamic Characteristics-Speed of Response, Fidelity, Lag and Dynamic Error, Statistical Analysis.

DISPLAY DEVICES: Basic Meter Movement, DC Voltmeters-Multirange, Range Extension, Loading, Transistor Voltmeter, Solid State Voltmeter, AC Voltmeters–Using Rectifiers, Multirange, Range Extension, Ammeters-Multirange, Universal Shunt, Extending Ranges, Ohmmeters, Series Type and Shunt Type, Calibration of DC Instrument & Ohmmeter, Multimeter for Voltage, Current and Resistance Measurements.

UNIT-II: (08 Periods)

SIGNAL GENERATORS

Fixed and Variable AF Oscillators, Standard Signal Generator, AF Sine & Square Wave Generator, Function Generators-Square & Pulse, Random Noise, Sweep and Arbitrary Waveform Generators-Specifications and Principles of Working (Block Diagram Approach).

ANALYZERS: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers and Logic Analyzers.

UNIT-III: OSCILLOSCOPES (10 Periods)

Block Diagram of CRO, CRT Features, Vertical and Horizontal Amplifiers, Horizontal and Vertical Deflection Systems, Triggered Sweep CRO and Delayed Sweep, Sync Selector Circuits, Probes for CRO – Active, Passive and Attenuator Type, Dual Beam & Trace CRO, Measurement of Amplitude, Frequency and Phase (Lissajous method). Standard Specifications of CRO. Sampling Oscilloscope, Storage Oscilloscope, Digital Readout Oscilloscope, Digital Storage Oscilloscope, Digital Frequency Counter, Time and Phase Measurement.

UNIT-IV: BRIDGES AND RECORDERS (08 Periods)

DC BRIDGES: Wheatstone Bridge, Kelvin Bridge, Practical Kelvin's Double Bridge.

AC BRIDGES: Maxwell's Bridge, Hay's Bridge, Schering Bridge, Wien Bridge, Anderson Bridge, Errors and Precautions in Using Bridges, Q-meter.

RECORDERS: Strip Chart Recorder and X-Y Recorder.

UNIT-V: (09 Periods)

SENSORS AND TRANSDUCERS

ACTIVE AND PASSIVE TRANSDUCERS: Measurement of Displacement (Resistance, Capacitance, Inductance; LVDT), Force (Strain Gauges), Pressure (Piezoelectric Transducers), Temperature (Resistance Thermometers, Thermocouples and Thermistors), Velocity, Acceleration, Vibration.

DATA ACQUISITION SYSTEM: Generalized Data Acquisition System, Signal Conditioning, Single & Multi Channel DAS.

Total Periods: 45

TEXT BOOKS:

1. H.S.Kalsi, *Electronic Instrumentation*, TMH, 3rd Edition, 2015.
2. A.D. Helfrick and W.D. Cooper, *Modern Electronic Instrumentation and Measurement Techniques*, PHI, 5th Edition, 2006.

REFERENCE BOOKS:

1. Sawhney.A.K., *A Course in Electrical & Electronic Measurement and Instrumentation*, Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.
2. David A. Bell, *Electronic Instrumentation & Measurements*, PHI, 2nd Edition, 2003.

IV B.Tech - I Semester

14BT70402: EMBEDDED SYSTEMS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Introduction to Embedded System; State Machines and Concurrent Process Models; Various Communication interfacing Models; RTOS Concepts; Target Architectures.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on Communication Interfacing Models, Processor Technology, State Machines, Kernel Objects, ARM and SHARC Controllers.

CO2. Analyze Various problems in Optimization of Single Purpose Processor, Synchronization among the Processes, Clock Driven and Event Driven Scheduling and Debugging Techniques.

CO3. Design and develop embedded system to suit a particular Application.

CO4. Choose suitable Hardware and software components of a system that Work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (12 Periods)

Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), Custom single purpose processor design (RT-level), Optimizing custom single purpose processors, Basic architecture, operation, Pipelining, Programmer's view, Development environment.

UNIT-II: STATE MACHINE AND CONCURRENT PROCESS MODELS (08 Periods)

Introduction, Models versus languages, Finite State Machines with Data path model (FSMD) using state machines, Program State Machine model (PSM), Concurrent process model, Concurrent processes, Communication among processes, Synchronization among processes, Implementation, Data flow model.

UNIT-III: COMMUNICATION INTERFACE (07 Periods)

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Fire wire, Ethernet, I^2C bus and CAN.

UNIT-IV: RTOS CONCEPTS (10 Periods)

CONCEPTS 1: Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, Resource sharing, Commercial RTOS.

CONCEPTS 2: Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT-V: TARGET ARCHITECTURES (08 Periods)

Host and target machines, Linkers, Loading software into target machine, Debugging techniques, ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, Salient features of SHARC microcontroller and comparison with ARM microcontroller.

Total Periods: 45

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dramatic Press, 2005.

REFERENCE BOOKS:

1. Raj Kamal, *Embedded System Architectures Programming & Design*, Tata MCGraw Hill Publising, 2003.
2. David E.Simons, *An Embedded Software Premier*, Pearson Educational, 2004.

IV B. Tech – I Semester

14BT70403: LIGHT WAVE COMMUNICATIONS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Engineering physics, Semiconductor devices and Circuits, Digital communications.

COURSE DESCRIPTION: Ray theory; Single mode fibers; Fiber materials; Fiber losses; Optical sources and detectors; Power launching into the fiber; Optical links; WDM; Introduction to optical networks.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in

- Mode theory of optical communication
- Various losses occurring in optical fibers
- Optical sources and detectors
- Power Launching and coupling techniques
- Optical links
- WDM concepts
- Optical Networks.

CO2. Analyze single & multimode fibers and analog & digital links.

CO3. Design and Develop Optical sources, Detectors and links.

CO4. Solve problems in Optical fibers, Sources and detectors for better Optical communication system.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO OPTICAL FIBER WAVEGUIDES (08 Periods)

Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory Transmission, Electromagnetic Mode Theory for Optical Propagation, Cylindrical Fiber. Single Mode Fibers, Fiber Materials, Fiber Fabrication, Mechanical Properties of Fibers, Fiber Optic Cables.

UNIT II: FIBER LOSSES (07 Periods)

Attenuation, Absorption, Scattering, Bending and Core & Cladding losses. Signal Distortion in Fibers - Pulse Broadening,Intramodal Dispersion, Intermodal Dispersion, Overall Fiber Dispersion in Multi Mode and Single Mode Fibers, Polarization.

UNIT III: OPTICAL SOURCES AND DETECTORS (11 Periods)

OPTICAL SOURCES: LED Structures, Light Source Materials, Quantum Efficiency and LED Power, Modulation of LED, 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, Comparison of Photo Detectors.

UNIT IV: POWER LAUNCHING AND COUPLING (07 Periods)
Source to Fiber Power Launching, Lensing Schemes for Coupling Improvement, Fiber-to-Fiber Joints, Fiber alignment and joint loss, LED coupling to single mode fibers, Fiber Splices, Fiber Connectors.

UNIT V: (12 Periods)
DIGITAL LINKS: Point-to-Point Links, Power Penalties, Error Control.
ANALOG LINKS: Overview, Carrier to Noise Ratio, Multi-channel Transmission Techniques, RF over Fiber, Radio over Fiber Links.
WDM CONCEPTS AND COMPONENTS:
Overview, Passive Optical Couplers, Isolators & Circulators, Fiber Grating Filters, Dielectric Thin Film Filters, Phased Array based Devices, Diffraction Gratings.
OPTICAL NETWORKS:
Network Concepts, Network Topologies, SONET/SDH.

Total Periods: 45

TEXT BOOKS:
1. Gerd keiser, *Optical Fiber Communications*, McGraw Hill International, 4th Edition, 2009.

REFERENCE BOOKS:
1. John M. Senior, *Optical Fiber Communications*, PHI, 3rd Edition, 2011.
2. Max Ming-Kang Liu, *Principles and Applications of Optical Communications*, TMH, 2010.
3. S.C.Gupta, *Optical Fiber Communication and its Applications*, PHI, 2011.

IV B.Tech – I Semester

14BT51201: COMPUTER NETWORKS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on Digital Communications.

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on
- concepts of computer networks
- functionality of reference models layers
- 3G Mobile Phone Networks, 802.11

CO2. Analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.

CO3. Acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND PHYSICAL LAYER (09 Periods)

Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11, Guided Transmission Media, Wireless Transmission.

UNIT-II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 Periods)

Data Link Layer Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols. Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT-III: NETWORK LAYER (10 Periods)

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

UNIT-IV: TRANSPORT LAYER (08 Periods)

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP;
UDP– Introduction, Remote Procedure Call, Real-Time Transport Protocol; TCP- Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.

UNIT-V: APPLICATION LAYER AND NETWORK SECURITY (08 Periods)

Domain Name System (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.
INTRODUCTION TO NETWORK SECURITY: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads.

Total Periods: 45

TEXT BOOKS:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, Pearson Education, 5th edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data communication and Networking*, Tata McGraw Hill, 4th edition, 2006.
2. James F. Kurose and Keith W. Ross, *Computer Networking A Top-Down Approach Featuring the Internet*, Pearson Education, 2nd edition, 2003.

IV B.Tech - I Semester

14BT6HS01: BANKING AND INSURANCE

(OPEN ELECTIVE)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash, NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in

- Tools and concepts of Banking and Insurance
- Basic Principles and concepts of Insurance and Banking
- Provides life skills for effective utilization of Banking and Insurance facilities
- e-fund transfers, e-payments and e-business models.

CO2. Develop analytical skills in understanding problems pertaining to

- Online banking and e – payments
- Risk Management through insurance benefits the society at large
- money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO BANKING (09 Periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT – II: BANK-CUSTOMER RELATIONSHIP (09 Periods)

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans.

UNIT – III: BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (09 Periods)

Features, types of e-payment system, e-cash, NEFT, RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C and B2G.

UNIT–IV: INTRODUCTION TO INSURANCE (09 Periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT–V: INSURANCE OVERVIEW (09 Periods)

Principles of insurance, insurance types, LIC & GIC insurance contract-nature, elements, functions, IRDA, Insurance Players in India.

Total periods: 45

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul, *Banking and Financial system*, Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta, *Insurance and Risk Management*, Himalaya Publishing House, New Delhi, **ISBN:** 9789350516676.

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma, *Electronic Commerce- A Manager's Guide to E-Business*, Vanity Books International, Delhi, 2002, **ISBN-13:** 978- 8174462039.
2. Kalakota Ravi and Whinston Andrew B, *Frontiers of Electronic Commerce*, Pearson Education India, 1996 New Delhi, **ISBN:** 978-81-7758-392-2.
3. Schneider, Grey P, *Electronic Commerce, Course Technology*, Cengage Learning, 2008, 8th Edition, New Delhi, **ISBN-13**:978-1-4239-0305-5.

IV B. Tech - I Semester

14BT6HS02: COST ACCOUNTING AND FINANCIAL MANAGEMENT

(OPEN ELETIVE)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: Concept of Risk and Returns on Investment.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1.Demonstrate Knowledge in

- Elements of Costing
- Basic concepts of Financial Management
- Risk and Return
- Financial Accounting
- Using advanced tools like tally and SAP
- Significance of Economics and Accountancy.

CO2. Do cost, risk and return of investment analysis.

CO3. Develop skills in providing solutions for

- Material, Labor, Overheads control
- Excellence and ability to minimize the cost of the organization
- Effective investment decisions.

CO4. Prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COST ACCOUNTING **(09 Periods)**

Cost and Cost Accounting, Scope, Objectives, Advantages and Disadvantages– Cost Accounting Vs Management Accounting – Elements of Costing– Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT-II: COST ANALYSIS (09 Periods)
Analysis of Cost – Preparation of cost sheet, Estimate, Tender and quotation (Simple problems) –Importance of Costing while pricing the products.

UNIT-III: STANDARD COSTING (09 Periods)
Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

UNIT-IV: FINANCIAL MANAGEMENT (09 Periods)
Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT-V:RISK AND RETURNS ON INVESTMENT (09 Periods)
Investment-Meaning and Definition- Concept of risk and returns-Investment Alternatives- Introduction to Behavioral Finance – Anomalies– Key Concepts– Anchoring – Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total Periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang, *Cost Accounting*, Kalyani Publishers, Ludhiana, 6th Edition, 2002.
2. James C Van Horne, *Financial Management and Policy*, Prentice-Hall of India/Pearson, 12th Edition, 2001 ISBN-10: 0130326577.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 10th Edition, 2010, ISBN-13: 9788125937142.

IV B.Tech - I Semester

14BT6HS03: ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in
- Schemes and Institutions Encouraging Entrepreneurship
- Basic Principles and Concepts of Accountancy
- Significance of Entrepreneurship.

CO2. (i) Develop analytical skills in understanding problems pertaining to
- Personal Excellence Through Financial and Professional Freedom
- Women Entrepreneurship acts as Contrivance in the Societal Development

(ii) Develop Critical Thinking and Evaluation Ability.

CO3. Generate Ideas for Formulating Business Plans.

DETAILED SYLLABUS:

UNIT–I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (09 Periods)

Concept of Entrepreneurship– Growth of Entrepreneurship in India - Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager – Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT–II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS (09 Periods)

Sources of Ideas – Methods of idea generation – Product Identification – Opportunity Selection – Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans – Significance – Formulation of Business Plan – Business Opportunities in Various Sectors – Common Errors in Business Plan Formulation – Project Report Preparation.

UNIT–III: MICRO AND SMALL ENTERPRISES (09 Periods)

Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics – Relationship between Micro and Macro Enterprises – Rationale behind Micro and Small Enterprises – Scope of Micro and Small Enterprises – Objectives of Micro Enterprises - Problems of Micro and Small Enterprises.

UNIT–IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (09 Periods)

Need for Institutional Finance **-** Commercial Banks - Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India Ltd. (IFCI) – Industrial Credit Investment Corporation of India Ltd. (ICICI)– State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) – Small Industries Development of Bank of India (SIDBI) – Need For Institutional Support – National Small Industries Corporation Ltd. (NSIC) – Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) – District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS)(Origin, Mission and credit facility/support).

UNIT–V: WOMEN ENTREPRENEURSHIP (09 Periods)

Concept of Women Entrepreneur - Functions of Women Entrepreneurs - Growth of Women Entrepreneurship in India - Challenges of Women Entrepreneurs- Programmes Supporting Women Entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural Entrepreneurship, Problems of Rural Entrepreneurship, Role of NGOs.

Total Periods: 45

TEXT BOOKS:

1. Dr.S.S.Khanka*, Entrepreneurial Development*, S. Chand and Company Ltd., Revised Edition, 2012, **ISBN**: 9788121918015.
2. Madhurima Lall & Shikha Sahai, *Entrepreneurship***,** Excel Books India, 2nd Edition 2008, **ISBN**: 9789350620953.

REFERENCE BOOKS:

1. Nandan.H, *Fundamentals of Entrepreneurship*, PHI Learning Pvt. Ltd., New Delhi, 3rd Edition, 2013, **ISBN**: 9788120347502.
2. Vasanth Desai, *The Dynamics of Entrepreneurial Development and Management*, Himalaya Publishing House, 4th Edition, 2009, **ISBN**: 9788183184113.
3. Bholanath Dutta, *Entrepreneurship Management* – Text and Cases, Excel Books, 1st Edition, 2009, **ISBN**: 9789350621257.

IV B.Tech - I Semester

14BT70105: DISASTER MITIGATION AND MANAGEMENT

(Open Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Natural Disasters and Hazards – Earthquakes – Floods and Cyclones, Droughts – Landslides – Disaster Management.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Explain various types of disasters and mitigation strategies.
CO2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis.
CO3. Use historical data of disaster losses and inform the people over preparedness.
CO4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society.
CO5. Function in multidisciplinary teams for the effective displacement of people during disasters.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (08 Periods)

Types of Disasters – Natural Disasters – Impact of Disasters on Environment – Infrastructure and Development – Concepts of Hazards and Vulnerability Analysis– Hazard Assessment – Guidelines for Hazard Assessment and Vulnerability Analysis – Basic Principles and Elements of Disaster Mitigation.

UNIT-II: EARTHQUAKES (11 Periods)

Introduction to Earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A.P. – Action plan for earthquake disaster preparedness – Elements at risk, Recovery and Rehabilitation after earthquake – Earthquake resistant design and construction of buildings. Tsunami – Onset, types and causes – Warning – Element at risk – Typical effects – Specific preparedness and mitigation strategies.

UNIT-III: FLOODS AND CYCLONES (11 Periods)

Onset, Types, Warnings – Elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards – Mitigation strategies and Community based mitigation.

DROUGHTS: Onset, Types and Warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India.

UNIT-IV: LANDSLIDES (07 Periods)

Onset, Types and Warning – Causes of landslides – Elements at risk – Indian land slides – Hazard zones – Typical effects – Mitigation strategies and community based mitigation.

UNIT-V: DISASTER MANAGEMENT (08 Periods)

Disaster Management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost – Benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods: 45

TEXT BOOKS:

1. V.K. Sharma, *Disaster Management,* National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth and Ankush Agarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians,* GOI–UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS:

1. *Disaster Management in India*, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh, *Natural Hazards and Disaster Management*, Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja & Uma Medury, *Disaster Mitigation*, 4th Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma, *Environment Engineering and Disaster Management,* 1st Edition, USP Publishers, 2011.

IV B.Tech - I Semester

14BT70106: ENVIRONMENTAL POLLUTION AND CONTROL

(Open Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution – Dispersion of Pollutants and their control – Surface and Ground Water Pollution and Control–Soil Pollution and remediation–Management of Municipal Solid Wastes.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Explain various pollutants, characteristics and their dispersion
CO2. Analyze the major pollutants that causes environmental pollution.
CO3. Conduct research and select suitable techniques to control pollution.
CO4. Understand the effects of environmental pollutions on human beings and vegetation.
CO5. Communicate the methods of management and control of environmental pollution.

UNIT-I: INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS (08 Periods)

Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non–Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT-II: EFFECTS AND CONTROL OF PARTICULATES (09 Periods)

Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources– Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT-III: WATER POLLUTION (10 Periods)

Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries – Drinking Water Quality Standards.

UNIT-IV: SOIL POLLUTION (09 Periods)

Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution–Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT-V: MUNICIPAL SOLID WASTE MANAGEMENT (09 Periods)

Introduction– Types of Solid Wastes– Principles of Excreta Disposal– Domestic Solid Waste Production– Collection of Solid Wastes– Transport of Solid Wastes– Management of Solid Wastes– Methods of Land Disposal– Sanitary Landfill– Composting– Incineration.

Total Periods: 45

TEXT BOOKS:

1. C.S.Rao, *Environmental Pollution Control Engineering*, 2nd Edition, New Age International Pvt. Ltd., 2007.
2. Y.Anjaneyulu, *Introduction to Environmental Science,* 1st Edition, BS Publications, 2009.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, *Air Pollution,* 19th Edition, Tata McGraw Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* 5th Edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar, *Environmental Pollution Monitoring and Control,* 2nd Edition, New Age International Pvt. Ltd., 2007.
4. S.Deswal and K.Deswal, *Environmental Science,* 2nd Edition, Dhanpat Rai & Co., 2011.

IV B.Tech - I Semester

14BT70107: CONTRACT LAWS AND REGULATIONS

(Open Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: —-

COURSE DESCRIPTION: Construction Contracts – Tenders – Arbitration – Legal Requirements – Labour Regulations.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:
CO1. Explain contract documents and tendering processes.
CO2. Analyze the legal issues in arbitration and in contracts documents.
CO3. Address the legal issues in collecting taxes.
CO4. Follow ethics while bidding, sale and purchase of property.
CO5. Develop and Prepare tender documents as per the standards.

DETAILED SYLLABUS:

UNIT-I: CONSTRUCTION CONTRACTS (09 Periods)
Indian Contracts Act – Elements of Contracts – Types of Contracts– Features – Suitability – Design of Contract Documents– International Contract Document and laws – Standard Contract Document – Law of Torts.

UNIT-II: TENDERS (09 Periods)
Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Financial Points of View – Two Cover System – Preparation of the Documentation – Contract Formation and Interpretation – Potential Contractual Problems – Price Variation Clause – Comparison of Actions and Laws – Subject Matter – Violations.

UNIT-III: ARBITRATION (09 Periods)
Arbitration – Comparison of Actions and Laws – Agreements – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Arbitration Disputes – Dispute Review Board.

UNIT-IV: LEGAL REQUIREMENTS (09 Periods)

Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations – Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT-V: LABOUR REGULATIONS (09 Periods)

Social Security – Welfare Legislation – Laws Relating to Wages, Bonus and Industrial Disputes – Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Maternity Benefit Act – Child Labour Act – Other Labour Laws.

Total Periods: 45

TEXT BOOKS:

1. G.C.V. Subba Rao *Law of Contracts I & II*, 11th Edition, S. Gogia & Co., 2011.
2. Jimmie Hinze, *Construction Contracts,* 2nd Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS:

1. Gajaria G.T, Kishore Gajaria, *Laws Relating to Building and Engineering Contracts in India*, 4th Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, *Civil Engineering Contracts and Estimates*, 3rd Edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, *Contracts and the Legal Environment for Engineers and Architects*, 7th Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, *Contract Law*, 1st Edition, Oxford University Press, 2011.

IV B.Tech - I Semester

14BT70108: PLANNING FOR SUSTAINABLE DEVELOPMENT

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Sustainable Development – Environment, Sciences and Sustainability – Sustainable Development Politics and Governance – Tools, Systems and Innovations for Sustainability – Communication and Learning for Sustainability.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate the knowledge of Planning, Environment, Tools and Systems for Sustainable Development.

CO2. Analyze the current challenges to sustainability.

CO3. Use theoretical frameworks and provide solutions to the real world sustainability issues.

CO4. Conduct awareness of contemporary issues on globalization in terms of sustainability.

CO5. Give recommendations for the sustainability issues and solutions using a holistic approach.

CO6. Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities.

CO7. Participate in decision making as individual and responsible for collective decision.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO SUSTAINABLE DEVELOPMENT (08 Periods)

Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals – Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies.

UNIT-II: ENVIRONMENT, SCIENCES AND SUSTAINABILITY (08 Periods)

Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies.

UNIT-III: SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE (10 Periods)

Governance and Democracy and Eco–Welfare – Global Civil Society and World Civil Politics – Civic Environmentalism – Policy Responses to Sustainable Development – Economics of Sustainability – Social Responsibility in Sustainability – National Action.

UNIT-IV: TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY (11 Periods)

Need for System Innovation – Transition and Co–Evolution – Theories and Methods for Sustainable Development – Strategies for Eco–Innovation – Ecological Foot Print Analysis – Socio Ecological Indicators – Eco Labels – Policy Programmes for System Innovation – Case Studies.

UNIT-V: COMMUNICATION AND LEARNING FOR SUSTAINABILITY (08 Periods)

Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies.

Total Periods: 45

TEXT BOOKS:

1. John Blewitt, *Understanding Sustainable Development*, Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, *An Introduction to Sustainable Development*, Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS:

1. Peter Rogers, Kazi F Jalal & John A Boyd, *An introduction to sustainable development*, Earth Scan Publications Ltd., 1st Edition, 2006.
2. Simon Dresner, *The Principles of Sustainability*, Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, *Environment Growth and Development: The Concepts and Strategies of Sustainability*, Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza & Maria Vittoria Giuliani, *People Places and Sustainability*, Hogrefe & Huber Publishers, 2nd Edition, 2003.

IV B.Tech - I Semester

14BT70109: RURAL TECHNOLOGY

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Research & Development – Non Conventional Energy – Community Development – IT Management.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.

CO2. Apply the principles of IT for the rural development.

CO3. Responsible for the development of technologies in rural areas.

CO4. Understand the impact of technologies in societal and environmental aspects.

DETAILED SYLLABUS:

UNIT-I: RESEARCH & DEVELOPMENT (09 Periods)

India – Ancient Indian Technologies – Rural India Life – Indian Farmer – Role of Science and Technology in Rural Development – Rural Technology and Poverty Eradication – Rural Business Hubs– Technology in improving rural infrastructure – Various organizations related to innovation – Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT-II: NON CONVENTIONAL ENERGY (09 Periods)

Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy– Solar energy– Solar Cooker– Solar Heater– Biogas– Recycling & Management and Wastes Conservation– Assessment & Production of biomass products & their utilization.

UNIT-III: TECHNOLOGIES FOR RURAL DEVELOPMENT (09 Periods)

Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT-IV: COMMUNITY DEVELOPMENT (09 Periods)

Water conservation – Rain water Harvesting – Drinking water – Environment and Sanitation – Bio fertilizers – Medical and Aromatic plants – Employment generating technologies – Api-culture – Piciculture – Aquaculture.

UNIT-V: IT IN RURAL DEVELOPMENT (09 Periods)

The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – Village adoptions schemes.

Total Periods: 45

TEXT BOOKS:

1. M.S Virdi, *Sustainable Rural Technologies*, Daya Publishing House, New Delhi, 1st Edition, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, *Technology and Rural India*, Serials Publications, New Delhi, 1st Edition, 2012.

REFERENCE BOOKS:

1. P. R. S. Murthy, R.C. Chackravarthy, *Information Technology & Rural Development*, Pacific Books International, 1st Edition, 2011.
2. Shivakanth Singh, *Rural Development Policies and Programmes,* Northern book centre, New Delhi, 1st Edition, 2002.
3. L.M.Prasad, *Principles and Practice of Management*, Sultan Chand & Sons, New Delhi, 8th Edition, 2014.
4. Venkata Reddy. K, *Agriculture and Rural Development Gandhian Perspective*, Himalaya Publishing House, 1st Edition, 2001.

IV B. Tech – I Semester

14BT60305: ARTIFICIAL INTELLIGENCE AND ROBOTICS

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.

CO2. Employ effective methods to analyze a robot motion control while executing a specific task.

CO3. Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve actions of a robot.

CO4. Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

DETAILED SYLLABUS:

UNIT-I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING **(10 Periods)**

The Underlying assumption of AI; AI Technique: Simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: Control Strategies, Search space control: Depth-first, Breadth-First search; Heuristic search: Hill climbing, Best-first search, Branch and Bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II: KNOWLEDGE REPRESENTATION & LEARNING (09 Periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, Resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; Slots; Conceptual dependency; Scripts; Non-Monotonic Reasoning, Probabilistic reasoning, Use of certainty factors, Fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT-III: ROBOTICS– VISION & SENSING (08 Periods)

ROBOTICS: Robot Classification, Robot Specification, Notation; Sensing: Range sensing: Triangulation; Proximity sensing: Inductive, Capacitive and Ultrasonic sensing; Touch sensing: Tactile sensing, Artificial skins; Force and Torque sensing: Wrist force sensors; Vision: Low-level vision, High-level vision.

UNIT-IV: ROBOT PROGRAMMING & CONTROL (10 Periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: Characteristics, Specifications; Task level languages; Language structure: VAL II.

UNIT-V: ROBOT INTELLIGENCE & TASK PLANNING (08 Periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; Graph search technique; Problem solving and problem reduction; Robot learning; Task planning: Modelling, Task specification, Obstacle avoidance, Grasp planning; Expert system.

Total Periods: 45

TEXT BOOKS:

1. E. Rich and K. Knight, *Artificial Intelligence*, Tata Mc Graw Hill, 2nd Edition, 1992.
2. K.S. Fu, R.C. Gonzalez & C.S.G. Lee, *Robotics: Control, Sensing, Vision and Intelligence*, McGraw Hill, International Edition, 1987.

REFERENCE BOOKS:

1. Mikell P. Groover, *Industrial Robotics, Technology, Programming, and Applications*, Tata Mc Graw Hill, 9th reprint 2011.
2. D.W. Patterson, *Introduction to AI and Expert Systems*, PHI, 1992.
3. N.J. Nilsson, *Principles of AI*, Narosa Publ., House, 2000.
4. George Luger, *Al-Structures and Strategies for and Strategies for Complex Problem solving*, Pearson Educations, 4th Edition, 2002.

IV B.Tech – I Semester

14BT60306: Global Strategy and Technology

(Open Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Strategic Management, strategic management process, Principles of good strategy, Globalisation, Globalisation strategies, Research & development strategies, Technology management and transfer, Significance, Elements of transfer process, Corporate governance: The Indian scenario.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Decide upon a Macroscopic Management Strategy to optimize the impact of decisions with limited resources.
CO2. Identify the Impact of Globalization in a given Engineering scenario. Participate in Elementary Discussions on Corporate Governance.
CO3. Analyse an Industrial Engineering Problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO STRATEGIC MANAGEMENT **(09 Periods)**

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT II: GLOBALISATION **(09 Periods)**

Meaning and Dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT-III: RESEARCH & DEVELOPMENT STRATEGIES

(09 Periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT-IV: TECHNOLOGY MANAGEMENT AND TRANSFER

TECHNOLOGY MANAGEMENT: (09 Periods)

Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

TECHNOLOGY TRANSFER: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT–V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO

(09 Periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – Owned business in India, Corporate Governance and the Indian Ethos.

Total Periods: 45

TEXT BOOKS:

1. Francis Cherunilam, *Stategic Management*, Himalaya Publishing House, 3rd Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, *Management of Technology*, Stategic Management, Himalaya Publishing House, 2nd Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, *The Management of Technology and Innovation; A Strategic Approach*, Cengage Learning, 1st Edition, 2007.
2. S.K.Mandak, *Ethics in Business and Corporate Governance*, TMH, 2nd Edition, 2012.

IV B.Tech –I Semester

14BT60307: Intellectual Property Rights & Management

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Protection of ideas, Innovation and artistic endeavors; Acts and procedure related to patents, Trademarks, Passing off, Copy right, Design registration, Trade secrets and cyber laws, Case studies in each.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Prepare documents and fill applications needed for filing a patent, design, copy right and trade mark.

CO2. Ensure smooth transition from concept to final product.

CO3. Exercise discretion in following ethical aspects in dealing with intellectual property rights.

DETAILED SYLLABUS:

UNIT–I: OVERVIEW OF INTELLECTUAL PROPERTY RIGHTS

(09 Periods)

Introduction and importance of intellectual property rights (IPRs), Types of Intellectual property, International scenario in IPR: WIPO, WTO, RIPS, International and National patent acts: United States of America patent act, United Kingdom patent act, India patent act, Recent amendments in India patent act 1972.

UNIT–II: PATENTS

(09 Periods)

Introduction, Basic concepts, Object and value of patent law, Advantages of patent to inventor, Patentable inventions, Not patentable inventions, 0verview of patent procedure, Bio technology patents, Patents on computer program, Patent rights on micro organism, Plant breeding and breeders right, Protection of bio diversity, Protection of traditional knowledge, Infringement of patents and remedy for infringement.

UNIT–III: TRADEMARKS (09 Periods

TRADE MARKS: Basic concepts, Definition, Functions, Kinds of trademarks: Service trademarks, Collective trademarks, Certification trademarks, Textile trade marks, Registrable and non registrable trademarks, Registration of trademarks, Examination process, Establishing trade mark right, Good will, Infringement and action for trademarks, Passing off, Trade mark and eco label, Comparison with patents industrial design and copy right.

UNIT-IV: INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (09 Periods)

INDUSTRIAL DESIGN: Basic concepts, Scope and nature of rights, Process of registration rights, Rights after registration, Transfer of interest or rights, Reliefs and remedies and action for infringement of rights, Appeals.

TRADE SECRETS: Definition, significance, Tools to protect trade secrets in India.

CYBER LAWS: Co-relation to intellectual property.

UNIT-V: COPY RIGHTS (09 Periods)

COPY RIGHTS: Introduction, Nature and scope, Subject matter, Related or allied rights, Works in which copy rights subsists, registration of copy rights, Conferred by copy right, Copy right protection in India, Transfer of copy rights, Right of broad casing organizations and of performer, Computer software.

Total Periods: 45

TEXT BOOKS:

1. P.Narayan, *Intellectual Property Law*, Eastern Law House, New Delhi and Kolkata, 2005.
2. Deborah E. Bouchoux, *Intellectual Property Rights*, Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, *Intellectual Property Rights: Key to New Wealth, National Research Development Corporation*, Pearson Education, New Delhi.
2. W.R.Cornesh, *Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights*, Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, *Law of Intellectual Property*, Asia law house, Hyderabad, 2001.
4. Prabuddha Ganguly, *Intellectual Property Rights: Unleasing Knowledge Economy*, TMH New Delhi, 1st edition, 2001.

IV B.Tech – I Semester

14BT60308: MANAGING INNOVATION AND ENTREPRENEURSHIP

(Open Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Evolution of Entrepreneurship from Economic Theory Managerial and Entrepreneurial Competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1: Define, Explain and Illustrate theories of Business innovation and entrepreneurship, the evolution of industries and economies and the roles of Entrepreneurs.

CO2: Develop a comprehensive and well structured business plan for a new venture.

CO3: Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan.

CO4: Work effectively in multidisciplinary, Cross-cultural teams towards the development of a Team Project.

UNIT-I: ENTREPRENEURSHIP (07 Periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, Entrepreneurial growth and Development.

UNIT-II: CREATIVITY AND INNOVATION (11 Periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process;

Innovative Strategies: Strategies that aim at introducing an innovation, Innovation & entrepreneurship, Planning -incompatible with Innovation & Entrepreneurship.

UNIT-III: THE INDIVIDUAL ENTREPRENEUR (07 Periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus Inventors.

UNIT-IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 Periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, Strategic Issues in International Entrepreneurship.

UNIT-V: CREATIVE PROBLEM SOLVING (09 Periods)

Problem Identification and Problem Solving: Problem Identification, Problem solving Innovation and Diversification.

Total Periods: 45

TEXT BOOKS:

1. Martin, M.J., *Managing Innovation and Entrepreneurship in Technology based Firm*, John Wiley Interscience, 1994.
2. Ettlie, J.E., *Managing Technology Innovation*, John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd, *Entrepreneurship,* The McGraw-Hill Companies, 6th Edition, 2011.

REFERENCE BOOKS:

1. Christensen, C. M. and Raynor, M. E. *The Innovators Solution: Creating and Sustaining Successful Growth*, Boston, MA: Harvard Business School Press, 2003.
2. Drucker, P. F., *Innovation and Entrepreneurship*, New York: Harper, 1985.
3. *Harvard Business Review on Innovation* (Collection of articles), Harvard Business School Press 2001.
4. *Harvard Business Review on Entrepreneurship* (Collection of articles), Harvard Business School Press 1999.
5. Rogers, E.M., *Diffusion of Innovations*, New York: Simon and Schuster, 5th Edition, 2003.
6. Drucker, P. F. *The Discipline of Innovation*, Harvard Business Review, May, 2000. (Originally published 1985, May-June).

IV B.Tech – I Semester

14BT60309: MATERIALS SCIENCE

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES:

Courses on Engineering Chemistry, Engineering Physics.

COURSE DESCRIPTION:

Structure and Bonding in metals; Steels, Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics Engineering, Material Selection and Manufacturing of Optical fibers.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Understand how materials are formed and their classification based on atomic arrangement.

CO2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.

CO3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO MATERIALS SCIENCE **(07 Periods)**

Structure of Metals: Bonds in Solids – Metallic bond - Crystallization of metals, Grain and grain boundaries, Effect of grain boundaries on the properties of metal / alloys – Determination of grain size.

Constitution of alloys: Necessity of alloying, Types of solid solutions, Hume Rotherys rules, Intermediate alloy phases and Electron compounds.

UNIT – II: CAST IRONS, STEELS & NON-FERROUS METALS
(12 Periods)

Structure and Properties of White Cast iron, Malleable Cast iron, Grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, Structure and Properties of plain carbon steels. Structure and Properties of Copper and its alloys, Aluminum and its alloys.

UNIT – III: ELECTRIC CONDUCTORS & INSULATORS
(12 Periods)

Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics- Bonding and microstructure-DC properties of ceramic materials–AC properties– Mechanical Properties - Ceramics as Conductors, Insulators and Capacitors, Introduction to Plastics-DC properties-AC properties-Mechanical properties.

UNIT – IV: SEMICONDUCTORS AND MAGNETIC MATERIALS
(09 Periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring Magnetic properties-Application of soft magnetic materials in Electromagnets and Relays, AC transformers, Generators and Motors.

UNIT –V: ADVANCED MATERIALS AND APPLICATIONS
(05 Periods)

Composites – Fiber reinforced, Metal Matrix, Ceramic Matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses– properties and applications, Manufacturing of Optical fibers.

Total Periods: 45

TEXT BOOKS:

1. Kodigre V D, *Material Science and Metallurgy*, Everest Publishing House, Pune, 31st edition, 2011.
2. Ian.P.Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, New Delhi,2000.

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices,* PHI, New Delhi, 2nd edition, 2006.
2. William. D. Callister, *Materials Science & Engineering-An Introduction,* John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. Dekkar, *Electrical Engineering Materials*, PHI, New Delhi, 1970.

IV B. Tech – I Semester

14BT60502: ENGINEERING SYSTEMS ANALYSIS AND DESIGN

(Open-Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION:
Overview of the Systems Process, Technologies for systems, System Development Life Cycle, System Analysis and Modeling, Levels of management, Project Management, Systems Implementation and Importance of UML Prototyping, Maintaining and Managing the Systems Output Process.

COURSE OUTCOMES:
On successful completion of the course, the students will be able to:
CO1. Demonstrate knowledge on:
- Systems Process and System Design
- Systems Analysis and Modeling
- System Development Life Cycle
- Design Management and Maintenance Tools.

CO2. Apply the CASE Tools for System Process and Estimation the given models.
CO3. Design, Develop and Implement new Techniques for modeling the systems.
CO4. Work effectively as Team member on Projects.
CO5. Manage and Maintain the System Process.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (09 Periods)
Introduction- Systems, Types of systems, Integrating technologies for systems, Need for system analysis and design, Roll of the systems analyst, The system development life cycle, CASE tools for analysis and design.

UNIT-II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (09 Periods)
Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, Levels of management, Organizational culture.

UNIT-III: PROJECT MANAGEMENT (09 Periods)

Project Initiation, Problem in organization, Determining feasibilities, Ascertaining hardware and software needs, Identifying, Forecasting, Comparing costs and benefits, Activity planning and control, Managing the project.

UNIT-IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (09 Periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, Functional modeling, Packages and other UML artifacts, The importance of using UML for modeling.

UNIT-V: DESIGNING EFFECTIVE OUTPUT (09 Periods)

Output design objectives, Relating output content to output method, Realizing how output bias affects users, Designing output for display, Case studies- Designing a web site management, Online exam management.

Total Periods: 45

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, *System analysis and Design*, 8th Edition, Pearson Education, India, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom and Roth, *Systems Analysis and Design,* 5th Edition, John Wiley, 2012.
2. Shelly and Rosenblatt, *Systems Analysis and Design,* 9th Edition, Cengage Learning, 2012.

IV B. Tech. – I Semester

14BT71005: MICROELECTROMECHANICAL SYSTEMS

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Basic knowledge in Physics.

COURSE DESCRIPTION: Overview of Micro Electro Mechanical Systems (MEMS), Scaling laws, Working principles of microsensors and microactuators, Materials, Microfabrication processes, Packaging of Microsystems.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on MEMS devices, Scaling Laws, Microsensors and Microactuators.

CO2. Identify the Suitable Materials, Fabrication Techniques, Packaging Methodologies to Develop MEMS devices.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF MEMS AND SCALING LAWS **(09 Periods)**

Introduction, MEMS and Microelectronics, Miniaturization, Applications of MEMS in the automotive industry and in other industries.

Scaling Laws of Miniaturization: Introduction to scaling, Scaling in: Geometry, Rigid-body dynamics, Electrostatic forces, Electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT-II: **WORKING PRINCIPLES OF MICROSYSTEMS** **(09 Periods)**

Microsensors, Acoustic wave sensors, Biomedical and Biosensors, Chemical sensors, Pressure sensors, Thermal sensors. Microactuation: Actuation using thermal forces, Shape-memory alloys, Piezoelectric crystals, Electrostatic forces. MEMS with Microactuators, Microgrippers, Micromotors, Microvalves, Micropumps. Microaccelerometers, Microfludics.

UNIT-III: MATERIALS FOR MEMS AND MICROSYSTEMS **(09 Periods)**

Substrate and Wafers, Silicon as a substrate material, Silicon compounds, Silicon piezoresistors, Gallium arsenide, Quartz, Piezoelectric crystals, Polymers, Carbon Nano Tube (CNT), Development of CNTs, Application of CNTs.

UNIT-IV: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (09 Periods)

Photolithography, Ion implantation, Diffusion, Oxidation, Chemical Vapor Deposition, Physical Vapor Deposition, Deposition by Epitaxy, Etching, Bulk micromanufacturing, Surface micromanufacturing, LIGA process.

UNIT-V: MEMS PACKAGING (09 Periods)

Introduction to Microsystem packaging, Objectives and General considerations in packaging design, Three levels of microsystem packaging, Interfaces in microsystem packaging, Packaging technologies, Three-dimensional packaging, Selection of packaging materials, Signal mapping and transduction, Design case: Pressure sensor packaging.

Total Periods: 45

TEXT BOOKS:

1. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw Hill Education, India Pvt. Ltd., 2002.

REFERENCE BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, *Micro and Smart Systems*, Wiley India, Ist edition, 2010.
2. Nitaigour Premchand Mahalik, *MEMS*, McGraw Hill Education India Pvt. Ltd., eighth reprint, 2013.

IV B. Tech – I Semester

14BT61205: BIO INFORMATICS

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and Dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on concepts of Biological databases, Genome and Proteome.

CO2. Analyze biological database management system.

CO3. Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (08 Periods)

Internet basics, Scope of bioinformatics, Elementary commands and protocols, FTP, Telnet, http, Primer on information theory, Introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (07 Periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 Periods)

Heuristic alignment algorithms, Global sequence alignments- Needleman-Wunsch algorithm, Local sequence alignments- Smith-Waterman algorithm, Amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and Phylogenetic analysis.

UNIT-IV: PRIMARY DATABASES AND THEIR USE (11 Periods)

Introduction to Biological databases- Organization and management, Searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), Primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES (09 Periods)

Introduction to secondary databases- Organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-Organization and Management of databases, KEGG, ExPASy, BRENDA.

Total Periods: 45

TEXT BOOKS:

1. David W. Mount, *Bioinformatics: Sequence and Genome Analysis*, CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics, Applications in Biological Science and Medicine*, CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, *Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery*, PHI Learning Pvt. Ltd.,3rd edition, 2011.

IV B.Tech – I Semester

14BT61206: CYBER SECURITY AND LAWS

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.

CO2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.

CO3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CYBER CRIMES (09 Periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Cafe and Crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME (09 Periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT-III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (08 Periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT-IV: CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS (10 Periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations – Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT-V: CYBER TERRORISM AND INFORMATION WARFARE (09 Periods)

Introduction, Intellectual Property in the Cyber Space, The Ethical Dimension of Cyber Crimes, The Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice Vs Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total Periods: 45

TEXT BOOKS:

1. Nina Gobole, Sunit Belapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,* Wiley India, 1st edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., *Cyber Law: Text and Cases,* Cengage Learning, 3rd edition, 2012.
2. Vivek Sood, *Cyber Law Simplified,* Tata McGraw Hill, 1st edition, 2012.
3. Prashant Mali, *Cyber Law and Cyber Crimes,* Snow White Publications Pvt. Ltd., 1st edition, 2013.

IV B. Tech – I Semester

14BT70404: ADVANCED DIGITAL SIGNAL PROCESSING

(PE-II)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Course on Digital Signal Processing.

COURSE DESCRIPTION:
Design of digital filter banks; Power spectral estimation; Digital signal processing algorithms; DSP applications.

COURSE OUTCOMES:
On successful completion of the course, the students will be able to:
CO1. Demonstrate knowledge in

- Filter banks and Wavelets
- Efficient power Spectral Estimation Techniques
- Adaptive filters
- Applications of Multirate signal processing.

CO2. Analyze complex engineering problems critically for conducting research in Adaptive filter design.
CO3. Design and develop digital filters and multirate systems to optimize system performance and their realization.
CO4. Solve engineering problems by designing computationally efficient DSP algorithms for feasible and optimal solutions in digital signal processing field.

DETAILED SYLLABUS:

UNIT I: MULTIRATE FILTER BANKS (10 Periods)

Decimation, Interpolation, Sampling rate conversion by a rational factor I/D, Multistage Implementation of sampling rate conversion. **Digital Filter Banks**: Two-Channel Quadrature-Mirror Filter Bank, Elimination of aliasing, Condition for Perfect Reconstruction, Polyphase form of QMF bank, Linear phase FIR QMF bank, IIR QMF bank, Perfect Reconstruction of Two-Channel FIR QMF Bank .

UNIT II: POWER SPECTRAL ESTIMATIONS (08 Periods)

Estimation of spectra from finite duration observation of signals. **Non-Parametric Methods**: Bartlett, Welch, Blackmann & Tukey Methods. Performance Characteristics of Nonparametric Power Spectrum Estimators, Computational Requirements of Nonparametric Power Spectrum Estimates.

UNIT-III: PARAMETRIC METHODS OF POWER SPECTRAL ESTIMATION (09 Periods)

Autocorrelation & Its Properties, Relation between auto correlation & model parameters, Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT-IV: DSP ALGORITHMS (09 Periods)

Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

UNIT-V: APPLICATIONS OF DIGITAL SIGNAL PROCESSING (09 Periods)

Digital cellular mobile telephony, Adaptive telephone echo cancellation, High quality A/D conversion for digital Audio, Efficient D/A conversion in compact hi-fi systems, Acquisition of high quality data, Multirate narrow band digital filtering, High resolution narrow band spectral analysis.

Total Periods: 45

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* Prentice Hall, 4th Edition, 2007.
2. Sanjit K Mitra, *Digital signal processing, A computer base approach,* McGraw Hill Higher Education, 4th Edition, 2011.

REFERENCE BOOKS:

1. Emmanuel C Ifeacher Barrie. W. Jervis, *DSP-A Practical Approach*, Pearson Education,2nd Edition, 2002.
2. A.V. Oppenheim and R.W. Schaffer, *Discrete Time Signal Processing,* PHI, 2nd Edition, 2006.

IV B. Tech – I Semester

14BT70405: DIGITAL CMOS IC DESIGN

(PE-II)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Digital IC Applications and VLSI Design.

COURSE DESCRIPTION: Design styles and characteristics of CMOS digital circuits; Transistor sizing and memory design; Design strategies; Layout design rules; Design of sub-systems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate advanced knowledge in

- Static and dynamic characteristics of CMOS
- Alternative CMOS Logics
- Transistor sizing
- Adders Design
- Design rules to develop layouts
- Estimation of Delay and Power.

CO2. Analyze complex engineering problems critically in the domain of CMOS Digital Integrated Circuits for conducting research.

CO3. Solve engineering problems for feasible and optimal solutions in the core area of CMOS Digital ICs.

DETAILED SYLLABUS:

UNIT-I: CMOS INVERTERS CHARACTERSTICS and DESIGN STYLES (08 Periods)

Static and Dynamic characteristics, Static and Dynamic CMOS design-Domino and NORA logic - Combinational and Sequential circuits.

UNIT-II: **HIGH SPEED NETWORK AND MEMORY DESIGN (09 Periods)**

Methods of Logical Effort for transistor sizing - Power consumption in CMOS Gates, Low power CMOS design. CMOS Memory design – SRAM, DRAM.

UNIT-III: **DESIGN METHODOLOGY AND TOOLS (10 Periods)**

Introduction, Structured Design Strategies, Design Methods, Design Flows, Design Economics, Data Sheets and Documentation.

UNIT-IV: **LAYOUT DESIGN RULES (10 Periods)**
Need for Design Rules, Mead Conway Design Rules for the Silicon Gate NMOS Process, CMOS Based Design Rules, Simple Layout Examples, Sheet Resistance, Area Capacitance, Wire Capacitance, Drive Large Capacitive Load**.**

UNIT-V: **SUBSYSTEM DESIGN PROCESS (08 Periods)**
General arrangement of 4-bit Arithmetic Processor, Design of 4-bit shifter, Design of ALU sub-system, Implementing ALU functions with an adder, Multipliers, Modified Booth's algorithm.

Total Periods: 45

TEXT BOOKS:

1. Eugene D Fabricus, *Introduction to VLSI Design*, McGraw Hill International Edition, 1990.
2. Kamran Eshranghian, Douglas A.Puknell and Sholh Eshranghian, *Essential of VLSI Circuits and Systems*, PHI, 1st Edition, 2005.
3. Neil H. E. Weste, David Money Harris, *CMOS VLSI Design-A Circuit and Systems Perspective*, Pearson 4th Edition, 2011.

REFERENCE BOOKS:

1. John P.Uyemura, *Introduction to VLSI Circuits and Systems*, Wiley Edition, 2002.
2. Sung-Mo Kang & Yusuf Leblebici, *CMOS Digital Integrated Circuits-Analysis & Design*, McGraw Hill, 2nd edition, 1999.
3. Jan M Rabaey, *Digital Integrated Circuits-A Design Perspective*, Prentice Hall, 1st Edition, 1997.

IV B. Tech – I Semester

14BT70406: TELECOMMUNICATION SWITCHING SYSTEMS

(PE – II)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Analog & DigitalCommunications.

COURSE DESCRIPTION:
Overview of telecommunication switching systems, telephone networks, signaling techniques in telephone networks, ISDN, DSL technology and SONET.

COURSE OUTCOMES:
On successful completion of the course, the students will be able to:
CO1.Demonstrate fundamental knowledge in:

- Switching systems
- Subscriber loop systems, numbering plan, charging plan and transmission plan
- Signaling techniques and traffic in the context of telecommunication network
- Integrated Services Digital Network (ISDN)
- Frame relay and ATM
- DSL technologies and SONET networks.

CO2. Perform analysis of traffic load parameters like blocking probability and grade of service.
CO3. Solve engineering problems pertaining to telecommunications.

DETAILED SYLLABUS:

UNIT-I: PRINCIPLES AND EVOLUTION OF SWITCHING SYSTEMS (13 Periods)

Evolution of telecommunications, Simple telephone communication, Basics of a switching system, Manual switching system, Crossbar switching, Electronic space division switching, Time division switching, Combination switching.

UNIT-II: TELEPHONE NETWORKS (06 Periods)

Subscriber loop systems, Switching hierarchy and routing, Transmission plan, Numbering plan, Charging plan.

UNIT-III: SIGNALLING TECHNIQUES (06 Periods)
In-channel signaling, common channel signaling, Network traffic load and parameters, Grade of service and blocking probability.

UNIT-IV: DATA NETWORKS (12 Periods)
Data transmission in PSTNs, Switching techniques for data transmission, Motivation for ISDN, Services, network and protocol architecture, Transmission channels and user network interfaces, Signaling , Numbering and addressing, ISDN standards ,Broadband ISDN, Introduction to the basic principles of frame relay, ATM.

UNIT-V: (08 Periods)
DSL TECHNOLOGY: ADSL, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS.
SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries.

Total Periods: 45

TEXT BOOKS:

1. Thyagarajan Viswanath, *Telecommunication Switching Systems and Networks*, PHI, 2008.
2. B.A. Forouzan, *Data Communication & Networking*, TMH, 4th Edition, 2007.

REFERENCE BOOKS:

1. Wayne Tomasi, *Advanced electronic communications systems*, Pearson Education, 6th Edition, 2004.
2. Achyut. S .Godbole, *Data Communications & Networks*, TMH, 2004.

IV B.Tech - I Semester

14BT51501: OPERATING SYSTEMS

(PE-II)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Computer Organization.

COURSE DESCRIPTION:
Operating systems operations, Scheduling; Critical section problem, Deadlocks; Paging, Segmentation; File Concept, Disk scheduling; I/O interface, Concepts of Protection.

COURSE OUTCOMES:
On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on Operating system operations, Services, I/O management and protection.

CO2. Analyze

- CPU scheduling algorithms
- Synchronization issues
- Disk scheduling algorithms
- Memory allocation algorithms
- Page replacement algorithms
- File and Directory maintenance.

DETAILED SYLLABUS:

UNIT-I: OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT (09 Periods)

Operating systems operations, Distributed systems, Special purpose systems, Operating systems services, System calls, Operating system structure.

Process Management: Process scheduling, Operations on process, Inter process communication, Multi threading models, Threading issues, Scheduling criteria, Scheduling algorithms - First come first served, Shortest-job-first, Priority, Round-robin, Multilevel queue, Multilevel feedback queue.

UNIT-II: SYNCHRONIZATION AND DEADLOCKS (10 Periods)

Synchronization: The critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlock recovery.

UNIT-III: MEMORY MANAGEMENT (09 Periods)

Memory-Management Strategies: Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Demand paging, Copy-on-Write, Page replacement, Allocation of frames, Thrashing.

UNIT-IV: STORAGE MANAGEMENT (08 Periods)

File System: File Concept, Access methods, Directory structure, File system structure, File system implementation, Directory implementation, Allocation methods.

Secondary Storage Structure: Disk structure, Disk attachment, Disk scheduling, Swap-space management, Stable-storage implementation, Tertiary storage structure.

UNIT-V: I/O SYSTEMS AND PROTECTION (09 Periods)

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights.

Total periods: 45

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, *Operating System Principles*, 7th Edition, Wiley India Edition, 2011.

REFERENCE BOOKS:

1. William Stallings, *Operating Systems, Internals and Design Principles*, 7th Edition, Pearson Education, 2013.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 3rd Edition, PHI, 2009.

IV B. Tech – I Semester

14BT70421: DIGITAL SIGNAL PROCESSING LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: A Course on Digital Signal Processing.

COURSE DESCRIPTION: Implementation of Convolution; DFT and FFT; Design of Analog FIR and IIR filters.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate simulation of basic concepts and algorithms such as convolution, DFT, FFT in signal processing using CCS.

CO2. Design and simulation of Digital and Analog filters such as IIR, FIR.

CO3. Solve engineering problems for feasible and optimal solutions in the core area of signal processing.

CO4. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

LIST OF EXPERIMENTS:

(Minimum of Twelve experiments to be conducted)

1 To verify linear convolution on DSP Processors.
2 To verify the circular convolution on DSP Processors.
3 To verify N-point DFT & IDFT on DSP Processors.
4 To verify N-point FFT algorithm on DSP Processors.
5 To design FIR filter (LP/HP/BP/BR) using windowing technique
   a) Using Rectangular window
   b) Using Triangular window
6 To design FIR filter (LP/HP/BP/BR) using windowing technique
   a) Using Hamming window
   b) Using Hanning window
   c) Using Blackmann window
7 To design FIR filter (LP/HP/BP/BR) using Kaiser window.
8 To find the frequency response of analog Butterworth prototype filters (LP/HP/BP/BR).
9 To find the frequency response of analog Chebyshev prototype filters (LP/HP/BP/BR).
10 To Implement IIR Butterworth filter (LP/HP/BP/BR) using transformation techniques.
11 To Implement IIR Chebyshev filter (LP/HP/BP/BR) using transformation techniques.
12 Design of FIR filters using frequency sampling method.

IV B. Tech - I Semester

14BT70422: MICROWAVE AND LIGHT WAVE COMMUNICATIONS LAB

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on Microwave Engineering and Light wave communications.

COURSE DESCRIPTION:
Design and study of various Microwave and Light wave communication circuits, Characteristics of Microwave power supplies and components, Optical fibers and sources.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze the characteristics and working of various microwave components like attenuators, directional couplers, Horn antennas etc.
CO2. Simulate and design various Lightwave communication circuits and study their characteristics.
CO3. Solve problems given in Lightwave and microwave communication systems.

LIST OF EXPERIMENTS:
Minimum Twelve Experiments to be conducted:

Part – A (Any 6 Experiments):
1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Attenuation Measurement
4. Directional Coupler Characteristics
5. VSWR Measurement
6. Impedance Measurement
7. Waveguide parameters measurement
8. Scattering parameters of Circulator.

Part – B (Any 6 Experiments):
1. Characterization of LED
2. Characterization of Laser diode
3. Intensity modulation of Laser output through an optical fiber
4. Measurement of Data rate for Digital optical link
5. Measurement of Numerical Aperture
6. Measurement of losses for Analog optical link
7. Demonstration of Optical Simulator.

IV B. Tech – I Semester
14BT70423: **SEMINAR**

Int. Marks: - Ext. Marks: 50 Total Marks: 50

L	T	P	C
-	-	-	2

PREREQUISITES: All the courses of the program up to III B. Tech.–I Semester.

COURSE DESCRIPTION: Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate in-depth knowledge on the seminar topic.
CO2. Analyze critically, Chosen seminar topic for substantiated conclusions.
CO3. Undertake investigation of issues related to seminar topic providing valid conclusions.
CO4. Function effectively as individual on the chosen seminar topic.
CO5. Develop communication skills, both oral and written for preparing and presenting seminar report.
CO6. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech - II Semester

14BT5HS02: MANAGEMENT SCIENCE

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Concepts of Management; Evolution of thought of Management; Functions of Management; Environmental Scanning; SWOT analysis; Social Responsibility of Management; Operations Management; Forecasting Methods; Work study; Method Study; Work measurement; Statistical Quality Control; Inventory Management; Marketing; Marketing functions; Human Resource Management; Job evaluation; Merit rating; Theories of motivation; Project Management; CPM; PERT; Project cost analysis; Project crashing; Entrepreneurship; Entrepreneur Vs Manager; Contemporary Management practices; Just-in-time; Enterprise Resource Planning; Business Process Outsourcing; Intellectual property rights and Supply chain management.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.

CO2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.

CO3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.

CO4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.

CO5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe and sustainable operations of the business.

DETAILED SYLLABUS:

UNIT-I:INTRODUCTION TO MANAGEMENT AND ORGANIZATION (09 Periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations - Merits, demerits and adoptability to modern firms.

UNIT-II: OPERATIONS MANAGEMENT (12 Periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory - Classical EOQ model- ABC analysis - Purchase procedure - Stores management. Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT-III:HUMAN RESOURCES MANAGEMENT (HRM) (06 Periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT-IV:PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (09 Periods)

Network analysis - Program evaluation and review technique (PERT)- Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing. Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT-V: CONTEMPORARY MANAGEMENT PRACTICES

(09 Periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO)-Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making.

Total Periods: 45

TEXT BOOKS:

1. O.P. Khanna, Industrial Engineering and Management, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, Management, 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, Marketing Mangement, 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, Essentials of Management, 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, Quantitative Techniques in Management, 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, Management- A Global Perspective,10th Edition, McGraw-Hill International.

IV B.Tech - II Semester

14BT80401: CELLULAR AND MOBILE COMMUNICATIONS

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Analog and Digital Communications and Antennas.

COURSE DESCRIPTION: Concepts of cellular systems; Lee-model for cellular coverage; Desired C/I; Interference and reduction techniques; Frequency management in cellular systems; Handoff techniques; Various modulation techniques and Multiple Access techniques; 2G Systems-GSM, IS-95.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Cellular systems
- Interference and cell coverage in Cellular systems
- Handoffs and Dropped calls
- Modulation techniques for cellular systems
- 2G and 3G Wireless communication systems.

CO2. Analyze low interference cellular systems.

CO3. Design omni-directional and directional antenna systems.

CO4. Solve engineering problems with wide range of solutions in cellular communications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CELLULAR MOBILE SYSTEMS (10 Periods)

A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, overview of generations of cellular systems.

ELEMENTS OF CELLULAR RADIO SYSTEMS DESIGN AND INTERFERENCE

General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems, Introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.

UNIT-II: CELL COVERAGE FOR SIGNAL & ANTENNA STRUCTURES (09 Periods)

General introduction, obtaining the mobile point to point model, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model - characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation, Characteristics of basic antenna structures, antenna at cell site, mobile antennas.

UNIT- III: FREQUENCY MANAGEMENT & CHANNEL ASSIGNMENT, HAND OFF & DROPPED CALLS (05 Periods)

Frequency Management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

UNIT-IV: MODULATION METHODS AND CODING FOR ERROR DETECTION AND CORRECTION (08 Periods)

Modulation methods in cellular wireless systems, OFDM, Block Coding, Convolution coding and Turbo coding.

UNIT-V: MULTIPLE ACCESS TECHNIQUES (13 Periods)

FDMA, TDMA, CDMA: Time-Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), CDMA capacity, Probability of bit error considerations, CDMA compared with TDMA.

SECOND GENERATION DIGITAL WIRELESS SYSTEMS

GSM, IS-136 (D-AMPS), IS-95, Mobile Management, Voice Signal Processing and Coding, Introduction to 3G.

Total Periods: 45

TEXT BOOKS:

1. William C. Y. Lee, *Mobile Cellular Telecommunications*, McGraw Hill, 2nd Edition, 1990.
2. Mischa Schwartz, *Mobile Wireless Communications*, Cambridge University Press, UK, 2005.

REFERENCE BOOKS:

1. *Mobile Communication Hand Book*, IEEE Press, 2nd Edition.
2. Theodore S Rappaport, *Wireless Communication Principles and Practice*, Pearson Education, 2nd Edition, 2002.
3. Lawrence Harte, *3G Wireless Demystified*, McGraw Hill Publications, 2001.

IV B. Tech - II Semester

14BT80402: MIXED SIGNAL DESIGN

(PE-III)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on Analog IC Design.

COURSE DESCRIPTION: Switched Capacitor Integrated Circuits; Biquad Filters; Charge Pump PLL; Delay Locked Loops; Nyquist rate D/A & A/D Converters; Oversampling Converters.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate in-depth knowledge in
- Switched Capacitor Circuits
- PLL
- Data Converters - ADC and DAC.

CO2. Analyze complex engineering problems critically for conducting research in Data Converters for Communication Systems.

CO3. Design and Develop Switched Capacitor Circuits and PLL.

CO4. Solve engineering problems with wide range of solutions to increase Data Rate of ADC and DAC.

DETAILED SYLLABUS:

UNIT-I: SWITCHED CAPACITOR CIRCUITS (10 Periods)

Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing, Biquad filters.

UNIT-II: PHASED LOCK LOOP (PLL) (08 Periods)

Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs-PFD/CP non-idealities, Jitter in PLLs, Delay Locked Loops, applications.

UNIT-III: DATA CONVERTER FUNDAMENTALS (10 Periods)

DC and dynamic specifications, Quantization noise, Nyquist rate D/A Converters- Decoder based Converters, Binary-Scaled Converters, Thermometer-code Converters, Hybrid Converters.

UNIT-IV: NYQUIST RATE A/D CONVERTERS (08 Periods)
Successive Approximation Converters, Flash Converter, Two-step A/D Converters, Interpolating A/D Converters, Folding A/D Converters, Pipelined A/D Converters, Time-Interleaved Converters.

UNIT-V: OVERSAMPLING CONVERTERS (09 Periods)
Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multibit quantizers, Delta sigma D/A.

Total Periods: 45

TEXT BOOKS:

1. Behzad Razavi, *Design of Analog CMOS Integrated Circuits*, TMH Edition, 2008.
2. Philip E. Allen and Douglas R. Holberg, *CMOS Analog Circuit Design*, Oxford University Press, International 2nd Edition/ Indian Edition, 2010.
3. David A. Johns, Ken Martin, *Analog Integrated Circuit Design*, Wiley Student Edition, 1997.

REFERENCE BOOKS:

1. Rudy Van De Plassche, *CMOS Integrated Analog-to-Digital and Digital-to-Analog converters*, Kluwer Academic Publishers, 2007.
2. Richard Schreier, *Understanding Delta-Sigma Data converters*, Wiley Interscience, 2005.
3. R. Jacob Baker, *CMOS Mixed-Signal Circuit Design*, Wiley Interscience, 2014.

IV B.Tech - II Semester

14BT80403: SATELLITE COMMUNICATIONS

(PE - III)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Analog Communications and Digital Communications.

COURSE DESCRIPTION: Orbital Aspects; Satellite Subsystems; Satellite Link Design; Earth Station Technology; Multiple Access; Orbit Considerations; Global Positioning System.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Basic concepts of satellite communications
- Satellite Orbits and Sub-Systems
- Satellite link design
- Earth station subsystems
- FDMA, TDMA, CDMA
- Geostationary satellite systems
- Satellite navigation and global positioning system.

CO2. Perform analysis of complex engineering problems pertaining to satellite systems.

CO3. Design and develop satellite links.

CO4. Solve engineering problems with feasible and economical solutions in satellite communications.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION, ORBITAL MECHANICS AND LAUNCHERS (09 Periods)

Origin of Satellite Communications, Historical Background, Basic Concepts of Satellite Communications, Frequency Allocations for Satellite Services, Applications, Future Trends of Satellite, Orbital Mechanics- Kepler's Laws of planetary motion, Look Angle Determination, Orbit Determination. Launches and Launch Vehicles, Orbital Perturbations, Orbital Effects in Communication Systems Performance.

UNIT-II: SATELLITE SUBSYSTEMS AND SATELLITE LINK DESIGN (10 Periods)

Satellite Subsystems - Attitude and Orbital Control System, Telemetry, Tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite Antennas. Equipment Reliability and Space Qualification, Basic Transmission Theory, System Noise Temperature and G/T ratio, Design of Uplink and Down Links, Design of Satellite Links for specified C/N, System Design examples.

UNIT-III: EARTH STATION SUBSYSTEMS AND MULTIPLE ACCESS (09 Periods)

EARTH STATION: Introduction, Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Primary Power and Test Methods.

MULTIPLE ACCESS: Frequency Division Multiple Access (FDMA), Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) Frame Structure, Examples, Satellite Switched TDMA Onboard Processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.

UNIT-IV: LOW EARTH ORBIT AND NON-GEOSTATIONARY SATELLITE SYSTEMS (08 Periods)

Orbit Consideration, Coverage and Frequency Considerations, Delay and Throughput Considerations, System Considerations, Operational NGSO Constellation Designs and comparisons.

UNIT-V: SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM (09 Periods)

Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, Timing Accuracy, GPS Receiver Operation, GPS C/A Code Accuracy.

Total Periods: 45

TEXT BOOKS:

1. Timothy Pratt, Charles W Bostian and Jeremy E Allnutt, WSE, *Satellite Communications*, Wiley publications, 2nd Edition, 2010.
2. Wilbur L.Pritchard, Henri G.Suyderhoud and Robert A. Nelson, *Satellite Communication Systems Engineering*, Pearson Publications, LPE, 2nd Edition, 2008.

REFERENCE BOOKS:

1. Dennis Roddy, *Satellite communications*, McGraw Hill, 4th Edition, 2009.
2. K. N. Raja Rao, *Fundamentals of Satellite communication*, Prentice Hall of India Pvt. Ltd, 2006.

IV B. Tech - II Semester

14BT80531: WIRELESS SENSOR NETWORKS

(PE-III)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on Cellular and Mobile Communications.

COURSE DESCRIPTION: Concepts of wireless sensor networks; Physical, Data link, Network and Transport layers.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in fundamentals of Wireless Sensor Networks and WSN layers
- Physical layer
- Data link layer
- Network layer
- Transport layer.

CO2. Analyze protocols at MAC layer, Network layer and Transport layer in Wireless Sensor Networks.

CO3. Apply routing protocols in wireless sensor networks to solve real world problems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO WIRELESS SENSOR NETWORKS

(10 Periods)

Challenges for wireless sensor networks, Comparison of sensor network with adhoc network, Single node architecture - Hardware components, energy consumption of sensor nodes.

Network architecture: Sensor network scenarios - types of sources and sinks, single hop versus multi-hop networks, multiple sinks and sources. Design principles for wireless sensor networks.

UNIT-II: PHYSICAL LAYER (09 Periods)

Introduction, wireless channel and communication fundamentals-frequency allocation, modulation and demodulation, wave propagation effects and noise, channel models, spread spectrum communication, packet transmission and synchronization, quality of wireless channels and measures for improvement. Physical layer and transceiver design consideration in wireless sensor networks-Energy usage profile, choice of modulation, Power Management.

UNIT-III: DATA LINK LAYER (09 Periods)

MAC PROTOCOLS: fundamentals of wireless MAC protocols, Low duty cycle protocols and wakeup concepts, Contention-based protocols- CSMA protocols, PAMAS. Schedule-based protocols - SMAC, BMAC, Traffic-Adaptive Medium Access Protocol (TRAMA). Link Layer protocols - fundamentals, task and requirements, error control, Framing, Link management.

UNIT-IV: NETWORK LAYER (09 Periods)

Gossiping and agent-based uni-cast forwarding, Energy-efficient Uni-cast, Broadcast and Multicast - Source-based tree protocols, Shared, core-based tree protocols, Mesh-based protocols. Geographic routing, Mobile nodes , Data-centric routing - SPIN, Directed Diffusion, Energy aware routing, Gradient-based routing.

UNIT-V: TRANSPORT LAYER (08 Periods)

The transport layer and QoS in wireless sensor networks - Quality of service/reliability, Transport protocols. Coverage and deployment, Reliable data transport, Single packet delivery, Congestion control and rate control - Congestion situations in sensor networks, Mechanisms for congestion detection and handling, Protocols with rate control, The CODA congestion-control framework.

Total Periods: 45

TEXT BOOKS:

1. Holger Karl, Andreas Willig, *Protocol and Architecture for Wireless Sensor Networks*, John Wiley, Oct-2007.

REFERENCE BOOKS:

1. Feng Zhao, Leonidas J Guibas, *Wireless Sensor Networks: an information processing approach*, Morgan Kaufmann, 2004.
2. Edgar H. Callaway, *Wireless Sensor Networks: Architectures and protocols*, CRC Press, 2003.

IV B.Tech - II Semester

14BT81202: CRYPTOGRAPHY AND NETWORK SECURITY

(Common to CSE, IT, CSSE & ECE)
(PE-III)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on Computer Networks.

COURSE DESCRIPTION: Principles and practice of cryptography and network security: classical systems, symmetric block ciphers-DES; Public-key cryptography-RSA, Diffie-Hellman; Hash functions; Authentication; key management; key exchange; Signature schemes; E-mail; web security and firewalls.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on Cryptographic algorithms, their mathematical models, Message Authentication, Digital Signatures and firewall.

CO2. Analyze vulnerabilities and threats on information systems based on various security parameters.

DETAILED SYLLABUS:

Unit-I: CLASSICAL ENCRYPTION TECHNIQUES (08 Periods)

INTRODUCTION: Services, Mechanisms and Attack Concepts, The OSI Security Architecture, Model for Network Security.

CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

Unit-II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY (09 Periods)

BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

PUBLIC-KEY CRYPTOGRAPHY: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie-Hellman Key Exchange.

UNIT-III: MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS AND DIGITAL SIGNATURES (09 Periods)

MESSAGE AUTHENTICATION CODES: Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Hash algorithms-SHA, HMAC.

DIGITAL SIGNATURES: Digital Signatures, Digital Signature Standard (DSS), Authentication applications- Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY, IP SECURITY AND WEB SECURITY (10 Periods)

ELECTRONIC MAIL SECURITY: Pretty Good Privacy (PGP), S/MIME-Multipurpose Internet Mail Extensions (MIME), S/MIME Functionality, Messages, Certificate Processing.

IP SECURITY: IP Security Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

WEB SECURITY: Web security Considerations, Secure Sockets Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction.

Unit-V: INTRUDERS, MALICIOUS SOFTWARE AND FIREWALLS (09 Periods)

INTRUDERS: Intrusion Detection, Password Management-Password Protection, Password selection.

MALICIOUS SOFTWARE: Viruses and Related Threats, Virus Countermeasures.

FIREWALLS: Firewall Design Principles, Trusted Systems.

(Total Periods: 45)

TEXT BOOKS:

1. William Stallings, *Cryptography and network Security principles and Practice*, Pearson Education, 3rd Edition, 2003.

REFERENCE BOOKS:

1. William Stallings, *Network Security Essentials Applications and Standards,* Pearson Education, 3rd Edition.
2. Behrouz A Forouzan and Debdeed Mukhopadhyay, *Cryptography and Network Security*, McGraw Hill Education, 2nd Edition, 2010.

IV B. Tech - II Semester

14BT80404: LOW POWER CMOS VLSI DESIGN

(PE-IV)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Switching Theory and Logic Design, VLSI Design.

COURSE DESCRIPTION: Power dissipation in MOSFETs; Estimation of Power; Design, Optimization and Testing of Low Power Circuits; Low power SRAM; Energy Recovery Techniques and Low Power Software Design.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate knowledge in CMOS Power Dissipation, Optimization Techniques at various abstraction levels, design and test Low Power circuits, Low Power SRAM Architectures, Energy Recovery Techniques and software design.

CO2. Perform analysis of Low Power CMOS Circuits.

CO3. Design and develop Energy Recovery Circuits.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO LOW POWER VLSI DESIGN **(06 Periods)**

Need For Low Power VLSI Chips, Charging and Discharging Capacitances, Short Circuit Current in CMOS, CMOS Leakage Current, Static Current, Basic Principles of Low Power Design, Low Power Figure Of Merits.

UNIT-II: **(11 Periods)**

SIMULATION POWER ANALYSIS:

Spice Circuit Simulation, Discrete Transistor Modeling and Analysis, Gate Level Logic Simulation, Architecture Level Analysis, Data Correlation Analysis, Monto Carlo Simulation.

PROBABILISTIC POWER ANALYSIS:

Random Logic Signals, Probability and frequency, Probabilistic Power Analysis Techniques, Signal Entropy.

UNIT-III: (13 Periods)

CIRCUIT ANALYSIS:

Transistor and Gate Sizing, Equivalent Pin Ordering, Network Restructuring and Reorganization, Special latches and Flip flops, Low Power Digital Cell Library, Adjustable Device threshold Voltage.

LOGIC ANALYSIS:

Gate Reorganization, Signal Gating, Logic Encoding, State Machine Encoding, Precomputation Logic.

UNIT-IV: SPECIAL TECHNIQUES (07 Periods)

Power Reduction in Clock Networks, CMOS Floating Node, Low Power Bus, Delay Balancing, Low Power Techniques for SRAM.

UNIT-V: ARCHITECTURE AND SYSTEM (08 Periods)

Power and Performance Management, Switching Activity Reduction, Parallel Architecture with Voltage Reduction, Flow Graph Transformation.

Total Periods: 45

TEXT BOOKS:

1. Gary Yeap, *Practical Low-Power Digital VLSI Design*, Springer Publication, 1998.

REFERENCE BOOKS:

1. Kaushik Roy, Sharat Prasad, *Low-Power CMOS VLSI Circuit Design*, Wiley Student Edition, 2000.

IV B. Tech - II Semester

14BT80405: SPEECH PROCESSING

(PE - IV)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Signals & Systems and Digital Signal Processing

COURSE DESCRIPTION: Acoustic Theory of speech production; model for speech signals and speech processing systems; Mathematical analysis of speech signal -Homomorphic and LPC models; Speech and Speaker recognition systems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate fundamental knowledge in
- Digital Model representation of speech signal
- STFT analysis
- LPC analysis
- Homomorphic models.

CO2. Analyze complex engineering problems critically for conducting research in speech signal processing.

CO3. Solve engineering problems using efficient algorithms for feasible and optimal solutions in speech signal processing field.

DETAILED SYLLABUS:

UNIT-I: DIGITAL MODEL FOR THE SPEECH SIGNAL **(11 Periods)**

The process of speech production - the mechanism of speech production, acoustic phonetics. The Acoustic theory of speech production- sound propagation, uniform lossless tubes, Effect of losses in the vocal tract, Effect of radiation at the lips, Vocal tract transfer functions for vowels, the effect of nasal coupling, Excitation of sound in the vocal tract. Digital models for speech signals.

UNIT-II: TIME DOMAIN MODELS FOR SPEECH PROCESSING **(08 Periods)**

Introduction, Window considerations, Short time energy and average magnitude, Short time average zero crossing rate, Speech Vs silence discrimination using Average energy and zero crossing, Pitch period estimation using parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT-III: HOMOMORPHIC SPEECH PROCESSING (10 Periods)

SHORT TIME FOURIER TRANSFORM: Definition, Fourier transform interpretation, linear filter interpretation, Filter Bank summation method, Overlap addition method. Homomorphic systems for convolution - properties of the complex Cepstrum, computational considerations. The complex Cepstrum of speech, pitch detection, formant estimation, Homomorphic vocoder.

UNIT-IV: LINEAR PREDICTIVE CODING OF SPEECH (10 Periods)

Basic principles of linear predictive analysis - Auto correlation method, The covariance method. Computation of the gain for the model, solution of LPC Equations - Cholesky Decomposition solution for the covariance method. Durbin's Recursive solution for the autocorrelation equations. Comparison between methods of solutions of LPC analysis equations. Applications of LPC parameters- Pitch detection using LPC parameters, Formant analysis using LPC parameters.

UNIT-V: SPEECH AND SPEAKER RECOGNITION SYSTEMS (06 Periods)

Speaker recognition system- speaker verification system, speaker identification systems. Speech recognition system- isolated digit recognition system, continuous digit recognition system, LPC distance measure.

Total Periods: 45

TEXT BOOKS:

1. L R Rabiner and SW Schafer, *Digital processing of speech signals*, Pearson Education, 2006.
2. L R Rabiner, BH Juang, B Yegnanarayana, *Fundamentals of Speech Recognition*, Pearson Education, 2009.

REFERENCE BOOKS:

1. Thomas F Quateri, *Discrete time speech signal processing*, Pearson Education, 2006.
2. Ben Gold & Nelson Morgan, *Speech & audio signal processing*, John Wiley, 2006.
3. Douglas O Shaughnessy, *Speech Communications*, Oxford University Press, 2nd Edition, 2000.

IV B. Tech - II Semester

14BT80406: SPREAD SPECTRUM COMMUNICATIONS

(PE - IV)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on Digital Communications.

COURSE DESCRIPTION: Fundamentals of spread spectrum systems; Analysis of spread spectrum systems; Detection of spread spectrum signals; Applications of spread spectrum to communications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate knowledge in various types of spread spectrum techniques, generation and detection of spread spectrum signals and their applications in communications.

CO2. Analyze problems in direct sequence and avoidance-type spread spectrum systems.

CO3. Consider design and development issues in spread spectrum communication systems.

CO4. Solve engineering problems pertaining to spread spectrum communications.

DETAILED SYLLABUS :

UNIT-I: FUNDAMENTALS OF SPREAD SPECTRUM SYSTEMS (07 Periods)

General concepts, Direct sequence (DS), Frequency Hopping (FH), Time Hopping (TH), Comparison of modulation methods, Hybrid spread spectrum systems, Chirp spread spectrum.

UNIT-II: ANALYSIS OF DIRECT SEQUENCE SPREAD SPECTRUM SYSTEMS (09 Periods)

Properties of Pseudo noise (PN) sequences, m-sequences and their properties, Partial Correlation, PN signal from PN sequences, Partial correlation of PN signals, The PN Signal, De-spreading the PN signal, Interference rejection, Output signal to noise ratio, Anti-jam characteristics, Interception, Energy bandwidth efficiency.

UNIT-III: ANALYSIS OF AVOIDANCE-TYPE SPREAD SPECTRUM SYSTEMS & GENERATION OF SPREAD SPECTRUM SIGNALS (07 Periods)

ANALYSIS OF AVOIDANCE - TYPE SPREAD SPECTRUM SYSTEMS:

The frequency hopped signal, Interference rejection in a frequency hopping receiver, The time hopped signal.

GENERATION OF SPREAD SPECTRUM SIGNALS:

Shift register sequence generators, Discrete frequency synthesizers, SAW device PN generators.

UNIT-IV: DETECTION OF SPREAD SPECTRUM SIGNALS (12 Periods)

TRACKING: Coherent direct sequence receivers, other method of carrier tracking, Delay lock loop analysis, Tau - Dither loop, Coherent carrier tracking, Non-coherent frequency hop receiver.

ACQUISITION: Acquisition of spread spectrum signals, Acquisition by cell-by-cell searching, Reduction of acquisition time, Acquisition with matched filters, Matched filters for PN sequences, Matched filters for frequency hopped signals, Matched filters with acquisition-aiding waveform.

UNIT-V: APPLICATION OF SPREAD SPECTRUM TO COMMUNICATIONS (10 Periods)

General capabilities of spread spectrum, Multiple access considerations, Energy and bandwidth efficiency in multiple access, Selective calling and Identification, Anti-jam considerations, Error correction coding, Intercept consideration (AI), Miscellaneous considerations, Examples of spread spectrum systems.

Total Periods: 45

TEXT BOOKS:

1. George R. Cooper and Clare D. McGillem, *Modern Communications and Spread Spectrum*, McGraw Hill, 1986.

REFERENCE BOOKS:

1. Roger L. Peterson, Rodger E.Ziemer & David E. Borth, *Introduction to Spread Spectrum Communications*, Prentice Hall, 2013.
2. Dr. Kamilo Feher, Wireless Digital Communications: *Modulation & Spread Spectrum Applications*, Pearson Education, 2006.
3. Andrea Goldsmith, *Wireless Communications, Cambridge University Press*, 2009.
4. Upendra Dalal, *Wireless Communication*, Oxford University Press, 2009.

IV B. Tech - II Semester

14BT40502: DATABASE MANAGEMENT SYSTEMS

(PE-IV)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Programming in C and Data Structures.

COURSE DESCRIPTION: Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on
- Fundamentals of DBMS
- Database design
- Normal forms
- Storage and Indexing.

CO2. Apply Structured Query Language (SQL) in retrieval and management of data in real time applications.

CO3. Develop skills in designing, managing databases and its security.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DATABASE SYSTEMS & DATABASE DESIGN (09 Periods)

INTRODUCTION TO DATABASE SYSTEMS: Database System Applications, Purpose of Database Systems, View of Data-Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators.

INTRODUCTION TO DATABASE DESIGN: ER diagrams, Beyond ER design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional features of ER model, Conceptual Design with ER model.

UNIT-II: THE RELATIONAL MODEL & RELATIONAL ALGEBRA AND CALCULUS (08 Periods)

RELATIONAL MODEL: Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views-Destroying/altering Tables and Views.

RELATIONAL ALGEBRA AND CALCULUS: Preliminaries, Relational Algebra Operators, Relational Calculus- Tuple and Domain Relational Calculus, Expressive Power of Algebra and calculus.

UNIT-III: SQL & SCHEMA REFINEMENT (10 Periods)

SQL: Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, correlated Nested Queries, Set-Comparison Operators, Aggregate Operators, NULL values-Comparison using Null values- Logical connectives- AND, OR and NOT- Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL, Triggers and Active Databases.

SCHEMA REFINEMENT: Problems Caused by redundancy Decompositions - Problem related to decomposition, Functional Dependencies- Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms- BCNF, Multi valued Dependencies-FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT-IV: TRANSACTIONS AND CONCURRENCY CONTROL (09 Periods)

TRANSACTIONS: Transaction Concept- Transaction State-Implementation of Atomicity and Durability- Concurrent Executions-Serializability- Recoverability - Implementation of Isolation - Testing for serializability.

CONCURRENCY CONTROL: Lock Based Protocols - Timestamp Based Protocols- Validation Based Protocols - Multiple Granularity, Deadlock Handling.

UNIT-V: STORAGE AND INDEXING (09 Periods)

STORAGE AND INDEXING: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

TREE STRUCTURED INDEXING: Intuitions for tree Indexes, Indexed Sequential Access Methods(ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Total Periods: 45

TEXT BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, Tata McGraw Hill, 3rd Edition, 2007.
2. A.Silberschatz, H.F.Korth, S.Sudarshan, *Database System Concepts*, Tata McGraw Hill , 5th Edition, 2005.

REFERENCE BOOKS:

1. Ramez Elmasri, Shamkant B.Navathe, *Database Systems*, 6 th Edition, Pearson Education, 2013.
2. Peter Rob and Carlos Coronel, *Database Systems Design, Implementation and Management*, Cengage Learning, 7th Edition, 2009.

IV B. Tech - II Semester

14BT80421: COMPREHENSIVE VIVA-VOCE

Int. Marks: -- Ext. Marks: 100 Total Marks: 100

L	T	P	C
-	-	-	2

PREREQUISITES: All courses of the program.

COURSE DESCRIPTION: Assessment of student learning outcomes.

COURSE OUTCOMES: Comprehensive Viva-Voce enables a successful student to:

CO1. Demonstrate knowledge in the program domain.

CO2. Exhibit professional etiquette suitable for career progression.

CO3. Present views cogently and precisely.

IV B. Tech - II Semester
14BT80422: PROJECT WORK

Int. Marks: 60 Ext. Marks: 140 Total Marks: 200

L	T	P	C
-	-	20	10

PREREQUISITES: All courses up to IV B. Tech. - I Semester.

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On successful completion of project work, the students will be able to:

CO1. Demonstrate in-depth knowledge on the project topic.
CO2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
CO3. Design solutions to the chosen project problem.
CO4. Undertake investigation of project problem to provide valid conclusions.
CO5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
CO6. Understand professional and ethical responsibilities while executing the project work.
CO7. Function effectively as individual and a member in the project team.
CO8. Develop communication skills, both oral and written for preparing and presenting project report.
CO9. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
CO10. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.