R15 REGULATIONS

COURSE STRUCTURE

FOR

B.TECH –ELECTRONICS AND COMMUNICATION ENGINEERING

w.e.f.

2015 ADMITTED BATCH

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA

Y.S.R. (DIST), ANDHRA PRADESH, INDIA–516390.

COURSE STRUCTURE OF R15 REGULATIONS FOR B.TECH IN ELECTRONICS AND COMMUNICATION ENGINEERING

B. Tech I Year I Semester

S.No.	Course Code	Subject Name	Theory/Tutorial	Drawing/Lab	Credits
1	15AHS01	Functional English	3+1	-	3
2	15ABS06	Mathematics - I	3+1	-	3
3	15ACS01	Computer Programming	3+1	-	3
4	15ABS01	Engineering Physics	3+1	-	3
5	15AME01	Engineering Drawing	1	3	3
6	15AEC02	Network Analysis	3+1	-	3
7	15AHS02	English Language Communication Skills Lab	3+1	-	2
8	15ACS02	Computer Programming Lab	-	3	2
9	15ABS02	Engineering Physics Lab	-	3	2
		Total	25	09	24

B. Tech I Year II Semester

S.No.	Course Code	Subject Name	Theory/Tutorial	Drawing/Lab	Credits
1	15AHS03	English for Professional Communication	3+1	-	3
2	15ABS07	Mathematics - II	3+1	-	3
3	15ABS03	Engineering Chemistry	3+1	-	3
4	15ABS05	Environmental Studies	3+1	-	3
5	15ACS04	Data Structures	3+1	-	3
6	15AEC01	Electronic Devices and Circuits	3+1	-	3
7	15ACS05	Data Structures Lab	-	3	2
8	15ABS04	Engineering Chemistry Lab	-	3	2
9	15AME03	Engineering & IT Workshop Lab	-	3	2
		Total	24	09	24

II Year I Semester

S.No.	Course Code	Subject Name	Theory/Tutorial	Drawing/ Lab	Credits
1	15ABS08	Mathematics – III	3+1	-	3
2	15AEC05	Signals and Systems	3+1	-	3
3	15AEC06	Switching Theory and Logic Design	3+1	-	3
4	15AEE10	Electrical Technology	3+1	-	3
5	15AEC07	Probability Theory and Stochastic Processes	3+1	-	3
	Choice based credit course of inter department		3+1	-	3
	ANNEXURE-I				
7	15AEC03	Electronic Devices and Circuits Lab	-	3	2
8	15AEE11	Electrical Technology Lab	-	3	2
9	15AHS04	Human Values and Professional Ethics (Audit Course)	2		
		Total	26	6	22

ANNEXURE-I

Choice Based Credit Course of Inter Department offered in

B.TECH II YEAR I SEMESTER

BRANCH	SUBJECT CODE	SUBJECT NAME
PHYSICS	15ABS12	Basics of Nano Science and Nano Technology
MATHEMATICS	15ABS14	Set Theory and Mathematical Logic
	15ABS23	Mathematical Modeling
CHEMISTRY	15ABS15	Green Chemistry and Catalysis for Sustainable Environment
	15ABS16	Instrumental Methods of Chemical Analysis
	15ABS17	Chemistry of Nano Material and Application
ENGLISH	15AHS08	Campus Recruitment Training & Soft Skills
	15AHS09	Competitive & Spoken English
CE	15ACE09	Green Buildings
	15ACE10	Disaster Management and Mitigation
	15ACE11	Water Harvesting and Conservation
ECE	15AEC08	Basic Electronics
	15AEC09	Fundamentals of Digital Electronics
	15AEC10	Electronic Measurements & Instrumentation
ME	15AME11	Robotics
	15AME12	Mechanical Manufacturing Process
	15AME13	Non-Conventional Sources of Energy
EEE	15AEE08	Principles of electrical engineering
	15AEE01	Electrical engineering materials
	15AEE09	Electrical measuring instruments
CSE	15ACS04	Data Structures
	15ACS11	Object oriented Programming
	15ACS08	Operating Systems

II Year II Semester

S.No.	Course Code	Subject Name	Theory/Tutorial	Drawing/Lab	Credits
1	15ABS10	Mathematics – IV	3+1	-	3
2	15AHS05	Managerial Economics & Financial Analysis	3+1	-	3
3	15AEC11	Control Systems Engineering	3+1	-	3
4	15AEC13	Electronic Circuit Analysis and Design	3+1	-	3
5	15AEC14	Pulse and Digital Circuits	3+1	-	3
6	15AEC15	Electromagnetic Waves and Transmission Lines	3+1	-	3
7	15AEC16	Electronic Circuit Analysis and Design Lab		3	2
8	15AEC17	Pulse and Digital Circuits Lab	-	3	2
9	15AEC18	Comprehensive Online Examination	-		1
		Total	26	6	23

III YEAR I SEMESTER

S.No.	Course Code	Subject Name	Theory /Tutorial	Drawing /Lab	Credits
1	15ACS18	Computer Architecture And Organization	3+1	-	3
2	15AEC24	Analog Communication Systems	3+1	-	3
3	15AEC25	Linear IC Applications	3+1	-	3
4	15AEC26	Digital IC Applications	3+1	-	3
5	15AEC27	Electronic Measurements & Instrumentation	3+1	-	3
6	15AEC28	Antennas And Wave Propagation	3+1	-	3
7	15AEC29	Analog Communication Systems Lab	--	3	2
8	15AEC30	IC Applications Lab	-	3	2
9	15AHS06	Advanced Communication Skills Lab (Audit Course)	-	-	-
		TOTAL	24	6	22

III YEAR II SEMESTER

S.No.	Course Code	Subject Name	Theory /Tutorial	Drawing /Lab	Credits
1	15AHS07	Management Sciences	3+1	-	3
2	15AEC31	Digital Communication Systems	3+1	-	3
3	15AEC32	Microprocessors And Microcontrollers	3+1	-	3
4	15AEC33	Digital Signal Processing	3+1	-	3
5		**MOOC-I**	3+1	-	3
6	**CHOICE BASED CREDIT COURSE OF INTER DEPARTMENT**				
7	15AEC37	Microprocessor And Microcontrollers Lab	-	3	2
8	15AEC38	Digital Communication Systems Lab	-	3	2
9	15AEC39	Comprehensive Online Examination	-	-	1
		TOTAL	24	8	23

ANNEXURE-II

CHOICE BASED CREDIT COURSE OF INTER DEPARTMENT

Branch	Subject Code	Subject Name
MATHEMATICS	15ABS18	FUZZY SETS AND APPLICATIONS
	15ABS19	OPTIMIZATION TECHNIQUES
CHEMISTRY	15ABS20	CHEMISTRY ENERGY MATERIALS
	15ABS21	CHEMISTRY OF LIFE
	15ABS22	CHEMISTRY OF POLYMERS AND THEIR APPLICATIONS
CE	15ACE35	REMOTE SENSING & GIS
	15ACE36	ENVIRONMENTAL IMPACT ASSESTMENT & MANAGEMENT
	15ACE37	FINITE ELEMENT METHODS
EEE	15AEE19	POWER ELECTRONICS
	15AEE34	RENEWABLE ENERGY SOURCES
	15AEE35	UTILIZATION OF ELECTRICAL ENERGY
ME	15AME35	OPTIMIZATION TECHNIQUES BY MATLAB
	15AME36	MECHATRONICS & MEMS
	15AME37	AUTOMOTIVE ELECTRONICS
ECE	15AEC34	FUNDAMENTALS OF COMMUNICATION SYSTEMS
	15AEC35	INDUSTRIAL ELECTRONICS
	15AEC36	NEURAL NETWORKS & FUZZY LOGIC
CSE	15ACS35	MOBILE COMPUTING
	15ACS36	OPTIMIZATION TECHNIQUES
	15ACS37	MACHINE LEARNING

IV YEAR I SEMESTER

S.No.	Course Code	Subject Name	Theory /Tutorial	Drawing /Lab	Credits
1	15AEC51	Microwave Engineering	3+1	-	3
2	15AEC52	Optical Fiber Communications	3+1	-	3
3	15AEC53	VLSI Design	3+1	-	3
4		**MOOC-II**	3+1	-	3
5		CHOICE BASED CREDIT COURSES (**DEPARTMENT SPECIFIC**)	3+1	-	3
	15AEC54	Digital Image Processing			
	15AEC55	DSP Processors And Architectures			
	15AEC56	Cyber Security			
6		CHOICE BASED CREDIT COURSES (**DEPARTMENT SPECIFIC**)	3+1	-	3
	15AEC57	Bio-Medical Instrumentation			
	15AEC58	Satellite Communications			
	15AEC59	Advanced DSP			
7	15AEC60	DSP And VLSI Lab	-	4	2
8	15AEC61	Microwave And Optical Communications Lab	-	4	2
		TOTAL	24	8	22

IV YEAR II SEMESTER

S.No.	Course Code	Subject Name	Theory /Tutorial	Drawing /Lab	Credits
1	15AEC81	Embedded Systems And IOT	3+1	-	3
2	15AEC82	Radar And Navigational Aids	3+1	-	3
3	15AEC83	Wireless Communications	3+1	-	3
4		**MOOC-III**	3+1	-	3
5	15AEC99	Seminar And Project Work		20	10
		TOTAL	16	20	22

I B.Tech I Sem

15AHS01-FUNCTIONAL ENGLISH
(Common For All Branches)

L	T	P	C
3	1	0	3

1. Introduction:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career, better pay, and advanced knowledge and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy. The prescribed books serve the purpose of preparing them for everyday communication and to face the global competitions in future.

The texts prescribed for detailed study focus on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and learner-centered. They should be encouraged to participate in the classroom activities keenly.

In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

2. Objectives:

1. To enable the students to communicate in English for academic and social purpose.
2. To enable the students to acquire structure and written expressions required for their profession.
3. To develop the listening skills of the students.
4. To inculcate the habit of reading and critical thinking skills.
5. To enhance the study skills of the students with emphasis on LSRW skills.

3. SYLLABUS:

UNIT –I

Reading: What Is My Name? —P Sathyavathi
Writing: Paragraph writing
Listening: Listening for sounds, stress
Functional English: Greeting, taking leave and introducing oneself and others
Grammar: Nouns -classification
Vocabulary: Homonyms
Non Detailed Study: Listening Skills from English and Soft Skills

UNIT-II

Reading : SWOT Analysis of the Indian software Industry (from Mindscapes)
Writing : Essay Writing
Listening : Listening for theme -1
Functional English: Making requests
Grammar: Pronouns
Vocabulary : Homophones
Non detailed Study: Teamwork Skills

verified / checked

UNIT-III

Reading : How To Regain Green Cover? (From Mindscapes)
Writing Descriptive essays
Listening :Listening for theme -2
Functional English : Asking for the time and directions
Grammar: Articles
Vocabulary : Homographs
Non detailed Study : Emotional Intelligence Skills

UNIT-IV

Reading : The Kitchen — Vimala
Writing Narrative essays- Expository essays - Argumentative essays
Listening: Listening for main ideas
Functional English: Inviting -Apologizing
Grammar: Kinds of verbs – Auxiliaries- Adjectives
Vocabulary : Synonyms - Antonyms.
Non detailed Study : Assertive Skills

UNIT-V

Reading: Adivasis — Kancha Ilaiah
Writing: Letter Writing –official letters-business letters
Listening: Listening for details
Functional English: Interrupting - Asking for and giving opinions
Grammar: Tenses -Adverbs
Vocabulary: Prefixes -Suffixes
Non detailed Study: Learning Skills

Prescribed Text books:

Detailed text: **English for Fluency**, K Purushottam, Orient Black Swan,2013.
Non detailed text: **English and Soft Skills**, S P Danavel, Orient Black Swan 2013Edition.

References:

1. Mindscapes, English For Technologists And Engineers, Orient Black Swan,2012.
2. A Practical Course in Effective English Speaking Skills. J.K.Gangal, PHI, New Delhi.2012
3. Fundamentals of Technical Communication, Meenakshi Raman, Oxford University Press,2015.
4. Spoken English, R.K. Bansal & JB Harrison, Orient Longman,2013, 4Th edition.
5. Murphy's English Grammar with CD, Murphy, Cambridge University Press,3 Rd edition.
6. Advanced English Grammar , Martin Hewings Cambridge University Press 2007

Expected Outcomes:

At the end of the course, students would be expected to:

1. Have improved communication in listening, speaking, reading and writing skills in general.
2. Have developed their oral communication and fluency in group discussions and interviews.
3. Have improved awareness of English in science and technology context.
4. Have achieved familiarity with a variety of technical reports.

I B.Tech I Sem

15ABS06-MATHEMATICS – I
(Common For All Branches)

L	T	P	C
3	1	0	3

Objectives

- To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential and Integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students' abilities to formulate and modeling the problems, to think creatively and to synthesize information.

UNIT – I

Exact, linear and Bernoulli equations, Applications to first order equations; Orthogonal trajectories, Simple electric circuits, Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), Method of variation of parameters.

UNIT – II

Linear equations with variable coefficients: Euler-Cauchy Equations, Legendre's linear equation. Applications of linear differential equations- Mechanical and Electrical oscillatory circuits.

UNIT – III

Functions of Severable Variables:

Functions of severable variables, level curves, Limits, Continuity, Partial derivatives, chain Rule, Directional derivative, gradient vectors, Tangent planes & normal line, Maximum, Minimum & Saddle points of functions of two or three variables, Constrained Maxima & Minima, Method of Lagrange multipliers.

UNIT – IV

Multiple Integrals:

Double Integrals, Area, Change of integrals to Polar Coordinates, Change of order of integration, Triple Integrals in Cartesian, Cylindrical and Spherical Coordinates.

UNIT – V

Vector Calculus:

Line integral, work, circulation, flux, path independence, potential function, conservative fields; Green's theorem in the plane (without proof), Surface area & Surface Integral; Stokes theorem, Gauss divergence theorem (without proof) and simple problems.

2.7.2018

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Weir, MD, Hass J, Giordano FR: Thomas' Calculus Pearson education 11th ED, 2008.(Unit-III, IV & V)

References:

1. Engineering Mathematics-I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.

Outcomes: At the end of the course, the student will be able to attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications, using Ordinary Differential Equations, Multiple Integrals and Vector Calculus.

2.7.2018

I B.Tech I Sem

15ACS01-COMPUTER PROGRAMMING
(Common For All Branches)

L	T	P	C
3	1	0	3

Course Objectives:

- To make the student understand problem solving techniques
- Students will be able to understand the syntax and semantics of C programming language and other features of the language

Course Outcomes:

- Student can effectively apply problem solving techniques in designing the solutions for a wide-range of problems
- Student can choose appropriate data structure and control structure depending on the problem to be solved
- Student can modularize the problem and also solution

UNIT –I

Fundamentals of Computers: What is Computer, Applications of Computers, Evaluation of Computers, Generations of Computers, Basic I/O Devices, Computer Software, Types of computer, Software Development Methodology, Top-Down Vs Bottom –Up Approaches, Problem Solving, Fundamental Techniques to Solve The Problem, Representation of a solution to a Problem, Developing a computer program, Number Systems.

Fundamentals of C: An Overview of C, A Brief History of C , C Is a Middle-Level Language , C Is a Structured Language ,C Is a Programmer's Language Compilers Vs. Interpreters , The Form of a C Program, The Library and Linking, Separate Compilation, Compiling a C Program, C's Memory Map.

UNIT –II

Expressions: The Basic Data Types, Modifying the Basic Types, Identifier Names, Variables, The Four C Scopes, Type Qualifiers, Storage Class Specifiers,, Variable Initializations, Constants.

Operators: The Assignment Operator, Arithmetic Operators, The Increment and Decrement Operators, Relational and Logical Operators, Bitwise Operators, The ? Operator, The & and * Pointer Operators, The Compile-Time Operator sizeof, The Comma Operator, The Dot (.) and Arrow (–>) Operators, The [ ] and ( ) Operators, Precedence Summary, Expressions, Statements.

Conditional, unconditional and Iteration Statements: Selection Statements, Iteration Statements, Jump Statements, Expression Statements

UNIT –III

Arrays and Strings: Single-Dimension Arrays, Generating a Pointer to an Array, Passing Single Dimension Arrays to Functions , Strings, Two-Dimensional Arrays, Multidimensional Arrays, Indexing Pointers, Array Initialization, Variable-Length Arrays, A Tic-Tac-Toe Example.

Console I/O: Reading and Writing Characters, Reading and Writing Strings. Formatted Console I/O: printf( ), scanf( ), Suppressing Input.

Functions: The General Form of a Function, Understanding the Scope of a Function, Function Arguments, argc and argv— Arguments to main( ), The return Statement ,What Does main( ) Return? , Recursion, Function Prototypes, Declaring Variable Length Parameter Lists, The "Implicit int" Rule, Old Style Vs. Modern Function Parameter Declarations, The inline Keyword.

UNIT-IV

Pointers: What Are Pointers?, Pointer Variables, The Pointer Operators, Pointer Expressions, Pointer Assignments, Pointer Conversions, Pointer Arithmetic, Pointer Comparisons, Pointers and Arrays, Arrays of Pointers, Multiple Indirection, Initializing Pointers, Pointers to Functions, C's Dynamic Allocation Functions, Dynamically Allocated Arrays, restrict-Qualified Pointers, Problems with Pointers.

Structures, Unions, Enumerations, and typedef: Structures , Arrays of Structures, A Mailing List Example, Passing Structures to Functions, Structure Pointers, Arrays and Structures within Structures.

Unions, Bit-Fields , Enumerations, Using sizeof to Ensure Portability, typedef.

UNIT –V

File I/O: Standard C Vs. Unix File I/O, Streams and Files, File System Basics, fread( ) and fwrite(), Using fread( ) and fwrite( ), fseek( ) and Random-Access, fprintf( ) and fscanf( ), The Standard Streams, The Console I/O Connection, Using freopen( ) to Redirect the Standard Streams.

The Preprocessor and Comments: The Preprocessor, #define, #error, #include, Conditional Compilation Directives, #undef, Using defined, #line . #pragma, The # and ## Preprocessor Operators,Predefined Macro Names,Comments, Single-Line Comments.

Text book:

1. **"Computer Fundamentals and C Programming"** :Dr. P. Chenna Reddy, Professor of CSE, JNTUA College of Engg, Pulivendula, YSR District, Andhra Pradesh, INDIA. (unit-I)
2. **"The Complete Reference C":** Fourth Edition Herbert Schildt Osborne/McGraw-Hill.(Unit-2,3,4,5).

References:

1. "Programming in C", Pradip Dey, Manas Ghosh, Oxford Higher Education
2. "Programming in C and Data Structures", Hanly, Koffman, Kamthane, Ananda Rao, Pearson.
3. "Programming in C", Reema Thareja, Oxford Higher Education.
4. "Computer Fundamentals and C Programming", First Edition, Dr.P.Chenna Reddy, Available at: www.pothi.com.
5. "Data Structure and Program Design in C", Second Edition, Kruse, Tondo, Leung, Mogalla, Pearson.
6. "Programming with C", R.S. Bichkar, University Press.
7. "Computer Science A Structured Programming Approach Using C", Third Edition, Fourouzan & Gilberg, Cengage Learning
8. "Programming with C", Byron Gottfried, Third Edition, Schaum's Outlines, 3rd edition, 2010, Mc Graw Hill.

R-15

I B.Tech I Sem

15ABS01-ENGINEERING PHYSICS

(Common for EEE, ECE and CSE)

L	T	P	C
3	1	0	3

Objectives:

1. To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
2. To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays and non-destructive evaluation using ultrasonic techniques.
3. To get an insight into the microscopic meaning of conductivity , classical and quantum free electron model, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials and to understand electron transport mechanism in solids.
4. To open new avenues of knowledge and understanding semiconductor based electronic devices , basic concepts and applications of semiconductors and magnetic materials have been introduced which find potential in the emerging micro device applications.
5. To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them and their fascinating applications. Considering the significance of microminiaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties and applications in emerging technologies are elicited.

UNIT 1: Physical Optics, Lasers And Fibre Optics

Physical Optics: Interference (Review) – Interference in thin film by reflection –Newton's rings –Diffraction (Review) - Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients — Population inversion – Excitation mechanism and optical resonator – Nd:YAG laser - He-Ne laser – Semiconductor Diode laser - Applications of lasers

Fiber optics: Introduction - construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers – Attenuation and losses in Optical fibers –Block diagram of Optical fiber communication system – Applications of optical fibers

UNIT 2: Crystallography And Ultrasonics

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Powder method.

Ultrasonics: Introduction – Production of ultrasonics by piezoelectric method – Properties and detection – Applications in non-destructive testing.

UNIT 3: Quantum Mechanics And Electron Theory

Quantum Mechanics: Matter waves – de'Broglie hypothesis and properties - Schrodinger's time independent wave equations – Physical significance of wave function - Particle in one dimensional infinite potential well.

Electron theory: Classical free electron theory – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Source of electrical resistance – Kronig-Penny model (qualitative treatment) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

UNIT 4: Semiconductors And Magnetic Materials

Semiconductors: Intrinsic and extrinsic semiconductors (Qualitative treatment) – Drift & diffusion currents and Einstein's equation – Hall effect - Direct and indirect band gap semiconductors – Formation of p-n junction.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magnetron – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials (Qualitative treatment) – Hysteresis - Soft and hard magnetic materials, applications of magnetic materials.

UNIT 5: Superconductivity And Physics Of Nanomaterials

Superconductivity: Introduction - Effect of magnetic field - Meissner effect – Type I and Type II superconductors – Flux quantization – Penetration depth - BCS theory (qualitative treatment) — Josephson effects –Applications of superconductors.

Physics of Nanomaterials: Introduction - Significance of nanoscale and types of nanomaterials – Physical properties: optical, thermal, mechanical and magnetic properties – Synthesis of nanomaterials by Top down and bottom up approaches: ball mill, chemical vapour deposition, and sol gel –Applications of nanomaterials.

Text books:

1. Engineering Physics – K.Thyagarajan, 5th Edition, MacGraw Hill Publishers, NewDelhi, 2014.
2. Physics for Engineers - N.K Verma, 1st Edition, PHI Learning Private Limited, Delhi,2014.

Reference Books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, 10th Edition, S.Chand and Company, New Delhi, 2014.
2. Engineering Physics – D K Pandey, S. Chaturvedi, 2nd Edition, Cengage Learning, New Delhi, 2013.
3. Engineering Physics – D.K Bhattacharya, Poonam Tandon, 1nd Edition, Oxford University Press, New Delhi, 2015.

Outcomes:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.
- The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting and magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

I B.Tech I Sem

15AME01-ENGINEERING DRAWING

(Common for EEE, ECE and CSE)

L	T	P	C
3	1	0	3

Course Objective:

- By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.
- This course develops the engineering imagination i.e., so essential to a successful design, By learning techniques of engineering drawing changes the way one things about technical images.
- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers, by studying this course engineering and technology students will eventually be able to prepare drawings of various objects being used in technology.

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance-Conventions in Drawing-Lettering - BIS Conventions. Curves used in Engineering Practice.

a) Conic Sections including the Rectangular Hyperbola- General method only,
b) Cycloid, Epicycloids and Hypocycloid
c) Involutes

UNIT II

Projection of Lines: Inclined to one or both planes, Problems on projections, Finding True lengths. **Projections of Planes**: Projections of regular plane surfaces/figures, Projection of lines and planes using auxiliary planes.

UNIT III

Projections of solids: Projections of regular solids inclined to one or both planes – Auxiliary Views. **Sections of Solids**: Section Planes and Sectional View of Right Regular Solids- Prism, cylinder, Pyramid and Cone. True shapes of the sections.

UNIT IV

Development of Surfaces: Development of Surfaces of Right Regular Solids-Prism, Cylinder, Pyramid, Cone and their Sectional Parts.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale-Isometric Views- Conventions- Isometric Views of lines, Planes Figures, Simple and Compound Solids-Conversion of isometric Projections/Views of Orthographic Views-Conventions.

Text Books:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai

Reference Books:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, K.C. John, PHI,2013
5. Engineering Drawing, Basant Agarwal/ C.M.Agarwal

Suggestions:

1. Student is expected to buy a book mentioned under Text books " for better understanding.
2. Students can find the applications of various conics in engineering and application of involute on gear teeth. The innovation for drawing can be had on line from introduction to engineering drawing with tools-youtube http-sewor,Carleton.ca/-g,kardos/88403/drawings.html conic sections-online, red woods.edu

This subject also paves the way for learing Auto Cad, CAD / CAM, CATIA and Pro E which are advanced software packages needed for every mechanical engineer (To be taught & examined in First angle projection). The skill acquired by the student in this subject is very useful in conveying his ideas to the layman easily.

Head
Mechanical Engineering Department,
JNTUA College of Engineering,
PULIVENDULA - 516 390.

R-15

I B.Tech I Sem

15AEC02-NETWORK ANALYSIS

L	T	P	C
3	1	0	3

Course Objectives:

To help students develop an understanding on analyzing electrical circuits using various techniques. To make the student familiarize with the fundamental concepts of coupled circuits, resonance, filters and to analyze the transient response in electric circuits.

Course Outcomes:

Upon completion of the course, students will be able to:

a. To solve the electrical network using mesh and nodal analysis by applying network theorems.
b. Understand the basic concepts of coupled circuits, resonance and filters and solve problems.
c. Analyze transient response in AC and DC electric circuits.

UNIT-I

Introduction: The capacitance parameter, The inductance parameter , The resistance parameter, reference direction for current and voltage, active element convention , the dot convention for coupled circuits, Kirchhoff's laws, the number of network equation, source transformation, example of the formulation of network equation loop variables analysis, node variables analysis, duality, network. Dependent sources.

Network graph theory: concept of network graph , terminology used in network graph, relation between Twigs and Links, properties of tree in a graph, formation of incidence Matrix[Ai], number of trees in a graph, cut-set matrix, tie set matrix, fundamental tie-set matrix, fundamental of cut-set.

UNIT-II

Initial Conditions in Networks: Why Study Initial Conditions, Initial Conditions in Element, Geometrical Interpretation of Derivatives, A Procedure for Evaluating Initial Conditions, initial State of a Network.

Resonance: Introduction, Definition of 'quality factor Q' of inductor and capacitor, Series resonance, Bandwidth of the series resonant circuits, Parallel resonance (or anti-resonance), Conditions for maximum impedance, Currents in parallel resonance,

UNIT-III

Network theorems: Superposition and Reciprocating, Maximum power transfer theorem, Thevenin's Theorem, Norton's Theorem and Tellegen's theorem.

Network function: poles and zeros, terminal pairs or ports, network function for one port and two port, the calculation of network function: ladder network, general network, poles and zeros of network function

UNIT- IV

Two port parameters: relation of two port variables, short circuit admittance parameters, the open circuit impedance parameters, Transmission parameters, the hybrid parameters, relation between parameter sets, parallel connection of two port network.

Input power, power transfer and insertion loss: energy and power, effective or root mean square values, average power and complex power, problem in optimizing power transfer, insertion loss.

UNIT- V

Filters: Introduction, the neper & decibel, Characteristic Impedance of symmetrical networks, Currents & voltage ratios as exponentials; the propagation constant, Hyperbolic trigonometry, Properties of symmetrical networks, Filter fundamentals; pass and stop bands, Behavior of characteristic impedance, The constant – k low pass filter, the constant – k high pass filter, The m-derived T section, The m-derived π section.

Text Books:

1. Engineering Circuit Analysis, William H Hayt Jr. Jack E Kemmerly, Steven Durbin, 8th edition, Tata McGraw-Hill, 2013.
2. Networks, Lines, and Fields, John D. Ryder, 2nd Edition, PHI publications, 2013.

References:

1. Network Analysis, Van Valkenburg, 3rd Edition, Pearson, 2006.
2. Network and Systems, D Roy Choudary, 1st Edition, New Age International, 2015.
3. Circuits & Network Analysis & Synthesis, A. Sudhakaar & Shyanmugam S.Palli, 2nd Edition, Tata McGraw Hill, 2006.
4. Network Analysis and synthesis, Franklin F. Kuo, 2nd Edition, Wiley India Pvt Ltd., 1962.

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I B.Tech I Sem

15AHS02-ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

(Common For All Branches)

L	T	P	C
0	0	3	2

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Objectives:

- To enable students to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus:

UNIT-I

1. Phonetics -importance
2. Introduction to Sounds of Speech
3. Vowels and consonants sounds
4. Phonetic Transcription

UNIT-II

5. Word Stress
6. Strong and weak forms
7. Sentence stress and Intonation

UNIT-III

8. Communication skills –process & barriers
9. Role Plays & JAM
10. Describing people/objects/places

UNIT-IV

11. Debates & Group Discussions
12. Speeches for Special Occasions
13. Group Discussions
14. Interview skills

UNIT-V

15. Writing video speeches
16. Book reviews -oral and written

Minimum Requirement For Elcs Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.
   System Requirement (Hardware component):
   Computer network with Lan with minimum 60 multimedia systems with the following specifications:
   i) P – IV Processor
      a) Speed – 2.8 GHZ
      b) RAM – 512 MB Minimum
      c) Hard Disk – 80 GB
   ii) Headphones of High quality

Suggested Software:

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – part II
3. K-Van Advanced Communication Skills
4. Walden InfoTech Software.

Reference Books:

1. Spring Board Success, Sharada Kouhik, Bindu Bajwa, Orient Blackswan, Hyderbad, 2010.
2. Technical English – Dr. M. Sambaiah- Wiley India Pvt. Ltd..NewDelhi. 2014.
3. A Textbook of English Phonetics for Indian Students 2nd Ed T. Balasubramanian. (Macmillian),2012.
4. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
5. Speaking English Effectively, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
6. A Hand book for English Laboratories, E.Suresh Kumar, P.Sreehari, Foundation Books,2011

Expected Outcomes:

- Become active participants in the learning process and acquire proficiency in spoken English.

Speak with clarity and confidence thereby enhance employability skills.

verified

I B.Tech I Sem

15ACS02-COMPUTER PROGRAMMING LAB

(Common For All Branches)

L	T	P	C
0	0	3	2

WEEK	LIST OF EXPERIMENTS
1	Practice DOS Commands necessary for design of C Programs.
2	Practice LINUX Commands necessary for design of C Programs.
3	Practice the Raptor Tool
4	a. Write a program to perform arithmetic operations. b. Write a program to exchange two numbers without using temporary variable c. Write a program to exchange two numbers with temporary variable d. Write a program to find the maximum of three numbers
5.	a. Write a program for s=ut+1/2at^2 b. Write a program to find area of square, circle and rectangle. c. Write a program to find the maximum of two numbers using ternary operator. d. Write a program for sum of first N natural numbers.
6	a. Write a program to compute the factorial of a given number. b. Write a program to check whether the number is prime or not. c. Write a program to check for number palindrome. d. Write a program to generate Fibonacci numbers in the given range.
7	a. Write a program to find the sum of the digits of a number. b. Write a program to find the sum of positive and negative numbers in a given set of numbers. c. Write a program to perform the operations addition, subtraction, multiplication of complex numbers. d. Write a program to find the sum of first and last digit numbers in a given number.
8	a. Write a program to read two matrices and print their sum and product in the matrix form. b. Write a program to find the maximum of a set of numbers. c. Write a program to read matrix and perform the following operations. a. Find the sum of Diagonal Elements of a matrix. b. Print Transpose of a matrix. c. Print sum of even and odd numbers in a given matrix.
9	a. Write a program to accept a line of characters and print the count of the number of Vowels, Consonants, blank spaces, digits and special characters. b. Write a program to insert a substring in to a given string and delete few characters from the string. Don't use library functions related to strings. c. Write a program to read two strings and perform the following operations without using built-in string Library functions and by using your own implementations of functions. i. String length determination ii .Compare Two Strings iii. Concatenate them, if they are not equal iv. String reversing
10	a. Write programs using recursion for Factorial of a number, GCD, LCM, Towers of Hanoi. b. Write a program for tic-tac-toe game. c. Write a program to implement numerical methods Lagrange's interpolation, Trapezoidal rule.

11	a. Write a program to exchange two numbers using pointers. b. Write a program to calculate the length of string using pointers. c. Write a program to using pointers to read in an array of integers and print its elements in reverse order. d. Write a program to generate pseudo random generator.
12	a. Write a program to evaluate the sum of the following series up to 'n' terms $e^x=1+x+x^2/2!+x^3/3!+x^4/4!+$-------- b. Write a program that prints a triangle of stars. Print 1 star in row 0, 3 stars in row 1, 5 stars in row 2, and so on. Here is what this looks like: For the non-star characters, use dot or space. .....*..... .....***..... .....*****..... .....*******..... .....*********..... c. Write a program to read student records into a file. Record consists of rollno, name and marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
13	a. Write a program to read last n characters of the file using appropriate file function. b. Write a program to copy the contents one of one file into another file using fgetc and fputc functions. c. A file consists of information about employee salary with fields employee id, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employee id, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions is user specified. Compute the Gross and Net salary of the employee and update the file.
14	a. Write a program to perform Base (decimal, octal, hexadecimal, etc) conversion b. Write a program to read a set of strings and sort them in alphabetical order. c. Write a program to Convert Decimal to Hexa Decimal? d. Write a program to Convert Binary to Decimal? e. **Write a Program to Add two numbers using Command Line Arguments.**

NEW PROGRAMS:

1. Write a program to implement magic square.
2. Write a program to print 50 students details using structures.
3. Write a program to create one structure and declare it inside union then accept values for structure members and display them.
4. Write a program to find the speed of ordinary, express, super luxury buses based on their distance and time.
5. Write c Program to accept N integer numbers and store even and odd integers in separate arrays.
6. Write a c program to input real numbers and find the mean, variance and standard deviation.

I B.Tech I Sem

15ABS02-ENGINEERING PHYSICS LABORATORY

(Common for EEE, ECE and CSE)

L	T	P	C
0	0	3	2

Lab Objective:

- Will recognize the important of optical phenomenon like Interference and diffraction.
- Will understand the role of optical fiber parameters and signal losses in communication.
- Will recognize the importance of energy gap in the study of conductivity and hall effect in a semiconductor
- Will understand the applications of B H curve.
- Will acquire a practical knowledge of studying the crystal structure in terms of lattice constant.
- Will recognize the application of laser in finding the particle size and its role in diffraction studies.
- Will learn to synthesis of the nano materials and recognize its importance by knowing its nano particle size and its impact on its properties.

Any 10 of the following experiments has to be performed

1. Determination of radius of curvature of a Plano-convex lens by forming Newton's rings.
2. Determination of wavelength of given source using diffraction grating in normal incidence method.
3. Determination of Numerical aperture, acceptance angle of an optical fiber.
4. Energy gap of a Semiconductor diode.
5. Hall effect – Determination of mobility of charge carriers.
6. B-H curve – Determination of hysteresis loss for a given magnetic material.
7. Determination of Crystallite size using X-ray pattern (powder) using debye-scheerer method.
8. Determination of particle size by using laser source.
9. Determination of dispersive power of a prism.
10. Determination of thickness of the thin wire using wedge Method.
11. Laser : Diffraction due to single slit
12. Laser : Diffraction due to double slit
13. Laser: Determination of wavelength using diffraction grating
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Synthesis of nanomaterial by any suitable method.

Reference:

1. Engineering Physics Practicals – NU Age Publishing House, Hyderabad.
2. Engineering Practical physics – Cengage Learning, Delhi.

Lab Outcomes:

- Would recognize the important of optical phenomenon like Interference and diffraction.
- Would have acquired the practical application knowledge of optical fiber, semiconductor, dieclectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

I B.Tech II Sem

15AHS03-ENGLISH FOR PROFESSIONAL COMMUNICATION

(Common for all Branches)

L	T	P	C
3	1	0	3

1. Introduction:

English is a global language and has international appeal and application. It is widely used in a variety of contexts and for varied purposes. The students would find it useful both for social and professional development. There is every need to help the students acquire skills useful to them in their career as well as workplace. They need to write a variety of documents and letters now extending into professional domain that cuts across business and research also. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy. The prescribed books serve the purpose of preparing them for everyday communication and to face the global competitions in future.

The texts prescribed for detailed study focus on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and learner-centered. They should be encouraged to participate in the classroom activities keenly.

In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

2. Objectives:

1. To develop confidence in the students to use English in everyday situations.
2. To enable the students to read different discourses so that they appreciate English for science and technologies.
3. To improve familiarity with a variety of technical writings.
4. To enable the students to acquire structure and written expressions required for their profession.
5. To develop the listening skills of the students.

3. Syllabus:

UNIT –I

Reading : Lawley Road — R.K. Narayan
Writing: Emails - Application letters and curricula vitae
Listening: Listening for information
Functional English: Agreeing and disagreeing - Suggesting and advising
Grammar: Types Of sentences
Vocabulary: Compound words -Collocations
Non Detailed Study : Problem-Solving Skills

UNIT-II

Reading: Environmental Consciousness- Solution to Plastic Pollution-Soma Basu
Writing: Technical Note making -Memorandums – agenda-Official reports
Listening: Listening for facts

Functional English: Giving instructions - Asking for clarifications and permission
Grammar: Question tags
Vocabulary: Prepositions
Non Detailed Study: Interview Skills

UNIT-III

Reading: The Man Behind 'i'
Writing: Summaries –
Listening: Listening for the gist –
Functional English: Telephone skills
Grammar: Adjectives
Vocabulary: Conjunctions
Non Detailed Study: Adaptability Skills

UNIT-IV

Reading: The Bet — Anton Chekhov
Writing: Technical documentation-Concise writing-Paraphrases –
Listening: Listening for opinions -Presentations
Functional English: Individual Presentations
Grammar: Subject-verb agreement
Vocabulary: Phrasal verbs- Idioms.
Non Detailed Study: Non-Verbal Communication Skills

UNIT-V

Reading: The Gift of the Magi — O. Henry
Writing: Information transfer
Listening: Listening for opinions
Functional English: Group Presentations
Grammar: Active and passive voice
Vocabulary: Commonly confused words- One-word substitutes
Non Detailed Study: Written Communication Skills

Text books:

Detailed text: **English for Fluency** , K Purushottam,Orient Black Swan,2013.
Non detailed text: **English and soft skills**, S P Danavel, Orient Black Swan 2013Edition.

References:

1. **Mindscapes**, English For Technologists and Engineers, Orient Black Swan,2012.
2. **Effective Technical Communication,** Rizvi,Tata McGraw-Hill Education, 2007.
3. **Technical Communication,** Meenakshi Raman, Oxford University Press.2011.
4. **English Conversations Practice,** Grant Taylor, Tata Mc GrawHill publications,2013.
5. **Practical English Grammar.** Thomson and Martinet, OUP, 2010.

Expected Outcomes:

At the end of the course, students would be expected to:
1. Have acquired ability to participate effectively in group discussions.
2. Have developed ability in writing in various contexts.
3. Have acquired a proper level of competence for employability.

Verified

I B.Tech II Sem

15ABS07-MATHEMATICS – II

(Common for all Branches)

L	T	P	C
3	1	0	3

Objectives: Our emphasis will be more on conceptual understanding and applications of Fourier series, Laplace transforms, Fourier transforms, Z transforms and solutions of partial differential equations.

UNIT – I

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

Differentiation and integration of Laplace transforms – Applications of Laplace transform to ordinary differential equations of first and second order.

UNIT – II

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions- Parseval's formula- Complex form of Fourier series.

UNIT – III

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT – IV

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

UNIT – V

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.

References:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
3. Engineering Mathematics, Volume - II, E. Rukmangadachari, Pearson Publishers.

12.07.2018

Outcomes:

At the end of the course, the student will be able to attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications, using discrete and continuous transforms and partial differential equations.

R-15

I B.Tech II Sem

15ABS03-ENGINEERING CHEMISTRY

(Common for EEE, ECE and CSE)

L	T	P	C
3	1	0	3

Course Objectives :

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, engineering materials and water chemistry.

UNIT.1: Water Treatment

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity, acidity and chlorides in water, Water treatment for domestic purpose (Chlorination, Bleaching, ozonisation, U.V. treatment)

Industrial Use of water:

For steam generation, troubles of Boilers: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water:

Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate treatment.

External Treatment: Ion-Exchange and Permutit processes.

Demineralisation of brackish water: Reverse Osmosis and Electrodialysis

UNIT.2: Electrochemistry

i).Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries),Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

ii). Voltammetry: Basic Principles and applications (Ferrous/Ferric System)

Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples : analysis of Glucose and urea

iii).Corrosion: Electrochemical Theory of corrosion, Factors affecting the corrosion. Prevention: Anodic and cathodic protection and electro and electroless plating.

UNIT.3: Polymers

i). Introduction: Basic concepts of polymerisation, Types of poloymerisation (Chain Growth (Addition), Step growth (Condensation)), Mechanism: cationic, anionic, free radical and coordination covalent, Polydispercity Index.

Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications , PVC, Bakelite, nylons, Polyester Elastomers (rubbers) Natural Rubber; Processing of natural rubber, Compounding of Rubber Synthetic Rubber: Preparation, properties and engineering applications of Buna-S, buna-N, Polyurethene, Polysulfide (Thiokol) rubbers
ii).Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.
iii).Liquid Crystals: Introduction, classification and applications
iv).Inorganic Polymers: Introduction, Silicones, Polyphospazins (-(R)2-P=N-), applications

UNIT.4: Fuel Technology

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.
i). Solid Fuels–Coal, Coke : Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.
ii).Liquid Fuels:
Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Troph's synthesis
Power Alcohol: Manufacture, merits and demerits of Power Alcohol
iii). Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.
iv). Bio Fuels: Biogas, Biodiesel and their significance

UNIT.V: Chemistry Of Engineering Materials

i).Semiconducting and Superconducting materials-Principles and some examples
ii).Magnetic materials – Principles and some examples
iii).Cement: Composition, Setting and Hardening (Hydration and Hydrolysis)
iv).Refractories: Classification , properties and applications
v).Lubricants: Classification and characteristics of lubricants, Theory of lubrication.

Expected Outcomes (EO): The student is expected to:

- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Foruth Edition, 2013.
2. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapath Rai Publishing Company, New Delhi, 15th Edition, 2012.

References:

1. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.
1. Engineering Chemistry, K. Sesha Maheswaramma and Mrudula Chugh, Pearson Education, First Edition, 2013.
2. Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra,
3. SCITECH, Publications India Pvt Limited, Chennai, 2nd Edition, 2012.
4. Concepts of Engineering Chemistry- Ashima Srivastavaf and N.N. Janhavi, Acme

R-15

I B.Tech II Sem

15ABS05-ENVIRONMENTAL STUDIES

(Common for EEE, ECE and CSE)

L	T	P	C
3	1	0	3

Objectives

- To investigate the relationship between human life and environment from scientific prospective
- To help you apply the fundamentals of Environmental science to important local, regional, national and global environmental problems and potential issues

UNIT-I:

i) Multidisciplinary nature of environmental studies

The **Multidisciplinary** nature of environmental studies Definition; Scope and importance, Need for public awareness.

ii) Natural Resources:

Renewable and non-renewable resources: Natural resources and associated problems.

a) Forest resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

UNIT-II:

i) Ecosystems

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession. Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystem: -

a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

ii) Biodiversity and its Conservation

Introduction-Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-III:

Environmental Pollution:

Definition - Causes, effects and control measures of: -

a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution
e. Noise pollution f. Thermal pollution g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV:

Social Issues and the Environment

From Unsustainable to Sustainable development. Urban problems related to energy.
Water conservation, rain water harvesting, watershed management.
Resettlement and rehabilitation of people; its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. 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 awareness.

UNIT-V:

i) Human Population and the Environment

Population growth, 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.

ii) Field Work

- Visit to a local area to document environmental assets-river/forest/grassland/ hill/mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

Expected Outcome:

- **Describe the structure and function of significant environmental systems**
- **Use scientific reasoning to identify and understand environmental problems and evaluate potential solutions**
- **Critically evaluate arguments regarding environmental issues**

Text Books:

1. Shashi Chawla, A Text Book of Environmental Studies, Mc Graw Hill Education, 4th edtion, 2014
2. De A.K., Environmental Chemistry, Wiley Eastern Ltd , 2012

Reference Books

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad -380013, India, Email: mapin@icenet. net (R).
2. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
3. Cunningham, W.P.Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.

I YEAR II SEM

15ACS04-DATA STRUCTURES

(Common for ME, ECE and CSE)

L	T	P	C
3	1	0	3

UNIT-I

Stacks & Queues: stacks, stacks using dynamic arrays, Queues, circular queues using dynamic arrays, amazing problem, evaluation of expressions.

Linked List: single linked list and chains, representing chains in C, Linked stacks and queues, polynomials, additional list operations, equivalence classes, sparse matrices, double linked list.

UNIT –II

Trees : Introduction, Binary tree, Binary tree traversals , Additional binary tree operations, Threaded binary trees, Heaps, Binary search trees, Selection trees, Forests, Representation of disjoint sets, Counting binary trees.

UNIT-III

Graphs: The graph abstract data type, Elementary graph operations, Minimam cost spanning trees, Shortest paths and transitive closure.

Sorting: Motivation, Insertion sort, Quick sort, Merge sort , Heap sort, sorting on several keys, list and table sorts, external sorting.

UNIT –IV

Hashing: Introduction, Static hashing, dynamic hashing, Bloom Filters.

Priority Queues: Single ended and double ended priority queues, leftist trees, Binominal Heaps, Fibonacci Heaps, Pairing Heaps, Symmetric Min-Max Heaps, and Interval Heaps.

UNIT-V

Efficient binary search trees: Optimal binary search trees, AVL Trees, RED Black Trees, Splay Trees, M- Way search trees, B-Trees, B+ -Trees.

Text Books:

1. Fundamentals of Data structures in C, 2nd edition, HOROWITZ, SAHNI, ANDERSON-FREED.

I B.Tech II Sem

15AEC01-ELECTRONIC DEVICES AND CIRCUITS

L	T	P	C
3	1	0	3

Course Objectives: To give understanding on semiconductor physics of the intrinsic, p and n materials, characteristics of the p-n junction diode, diode's application in electronic circuits, Characteristics of BJT,FET,MOSFET, characteristics of special purpose electronic devices. To familiarize students with dc biasing circuits of BJT, FET and analyzing basic transistor amplifier circuits.

Course Outcomes:

Upon completion of the course, students will:

a. Analyze the operating principles of major electronic devices, its characteristics and applications.
b. Design and analyze the DC bias circuitry of BJT and FET.
c. Design and analyze basic transistor amplifier circuits using BJT and FET.

UNIT-I

Semiconductors: Intrinsic and extrinsic semiconductors, mobility and conductivity, Fermi level and carrier concentration of semi conductors, Drift and diffusion currents, continuity equation, Hall Effect.

PN junction diode: Band structure of PN Junction, Quantitative Theory of PN Diode, Volt – Amp Characteristics, Temperature Dependence, Transition and Diffusion Capacitance of PN Junction, Illustrative problems.

UNIT-II

Rectifiers: Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics.

Special Diodes: Zener and Avalanche Breakdowns, Tunnel Diode, LED, Schottky Barrier Diode, Varactor Diode, Photo Diode, SCR.

UNIT-III

Bipolar Junction Transistors: Transistor construction, BJT Operation, Transistor as an Amplifier, Common Emitter, Common Base and Common Collector Configurations, Limits of Operation, BJT Specifications.

Junction Field Effect Transistor (JFET): The Junction Field Effect Transistor (Construction, Principle of Operation) - Pinch-Off Voltage – Volt-Ampere Characteristics, FET as Voltage Variable Resistor, Comparison between BJT and FET, MOSFET- Basic Concepts, Construction, modes (depletion & enhancement), symbol, principle of operation, characteristics.

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UNIT-IV

BIASING AND STABILISATION: Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Collector to Base Bias, Self Bias, Bias Stability, Stabilization against Variations in I_{CO} V_{BE} and β, Bias Compensation Using Diodes and Transistors, Thermal Runaway, Condition for Thermal Stability in CE configuration, Illustrative problems.

UNIT- V

SMALL SIGNAL ANALYSIS OF AMPLIFIERS: BJT Modeling using h-parameters, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using h-Parameters, Comparison of CB, CE and CC configurations, Simplified Hybrid Model, Illustrative problems.

Text Books:

1. Electronics Devices and Circuits, J.Millman and Christos. C. Halkias, 3rd edition, Tata McGraw Hill, 2006.
2. Electronics Devices and Circuits Theory, David A. Bell, 5th Edition, Oxford University press., 2008.

References:

1. Electronics Devices and Circuits Theory, R.L.Boylestad,Lousis Nashelsky and K.Lal Kishore, 12th edition, 2006, Pearson, 2006.
2. Electronic Devices and Circuits, K. Lal Kishore, 3rd Edition, BSP, 2008.
3. Electronic Devices and Circuits, N.Salivahanan, and N.Suresh Kumar, 3rd Edition, TMH, 2012
4. Microelectronic Circuits, S.Sedra and K.C.Smith, 5th Edition, Oxford University Press.

I B.Tech II Sem

15ACS05-DATA STRUCTURES LAB

L	T	P	C
0	0	3	2

1. Write a C Program to implement Stack ADT Using arrays and linked lists?
2. Write a C Program to implement Queue ADT Using arrays and linked lists?
3. Write a c Program to convert infix expression to postfix expression?
4. Write a C Program to implement List ADT?
5. Write a C Program to implement Sparse Matrices?
6. Write a C Program to traverse Binary tree?
7. Write a C Program to implement priority queues using arrays?
8. Write a C++ program to implement the search algorithms of the graph: Depth first search and Breadth first search.
9. Write a C program to find the connected components of the graph.
10. Write a C program to implement the spanning tree algorithms Kruskal's, Prim's.
11. Write a C program to implement insertion sort algorithm
12. Write a C program to implement quick sort algorithm
13. Write a C program to implement merge sort algorithm
14. Write a C program to implement heap sort algorithm
15. Write a C Program to implement Static Hashing.
16. Write a C Program to implement Dynamic Hashing
17. Write a C Program to implement AVL Trees.
18. Write a C Program to implement RED Black Trees.
19. Write a C Program to implement Splay Trees.

Text Books:

1. Fundamentals of Data structures in C 2nd edition HOROWITZ , SAHNI, ANDERSON-FREED.

R-15

I B.Tech II Sem

15ABS04-ENGINEERING CHEMISTRY LAB

(Common for EEE, ECE and CSE)

L	T	P	C
0	0	3	2

Programme Objective:

- Will learn practical understanding of the redox reaction
- Will able to understand the function of fuel cells, batteries and extend the knowledge to the processes of corrosion and its prevention
- Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications
- Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology

List Of Experiments

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method
4. Determination of Manganese by colorimetry.
5. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
6. Determination of Alkalinity of Water
7. Determination of acidity of Water
8. Preparation of Phenol-Formaldehyde (Bakelite)
9. Determination of Viscosity of oils using Redwood Viscometer I
10. Determination of Viscosity of oils using Redwood Viscometer II
11. Conductometric titration of strong acid Vs strong base (Neutralization titration).
12. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
13. Estimation of Chloride ion using potassium Chromate indicator (Mohrs method)
14. Acid-Base neutralisation by pH method.

(Any 10 experiments from the above list)

Course Outcomes

- Would be confident in handling energy storage systems and would be able combat chemical corrosion
- Would have acquired the practical skill to handle the analytical methods with confidence.
- Would feel comfortable to think of design materials with the requisite properties
- Would be in a position to technically address the water related problems.

Text Books:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Chemistry Practical – Lab Manual by K.B.Chandra Sekhar, G.V. Subba Reddy and K.N.Jayaveera, SM Publications, Hyderabad, 3rd Edition, 2012.

I B.Tech II Sem

15AME03-ENGINEERING AND IT WORKSHOP

(Common for all Branches)

L	T	P	C
0	0	3	2

PART A: ENGINEERING WORKSHOP

Course Objective:

- The objective of this Lab is to provide the basic concepts about different manufacturing processes, use of various workshops tools and exposer to the power tools.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Trades For Exercises:

At least 2 exercise in each:

1. Carpentry
2. Fitting
3. House-wiring
4. Foundry
5. Tin smithy
6. Welding.

Text Book:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/Scitech Publishers.
2. Workshop practice manual by K.Venkata Reddy B.S Publications

Codes / Tables : will be provided

Question Paper pattern : Test in any two trades out of 6 trades.

Course outcomes

- Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops.
- This course intends to impart basic know-how of various hand tools and their use in different sections of manufacturing.
- Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems.
- Workshop curricula build the hands on experiences which would help to learn manufacturing processes and production technology courses in successive semesters.

Workshop practice is also important since only practice can make the man perfect.

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15AME03-ENGINEERING AND IT WORKSHOP

(Common for all Branches)

L	T	P	C
0	0	3	2

PART B: IT Workshop

Course Objectives:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

Preparing your Computer (2 weeks)

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Productivity tools (6 weeks)

Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content

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sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 5: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 6: Presentations : creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Task 7:ACCESS:

Optional Tasks:

Task 7: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

References:

1. "Introduction to Computers", Peter Norton, Mc Graw Hill
2. "LaTeX Companion" – Leslie Lamport, PHI/Pearson.
3. "MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.

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4. "Introduction to Information Technology", ITL Education Solutions limited, Pearson Education.
5. "Networking your computers and devices", Rusen, PHI
6. "Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH.

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II B.Tech I Sem

15ABS08-MATHEMATICS-III

(Common for all Branches)

L	T	P	C
3	1	0	3

Objectives:

- This course aims at providing the student with the concepts and applications of Matrices, Numerical Techniques and Curve fitting.

UNIT – I

Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix and inverse of a matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

UNIT – II

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout's triangularisation method, Gauss - Seidal iteration method.

UNIT – III

Interpolation: Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

UNIT – IV

Curve fitting: Fitting of a straight line – Second degree curve – Exponentional curve-Power curve by method of least squares. Numerical Differentiation for Newton's interpolation formula. Numerical Integration: Newton's – Cotes formula - Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT – V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive approximations-Euler's, Runge-Kutta 2^{nd} and 4^{th} order Methods– Milne's Predictor-Corrector Methods.

Text Books:

3. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
4. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

2.7.2018

References:

1. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

Outcomes:

At the end of the course, student will be able to analyze engineering problems using the concepts of Matrices and Numerical methods.

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II B.Tech I Sem

15AEC05-SIGNALS AND SYSTEMS

L	T	P	C
3	1	0	3

Objectives:

1. To study about signals and systems.
2. To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
3. To understand the stability of systems through the concept of ROC.
4. To know various transform techniques in the analysis of signals and systems.

Learning Outcomes:

a. For integro-differential equations, the students will have the knowledge to make use of Laplace transforms.
b. For continuous time signals the students will make use of Fourier transform and Fourier series.
c. For discrete time signals the students will make use of Z transforms.
d. The concept of convolution is useful for analysis in the areas of linear systems and communication theory.

UNIT - I

Signals and Systems: Continuous-Time and Discrete-Time Signals, Transformations of the Independent Variable, Exponential and Sinusoidal Signals, the Unit Impulse and Unit Step Functions, 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, Causal LTI Systems Described by Differential and Difference Equations, Singularity Functions.

UNIT-II

Fourier Series Representation of Periodic Signals: 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, Fourier Series Representation of Discrete-Time Periodic Signals, Properties of Discrete-Time Fourier Series, Fourier Series and LTI Systems, Filtering - Examples of Continuous-Time Filters Described by Differential Equations, Examples of Discrete-Time Filters Described by Difference Equations.

UNIT-III

The Continuous-Time Fourier Transform: 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 Discrete-Time Fourier Transform - Representation of Aperiodic Signals, The Discrete-Time Fourier Transform, The Convolution Property, Fourier Transform Properties and Basic Fourier Transform Pairs, Duality, Systems Characterized by Linear Constant-Coefficient Difference Equations.

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UNIT-IV

Time & Frequency Characterization of Signals and Systems: The Magnitude-Phase Representation of the Fourier Transform, The Magnitude-Phase Representation of the Frequency Response of LTI Systems, Time-Domain Properties of Ideal Frequency-Selective Filters, Time-Domain and Frequency-Domain Aspects of Non-ideal Filters, First-Order and Second-Order Continuous-Time Systems, First-Order and Second-Order Discrete-Time Systems, Examples of Time- and Frequency-Domain Analysis of Systems,

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-V

Laplace and z-Transforms: 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, 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.

Text Books:

1. Signals and Systems, Alan V. Oppenheim, Alan S. Willsky, & S. Hamid, 2nd Edition, Pearson Higher Education, 1997.
2. Principles of Linear Systems and Signals, B.P. Lathi, 2nd Edition, Oxford University Press, 2011.

References:

1. Signals & Systems, Simon Haykin and B. Van Veen, 2nd Edition, John Wiley, 2003.
2. Signals and systems, Narayana Iyer and K Satya Prasad, 1st Edition, CENGAGE Learning, 2011.
3. Signals, Systems and Transforms, C. L. Philips, J. M. Parr and Eve A. Riskin, 4th Edition, Pearson education, 2008.

II B.Tech I Sem

15AEC06-SWITCHING THEORY AND LOGIC DESIGN

L	T	P	C
3	1	0	3

Course Objectives:

To provide fundamental concepts used in the design of digital systems and learn the methods for the design of digital circuits.

Course Outcomes:

a. To introduce basic postulates of Boolean algebra and the methods for simplifying Boolean expressions
b. To illustrate the concepts and study the procedures for the analysis and design of combinational circuits and sequential circuits
c. To introduce the concepts of programmable logic devices.

UNIT I

Number System & Boolean Algebra: Digital Systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes. Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, Other logic operations & Logic gates.

UNIT I

Gate Level Minimization: The map method, four variable, K-map, Five variable 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: Combinational circuits, Analysis & Design procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT IV

Analysis And Synthesis Of Sequntial Circuits: Sequential Circuits, Latches Flips-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters – Registers, Shift Registers, Ripple Counters, Synchronous counters, other counters.

UNIT V

Asynchronous sequential Logic & Programmable Memories: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of State flow tables, Race-free

State Assignment, Hazards. Random Access Memory, Memory Decoding Errordetection and correction, ROM, PLA, PAL.

Text Books:

1. Digital Design, M.Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, Zvi Kohavi and Nirah K.Jha, 2nd Edition, Tata McGraw Hill, 2005.

References

1. Fundamentals of Logic Design, Charles H Roth,Jr., 5th Edition, Brooks/cole Cengage Learning, 2004.
2. Digital & State Machine Design, Comer, 3rd Edition, OXFORD.
3. Fundamentals Digital Circuits, A.Anand Kumar, 3rd Edition, PHI, 2014.

II B.Tech I Sem

15AEE10-ELECTRICAL TECHNOLOGY

L	T	P	C
3	1	0	3

UNIT _I: DC Generators

D.C. Generators – Principle of Operation – Action of Commutator – Constructional Features – Armature Windings – Lap and Wave Windings- E. M.F Equation– Numerical Problems - Methods of Excitation – Separately Excited and Self Excited Generators – Build-Up of E.M.F - Critical Field Resistance and Critical Speed - Causes for Failure to Self Excite and Remedial Measures-Load Characteristics of Shunt, Series and Compound Generators.

UNIT _II: DC Motors

D.C Motors – Principle of Operation – Back E.M.F. – Torque Equation – Characteristics and Application of Shunt, Series and Compound Motors- Speed Control of D.C. Motors: Armature Voltage and Field Flux Control Methods- Motor Starters (3 Point and 4 Point Starters)- Losses – Constant & Variable Losses – Calculation of Efficiency – Condition for Maximum Efficiency. Methods of Testing – Direct, Indirect – Brake Test – Swinburne's Test.

UNIT _III: Transformers

Single Phase Transformers-Types - Constructional Details--Emf Equation - Operation on No Load and on Load - Phasor Diagrams - Equivalent Circuit - Losses and Efficiency-Regulation - OC and SC Tests - Sumpner's Test - Predetermination of Efficiency and Regulation-Separation of Losses Test- Auto Transformers-Equivalent Circuit.

UNIT _IV: Induction Motors And Alternators

Induction Motors-Construction Details – Principle of operation - Rotor Power Input, Rotor Copper Loss and Mechanical Power Developed and Their Inter Relation – torque –slip characteristics – simple problems. Principle and operation of alternator - Pitch, Distribution, Winding Factors – E.M.F Equation- Principle and operation of synchronous motors.

UNIT – V Single Phase And Special Motors

Single Phase Induction Motor - Constructional Features – Double Revolving Field Theory-Elementary Idea of Cross Field Theory – Split Phase Motors – Capacitor Start and Run Motors – Shaded Pole Motor. Principle and Performance of A.C Series Motor - Universal Motor – Single Phase Synchronous Motors – Reluctance Motor – Hysteresis Motor – Stepper Motor.

TEXT BOOKS:

1. Electrical Machines – by P.S. Bimbra, Khanna Publishers
2. Principles of Electrical Engineering – By Ashfaq Hussian, Dhanapat Roy & Sons

BOS – chairman

II B.Tech I Sem

15AEC07-PROBABILITY THEORY & STOCHASTIC PROCESSES

L	T	P	C
3	1	0	3

Objectives:

1. To understand the concepts of a Random Variable and operations that may be performed on a single Random variable.
2. To understand the concepts of Multiple Random Variables and operations that may be performed on Multiple Random variables.
3. To understand the concepts of Random Process and Temporal & Spectral characteristics of Random Processes.

Outcomes: A student will able to determine the temporal and spectral characteristics of random signal response of a given linear system.

UNIT-I

Probability: Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bays' Theorem, Independent Events:

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Raleigh, Conditional Distribution, Conditional Density, Properties.

UNIT-II

Multiple Random Variables: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables.

UNIT-III

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation

Function and its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT-IV

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

UNIT-V

Linear Systems with Random Inputs: Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output, Band pass, Band-Limited and Narrowband Processes, Properties.

Text Books :

1. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, 4th Edition, Tata McGraw Hill, 2001.
2. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S. Unnikrishna Pillai, 4th Edition, PHI, 2002.

References:

1. Probability Theory and stochastic Processes, P.Ramesh Babu, 1st Edition, McGraw Hill Education, 2014.
2. Probability Methods of Signal and System Analysis, George R. Cooper, Clave D. MC Gillem, 3rd Edition, Oxford, 1999.

II B.Tech I Sem

15AEC03-ELECTRONIC DEVICES AND CIRCUITS LABORATORY

L	T	P	C
0	0	3	2

Objectives: This Lab provides the students to get an electrical model for various semiconductor devices. Students can find and plot V_I characteristics of all semiconductor devices. Student learns the practical applications of the devices. They can learn and implement the concept of the feedback and frequency response of the small signal amplifier

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: List of Experiments

(For Laboratory Examination-Minimum of Ten Experiments)

3. P-N Junction Diode Characteristics
   a. Germanium Diode (Forward bias& Reverse bias)
   b. Silicon Diode (Forward bias only)
2. Zener Diode Characteristics
   a. V-I Characteristics
   b. Zener Diode act as a Voltage Regulator
3. Rectifiers (without and with c-filter)
   a. Half-wave Rectifier
   b. Full-wave Rectifier
4. BJT Characteristics(CE Configuration)
   a. Input Characteristics
   b. Output Characteristics
5. FET Characteristics(CS Configuration)
   a. Drain (Output) Characteristics
   b. Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

PART C: Equipment required for Laboratory

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. Bread Boards
11. Connecting Wires
12. CRO Probes etc.

Outcomes: Students able to learn electrical model for various semiconductor devices and learns the practical applications of the semiconductor devices

R-15

II B.Tech I Sem

15AEE11-ELECTRICAL TECHNOLOGY LAB

L	T	P	C
0	0	3	2

Course objective for Electrical technology lab:

1. Students can learn about fundamental concepts circuits, DC, AC Machines.
2. Students can learn about Electrical instruments.
3. Student learn how to apply electrical principles in their applications.
4. Student can able verify theorems such as super position, thevinins and maximum power transfer and the measurements of RLC parameters using bridge principles

Course outcome for Electrical technology lab:

1. Students able to demonstrate knowledge on fundamental concepts circuits, DC, AC Machines.
2. Students able to demonstrate knowledge on how to measure the electrical quantities using measuring instruments.
3. Students are able to apply electrical principles in their applications.
4. Students are able to determine the RLC parameters using bridge principles.

PART-A

1. Series and parallel resonance- timing, resonant frequency, Bandwidth and Q-Factor determination for RLC Network.
2. Time response of first order RC/RL network for periodic non sinusoidal inputs-time constant
   and steady state error determination.
3. Z and Y Parameters.
4. Verification of Superposition Theorem and Reciprocity Theorem
5. Verification of Maximum Power Transfer Theorem
6. Verification of Thevenin's and Norton's Theorems.

PART-B

1. Magnetization Characteristics of DC Shunt Generator. Determination of Critical Field Resistance and Critical Speed.
2. Swinburne's Test and Speed Control of DC Shunt Motor. Predetermination of Efficiencies.
3. Brake Test on DC Shunt Motor. Determination of Performance Curves.
4. O.C. & S.C. Tests on Single phase Transformer
5. Brake Test on Three Phase Induction Motor
6. Regulation of Three-Phase Alternator by Z.P.F. and A.S.A Methods

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Bos-chairman

II B.Tech I SEM

15AHS04-HUMAN VALUES AND PROFESSIONAL ETHICS

(Common for all Branches)

L	T	P	C
3	1	0	3

Objectives

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of Others

UNIT-I: Human Values

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty - Courage- Co Operation – Commitment – Empathy –Self Confidence Character – Spirituality.

UNIT-II: Engineering Ethics

Senses of 'Engineering Ethics'- Variety of moral issued – Types of inquiry – Moral dilemmas – Moral autonomy –Kohlberg's theory- Gilligan's theory- Consensus and controversy – Models of professional roles- Theories about right action- Self-interest - Customs and religion –Uses of Ethical theories – Valuing time –Cooperation – Commitment.

UNIT-III : Engineering As Social Experimentation

Engineering As Social Experimentation – Framing the problem – Determining the facts – Codes of Ethics – Clarifying Concepts – Application issues – Common Ground - General Principles – Utilitarian thinking –respect for persons.

UNIT-IV: Engineers Responsibility For Safety And Risk

Safety and risk – Assessment of safety and risk – Risk benefit analysis and reducing risk-Safety and the Engineer- Designing for safety.

UINIT-V: Global Issues

Globalization – Cross Cultural issues- Environmental Ethics – Computer Ethics – Computers as the instrument of Unethical behavior – Computers as the object of Unethical acts – Autonomous Computers- Computer codes of Ethics – Weapons Development - Ethics and Research – Analyzing Ethical Problems in research – Intellectual property Rights(IPR).

Out Comes:

- Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- Identify the multiple ethical interests at stake in a real-world situation or practice
- Articulate what makes a particular course of action ethically defensible
- Assess their own ethical values and the social context of problems

- Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

Text Books

1. Engineering Ethics includes Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
2. Engineering Ethics by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – TMH- 2003.
4. Professional Ethics and Morals by Prof.A.R.Aryasri, Dharanikota Suyodhana, Maruthi Publications.
5. Professional Ethics and Human Values by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications.
6. Professional Ethics and Human Values by Prof.D.R.Kiran-
7. Indian Culture, Values and Professional Ethics by PSR Murthy-BS Publication.

Verified

R-15

II B.Tech II Sem

15ABS10-MATHEMATICS –IV

(Common for EEE and ECE)

L	T	P	C
3	1	0	3

Objectives: To enable the students to understand the mathematical concepts of special functions & complex variables and their applications in science and engineering.

UNIT – I: Special Functions: Gamma and Beta Functions – their properties – Evaluation of improper integrals. Series Solutions of ordinary differential equations (Power series and Frobenius Method).

UNIT – II: Bessel functions – Properties – Recurrence relations – Orthogonality. Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

UNIT – III

Functions of a complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thomson method.

Conformal mapping: Transformation of e^z, Inz, z^2, Sin z, cos z, Bilinear transformation - Translation, rotation, magnification and inversion – Fixed point – Cross ratio – Determination of bilinear transformation.

UNIT – IV

Complex integration: Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

Complex power series: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point – Isolated singular point – Pole of order m – Essential singularity.

UNIT – V

Residue – Evaluation of residue by formula and by Laurent's series – Residue theorem.

Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$ (c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - III, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher

References:

1. Complex variables and applications by Ruel. V. Churchill and J. W. Brown, 8th edition, 2008, McGraw-Hill.

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2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Advanced Mathematics for Engineers and Scientists by B. Rambhupal Reddy, Research India Publications.
4. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.

Outcomes:

At the end of the course, the student achieves the knowledge to analyze the problems using the methods of special functions and complex variables.

R-15

II B.Tech II Sem

15AHS05-MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common for EEE, ECE and CSE)

L	T	P	C
3	1	0	3

Course Objectives:

1. To enhance the knowledge of the students regarding importance of management and Managerial problems with optimum solutions.
2. To develop the concepts viz., Consumer Behaviour and demand-supply concept.
3. To introduce the concept of Demand Forecasting-methods.
4. To provide the knowledge regarding production and cost and Break-Even Analysis.
5. To share the concepts like market structures and Business Organization.
6. To discuss the contemporary practices-which influences the organization?
7. To provide awareness regarding Capital Budgeting decisions(Long term Investment decisions)
8. To introduce the concepts- Financial Accounting and Financial Analysis.
9. To give an idea of practicing technique of Ratio Analysis.
10. To provide the basic concepts which are related to managerial?

Unit I

Introduction to Managerial Economics & Demand Analysis: Definition of Managerial Economics, Characteristics and Scope – Managerial Economics and its relation with other subjects- Basic economic tools in Managerial Economics.

Demand Analysis: Meaning- Demand distinctions- Demand determinants- Law of Demand and its exceptions.

Elasticity of Demand & Theory of Production and Cost Analysis: Definition -Types of Elasticity of demand - Measurement of price elasticity of demand: Total outlay method, Point method and Arc method- Significance of Elasticity of Demand.

Unit-II

Demand Forecasting: Meaning - Factors governing demand forecasting - Methods of demand forecasting - Forecasting demand for new products- Criteria of a good forecasting method.

Theory of Production and Cost Analysis: Production Function- Isoquants and Isocosts, MRTS, Cobb-Douglas Production function.

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

Unit-III

Introduction to Markets & Pricing Policies: Market structures: Types of competition, Features of Perfect Competition, Monopoly and Monopolistic Competition. Price-Output Determination under Perfect Competition, Monopoly, Monopolistic Competition.

Pricing Policies: Methods of Pricing-Marginal Cost Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Bundling Pricing, and Peak Load Pricing. Internet Pricing Models:

Flat rate pricing, Usage sensitive pricing, Transaction based pricing, Priority pricing, charging on the basis of social cost, Precedence model, Smart market mechanism model.

UNIT-IV

Types of Industrial Organization & Introduction to business cycles: Characteristic features of Industrial organization, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, State/Public Enterprises and their types.

Introduction to business cycles: Meaning - Features of business cycles.

Capital and Capital Budgeting: Meaning of capital budgeting, Need for capital budgeting – Capital budgeting decisions (Examples of capital budgeting) - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), IRR and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting: Introduction to Double-entry system, Journal, Ledger, Trial Balance- Final Accounts (with simple adjustments) - Limitations of Financial Statements.

Interpretation and analysis of Financial Statement: Ratio Analysis – Liquidity ratios, Profitability ratios and solvency ratios – Preparation of changes in working capital statement and fund flow statement.

Learning Outcomes:

Expected to achieve the overall course objective to understand and enhancing the knowledge regarding managerial concepts and obtaining optimal solutions. And to get an idea of analysis of firm's financial position with the techniques of financial analysis and ratio analysis.

Text Books:

1. **J.V. Prabhakar Rao**: Managerial Economics and Financial Analysis, Maruthi Publications, 2011
2. **N. Appa Rao. & P. Vijaya Kumar**: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi, 2011

References:

1. **A R Aryasri** - Managerial Economics and Financial Analysis, TMH 2011
2. **Suma damodaran-** Managerial Economics, **Oxford** 2011
3. **S.A. Siddiqui & A.S. Siddiqui**, Managerial Economics and Financial Analysis, New Age International Publishers, 2011.

II B.Tech II Sem

15AEC11-CONTROL SYSTEMS ENGINEERING

L	T	P	C
3	1	0	3

Objectives:

To make the students learn about:

- Merits and demerits of open loop and closed loop systems; the effect of feedback
- The use of block diagram algebra and Mason's gain formula to find the effective transfer function
- Transient and steady state response , time domain specifications
- The concept of Root loci
- Frequency domain specifications, Bode diagrams and Nyquist plots
- The fundamental aspects of modern control

UNIT – I Introduction

Open Loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback Characteristics, Effects of positive and negative feedback. Mathematical models – Differential equations of Translational and Rotational mechanical systems, and Electrical Systems, Block diagram reduction methods – Signal flow graph - Reduction using Mason's gain formula. Transfer Function of DC Servo motor - AC Servo motor - Synchro transmitter and Receiver

UNIT-II Time Response Analysis

Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants

UNIT – III Stability

The concept of stability – Routh's stability criterion – Stability and conditional stability – limitations of Routh's stability. The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

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BOS chairman.

UNIT – IV Frequency Response Analysis

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Stability Analysis from Bode Plots. Polar Plots-Nyquist Plots- Phase margin and Gain margin-Stability Analysis. Compensation techniques – Lag, Lead, Lag-Lead Compensator design in frequency Domain.

UNIT – V State Space Analysis

Concepts of state, state variables and state model, derivation of state models from differential equations. Transfer function models. Block diagrams. Diagonalization. Solving the Time invariant state Equations- State Transition Matrix and it's Properties. System response through State Space models. The concepts of controllability and observability.

Outcomes:

After completing the course, the student should be able to do the following:

- Evaluate the effective transfer function of a system from input to output using (i) block diagram reduction techniques (ii) Mason's gain formula
- Compute the steady state errors and transient response characteristics for a given system and excitation
- Determine the absolute stability and relative stability of a system
- Draw root loci
- Design a compensator to accomplish desired performance
- Derive state space model of a given physical system and solve the state equation

Text Books:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 5th edition, 2007.

Reference Books:

1. Control Systems Principles & Design 4th Edition, M.Gopal, Mc Graw Hill Education, 2012.
2. Automatic Control Systems– by B. C. Kuo and Farid Golnaraghi – John wiley and son's, 8th edition, 2003.
3. Control Systems 3rd Edition, Joseph J Distefano III, Allen R Stubberud & Ivan J Williams, Schaum's Mc Graw Hill Education.

John J D'Azzo and C. H. Houpis , "Linear Control System Analysis and Design Conventional and Modern", McGraw - Hill Book Company, 1988.

BOS chairman

II B.Tech II Sem

15AEC13-ELECTRONIC CIRCUIT ANALYSIS & DESIGN

L	T	P	C
3	1	0	3

Course Objectives: The aim of this course is

1. To familiarize the student with the analysis and design of multistage amplifiers with compound connections, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers.
2. To study and analyze the frequency response of amplifier circuits.

Course Outcomes: Upon completion of this course, student will be able to :

a. Analyze the frequency response of the BJT amplifiers at low and high frequencies.
b. Analyze and design multistage amplifiers with compound connections, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers.

UNIT I

Multistage Amplifiers:

Classification of Amplifiers- Distortion in amplifiers, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Different Coupling Schemes used in Amplifiers – RC Coupled Amplifier, Direct and Transformer Coupled Amplifiers, Frequency Response of BJT Amplifier, Design of Single stage RC Coupled Amplifier Using BJT, Analysis of Cascaded RC Coupled BJT Amplifiers, Darlington Pair, Cascode Amplifier, Illustrative design problems.

UNIT II

High Frequency Response

Logarithms, Decibels, General Frequency considerations, Analysis of BJT amplifiers at High Frequencies, Effect of Coupling and bypass Capacitors, The Hybrid-pi (π)- Common Emitter Transistor Model, CE short Circuit Current gain, Current gain with Resistive Load, Single Stage CE Transistor Amplifier response, Gain-Bandwidth Product, Emitter follower at higher frequencies, Illustrative design problems.

UNIT III: Feedback Amplifiers

Concepts of Feedback, Classification of Feedback Amplifiers, General Characteristics of Negative Feedback Amplifiers, Effect of Feedback on Amplifier characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations, Illustrative design Problems.

UNIT IV: Oscillators

Conditions for Oscillations, RC and LC type Oscillators, RC-Phase shift and Wien-Bridge Oscillators, Generalized Analysis of LC Oscillators, Hartley and Colpitts Oscillators, Crystal Oscillators, Frequency and Amplitude Stability of Oscillators, Illustrative design problems.

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UNIT V:

Power Amplifiers: Classification, Series fed Class A Power Amplifier, Transformer Coupled Class A Amplifier, Efficiency, Push Pull Amplifier- Complementary Symmetry Class-B Power Amplifier, Amplifier Distortion, Power Transistor Heat sinking, Class C and Class D Power amplifiers, Illustrative design problems.

Introduction to Tuned amplifiers: Q-Factor, Single tuned, double tuned and stagger tuned amplifiers.

Text Books:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, 2nd Edition, Mc Graw Hill, 2002.
2. Electronic Devices and Circuit Theory, Robert L.Boylestad, Louis Nashelsky, 9th Edition, Pearson, 2008.

Reference Books:

1. Electronic Circuit Analysis, K.Lal Kishore, 2nd Edition, BSP, 2004.
2. Electronic Circuits Analysis and Design, Donald A Neamen, 3rd Edition, Tata McGraw-Hill, 2009.
3. Microelectric circuits, Sedra, Kenneth, Smith, 5th Edition, Oxford University Press, 2011.
4. Electronic Circuit and Applications, Mohammad H. Rashid, 3rd Edition, CENGAGE Learning, 2009..

Introductory Electronic Devices and Circuits, Robert T. Paynter, 7th edition, PEI, 2009.

II B.Tech II Sem

15AEC14-PULSE AND DIGITAL CIRCUITS

L	T	P	C
3	1	0	3

Objectives:-

1. To study various wave shaping circuits and their applications.
2. To study different circuits that produce non-sinusoidal waveforms (multivibrators) and their applications
3. To study various voltage time base generators and their applications.
4. To study different logic families and their comparison.

Outcomes: Students will be able to design different pulse circuits based on the above concepts.

UNIT I

Linear Wave Shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. High Pass RC network as Differentiator, Low Pass RC network as integrator, attenuators and its applications as a CRO probe, RL circuits and its response for step input, Illustrative Problem .

UNIT II

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators, clamping operation, clamping circuits taking source and Diode resistances into account, Clamping circuit theorem, practical clamping circuits, Illustrative Problems.

UNIT III

Multivibrators: Transistor as a switch, Break down voltages, Transistor-Switching Times, Triggering circuits. Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger circuit using BJT.

UNIT IV

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.

UNIT V

Synchronization And Frequency Division: Pulse Synchronization of relaxation Devices, Frequency division in sweep circuit, Stability of relaxation Devices, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

Sampling Gates: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Four Diode Sampling Gate, Reduction of pedestal in gate circuits, Six Diode Gate, Application of Sampling Gates.

Text Books:

1. Pulse, Digital and Switching Waveforms, J.Millman, H.Taub and Mothiki S. Prakash Rao, 2nd Edition, Tata McGraw Hill, 2008.
2. Solid State Pulse Circuits, David A. Bell, 4th Edition, PHI, 2002.

References:

1. Pulse and Digital Circuits, A. Anand Kumar, 2nd Edition, PHI, 2011.
2. Fundamentals of Pulse and Digital Circuits, Ronald J. Tocci, 3rd Edition, Merrill's International, 2008.

Wave Generation and Shaping, L. Strauss, 2nd Edition, Tata McGraw Hill, 1960.

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II B.Tech II Sem

15AEC15-ELECTROMAGNETIC THEORY & TRANSMISSION LINES

L	T	P	C
3	1	0	3

Pre requisites by Topics:

1. Understanding and the ability to use vector algebra, and vector calculus.
2. Proficiency in the use of vector identities, and various Coordinate systems & transformations.

Learning Outcomes:

This course provides the foundational education in static electromagnetic fields, and time varying electromagnetic waves. Through lecture, and out-of-class assignments, students are provided learning experiences that enable them to:

a. Analyze and solve the problems of electric and magnetic fields that vary with three dimensional spatial co-ordinates as well as with time.
b. Become proficient with analytical skills for understanding propagation of electromagnetic waves in different media.
c. Understand the concept of transmission lines & their applications.
d. Develop technical & writing skills important for effective communication.
e. Acquire team-work skills for working effectively in groups.

UNIT-I

Electrostatics: Review of Vector algebra, Co-ordinate systems & transformation, Vector calculus, Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Electric dipole, Energy Density, Convection and Conduction Currents, Dielectric Constant, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

UNIT-II

Magneto statics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Magnetic torque and moment, Magnetic dipole, Inductances and Magnetic Energy, Illustrative Problems.

UNIT-III

Maxwell's Equations (for Time Varying Fields): Faraday's Law and Transformer e.m.f, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Boundary Conditions of Electromagnetic fields: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Illustrative Problems.

UNIT-IV

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves ,All Relations between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Wave Propagation in Good Conductors and Good Dielectrics, Skin depth, physical significance of Skin Depth, Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Illustrative Problems.

UNIT-V

Transmission Lines: Types, Transmission line parameters (Primary and Secondary), Transmission line equations, Input impedance, Standing wave ratio & power, Smith chart & its applications, Applications of transmission lines of various lengths, Basics of waveguides and resonators. Illustrative Problems.

Text Books:

1. Elements of Electromagnetics, Matthew N.O. Sadiku, 4th Edition, Oxford University Press, 2008.
2. Electromagnetic Waves and Radiating Systems, E.C. Jordan and K.G. Balmain, 2nd Edition, PHI, 2000.

References:

1. Engineering Electromagnetics, William H. Hayt Jr. and John A. Buck, 7th Edition, Tata McGraw Hill, 2006.
2. Electromagnetics, John D. Krauss, 3rd Edition, McGraw Hill, 1988.
3. Networks, Lines, and Fields, John D. Ryder, 2nd Edition, PHI publications, 2012.
4. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, 2nd Edition, Pearson Education, 2013.

II B.Tech II Sem

15AEC16-ELECTRONIC CIRCUIT ANALYSIS AND DESIGN LAB

L	T	P	C
0	0	3	2

List of Experiments (12 experiments to be done):

Objectives

- Help students make transition from analysis of electronic circuits to design of electronic circuits.
- To understand the Analysis of transistor at high frequencies.
- To understand the concept of designing of tuned amplifier.
- The student will construct and analyze voltage regulator circuits.
- To understand the circuit configuration and the principle operation of converters, including diode rectifiers, controlled AC-DC converters and DC choppers

Outcomes:

- The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
- Designing and analyzing the transistor at high frequencies.
- Determine the efficiencies of power amplifiers.
- Determine Frequency response and design of tuned amplifiers.
- Able to analyze all the circuits using simulation software and Hardware.

I) Design and Simulation in Simulation Laboratory using Any Simulation Software. (Minimum of 6 Experiments):

1. Common Emitter Amplifier
2. Common Source Amplifier
3. A Two Stage RC Coupled Amplifier.
4. Current shunt and Voltage Series Feedback Amplifier
5. Cascade Amplifier
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. High Frequency Common base (BJT) / Common gate (JFET) Amplifier.

II) Testing in the Hardware Laboratory (6 Experiments)

Any Three circuits simulated in Simulation laboratory

Any Three of the following

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

III) Equipment required for Laboratories:

For software simulation of Electronic circuits

Computer Systems with latest specifications.
Connected in LAN (Optional).
Operating system (Windows XP).
Suitable Simulations software.

For Hardware simulations of Electronic Circuits

Regulated Power Supply (0-30V)
CRO's
Functions Generators.
Multimeters.
Components.

II B.Tech II Sem

15AEC17-PULSE & DIGITAL CIRCUITS LAB

L	T	P	C
0	0	3	2

Objectives:

1. To generate Different types of non-sinusoidal signals.
2. To generate and processing of non-sinusoidal signals.
3. To learn about Limiting and storage circuits and their applications.
4. To learn about Different synchronization techniques, basics of different sampling gates and their uses.
5. To obtain Basics of digital logic families.

Outcomes:

a. Student understands the various design and analysis to generate various types of signals.
b. Student can design various digital circuits based on the application and specifications.

Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.`
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.
14. Constant Current Sweep Generator using BJT.

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

III B.Tech I Semester

15ACS18 - COMPUTER ARCHITECTURE AND ORGANIZATION

L	T	P	C
3	1	0	3

Course Objectives: *The student can able to*

1. *Understand the structure, function, characteristics and performance issues of computer systems.*
2. *Understand the design of the various functional units of digital computers*
3. *Understand I/O transfer mechanism, design of I/O circuit interfaces and example bus standards (like PCI, SCSI, USB)*
4. *Understand the basic processing unit and how they are connected and how it generates control signals (using hardwired and micro-programmed approaches)*
5. *Understand the different types of memory and how they are related.*
6. *Learn basics of Parallel Computing and Pipelining.*

UNIT-I

Basic Structure of Computers: Computer types, Functional units, basic operational concepts, Bus structures, Data types, Software: Languages and Translators, Loaders, Linkers, Operating systems.

Addressing Methods and Machine Program Sequencing: Memory locations – addresses and encoding of information – main memory operations – Instruction formats and instruction sequences – Addressing modes and instructions – Simple input programming – pushdown stacks – subroutines.

UNIT-II

Register Transfer and Micro Operations: Register transfer Language, Register transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, shift Micro operations, Arithmetic Logic Shift Unit.

Central Processing Unit: Stack organization, instruction formats, Addressing modes, Data transfer and manipulation, Execution of a complete instruction, Sequencing of control signals, Program Control.

UNIT-III

Micro-Programmed Control: Control Memory, address Sequencing, Micro Program Example, Design of Control Unit.

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

UNIT-IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.

Memory Organization: Memory hierarchy, main memory, auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware.

UNIT-V

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Multi-Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence.

Course Outcomes: *After completion of the course, the student should be able to*

a. *Learn about computer performance, computer design, and trade-off between cost and performance as well as between hardware and software*
b. *Formulate and solve problems, understand the performance requirements of systems*
c. *Design circuits and also able to identify the issues related to computers.*

Text Books :

1. M. Morris Mano, "Computer system Architecture", Prentice Hall of India (PHI), Third edition.
2. William Stallings, "Computer organization and programming", Prentice Hall of India (PHI) Seventh Edition, Pearson Education (PE) Third edition, 2006.

Reference Books:

1. Carl Hamacher, ZvonksVranesic, SafwatZaky, "Computer Organization" 5th Edition, McGraw Hill, 2002.
2. Andrew S.Tanenbaum, "Structured Computer Organization", 4th Edition PHI/Pearson

III B.Tech I Semester

15AEC24 - ANALOG COMMUNICATION SYSTEMS

L	T	P	C
3	1	0	3

Course Objectives:

1. *To study the fundamental concept of the analog communication systems.*
2. *To study the various analog modulation and demodulation techniques.*
3. *To understand the influence of noise on the performance of analog communication systems, and to acquire the knowledge about information and capacity.*

UNIT- I

Introduction: Elements of communication systems, Information, Messages and Signals, Modulation, Modulation Methods, Modulation Benefits and Applications.

Amplitude Modulation & Demodulation: Baseband and carrier communication, Amplitude Modulation (AM), Side band and carrier power of AM, Generation of amplitude modulated wave- square law Modulator, switching Modulator, Demodulation of AM Waves- Envelope detector, Rectifier detector, Suppressed carrier Modulation, Double sideband suppressed carrier (DSB-SC) Modulation, Generation of DSB-SC signals- Balanced Modulator, Ring Modulator, Demodulation of DSB-SC signals- Synchronous detector, Quadrature amplitude modulation (QAM), Single side band suppressed carrier (SSB-SC) Modulation, Generation of SSB-SC signals-Frequency & Phase discrimination methods, Demodulation of SSB-SC signals-Synchronous detector, Vestigial sideband (VSB) modulation & demodulation, Frequency mixer.

Radio Receiver: Super-heterodyne AM receiver, Sensitivity, Selectivity, and fidelity. Illustrative Problems.

UNIT- II

Angle Modulation &Demodulation: 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, Features of angle modulation, Generation of FM waves – Indirect method, Direct generation; Demodulation of FM, Band pass limiter, Practical frequency demodulators, Power Spectral density, Pre-emphasis & De-emphasis filters, FM receiver, FM Capture Effect, Illustrative Problems.

UNIT- III

Noise in Communication Systems: Thermal noise, Properties of Thermal Noise, Time domain representation of narrowband noise, Filtered white noise, Quadrature representation of narrowband noise, Envelope of narrowband noise plus sine wave, Signal to noise ratio & probability of error, Noise equivalent bandwidth, Effective noise temperature, and Noise figure, Baseband systems with channel noise, Performance analysis of AM, DSB-SC, SSB-SC, FM, PM in the presence of noise, Illustrative Problems.

UNIT- IV

Sampling: Sampling theorem, sampling of continuous time signals, Reconstruction of Signal From its samples, Effect of under sampling, Natural and Flat top sampling

Analog pulse modulation schemes: Pulse amplitude modulation (PAM) & demodulation, Pulse-Time Modulation – Pulse Duration and Pulse Position modulations, and demodulation schemes, Illustrative Problems.

UNIT- V

Information & Channel Capacity: Introduction, Information content of message, Entropy, Entropy of symbols in long independent and dependent sequences, Entropy and information rate of Mark off sources, Shannon's encoding algorithm, Discrete communication channels, Rate of information over a discrete channel, Capacity of discrete memory less channels, Discrete channels with memory, Shannon – Hartley theorem and its implications, Illustrative problems.

Course Outcomes:

This course provides the foundational education in Analog Communication systems, and applications. The students are provided the learning experience through class room teaching and solving assignment & tutorial problems. At the end of course, students should be able to:

a. *Acquire knowledge on the basic concepts of Analog Communication Systems.*
b. *Analyze the various modulation and demodulation systems.*
c. *Verify the effect of noise on the performance of communication systems.*
d. *Analyze the bandwidth and power requirements of analog systems.*
e. *Analyze the different characteristics of receiver.*
f. *Analyze the various Pulse modulation techniques, Information and channel capacity.*

TEXT BOOKS:

1. Simon Haykin, "Communication Systems", 3rd edition, Wiley-India edition, 2010.
2 B. P. Lathi, "Modern Digital and Analog Communication Systems," 3rd Edition, Oxford Univ. press, 2006.
3 A. Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", 5th Edition, McGraw-Hill International Edition, 2010.

REFERENCES:

1 Herbert Taub, Donald L Schilling, "Principles of Communication Systems", 3rd Edition, Tata McGraw-Hill, 2009.
2 George Kennedy, Bernard Davis, "Electronics & Communication System", 3rd Edition, Tata McGraw Hill, 2004.

III B.Tech I Semester

15AEC25 - LINEAR IC APPLICATIONS

L	T	P	C
3	1	0	3

Course objectives: To make the students understand basic concepts in the design of electronic circuits using linear integrated circuits and their applications. To introduce some special function IC's.

UNIT –I

DIFFERENTIAL AMPLIFIER AND OPAMPS

Differential amplifiers: Differential amplifier configurations, Balanced and unbalanced output differential amplifiers, current mirror, level translator.

Operational amplifiers: Introduction, Block diagram, Ideal Op-Amp, Equivalent circuit, Voltage Transfer curve, open loop op-amp configurations, Introduction to dual OP-AMP TL082 as a general purpose JFET-input Operational Amplifier.

UNIT –II

OP-AMP WITH NEGATIVE FEEDBACK AND FREQUNCY RESPONSE

Introduction, feedback configurations, voltage series feedback, voltage shunt feedback and differential amplifiers, properties of Practical op-amp.

Frequency response: Introduction, compensating networks, frequency response of internally compensated op-amps and non-compensated op-amps, High frequency op-amp equivalent circuit, open loop gain Vs frequency, close loop frequency response, circuit stability, slew rate.

UNIT-III

OP-AMP APPICATIONS-1

DC and AC amplifiers, peaking amplifiers, summing, scaling and averaging amplifiers, instrumentation amplifier, voltage to current converter, current to voltage converter, integrator, differentiator, active filters, First, Second and Third order Butterworth filter and its frequency response, Tow-Thomas bi-quad filter.

UNIT-IV

OP-AMP APPICATIONS-2

Oscillators: Phase shift and Wien bridge oscillators, square, triangular and sawtooth wave generators, comparators, Zero crossing detector, Schmitt trigger, Characteristics and limitations.

Specialized applications: 555 timer IC (Monostable&Astable operation) & its applications, PLL operating principles, Monolithic PLL, applications, analog amplifier and phase detection, Wide bandwidth precision analog multiplier MPY634 and its applications.

UNIT V

ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS

Analog and Digital Data Conversions ,D/A Converter -specifications-Weighted resistor type , R-2R ladder type ,Voltage Mode And current- Mode R-2R ladder types _switches for D/A Converters, High speed sample-and – hold circuits, A/D Converters-specifications-Flash type-Successive Approximation type-Single slope type-Dual slope type –A/D Converter using Voltage –to–Time Conversion–Over sampling A/D Converters..

Course Outcomes: *Upon completion of the course, students will be able to:*

a. *Understanding basic building block of linear integrated circuits and its characteristics.*
b. *Analyze the linear non-linear and specialized applications of operational amplifiers.*
c. *Understand the theory of ADC and DAC.*

TEXT BOOKS:

1. D.RoyChowdhury, "Linear integrated circuits", 2nd Edition, New Age International (P) Ltd, 2003.
2. Ramakanth A.Gayakwad,"Op-amps and Linear ICs", 4th Edition, PHI, 1987.
3. TL082 Data sheet: http://www.ti.com/lit/ds/symlink/tl082.pdf

REFERENCES:

1. R.F.Coughlin and Fredrick Driscoll, "Op-amps and Linear ICs", 6th Edition, PHI.
2. David A.Bell, "Op-amps and Linear ICs", 2nd Edition, Oxford University press, 2010.

III B.Tech I Semester

15AEC26 - DIGITAL IC APPLICATIONS

L	T	P	C
3	1	0	3

Course Objectives:

1. *To be able to use computer-aided design tools for development of complex digital logic circuits*
2. *To be able to model, simulate, verify, analyze, and synthesize with hardware description languages*
3. *To be able to design and prototype with standard cell technology and programmable logic*
4. *To be able to design tests for digital logic circuits, and design for testability*

UNIT-I

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

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

UNIT-II

The VHDL Hardware Description Language: Design flow, program structure, types and constants, functions and procedures, libraries and packages.

The VHDL design elements: Structural design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT-III

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

UNIT- IV

Design Examples (using VHDL): Barrel shifter, comparators, floating-point encoder, and dual parity encoder.

Sequential logic Design: Latches & flip flops, PLDs, counters, shift register and their VHDL models, Design process of FSM: Moore and Mealy machines and their VHDL models, Synchronous design methodology and it's impediments.

UNIT-V

ROMs: Internal Structure, 2D – decoding commercial types, timing and applications.

Static RAMs: Internal Structure, timing and standard SRAMs, Synchronous SRAMs.

Dynamic RAMs: Internal Structure, timing and standard DRAMs, Synchronous DRAMs.

Course Outcomes: *Students can*

a. *Able to understand digital integrated circuits design*
b. *Able to use computer-aided design tools for development of complex digital logic circuits.*
c. *Able to model, simulate, verify, analyze, and synthesize with hardware description languages.*
d. *Able to design and prototype with standard cell technology and programmable logic.*
e. *Able to represent any combinational and sequential circuits using digital ICs.*
f. *Able to design tests for digital logic circuits, and design for testability.*

TEXT BOOKS:

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

REFERENCES:

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

III B.Tech I Semester

15AEC27 - ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

L	T	P	C
3	1	0	3

Course Objectives:

1. *To study about functioning of different meters associated with measurements of signal characteristics*
2. *To study and employ CRO for measuring Signal characteristics*
3. *To study in detail about different bridges employed for Electronic measurements*
4. *To study working of advanced measuring instruments such as logic analyzers and spectrum analyzers*

UNIT-I

Performance characteristics of Instruments: Static characteristics, Accuracy, Precision, Resolution, Sensitivity, static and dynamic calibration, Errors in Measurement, and their statistical analysis, dynamic characteristics-speed of Response, fidelity, Lag and dynamic error. DC ammeters, DC voltmeters-multirange, range extension/solid state and differential voltmeters, AC voltmeters–multirange, range extension. Thermocouple type RF ammeter, ohm meters, series type, shunt type, multimeter for voltage, current and resistance measurements.

UNIT-II

Oscilloscopes: Introduction, Basic Principle, Standard specifications of CRO,CRT features, vertical and horizontal amplifiers, horizontal and vertical deflection systems, sweep trigger pulse, delay line, sync selector circuits, probes for CRO – active, passive, and attenuator type, triggered sweep CRO, and Delayed sweep, dual trace/beam CRO, Measurement of amplitude, frequency and phase (Lissajous method). Principles of sampling oscilloscope, storage oscilloscope, and digital storage oscilloscope, Digital frequency counters, time & Period measurements.

UNIT-III

Review of DC Bridges: Wheatstone bridge, Wein Bridge, errors and precautions in using bridges, AC bridges: Measurement of inductance-Maxwell's bridge, Anderson Bridge. Measurement of capacitance- Shearing Bridge, Kelvin Bridge, Q-meter, Interference and noise reduction techniques.

UNIT-IV

Signal generator-fixed and variable, AF oscillators, function generators, pulse, random noise, sweep, and arbitrary waveform generators, their standards, specifications and principles of working (Block diagram approach).Wave analyzers, Harmonic distortion analyzers, Spectrum analyzers, and Logic analyzers.

UNIT-V

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, pH measurement Signal Conditioning Circuits.

Course Outcomes: *After the completion of the course the students will be able to*

a. *Understand basic principles involved in the meters for measuring voltage, current, resistance, frequency and so on.*
b. *Employ CRO for measuring voltage, current, resistance, frequency and so on.*
c. *Understand principles of measurements associated with different bridges.*
d. *Get complete knowledge regarding working of advanced instruments such as logic analyzers and spectrum analyzers.*

TEXT BOOKS:

1. A.D. Helfrick and W.D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", 5th Edition, PHI, 2002.
2. H.S.Kalsi, "Electronic Instrumentation", 2nd edition, Tata McGraw Hill, 2004.

REFERENCES:

1. David A. Bell, "Electronic Instrumentation & Measurements", 2nd Edition, PHI, 2003.
2. K. Lal Kishore, "Electronic Measurements & Instrumentations", Pearson Education, 2009.

III B.Tech I Semester

15AEC28 - ANTENNAS & WAVE PROPAGATION

L	T	P	C
3	1	0	3

Course Objectives:

1. *To introduce the fundamental principles of antenna theory and various types of antennas.*
2. *Applying the principles of antennas to the analysis, design, and measurements of antennas.*
3. *To know the applications of some basic and practical configurations such as dipoles, loops, and broadband, aperture type and horn antennas.*

UNIT - I

Antenna Basics & Dipole antennas: Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective height, Fields from oscillating dipole, Field Zones, Shape-Impedance considerations, Polarization – Linear, Elliptical, & Circular polarizations, Antenna temperature, Antenna impedance, Front–to-back ratio, Antenna theorems, Radiation – Basic Maxwell's equations, Retarded potential-Helmholtz Theorem, Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Natural current distributions, far fields and patterns of Thin Linear Center-fed Antennas of different lengths, Illustrative problems.

UNIT- II

VHF, UHF and Microwave Antennas - I: Loop Antennas - Introduction, Small Loop, Comparison of far fields of small loop and short dipole, Radiation Resistances and Directives of small and large loops (Qualitative Treatment), 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 Antennas- Types, Fermat's Principle, Optimum Horns, Design considerations of Pyramidal Horns, Illustrative Problems.

UNIT - III

VHF, UHF and Microwave Antennas - II: Micro strip Antennas- Introduction, features, advantages and limitations, Rectangular patch antennas- Geometry and parameters, characteristics of Micro strip antennas, Impact of different parameters on characteristics, reflector antennas - Introduction, Flat sheet and corner reflectors, parabola reflectors- geometry, pattern characteristics, Feed Methods, Reflector Types - Related Features, Lens Antennas - Geometry of Non-metallic Dielectric Lenses, Zoning , Tolerances, Applications, Illustrative Problems.

UNIT- IV

Antenna Arrays & Measurements: Point sources - Definition, Patterns, arrays of 2 Isotropic sources- Different cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside

Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison, BSAa with Non-uniform Amplitude Distributions - General considerations and Bionomial Arrays, Illustrative problems.

Antenna Measurements: 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: Introduction, Definitions, Characterizations and general classifications, different modes of wave propagation, Ray/Mode concepts, Ground wave propagation (Qualitative treatment) - Introduction, Plane earth reflections, Space and surface waves, wave tilt, curved earth reflections, Space wave propagation - Introduction, field strength variation with distance and height, effect of earth's curvature, absorption, Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, 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, Energy loss in Ionosphere, Summary of Wave Characteristics in different frequency ranges, Illustrative problems.

Course Outcomes:

Through lecture, and out-of-class assignments, students are provided learning experiences that enable them to:

a. *Understand the basic principles of all types of antennas and*
b. *Analyze different types of antennas designed for various frequency ranges.*
c. *Become proficient with analytical skills for understanding practical antennas.*
d. *Design some practical antennas such as dipole, Yagi-uda, and horn antennas.*
e. *Determine the radiation patterns (in principal planes) of antennas through measurement setups.*
f. *Develop technical & writing skills important for effective communication.*
g. *Acquire team-work skills for working effectively in groups.*

TEXT BOOKS:

1. John D. Kraus and Ronald J. Marhefka and Ahmad S.Khan, "Antennas and wave propagation," TMH, New Delhi, 4th Ed., (special Indian Edition), 2010.
2. C.A. Balanis, "Antenna Theory- Analysis and Design," John Wiley & Sons, 2nd Edn., 2001.

REFERENCES:

1. E.C. Jordan and K.G. Balmain, "Electromagnetic Waves and Radiating Systems," 2nd Edition, PHI, 2000.
2. K.D. Prasad, SatyaPrakashan, "Antennas and Wave Propagation," New Delhi, Tech. India Publications, 2001.

III B.Tech I Semester

15AEC29 - ANALOG COMMUNICATION SYSTEMS LAB

L	T	P	C
0	0	3	2

***Course Objectives*:**

1. To provide a real time experience for different analog modulation systems and demodulation schemes
2. To provide exposure to the real time behavior of different elements available in analog communication system such as filters, amplifiers etc
3. To perform radio receiver measurements and antenna measurements

List of Experiments: (All Experiments are to be conducted)

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Characteristics of Mixer.
4. Pre-emphasis & de-emphasis.
5. Pulse amplitude modulation & demodulation.
6. Pulse width modulation & demodulation
7. Pulse position modulation & demodulation.
8. Radio receiver measurements – sensitivity, selectivity and fidelity.
9. Measurement of half power beam width (HPBW) and gain of a half wave dipole antenna.
10. Measurement of radiation pattern of a loop antenna in principal planes.

Equipment required for the Laboratory:

1. Regulated Power Supply : 0 – 30 V
2. CROs: 0 – 20 M Hz.
3. Function Generators: 0 – 3 M Hz
4. RF Signal Generators: 0 – 1000 M Hz
5. Multimeters
6. Required electronic components (active and passive) for the design of experiments from 1-7
7. Radio Receiver Demo kits or Trainers.
8. RF power meter frequency range: 0 – 1000 MHz
9. Spectrum Analyzer
10. Dipole antennas (2 Nos.): 850 MHz – 1GHz
11. Loop antenna (1 no.): 850 MHz – 1GHz
12. Bread Boards

***Course Outcomes*:** After completion of the course the students will be able

To experience real time behavior of different analog modulation schemes

a Technically visualize spectra of different analog modulation schemes

b Analyze practical behavior of different elements available in analog communication system such as filters, amplifiers etc.

c Measure characteristics of radio receiver and antenna measurements.

III B.Tech I Semester

15AEC30 - IC APPLICATIONS LAB

L	T	P	C
0	0	3	2

Note: The students are required to perform any Six Experiments from each Part of the following.

PART A: LINEAR IC APPLICATIONS

Course Objectives:

1. *To verify the applications of Op-amp*
2. *To verify applications IC555, IC565 and IC566*
3. *To use computer-aided design tools for development of complex digital logic circuits*
4. *To model, simulate, verify, analyze, and synthesize with hardware description languages*
5. *To design and prototype with standard cell technology and programmable logic*
6. *To design tests for digital logic circuits and design for testability*

List of Experiments: (using Hardware)

1. Study the characteristics of negative feedback amplifier
2. Design of an Instrumentation amplifier
3. Study the characteristics of regenerative feedback system with extension to design an astablemultivibrator
4. Study the characteristics of integrator circuit
5. Design of Analog filters (2^{nd} order bandpass filter and Notch filter)
6. Design of a function generator
7. Design of a Voltage Controlled Oscillator (VCO)
8. Design of a Phase Locked Loop (PLL)

Equipment required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. ASLK Pro trainer kit
6. Analog IC Tester

Course Outcomes:

a. *Able to verify applications of Op-amp*
b. *Able to verify applications of IC555 and IC566*
c. *Able to use computer-aided design tools for development of complex digital logic circuits.*
d. *Able to model, simulate, verify, analyze, and synthesize with hardware description languages.*
e. *Able to design and prototype with standard cell technology and programmable logic.*
f. *Able to design tests for digital logic circuits, and design for testability.*

III B.Tech I Semester

15AEC30 - IC APPLICATIONS LAB

L	T	P	C
0	0	3	2

PART-B: DIGITAL IC APPLICATIONS

Course Objectives:

1. *To design and draw the internal structure of the various digital integrated circuits*
2. *To develop VHDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.*
3. *To verify the logical operations of the digital IC's (Hardware) in the laboratory.*

List of Experiments: (using Software)

1. Realization of Logic Gates.
2. 4 to 8 Decoder- 74138.
3. 8 x 1 Multiplexer-74151 and 2 x 4 De-multiplexer-74155.
4. 4-Bit Comparator-7485.
5. D Flip-Flop-7474.
6. Decade counter-7490.
7. Shift registers-7495.
8. ALU Design.

Equipment Required:

1. Xilinx ISE Software.
2. Personal Computers.

Course Outcomes: *After completion of the course, the students is able to*

a *Design and draw the internal structure of the various digital integrated circuits*

b *Develop VHDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.*

c *Verify the logical operations of the digital IC's (Hardware) in the laboratory*

III B.Tech I Semester

15AHS06 - ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

(Common for ME, ECE and CSE)

L	T	P	C
0	0	3	0

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1. INTRODUCTION

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS: The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

UNIT-I: COMMUNICATIVE COMPETENCY

1. Reading Comprehension – Techniques-Book Review
2. Listening comprehension – Video Talks-Eminent speeches
3. Verbal Competency - Vocabulary - Spotting Errors- Aptitude Tests

UNIT-II: TECHNICAL WRITING

1. Essentials of writing -Technical Paper/ Report writing-Concise writing
2. Administrative / Business Documentation – Circular Writing -Meeting – Agenda – Minutes-Resolutions

3. Project Writing – Framing Outline – Finding Problem- Documentation-Citation

UNIT-III: PRESENTATIONAL SKILLS

1. Oral presentations – Public Speaking –Paper & Seminar Presentation
2. Digital Presentations -Power point - Video Presentation -Poster presentation
3. Stage Dynamics – Body Language – Para Language

UNIT-IV: CORPORATE SKILLS

1. Etiquettes -Dress - Dining – Net Etiquettes
2. Telephonic skills –Mobile Etiquettes
3. Soft Skills – Intra – Inter Personal Skills

UNIT-V: GETTING READY FOR JOB

1. Before Interview -Curriculum vitae/ Resume-Covering letter-E-mail writing
2. During Interview – G.D-Mock Interviews– Psychometric Tests – Follow up
3. After interview - Excelling in Profession– Team spirit– Work culture

4. LEARNING OUTCOMES:

- Acquiring extensive range of vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Enhanced job prospects / Employability skills /developing organizational abilities in tune with corporate requirement
- Effective Speaking Abilities

5. MINIMUM REQUIREMENT:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids /LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

6. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

1. K-VAN SOLUTIONS-Advanced communication lab
2. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
3. TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
4. Train2success.com

7. BOOKS RECOMMENDED:

1. Objective English for Competitive Exams, HariMohana Prasad, 4th edition, Tata McGraw Hill.
2. Effective Technical Communication, AshrifRizvi, TataMcGrahill, 2011.

3. Technical Communication, Meenakshi Raman &Sangeeta Sharma, O U Press 2009.
4. Books on TOEFL/GRE/GMAT/CAT/IELTS, Barron's/DELTA/Cambridge University Press.2012.
5. Soft Skills for Everyone, Butterfield Jeff, Cengage Publications, 2011.
6. Ultimate Psychometric Tests: Mike Bryon,VinodVasishtha for Kogan Page India Pvt. Ltd, New Delhi.
7. Soft Skills- Know Yourself And Know The World, Dr.K.Alex, Chand Publications ,Third revised edition 2014.
8. Management Shapers Series , Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Word Power Made Handy, ShaliniVerma, S Chand Publications, 2011.

III B.Tech II Semester

15AHS07 - MANAGEMENT SCIENCE

L	T	P	C
3	1	0	3

COURSE OBJECTIVES:

- *To analyze the characteristics and contributions of enterprising people*
- *To assess their own entrepreneurial and enterprising potential To develop an understanding of the general role of Small Business Enterprises*
- *To develop skills to start, run and manage SMEs*
- *Understand the role of entrepreneurship in economic development.*
- *Identify the general characteristics of entrepreneurs.*
- *Know the differences between entrepreneurial and managerial type jobs.*
- *Understand the significance and sources of capital. Participate in the preparation of a complete business plan.*
- *Have an understanding of individual personalities and interpersonal skills needed for effective communications in a diverse business environment.*

UNIT I

INTRODUCTION TO MANAGEMENT:

Concepts of Management Nature - importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Leadership Styles, Social responsibilities of Management.

DESIGNING ORGANIZATIONAL STRUCTURES:

Basic concepts related to Organisation - Departmentation and Decentralization, Types of mechanistic and organic structures of organization (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, team structure) their merits, demerits and suitability.

UNIT II

OPERATIONS MANAGEMENT:

Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study. Statistical Quality Control:*c*chart, *p* chart, (simple Problems) Deming's contribution to quality.

MATERIALS MANAGEMENT: EOQ, ABC Analysis, Purchase Procedure and Stores Management. Inventory — functions. Types, inventory classification techniques.

Marketing: Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT III

HUMAN RESOURCES MANAGEMENT (HRM):

Concepts of HRM ,Personnel Management and Industrial Relations (PMIR), Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development,

Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation, Merit Rating and methods.

UNIT IV

STRATEGIC MANAGEMENT:

Vision, Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

PROJECT MANAGEMENT (PERT/CPM):

Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems).

UNIT V

CONTEMPORARY MANAGEMENT PRACTICES:

Basic concepts of MIS, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma concept, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

Assignments, case studies and mini project.

LEARNING OUTCOMES

- *Equipping engineers for a lifelong career addressing the critical technical and managerial needs of private and public organizations.*
- *Exploring and developing analytic abilities, making better decisions, developing and executing strategies while also leading people who innovate.*
- *Cultivating the technical skills as well as the behavioral challenges of running organizations and complex systems.*
- *Emphasizing quantitative analytic skills and an entrepreneurial spirit*
- *Have an introductory understanding of global entrepreneurship concepts.*
- *Understand the concept & process of entrepreneurship- its contribution & role in the growth & development of individual & the nation.*

TEXT BOOKS:

1. Management Science,Aryasri: TMH, 2004.
2. Management ,Stoner, Freeman, Gilbert, , 6th Ed, Pearson Education,New Delhi, 2004.

REFERENCES:

1. Marketing Mangement ,Kotler Philip & Keller Kevin Lane: 12/e, PHI,2005.
2. Essentials of Management ,Koontz&Weihrich:, 6/e, TMH, 2005.
3. Management—Principles and Guidelines, Thomas N.Duening& John M.Biztantra, 2003.
4. Production and Operations Management, KanishkaBedi, Oxford University Press, 2004.
5. Personnel Management, Memoria&S.V.Gauker, , Himalaya, 25/e, 2005
6. Modern Management ,Samuel C.Certo:, 9/e, PHI, 2005
7. Business Policy and Strategic Management, Lawrence R Jauch, R.Gupta&William F.Frank Bros., 2005.

III B.Tech II Semester

15AEC31 - DIGITAL COMMUNICATION SYSTEMS

L	T	P	C
3	1	0	3

Course Objectives:

1. *The students to be able to understand, analyze, and design fundamental digital communication systems.*
2. *To know various coding techniques such as source coding, line coding, and channel coding.*
3. *To understand various digital modulation techniques and their applications.*
4. *The course focuses on developing a thorough understanding of digital communication systems by using a series of specific examples and problems.*

UNIT – I

Source Coding Systems: Introduction, sampling process, quantization, quantization noise,conditions for optimality of quantizers, encoding, Pulse-Code Modulation (PCM), Line codes, Differential encoding, Regeneration, Decoding & Filtering, Noise considerations in PCM systems, Time-Division Multiplexing (TDM), Synchronization, Delta modulation (DM), Differential PCM (DPCM), Processing gain, Adaptive DPCM (ADPCM), Comparison of the above systems.

UNIT – II

Baseband Pulse Transmission: Introduction, Matched filter receiver, Properties of Matched filter,Matched filter for rectangular pulse, Error rate due to noise, Inter-symbol Interference (ISI) and its mitigation, Nyquist criterion for distortion less baseband binary transmission, ideal Nyquist channel, Raised cosine filter & its spectrum, Correlative coding – Duo binary & Modified duo binary signaling schemes, Partial response signaling, Baseband M-array PAM transmission, Eye diagrams.

UNIT – III

Signal Space Analysis: Introduction, Geometric representation of signals, Gram-Schmidtorthogonalization procedure, Conversion of the Continuous AWGN channel into a vector channel, Coherent detection of signals in noise, Correlation receiver, Equivalence of correlation and Matched filter receivers, Probability of error, Signal constellation diagram.

UNIT – IV

Digital Modulation Techniques: Types of digital modulation, wave forms for amplitude, frequency and phase shift keying. Method of generation and detection of coherent & non-coherent binary ASK, FSK & PSK, differential phase shift keying, Quadrature modulation techniques (QAM, QPSK and MSK), Signal to Noise Ratio (SNR) and Bit Error Rate (BER) for digital modulation.M-array PSK, M-array quadrature amplitude modulation (M-array QAM), Comparison of power bandwidth requirements for all the above schemes.

UNIT – V

Channel Coding: Error Detection & Correction - Repetition & Parity Check Codes,Interleaving, Code Vectors and Hamming Distance, Timing and Frequency Synchronization, Forward Error Correction (FEC) Systems, Automatic Retransmission Query (ARQ) Systems, Linear Block Codes – Matrix Representation of Block Codes, Convolutional Codes – Convolution Encoding, Decoding Methods and Maximum Likelihood(ML) decoding and Maximum a Posteriori(MAP) decoding., Basics of MultipleAccessTechniques (TDMA,FDMA and CDMA)

***Course Outcomes**: At the end of the course, the students should be able to:*

a. *Able to understand basic sapling and quantization techniques and source coding systems.*
b. *Know the difference between source coding, channel coding, and line coding techniques and apply their concepts in the analysis and design of digital communication systems.*
c. *Able to explain generation and detection of various digital modulation techniques.*
d. *Understand the basic principles of baseband and pass band digital modulation schemes.*
e. *Analyze probability of error performance of digital systems and are able to design digital communication systems.*
f. *Understand the basics of information theory and error correcting codes.*

TEXT BOOKS:

1. Simon Haykin, "Analog Communication Systems," 4th Edition, Wiley India Edition, 2011
2. Bernard Sklar, "Digital Communications", 2nd edition, Prentice-Hall PTR, 2001.

REFERENCES:

1. J. G. Proakis, M Salehi, Gerhard Bauch, "Modern Communication Systems Using MATLAB," 3rd Edition, CENGAGE, 2013.
2. A. Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", 5th Edition, McGraw-Hill International Edition, 2010.

R-15

III B.Tech II Semester

15AEC32-MICROPROCESSORS & MICROCONTROLLERS

(Common for EEE and ECE)

L	T	P	C
3	1	0	3

Course Objectives: *This subject deals about the basic 16-bit (8086) processor and an 8-bit (8051) controllers, their architecture, internal organization and their functions, interfacing an external device with the processors/ controllers.*

UNIT-I: Introduction

Microprocessor based personal computer system, 8085 Micro Processors: Architecture, Register Organizing, Addressing modes, interrupts, Instruction set, Bus Timings, T state Calculations.
8086 Micro Processors: Programmer's model for 8086, memory organization of 8086, Addressing modes, Instruction set of 8086, Assembly language programming.

UNIT- II: Interfacing with 8086 –Part 1

Pin diagram detail of 8086, Minimum and Maximum mode of operations, Bus timing, Memory interface to 8086, DMA Controller: 8257 and 8237 their interfacing to 8086.

UNIT-III: Interfacing with 8086 – Part 2

Parallel and serial data transfer methods, I/O interface method, 8255 PPI chip, Interfacing with 7 segment LEDs, Interfacing with keyboards, Interfacing with ADCs, Interfacing with DACs, Interfacing with Stepper Motor.

UNIT-IV: Interfacing with 8086 – Part 3

Interrupts of 8086, Programming with DOS and BIOS function calls, 8259 interrupt controller and its interfacing with 8086, cascade mode of operation of 8259.

UNIT–V: Introduction to Microcontrollers

8051 Micro Controllers: Architecture, Registers Organization, Memory Organization, Pin Description, Connections, I/O Ports, Timers and their modes of operations, Serial Communication, Addressing Modes, Instruction Set, Assembly directives, Simple assembly software programs with 8051, Interfacing:LEDs, LCDs and switches.

Course Outcomes: *Students can able to*

a. *Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.*
b. *Understand architecture and working of basic microprocessor and Microcontrollers.*
c. *Understand the detailed s/w & h/w structure of the Microprocessor.*
d. *Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.*
e. *Write Assembly level language programming for basic microprocessor and microcontrollers.*
f. *Analyze the data transfer process through serial & parallel ports.*

TEXT BOOKS:

1. Ramesh Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085," 6th Edition, Penram International Publishing, 2013
2. Douglas V Hall, S. S. SP Rao, "Microprocessors and Interfacing," 3rd Edition, Tata McGraw Hill, 2012.
3. M.A. Mazidi& J.C. Mazidi Microcontroller and Embedded systems using Assembly & C, 2nd Edition, Pearson Education, 2007.

REFERENCES:

1. A.K.Ray, K.M.Bhurchandi, "Advanced Microprocessors and Peripherals," 3rd Edition, Tata McGraw Hill, 2006.
2. Kenneth J Ayala, "The 8051 Microcontroller," 3rd Edition, Thomson Delmar Learning, 2004.

III B.Tech II Semester

15AEC33 - DIGITAL SIGNAL PROCESSING

L	T	P	C
3	1	0	3

Course Objectives:

1. *To use Z transforms and discrete time Fourier transforms to analyze a digital system.*
2. *To design and analyze simple finite impulse response filters*
3. *To understand stability of FIR filters*
4. *To know various structures used in the implementation of FIR and IIR filters*
5. *Window method design structure for implementation.*

UNIT-I

Introduction: Review of discrete-time signals and systems–Time domain analysis of discrete-time signals & systems, Frequency domain analysis of discrete-time signals and systems.

Discrete Fourier Transform: Frequency-domain sampling and reconstruction of discrete-time signals, Discrete Fourier Transform (DFT), The DFT as a linear transformation, Relationship of the DFT to other transforms, Properties of DFT, Linear filtering methods based on DFT, Frequency analysis of signals using the DFT.

UNIT-II

Fast Fourier Transform Algorithms (FFTA): Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT and FFT for composite N, Applications of FFT algorithms – Efficient computation of the DFT of two real sequences, 2N point real sequences, Use of the FFT algorithm in linear filtering and correlation, Quantization errors in the computation of DFT.

UNIT-III

Implementation of Discrete-Time Systems: Overview of Z-transform, Structures for IIR systems – Direct form, Signal flow graphs & Transposed, Cascade form, Parallel form and Lattice structures, Conversion from Lattice structure to direct form, lattice –Ladder structure. Structures for the realization of discrete-time systems, Structures for FIR systems - Direct form, Cascade form, Frequency sampling, and Lattice structures

UNIT-IV

Design of Digital Filters: General considerations–Causality and its implications, Characteristics of practical Frequency Selective Filters,

Design of IIR filters from analog filters–IIR filter design: approximation of derivatives, Impulse invariance method and bilinear transformation method, Frequency transformation in the analog and digital domains, Illustrative problems.

Design of FIR filters–Symmetric and asymmetric FIR filters, Design of linear phase FIR filters: using windows, using frequency sampling method.

UNIT-V

Multirate Digital Signal Processing: Introduction, Decimation, and interpolation, Sampling rate conversion by a rational factor, Implementation of sampling rate conversion, Multistage implementation of sampling rate conversion, Sampling rate conversion of bandpass signals, Sampling rate conversion by arbitrary factor, Applications of multirate signal processing.

***Course Outcomes**: At the end of the course, the student should be able to*

- *a Understand of various signals and systems using Discrete Fourier Transform (DFT).*
- *b Explain various algorithms using Fast Fourier Transforms (FFT).*
- *c Implement IIR and FIR Digital Filter Structures using different methods.*
- *d Design IIR and FIR digital filter using various methods*
- *e Understand Multirate Digital Signal Processing with Interpolation and Decimation methods.*
- *f Explain various applications of Multirate Signal Processing*

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, "Digital signal processing, principles, Algorithms and applications," 4th Edition, Pearson Education, 2007.
2. P.RameshBabu, Digital Signal Processing, 4th Edition, SciTech Publishing, 2012.

REFERENCES:

1. Sanjit K Mitra, "Digital Signal Processing, A computer base approach," 3rd Edition, Tata McGraw Hill, 2009.
2. A. Anand Kumar, "Digital Signal Processing," 2nd Edition, PHI Learning, 2011

III B.Tech II Semester

15AEC37 - MICROPROCESSORS & MICROCONTROLLERS LAB

L	T	P	C
0	0	3	2

Course Objectives:

1. *To become skilled in 8086 Assembly Language programming.*
2. *To understand programmable peripheral devices and their Interfacing.*
3. *To understand and learn 8051 microcontroller.*
4. *To learn 8051 assembly Language programming*

Minimum Ten Experiments to be conducted (Five from each section)

I) 8086 Microprocessor Programs using MASM/8086 kit.

1. Introduction to MASM Programming.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Length of the string, String comparison.

Interfacing:

5. 8259 – Interrupt Controller and its interfacing programs
6. A /D Interfacing
7. D /A Interfacing
8. Stepper Motor.

II) Microcontroller 8051 Trainer kit

1. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation.
2. Logic operations – Shift and rotate.
3. Sorting- Ascending and descending order.

Interfacing using 8051 Trainer kit:

4. A/D Interfacing
5. D /A Interfacing
6. Switch Interfacing
7. Relay Interfacing

Course Outcomes:

a. Able to write8086 Assembly Language programs.
b. Able to understand programmable peripheral devices and their Interfacing.
c. Able to write 8051 assembly Language programs.

III B.Tech II Semester

15AEC38 - DIGITAL COMMUNICATION SYSTEMS LAB

L	T	P	C
0	0	3	2

Course Objectives:

1. To provide a real time experience for different digital modulation and demodulation schemes

Minimum of Ten experiments to be conducted (Five from each Part-A & B)

PART-A: HARDWARE EXPERIMENTS

1. Sampling Theorem – verification.
2. Time division multiplexing.
3. Pulse code modulation.
4. Differential pulse code modulation.
5. Delta modulation.
6. Frequency shift keying.
7. Differential phase shift keying.
8. QPSK modulation and demodulation.

PART-B: SOFTWARE EXPERIMENTS

(Modeling of Digital Communications using MATLAB)

1. Sampling Theorem – verification.
2. Pulse code modulation.
3. Differential pulse code modulation.
4. Delta modulation.
5. Frequency shift keying.
6. Phase shift keying.
7. Differential phase shift keying.
8. QPSK modulation and demodulation.

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CROs - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators (3 Nos.) - 0 – 1000 M Hz.
5. Multimeters
6. Lab Experimental kit for Pulse Code Modulation (Experiment No.3 of part – A)
7. Required Electronic Components (Active and Passive) which include required ICs
8. Arbitrary Wave form generators/ PNS generators – 2 Nos. (to generate digital data at required data rates)
9. Licensed MATLAB software for 30 users with required tool boxes.

Course Outcomes: After completion of the course the students will be able

a. To experience real time behavior of different digital modulation schemes and technically visualize spectra of different digital modulation schemes

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IV B.Tech I Semester

15AEC51 - MICROWAVE ENGINEERING

L	T	P	C
3	1	0	3

Course Objectives:

1. *To analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.*
2. *To Use S-parameter terminology to describe circuits.*
3. *To explain how microwave devices and circuits are characterized in terms of their "S" Parameters.*
4. *To give students an understanding of microwave transmission lines.*
5. *To Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc..*
6. *To give students an understanding of basic microwave devices (both amplifiers and oscillators).*
7. *To expose the students to the basic methods of microwave measurements.*

UNIT-I

Waveguides & Resonators: Introduction, Microwave spectrum and bands, applications of Microwaves, Rectangular Waveguides-Solution of Wave Equation in Rectangular Coordinates, TE/TM mode analysis, Expressions for fields, 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, Circular Waveguides - Dominant mode (qualitative treatment only), Rectangular Waveguides – Power Transmission and Power Losses, Impossibility of TEM Modes, losses, Q-factor, Cavity resonators-introduction, Rectangular and cylindrical cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients, Illustrative Problems.

UNIT-II

Waveguide Components: Scattering Matrix - Significance, Formulation and properties, Coupling mechanisms - Probe, Loop, Aperture types, Wave guide discontinuities - waveguide Windows, tuning screws and posts, matched loads, Waveguide attenuators - Resistive card, rotary vane Attenuators, waveguide phase shifters-dielectric, rotary vane phase shifters, Wave guide multiport junctions - E plane and H plane Tees, Magic Tee, Directional couplers-2 hole, Bothe hole types, Ferrites-composition and characteristics, Faraday rotation, Ferrite components - Gyrator, Isolator, Circulator, S Matrix calculations for 2-port junction, E plane and H plane Tees, Magic Tee, Directional coupler, circulator and Isolator, Illustrative Problems.

UNIT-III

Linear beam Tubes: Limitations and losses of conventional tubes at microwave frequencies, Classification of Microwave tubes, 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, Significance, types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), Suppression of oscillations, Gain considerations.

UNIT - IV

Cross-field Tubes & Microwave Semiconductor Devices: 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, Introduction to Microwave semiconductor devices, classification, applications, Transfer Electronic Devices, Gunn diode - principles, RWH theory, Characteristics, Basic modes of operation - Gunn oscillation modes, LSA Mode, Varactor diode, Parametric amplifier, Introduction to Avalanche Transit time devices (brief treatment only), Illustrative Problems.

UNIT-V

Microwave Measurements: Description of Microwave bench-different blocks and their features, errors and precautions, Microwave power measurements, Measurement of attenuation, frequency, VSWR (low, medium, high), Measurement of 'Q' of a cavity, Impedance measurements.

***Course Outcomes**: At the end of the semester, students are provided learning experiences that enable them to:*

a. *Analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.*
b. *Understand the various principles involved in various Microwave oscillators and amplifiers such as Klystron tubes, TWTs, Magnetrons, Gunn diode etc.*
c. *Use S-parameter terminology & to describe the characteristics of microwave circuits through scattering parameters.*
d. *Ability to understanding of microwave transmission lines and how to use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc.*
e. *Set up the microwave benches for measurement of various parameters such as microwave frequency, VSWR, Impedance of unknown load etc.*
f. *Verify the characteristics of Microwave devices through measurements.*

TEXT BOOKS:

1. Samuel Y. Liao, "Microwave devices and circuits," 3rd Edition, Pearson Publishing, 2003.
2. Herbert J. Reich, J. G. Skalnik, P. F. Ordung and H. L. Krauss, "Microwave principles," CBS publishers and distributors, New Delhi, 2004.

REFERENCES:

1. R. E. Collin, "Foundations for microwave engineering," 2nd Edition, John Wiley, 2002.
2. Om. P. Gandhi, "Microwave Engineering and Applications," Pergamon, 1981.

IV B.Tech I Semester

15AEC52 - OPTICAL FIBRE COMMUNICATIONS

L	T	P	C
3	1	0	3

Course Objectives:

1. *To learn the basic concepts of fibre optics communications.*
2. *To make the students learn the system with various components or process for various applications.*
3. *To enlighten the student with latest trends in optical communications.*

UNIT-I

Introduction to Optical Fibers: Evolution of fiber optic system- Element of an Optical Fiber Transmission link- Ray Optics-Optical Fiber Modes and Configurations –Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts- Linearly Polarized Modes – Single Mode Fibers-Graded Index fiber structure.

UNIT-II

Signal Degradation Optical Fibers: Attenuation – Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides - Information Capacity determination –Group Delay- Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling –Design Optimization of SM fibers-RI profile and cut-off wavelength.

UNIT-III

Fiber Optical Sources and Coupling : Direct and indirect Band gap materials-LED structures – Light source materials –Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition –Rate equations –External Quantum efficiency – Resonant frequencies –Temperature effects, Introduction to Quantum laser, source-to-fiber Power Launching, Lensing schemes, Fibre –to- Fibre joints, Fibre splicing.

UNIT-IV

Fiber Optical Receivers : PIN and APD diodes –Photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise –Comparison of Photo detectors –Fundamental Receiver Operation – preamplifiers, Error Sources –Receiver Configuration –Probability of Error – Quantum Limit.

UNIT-V

System Design and Applications: Design of Analog Systems: system specification, power budget, bandwidth budget

Design of Digital Systems: system specification, rise time budget, power budget, Receiver sensitivity, Overview of WDM.

Applications: Telephony, Telemetry, video distribution, military applications, passive and active sensing.

Course Outcomes: *The students can able*

a. *To demonstrate the ability to design a system, component or process as per needs and specification.*
b. *To learn about SONET/SDH and its application.*

TEXT BOOKS:

1. Gerd Keiser, "Optical Fiber Communication," 3rd Edition, McGraw –Hill International, Singapore, 2000.
2. J.Senior, "Optical Fiber Communication, Principles and Practice", 3rd Edition, Pearson Publishers, 2010.

REFERENCES:

1. Max Ming-Kang Liu, "Principles and Applications of Optical Communications", 1st Edition, TMH, 2010.
2. S.C.Gupta, "Text book on optical fiber communication and its applications", 2nd Edition, PHI, 2012.

IV B.Tech I Semester

15AEC53 - VLSI DESIGN

L	T	P	C
3	1	0	3

Course Objectives:

1. *To understand VLSI circuit design processes.*
2. *To understand basic circuit concepts and designing Arithmetic Building Blocks.*
3. *To have an overview of Low power VLSI.*

UNIT-I

Introduction: Brief Introduction to IC technology – MOS, PMOS, NMOS, CMOS & Bi-CMOS technologies–Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation.
Basic Electrical Properties of MOS and BiCMOS Circuits: Ids–Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit ω0; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-II

Basic Circuit Concepts: Sheet Resistance Rs and its concepts to MOS, Area Capacitance calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out.
VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Case study: 2μm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-III

Gate level Design: Logic gates and other complex gates, Switch logic, Alternate gate circuits.
Physical Design: Floor-Planning, Placement, routing, Power delay estimation, Clock and Power routing

UNIT-IV

Subsystem Design: Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters, High Density Memory Elements.
VLSI Design styles: Full-custom, Standard Cells, Gate-arrays, ASIC, FPGAs, CPLDs and Design Approach for Full-custom and Semi-custom devices.

UNIT-V

VLSI Design Tools: The role of design tools in VLSI design process, VLSI design flow using design tools, front-end and back-end tools and their utilization in VLSI design process, study of cadence tools, case study of design of ALU using front-end and back-end tools Layout, Design capture tools, Design Verification Tools.

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Course Outcomes: *Students can able to*

a. *Design and explain the fabrication of various VLSI circuits.*
b. *Explain the basic circuit concepts*
c. *Design various subsystems.*
d. *Learn about different styles of VLSI design*
e. *Learn the utilization of design tools for VLSI design process*
f. *Learn about VLSI design for ASIC's and programmable platforms.*

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, "Essentials of VLSI circuits and systems", 1st Edition, PHI, 2011.
2. K.Lal Kishore and V.S.V. Prabhakar, "VLSI Design", 1st Edition, IK International Publishing House, 2009.

REFERENCES:

1. Weste and Eshraghian, "Principles of CMOS VLSI Design", 2nd Edition, Pearson Education, 2010.
2. Wayne Wolf, "Modern VLSI Design", 3rd Edition, Pearson Education, 1997.

IV B.Tech I Semester

15AEC54-DIGITAL IMAGE PROCESSING
(CBCC (DEPARTMENTSPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. To learn the fundamentals of Image Processing.
2. To learn sampling and reconstruction procedures.
3. To learn the various transforms used in image Processing.
4. To study various concepts of image enhancement, reconstruction and image compression.
5. To design image processing systems.

UNIT-1:

DIGITAL IMAGE FUNDAMENTALS: Elements of digital image processing systems, An image model, Basic relationships between pixels and basic transformation, Image acquisition, sampling and quantization, Image file formats Two dimensional convolution, Two dimensional correlation, Two dimensional frequency responses.

Image Transforms: Study analysis with examples of 2D transforms, Transforms: DFT, DCT, Discrete Sine, Walsh, Hadamard, Slant, Haar, KLT, Radon, Hough, and Wavelet

UNIT-2:

IMAGE ENHANCEMENT: Image enhancement through – point processing, Histogram processing, spatial filtering, Enhancement in frequency domain, image smoothing, image sharpening

UNIT-3:

IMAGE RESTORATION: Noise distributions, Degradation model, Unconstrained and constrained restoration, Inverse filtering, minimum mean square error (Wiener) filtering, Constrained least square restoration

UNIT-4:

IMAGE SEGMENTATION AND RECOGNITION: Edge detection, Image segmentation: Region growing, Region splitting and merging, Edge linking, Morphological operations: Dilation, Erosion, Opening, Closing, Image recognition: Patterns and pattern classes, Matching by minimum distance classifier, Statistical classifier, Matching by correlation.

UNIT-5:

IMAGE COMPRESSION: Need for image compression, Image coding, Huffman coding, Run length encoding, Arithmetic encoding, Vector Quantization, Block truncation coding, Transform coding: DCT, Wavelet, Image compression standards

Course Outcomes: *After completion of the course, the student can able to*

a. *Develops ability to identify, formulate &solve problems involving images.*
b. *Develops ability to design &conduct experiments, analyze &interpret image data.*
c. *To design a software, Component or process as per needs &specifications.*
d. *It will demonstrate the skills to use modern engineering tools, software's &equipment to analyze problems.*
e. *Develop confidence for self-education & ability for life-long learning.*
f. *It will show the ability to participate & try to succeed in competitive Exams.*

TEXT BOOKS:

1. R. C. Gonzalez & R.E. Woods, "Digital Image Processing", 3rd Edition, Addison Wesley/Pearson education, 2010.
2. A. K. Jain, "Fundamentals of Digital Image processing", PHI, 1994.

REFERENCES:

1. Rafael C. Gonzalez, Richard E woods and Steven L. Eddins, "Digital Image processing using MATLAB", 2nd Edition, Tata McGraw Hill, 2010.
2. William K. Pratt, "Digital Image Processing", 3rd Edition, John Wilely, 2004.

IV B.Tech I Semester

15AEC55-DSP PROCESSORS & ARCHITECTURES
(CBCC (DEPARTMENTSPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. To understand the concept of DSP Architecture & comparison of this with that of microprocessors.
2. To understand addressing modes, instruction sets , pipelining and application programs in TMS320C54XX processor
3. To understand the architectural issues of programmable DSP devices and their relationship to the algorithmic requirements, architectures of commercially popular programmable devices and the use of such devices for software development and system design
4. To highlight the suitability of programmable DSP devices for various application areas and motivate to design systems around these devices.

UNIT-I

Introduction to Digital Signal Processing: Introduction, a Digital signal-processing system, the sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), linear time-invariant systems, Digital filters, Decimation and interpolation, Analysis and Design tool for DSP Systems MATLAB, DSP using MATLAB.

Computational Accuracy in DSP Implementations: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-II

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

Execution Control and Pipelining: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT-III

Programmable Digital Signal Processors : Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On- Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT-IV

Implementations of Basic DSP Algorithms : The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

Implementation of FFT Algorithms : An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT-V

Interfacing Memory And I/O Peripherals to Programmable DSP Devices: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

Course Outcomes: After completion of the course, the student can able to

a. To become familiar with fundamentals of DSP Processors & architectures.
b. To gain in knowledge about the different types of processors and their operation.
c. Will demonstrate the ability to design a system component or process as per needs & specifications.
d. Will demonstrate the ability to identify, formulate & solve engineering problems.

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, "Digital Signal Processing Implementation", 1st Edition, Cengage Learning, 2004.
2. Lapsley et al. S. Chand & Co, "DSP Processor Fundamentals, Architectures & Features", 2000.

REFERENCES:

1. B. Venkata Ramani and M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", TMH, 2004.
2. Jonatham Stein, "Digital Signal Processing: A Computer Science Perspective", John Wiley, 2000.

IV B.Tech I Semester

15AEC56-CYBER SECURITY
(CBCC (DEPARTMENTSPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. To study essential concepts for cyber security , cyber security applications, cyber crimes, unauthorized crimes and hacking
2. To gain an understanding of terms commonly used in Cyber Security such as "vulnerability"
3. To study various network defence tools like firewalls and Network address translation, Packet filters etc.
4. To study prohibited action on cyber policies, evaluation of crime scene, evidence collection, cyber security law and policies.
5. To understand the cyber crime investigation.

UNIT-1: Systems Vulnerability Scanning

Overview of vulnerability scanning, Open Port/Service Identification, Banner/Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit. Networks Vulnerability Scanning - Netcat, Socat, understanding Port and Services tools - Datapipe, Fpipe, WinRelay, Network Reconnaissance – Nmap, THC-Amap and System tools. Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping Kismet

UNIT-2: Network Defense tools

Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless VsStateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System

UNIT-3: Web Application Tools

Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat, Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, HTC-Hydra

UNIT-4: Introduction to Cyber Crime and law

Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000.

UNIT-5: Introduction to Cyber Crime Investigation

Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks

Course Outcomes: After completion of the course, the student can able to

a. Possess a fundamental knowledge of Cyber security.

b. Understand what vulnerability is and how to address most common vulnerabilities.

c. Understand basic technical controls in use today, such as firewalls and Intrusion Detection systems.

d. Understand cyber policies, Evaluation of Crime scene, evidence collection, Cyber security law and policies and cyber crime investigation.

Text Books:

1. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication McGraw Hill.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and SunitBelpure, Publication Wiley

Reference Books:

1. James Graham, Ryan Olson, "Cyber Security Essentials," 1st Edition, Auerbach Publications, 2010.
2. Anthony Reyes, Richard Brittson, Keving O'Shea, James Steele, "Cyber Crime Investigations: Bridging the Gaps between Security Professional, Law Enforcement, and Prosecutors," 1st Edition, Syngress Publishing, 2007.

IV B.Tech I Semester

15AEC57-BIO-MEDICAL INSTRUMENTATION
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. To understand the functioning of Human Cell and its electrical characteristics.
2. To get Sufficient knowledge about Cardiovascular measurement and circulatory System of heart.
3. To get familiarize with pace makers and Defibrillators.
4. To understand about the electrical hazards that may occur during the usage of medical instruments.

UNIT-I

Human cell and its Electrical characteristics neuron and impulses, Recording Electrodes – Electrode-Electrolyte interface, polarizable – Non-polarizable Electrodes, body surface recording Electrodes, internal Electrodes, Micro Electrodes, Electrode array & Practical hints in using Electrodes.

UNIT-II

Bioelectric potential and cardiovascular measurement circulatory system of heart – ECG Anatomy & Function of heart abnormal cardiac Rhythms – Arrhythmias – Einthoven triangle. EEG recording system (10-20 electrode System) Biorhythms – Sleep pattern

UNIT-III

Therapeutic and prosthetic devices, Cardiac pace maker, Types – Asynchronous and Synchronous modes of operation (Demand). Asynchronous pace maker – Working principle and Function demand PM – Working principle – QRS triggered and atrioventricular Synchronized PM lead wires and Electrodes, Cardioverter.

Defibrillator : Working principle of DC Defibrillation Electrodes used. Infant incubator and Lithotripry.

UNIT-IV

Electrical Hazards in medical instruments macro and micro shock – devices to protect against electrical hazards – Ground fault interrupter, isolation transformer, line isolation monitor, receptacle tester, electrical safety analyzer equipment, preventive maintenance.

UNIT-V

Image Systems: Introduction, Basic principle and block diagram of x-ray machine, x-ray computed topography (C.T. Scanner) and Nuclear Magnetic resonance (NMR) Short-wave Diathermy, Microwave Diathermy, Ultrasound Therapy unit.

Recent trends: Ultrasonography -Introduction, medical ultrasound, block diagram of pulse echo-system, A-Scan, M-mode, B-scanner and real time ultrasound imaging systems – lasers principle and operation of laser types of lasers – Pulsed Ruby laser – ND-YAG laser – Helium –Neon laser-Argon laser-C02 laser exciner laser, Semiconductor lasers – Laser safety.

Course Outcomes: After completion of this course the student will be able to

a. Explain the functioning of Human Cell and its electrical characteristics
b. Acquire knowledge about Cardiovascular measurement and circulatory System of heart
c. Familiarize with pace makers and Defibrillators
d. Know about the electrical hazards that may occur during the usage of medical instruments

Text Books:

1. John G.Webser, "Medical Instrumentation Applications and Design," 3rd Edition, John Wiley & Sons, 1998.
2. Seslie Cromwell, Fred J.Weibell, EsichA.Plefittes, "Bio-Medical Instrumentation & measurements", 9th Edition, Pearson Education, 2007.

References:

1. RS Khandpur, "Handbook of BioMedical Instrumentation", 2nd Edition, Tata McGraw Hill, 1992.
2. Walter Welko- Witiz and Sid Doutsch, "Biomedical Instruments: Theory and Design," 2nd Edition, PHI, 1992.

IV B.Tech I Semester

15AEC58-SATELLITE COMMUNICATIONS
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. *To introduce the basic principles of Satellite Communication systems, orbital mechanics, launchers.*
2. *To introduce the basic concepts and designing of Satellite links.*
3. *To introduce the basic concepts of earth station transceiver.*
4. *To know the basic concepts of various multiple access techniques and GPS systems.*

UNIT-I

INTRODUCTION TO SATELLITE COMMUNICATIONS:

Origin of satellite communications, basic concepts of satellite communications, frequency allocations for satellite services, applications, future trends of satellite communications.

Orbital Mechanics look angle determination, orbital perturbations, orbit determination, launches and launch vehicles, orbital effects in communication systems performance.

UNIT-II

SATELLITE SUBSYSTEMS AND LINK DESIGN:

Attitude and orbital control system, Telemetry, Tracking, command and monitoring, power systems, communication subsystems, satellite antenna equipment reliability and space qualification.

Basic transmission theory, system noise temperature and G/T ratio, design of down links, uplink design, design of satellite links for specified C/N, system design example.

UNIT-III

EARTH STATION TECHNOLOGY:

Introduction, transmitters, receivers, Antennas, tracking systems, terrestrial interface, primary power test methods, comparison of LEO and GEO satellite systems in real world.

UNIT-IV

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-V

SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM:

Radio and satellite navigation, GPS position location principles, GPS receivers and codes, satellite signal acquisition, GPS navigation message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, differential GPS.

Course Outcomes:

a. *Students can determine the location of Satellite.*
b. *Students can design satellite uplink and downlink.*
c. *Students can design earth station transmitter, receiver and antenna systems.*

TEXT BOOKS:

1. Timothi Pratt, Charles Bostian and Jeremy Allnutt, "Satellite communications", 2nd Edition, WSE, Wiley publications, 2003.
2. Wilbur L.Prichard, Robert A. Nelson & Henry G.Suyderhoud, "Satellite communications Engineering", 2nd Edition, Pearson Publications, 2003.

REFERENCES:

1. Dennis Roddy, "Satellite communications", 2nd Edition, McGraw Hill, 1996.
2. K.N.RajaRao, "Fundamentals of Satellite communications", PHI, 2004.

IV B.Tech I Semester

15AEC59-ADVANCED DSP
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

a. To Understand the techniques of modern signal processing that are fundamental to a wide variety of application areas.
b. To know the mathematical basis of discrete time signal analysis, discuss the theory and implementation of FFT algorithms, digital filters.
c. To Understand the discrete Fourier transform (DFT), its applications and its implementation by FFT techniques. Gain some knowledge of the 2-D FFT and its application to image processing and compression.

UNITI

LTI DISCRETE-TIME SYSTEMS IN THE TRANSFORM DOMAIN: Types of Linear-Phase transfer functions, Simple Digital Filters, Complementary Transfer Function, Inverse Systems, System Identification, Digital Two-Pairs, Algebraic Stability Test.

UNITII

DIGITAL FILTER SRTUCTURE AND DESIGN: All Pass Filters, Tunable IIR Digital Filter, IIR Tapped Cascade Lattice Structures, FIR Cascaded Lattice Structures, Parallel All Pass Realization of IIR Transfer Functions, State Space Structures, Polyphase Structures, Digital Sine-Cosine Generator, Computational Complexity of Digital Filter Structures, Design of IIR Filter using pade' approximation, Least Square Design Methods, Design of Computationally Efficient FIR Filters.

UNITIII

DSP ALGORITHEMS: 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 IV

POWERSPECTRALESTIMATION:Estimationofspectrafromfinitedurationobservationofsignals, Non-parametric methods: Bartlett, Welch & Blackmann & Tukey methods.

PARAMETRICMETHODSFORPOWERSPECTRUMESTIMATION: Relationbetweenauto correlation &modelparameters,Yule-Waker&BurgMethods,MA&ARMAmodelsforpowerspectrumestimation.

UNITV

ANALYSIS OF FINITE WORD LENGTH EFFECTS INFIXED-POINT DSP SYSTEMS: Fixed, Floating Point Arithmetic–ADC quantizationnoise&signalquality-FinitewordlengtheffectinIIRdigitalFilters–Finiteword-length effects in FFT algorithms.

APPLICATIONS OF DIGITAL SIGNAL PROCESSING: Dual Tone Multi-frequency Signal Detection, Spectral Analysis of Sinusoidal Signals, Spectral Analysis of Non stationary Signals, Musial Sound Processing.

Course Outcomes: After completion of the course, the student can able to

a. Comprehend the concepts of Linear Time Invariant system.
b. Design and analyze the digital filters .
c. Understand the concepts of power spectral and estimation.
d. Understand the basics of multi rate digital signal processing.

TEXTBOOKS:

1. Sanjit K Mitra, "DigitalSignalProcessing: A Computer Based Approach," 4th Edition, McGraw Hill International, 2011.
2. J G Proakis, D G Manolokis, "DigitalSignalProcessing Principles, Algorithms, Applications," 4th Edition, PHI, 2006.

REFERENCES:

1. A V Oppenhiem, R W Schafer, "Discrete-Time Signal Processing," 3rd Edition, Pearson Education, 2010.
2. Emmanuel C Ifeacher Barrie. W. Jervis, "DSP- A Practical Approach," PHI, 2002.

IV B.Tech I Semester

15AEC60 - DSP & VLSI LABORATORY

L T P C
0032

Note: The students are required to perform any Six Experiments from each Part of the following.

Part-A: DSP Lab

Course Objectives:

1. *To design real time DSP systems and real world applications.*
2. *To Implement DSP Algorithms using both fixed and floating point processors*
3. *To generate the basic functions of different transforms*
4.

List of Experiments:

1. Generating, plotting and finding the power and energy a given signal.
2. Convolution and correlation (auto and cross) of discrete sequences without using built in functions.
3. DTFT of a given signal
4. N-Point FFT algorithm
5. Design of FIR filter using window technique and verifying the frequency response of the filter
6. Design of IIR filter using any of the available methods and verifying the frequency response of the filter

Course Outcomes: *After completion of the course, the student is able to*

a. *Design real time DSP Systems for real world applications.*
b. *Implement DSP Algorithms using both fixed and floating point processors*

Part-B: VLSI Lab

Course Objectives: *Student will be able to*

1. *Understand the layout design rules.*
2. *Learn implementation of Layout, Physical Verification and place & route for complex designs.*
3. *Learn the layout of any combinational circuit.*
4. *Verify the Layouts of DRC and LVS.*

List of Experiments:

Note: Any 4 of the above experiments are to be conducted. Exp.1 & 2 is mandatory.

1. Introduction to layout design rules
2. Layout, physical verification, placement & route for complex design, static timing analysis, IR drop analysis and crosstalk analysis of the following:
   - Basic logic gates
   - CMOS inverter
   - CMOS NOR/NAND gates
   - CMOR XOR MUX gates
   - CMOS 1-bit full adder

- Static/Dynamic logic circuit(register cell)
- Latch
- Pass transistor

3. Layout of any combinational circuit (complex CMOS logic gate) – learning about data paths
4. Introduction of Simulation and coding of NMOS/CMOS circuit
5. Simulation of basic analog circuits: Inverter/Differential amplifier
6. Analog Circuit simulation (AC analysis) – CS & CD amplifier

Course Outcomes: *Upon completion of the course, students will be able to:*

a. *Gain knowledge in Design of logic designs*
b. *Know to write HDL codes for all digital designs and implement using simulation tools.*
c. *Know obtaining static timing analysis, IR drop analysis and crosstalk analysis of combinational and sequential circuits.*
d. *Know the simulation of basic analog circuits.*

IV B.Tech I Semester

15AEC61 - MICROWAVE & OPTICAL COMMUNICATIONS LAB

L	T	P	C
0	0	3	2

Course Objectives:

1. *To verify the characteristics of various microwave components using microwave test bench.*
2. *Initiate an expose the newcomers to exciting area of optical communication*

PART-A: Microwave Lab - Any Seven (7) Experiments

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance Measurement.
7. Frequency and Wavelength measurements using slotted section.
8. Scattering parameters of Directional Coupler.
9. Scattering parameters of Magic Tee.
10. Radiation Pattern Measurement of horn Antennas (at least two antennas).

PART-B: Optical Fiber Lab - Any five (5) 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 of the given fiber.
6. Measurement of losses for Analog Optical link.

Equipment required for Laboratories:

1.	Regulated Klystron Power Supply	6 nos.
2.	VSWR Meter	6 nos.
3.	Milli/Micro Ammetersn	10 nos.
4.	Multi meters	10 nos.
5.	CROs	8 nos.
6.	GUNN Power Supply, Pin Moderator	4 nos.
7.	Reflex Klystron with mount	10 nos.
8.	Crystal Diodes	50 nos.
9.	Micro wave components (Attenuation)	10 nos.
10.	Frequency Meter (Direct frequency)	10 nos.

11.	Slotted line with carriage	10 nos.
12.	Probe detector	10 nos.
13.	Wave guide shorts	6 nos.
14.	Pyramidal/conical Horn Antennas	4 nos.
15.	Rectangular to circular transition	2 nos.
16.	Directional Couplers with different (coupling factors)	5 nos.
17.	E, H, Magic Tees	2 nos. each.
18.	Circulators, Isolator	10 nos.
19.	Matched Loads	30 nos.
20.	Antenna Training System with Tripod and Accessories	1no.
21.	Fiber Optic Analog Trainer based LED	3 nos.
22.	Fiber Optic Analog Trainer based laser	2nos.
23.	Fiber Optic Digital Trainer	1 no.
24.	Fiber cables -	(Plastic, Glass)

Course Outcomes:

a. *Students acquire applications and testing of microwave components.*
b. *Students acquire knowledge on the various applications of optical fiber communications*
c. *Students develop confidence for self-education and ability for life -long learning.*

IV B.Tech II Semester

15AEC81 - EMBEDDED SYSTEMS & INTERNET OF THINGS

L	T	P	C
3	1	0	3

Course Objectives:

1. *Understand the basics of Embedded System, IoT and the development model*
2. *Understand the architecture, Instruction set and work on ARM microcontroller using practical hands-on.*
3. *Ability to select appropriate hardware and microcontrollers based on need of application*
4. *Understand the Internet of Things Standards, Frameworks and Techniques*
5. *Apply the tools, techniques and skills acquired towards development of Projects.*

UNIT I: Introduction to Embedded Systems and Internet of Things (IoT)

Architecture of Embedded Systems, Embedded Systems Development process, Architecture of Internet of Things, Applications of Embedded Systems and IoT, Design Methodology for IOT Products.

UNIT II – ARM Microcontrollers Architecture and Programming

Architecture, Instruction set, Programming ports, Timer/Counter, Serial communication, interrupts in C, Introduction ARM mBed platform.

UNIT III – Fundamentals of Python Programming & Raspberry Pi

Introduction to python programming, Working with functions, classes, RESTfull Web Services, Client Libraries, Introduction & programming Raspberry Pi3, Integrating Input Output devices with Raspberry Pi3

UNIT IV - IoT: Technologies, Standards And Tools

Fundamental characteristics and high level requirements of IoT, IoT Reference models; Introduction to Communication Technologies & Protocols of IoT: BLE, Wi-Fi, LoRA, 3G/4G Technologies and HTTP, MQTT, CoAP protocols; Relevant Practicals on above technologies

UNIT V – IoT Platform: Cloud Computing Platforms for IoT Development (IBM Cloud)

IOT Platform Architecture (IBM Internet of Things & Watson Platforms); API Endpoints for Platform Services; Devices Creation and Data Transmission; Introduction to NODE-RED and Application deployment

Course Outcomes: *After completion of the course, the student is able to*

a. *Understand the vision of IoT from a global context.*
b. *Provide in-depth knowledge about ARM Architecture and its instruction set.*
c. *Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks*
d. *Implement state of the art architecture in IoT.*
e. *Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints.*

TEXT BOOKS

1. ArsheepBahga, Vijay Madisetti, "Internet of Things: A Hands-On Approach," 1st Edition, VPT, 2014.
2. K.V.K.K.Prasad, "Embedded Real Time Systems: Concepts, Design and Programming," 1st Edition, Dreamtech Publication, 2014.
3. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things‖," Wiley Publications, 2013

REFERENCES

1. Jonathan W Valvano, "Embedded Microcomputer Systems: Real-Time Interfacing," 3rd Edition, Thomson Engineering, 2012.
2. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things: Key applications and Protocols‖," 2nd Edition, Wiley Publications, 2012.

IV B.Tech II Semester

15AEC82 - RADAR AND NAVIGATIONAL AIDS

L	T	P	C
3	1	0	3

Course Objectives:

1. *The students to be able to understand, analyze, and design fundamental Basic radar systems.*
2. *To know various Radar systems such as pulse radar, CW radar etc.*
3. *To understand various Radar systems techniques and their applications.*
4. *Understanding of Radar systems by using a series of specific examples and problems*

UNIT I

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

UNIT II

CW AND FREQUENCY MODULATED RADAR: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Illustrative Problems.FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT III

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

TRACKING RADAR: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two-coordinates), Phase Comparison Monopulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT IV

DETECTION OF RADAR SIGNALS IN NOISE: Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

RADAR RECEIVERS: Noise Figure and Noise Temperature, Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

UNIT V

NAVIGATIONAL AIDS: Introduction, Four Methods of Navigation ,Radio Direction Findings, Radio Ranges, Hyperbolic Systems of Navigation, Aids to approach and Landing

MODERN NAVIGATION: Doppler navigation-Doppler Effect, New configuration, Doppler frequency equations, Track stabilization, Doppler navigation system , GPS principle of operation, Position location determination, principle of GPS receiver

Course Outcomes: *At the end of the course, the students should be able to:*

a. *Able to understand The Radar Operation and targets of the system*
b. *Know the difference between MTI radar, monopulse radar, and apply their concepts in the analysis and design of Tracking systems.*
c. *Understand the basic principles of Radar receiver and their schemes.*
d. *Analyze noise in the case of detection of Radar receiver in radar systems.*
e. *Able to know the methods of navigation, approaches and landing.*
f. *Able to understand the Modern navigational approaches.*

TEXT BOOKS:

1. Merrill I. Skolnik, "Introduction to Radar Systems," 2nd Edition, TMH Special Indian Edition, 2007.
2. Byron Edde, "Radar Principals, Technology, Applications," Pearson Education, 1992.

REFERENCES:

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd Edition, Tata McGraw-Hill, 2001.
2. Peebles, "Radar Principles," Wiley, New York, 1998.

R-15

IV B.Tech II Semester

15AEC83 - WIRELESS COMMUNICATIONS

L	T	P	C
3	1	0	3

Course Objectives:

1. To understand basics of Wireless Communications and its evolution process.
2. To learn about the mechanism of radio mobile propagation and its effects.
3. To understand various types of diversity and equalization techniques to counter balance the effects of Wireless Channel.
4. To Study about importance of Wireless Networking and multiple access techniques in the present day mobile communications
5. To design and analyze mobile systems using OFDM technology for mitigating the ISI effects at higher data rates.

UNIT – 1

Introduction to Wireless Communication Systems & Cellular Concept:

Evolution of Mobile Radio Communication Systems, Examples of Wireless Communication Systems, 1G, 2G, 2.5G, and 3G Wireless Cellular Networks and Standards, Frequency Reuse Concept, Channel Assignment Strategies, Interference and System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems, Problem Solving.

UNIT - 2

Mobile Radio Propagation:

Large Scale Path Loss: Introduction, Free Space Propagation Model, *Propagation Mechanisms* – Reflection, Diffraction, and Scattering, Practical Budget Design using Path Loss Models, Outdoor Propagation Models, Indoor Propagation Models.

Small Scale Fading and Multipath: Small Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small Scale Multipath Measurements, Parameters of Mobile Channels, Types of Small Scale Fading (all variations), *Statistical Models* – Clarke's Model for Flat Fading, Jake's Model, Level Crossing Rate, Simulation of Clarke's/Jake's Model, Two Ray Rayleigh Fading Model, Problem Solving.

UNIT -3

Equalization & Diversity Techniques:

Equalization: Survey of Equalization Techniques, Linear and Non-linear Equalizers – Linear Transversal Equalizer, Decision Feedback Equalizer (DFE), Algorithms for Adaptive Equalization – Zero Forcing, LMS, RLS, Fractionally Spaced Equalizers.

Diversity Techniques: Realization of Independent Fading Paths, *Receiver Diversity* – System Model, Selection Combining, Threshold Combining, Maximal Ratio Combining, Rake receiver, Equal Gain Combining, *Transmit Diversity*–Channel known at Transmitter, Channel unknown at Transmitter – the Alamouti Scheme, analysis.

UNIT - 4

Multiple Access Techniques & Networking:

Introduction to Multiple Access: FDMA, TDMA, CDMA, SDMA, Packet Radio, Capacity of Cellular Systems, Problem Solving.

Introduction to Wireless Networking: Introduction to Wireless Networks, Differences between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling.

UNIT - 5

Multicarrier Modulation:

Data Transmission using Multiple Carriers, Multicarrier Modulation with Overlapping Subchannels, Discrete Implementation of Multicarrier Modulation, The Cyclic Prefix, Orthogonal Frequency Division Multiplexing (OFDM), Matrix Representation of OFDM, Vector Coding, Challenges in Multicarrier Systems, Problem Solving.

Course Outcomes: After completion of this course the students will be able to

a. Understand basics of Wireless Communications and its evolution process.
b. Know about the mechanism of radio mobile propagation and its effects.
c. Apply various types of diversity and equalization techniques to counter balance the effects of Wireless Channel.
d. Recognize the importance of Wireless Networking and multiple access techniques in the present day mobile communications
e. Analyze and design mobile systems using OFDM technology for mitigating the ISI effects at higher data rates.

TEXT BOOKS:

1. Aditya K Jagannatham, "Principles of Modern Wireless Communications Systems," 1st Edition, McGraw Hill, 2015.
2. T. S. Rappaport, "Wireless Communications, Principles and Practice," 2nd Edition, Prentice Hall, 2002.

REFERENCES:

1. Andrea Goldsmith, "Wireless Communications," Cambridge University Press, 2005.
2. David Tse, PramodViswanath, "Fundamentals of Wireless Communications," Cambridge University Press, 2006.

B.TECH - R15 REGULATIONS

CHOICE BASED CREDIT COURSES (INTER DEPARTMENT)

OFFERED

IN

II YEAR I SEMESTER

w.e.f.

2015 ADMITTED BATCH

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA

PULIVENDULA – 516390, Y.S.R. (DIST), ANDHRA PRADESH, INDIA

ANNEXURE-I

Choice Based Credit Course of Inter Department offered in

B.TECH II YEAR I SEMESTER

BRANCH	SUBJECT CODE	SUBJECT NAME
PHYSICS	15ABS12	Basics of Nano Science and Nano Technology
MATHEMATICS	15ABS14	Set Theory and Mathematical Logic
	15ABS23	Mathematical Modeling
CHEMISTRY	15ABS15	Green Chemistry and Catalysis for Sustainable Environment
	15ABS16	Instrumental Methods of Chemical Analysis
	15ABS17	Chemistry of Nano Material and Application
ENGLISH	15AHS08	Campus Recruitment Training & Soft Skills
	15AHS09	Competitive & Spoken English
CE	15ACE09	Green Buildings
	15ACE10	Disaster Management and Mitigation
	15ACE11	Water Harvesting and Conservation
ECE	15AEC08	Basic Electronics
	15AEC09	Fundamentals of Digital Electronics
	15AEC10	Electronic Measurements & Instrumentation
ME	15AME11	Robotics
	15AME12	Mechanical Manufacturing Process
	15AME13	Non-Conventional Sources of Energy
EEE	15AEE08	Principles of electrical engineering
	15AEE01	Electrical engineering materials
	15AEE09	Electrical measuring instruments
CSE	15ACS04	Data Structures
	15ACS11	Object oriented Programming
	15ACS08	Operating Systems

II B.Tech – I Sem

15ABS12-Basics of Nano science and Nanotechnology

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

OBJECTIVES:

1. To understand the fundamentals of nanoscience and nanotechnology
2. To give a general introduction to different classes of nanomaterials
3. To impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology
4. To make the learner familiarize with nanotechnology potentialities.

Unit-I Basics of Nanoscience:

Introductory quantum mechanics for nano science- Historical back ground of nanoscience - Density of states for zero, one, two and three dimensional materials, Quantum confinement, Quantum wells, wires, dots, Factors affecting to particle size, Metal semiconductor (MS) and metal insulator (MI).

Unit-II Properties of Nanomaterials:

Mechanical, Thermal, Electrical, Optical, Magnetic and Structural properties, Carbon based materials- Fabrication, structure, electrical properties and mechanical properties.

Unit-III Synthesis of Nanomaterials:

Physical methods: Bottom up-Ball Milling, Physical vapour deposition, Laser pyrolysis, Sputter deposition.

Chemical methods: Hydrothermal, Sol-gel method, solution combustion method, Co-precipitation method.

Unit-IV Characterization:

Spectroscopic techniques: UV- Visible Spectroscopy, Fourier Transform infrared (FTIR) spectroscopy, Principles and analysis of X-ray diffraction (XRD); electron diffraction, Scanning Electron Microscope (SEM) – Transmission Electron Microscope (TEM).

Unit –V Applications:

Nano engineered materials – coatings – catalysts - nano scale thin films for water-repellent, antireflective and self cleaning surfaces. Communication systems, solar cells and energy storage applications.

TEXT BOOKS

1. ***A Textbook of Nanoscience and Nanotechnology,*** Pradeep T.,Tata Mc Graw Hill Education Pvt. Ltd., 2012.
2. Introduction to Nano Technology, Charles P. Poole Jr & Frank J. Owens. John Wiley and Sons, 2003.
3. The Chemistry of nanomaterials: Synthesis, Properties and Applications, C.N.R. Rao, A. Muller and A.K. Cheetham, Vol – 1, Wiley Online Library, 2005.
4. The Physics of Micro/Nano- Fabrication, Ivor Brodie & Julius J.Muray, Springer, 1992.

REFERENCES

1. ***Nanoscience: Nanotechnologies and Nanophysics,*** Dupas C., Houdy P., Lahmani M., Springer-Verlag Berlin Heidelberg, 2007.
2. Quantum Physics, A. Ghatak & S. Lokanathan, 5th Edition, Mac Millan India, 2004.
3. Nanophysics and Nanotechnology, Edward L. Wolf, Wiley-VCH, 2006.
4. Elements of X-ray Diffraction, B.D.Cullity, Addision Wesely, 1978.
5. Concise Encyclopedia of Materials Characterization, Robert Cahn, 2nd Edition (Advances in Materials Science and Engineering), Elsevier Publication, 2005.

Outcomes:

- Students will have the exposure to the multidisciplinary area of nanoscience.
- The necessary foundation for advanced materials engineering subject.
- Familiarity about the necessary characterization tools for nanoscale.
- Overview on the importance of nanoscience and nanotechnology through recent applications.

II B.Tech – **I Sem**

15ABS14- SET THEORY AND MATHEMATICAL LOGIC

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

- This course aims at providing the student with the concepts of statements, sets relations and Mathematical induction.

UNIT – I

Statement, truth values, negation, conjunction, disjunction, conditional and biconditional, contrapositive statement.

UNIT – II

Set, subset, superset, operations viz. union, intersection, complement etc. of sets; power set, cartesian product.

UNIT – III

Equivalence relations, equivalence classes, partition, fundamental theorem of equivalence relation, partial order relation, Poset, chain, upper & lower bounds in poset, greatest & least elements, maximal & minimal elements, supremum & infimum, Zorn's lemma, introduction to lattice theory. Functions, injection, surjection and bijection; image and pre-image of set under function and inverse mapping, composite mapping.

UNIT – IV

Peano's axioms, principle of mathematical induction, well ordering principle, axiom of choice.

UNIT – V

Finite and infinite sets, countable and uncountable sets, Schroeder Bernstein Theorem, Continuum hypothesis.

TEXT BOOKS:

1. P. R. Halmos, Naive Set Theory Springer, 2009.
2. Bartle, R. G. and Sherbert, D. R. Introduction to Real Analysis, (John Wiley and Sons, Third (Indian) Edition), 2007.

REFERENCES:

1. K. Hrbacek and T. Jech, Introduction to Set Theory , 3rd edition, CRC press, 1999.

Outcomes: The student will be able to analyze the Mathematical logical structures with the concepts of statements, sets, relations and Mathematical Induction.

2.7.18

II B.Tech – **I Sem**

15ABS23-Mathematical Modeling
(Choice based Credit Course)

L	T	P	C
3	1	0	3

Objectives:

- This course aims at providing the basic knowledge to understand a Mathematical model and formulate a Mathematical model related to a real word problems of engineering, biological science etc.

UNIT – I

Mathematical Modeling: Need, Techniques, Classifications and Simple illustarations,
Mathematical modeling Through Ordinary differential equations of First Order :
Mathematical modeling Through differential equations; Linear growth and decay models; Non-Linear Growth and Decay models; Mathematical modeling in dynamics through ordinary differential equations of first order.

UNIT – II

Mathematical modeling Through System of Ordinary differential equations of First Order: Mathematical modeling in population dynamics; Mathematical modeling of Epidemics through system of ordinary differential equations of first order; Compartment models through Systems of ordinary differential equations; Mathematical modeling in dynamics through systems of ordinary differential equations of first order.

UNIT – III

Mathematical modeling Through Ordinary differential equations of Second Order: Mathematical modeling of Planetary motion ; Mathematical modeling of Circular motion and motion of satellites; Mathematical modeling through linear differential equations of second order.

UNIT – IV

Mathematical modeling Through Difference equations : Need for Mathematical modeling Through Difference equations and simple models; Basic theory of Linear difference equations with constant coefficients; Mathematical modeling Through Difference equations in population dynamics and genetics; Mathematical modeling Through Difference equations in Probability theory.

UNIT – V

Mathematical modeling Through Functional, Integral, Delay- Differential and Differential-Difference Equations: Mathematical modeling Through Functional equations;
Mathematical modeling Through Integral equations; Mathematical modeling Through Delay-Differential and Differential-Difference Equations.

TEXT BOOKS:

1. J. N. Kapoor. Mathematical Modeling, NEW AGE INTERNATIONAL PUBLISHERS.

REFERENCES:

1. A. C. Fowler. Mathematical Models in Applied Sciences, Cambridge University Press.

Outcomes: The student will be able to analyze the real word problem through the technique of modeling of that problem to have better insight of the real word problem.

II B.Tech – **I Sem**

15ABS15-GREEN CHEMISTRY AND CATALYSIS FOR SUSTAINABLE ENVIRONMENT

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- Learn an interdisciplinary approach to the scientific and societal issues arising from industrial chemical production, including the facets of chemistry and environmental health sciences that can be integrated to promote green chemistry and the redesign of chemicals, industrial processes and products.
- Understand the use of alternatives assessments that combine chemical, environmental health, regulatory, and business considerations to develop safer products.

UNIT 1: Principles And Concepts Of Green Chemistry

Introduction, Green chemistry Principles, sustainable development and green chemistry, atom economy, atom economic: Rearrangement and addition reactions and un-economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling.

UNIT 2: Catalysis And Green Chemistry

Introduction to catalysis, Heterogeneous catalysts: Basics of Heterogeneous Catalysis, Zeolites and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries, Catalytic Converters, Homogeneous catalysis: Transition Metal Catalysts with Phosphine Ligands, Greener Lewis Acids, Asymmetric Catalysis, Heterogenising the Homogenous catalysts, Phase transfer catalysis: Hazard Reduction, C–C Bond Formation, Oxidation Using Hydrogen Peroxide, Bio-catalysis and photo-catalysis with examples.

UNIT 3: Organic Solvents: Environmentally Benign Solutions

Organic solvents and volatile organic compounds, solvent free systems, supercritical fluids: Super critical carbondioxide, super critical water and water as a reaction solvent: water based coatings, Ionic liquids as catalyst and solvent.

UNIT 4: Emerging Greener Technologies And Alternative Energy Sources

Biomass as renewable resource, Energy: Fossil Fuels, Energy from Biomass, Solar Power, Other Forms of Renewable Energy, Fuel Cells, Chemicals from Renewable feedstocks: Chemicals from Renewable Feedstocks: Chemicals from Fatty Acids, Polymers from Renewable Resources, Some Other Chemicals from Natural Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency: Photochemical Reactions: Advantages of and Challenges Faced by Photochemical

Processes, Examples of Photochemical Reactions, Chemistry Using Microwaves: Microwave Heating, Microwave-assisted Reactions, Sonochemistry: Sonochemistry and Green Chemistry, Electrochemical Synthesis: Examples of Electrochemical Synthesis. Industrial applications of alternative environmentally benign catalytic systems for carrying out the important reactions such as selective oxidation, reduction and C-C bond formations (specific reactions).

UNIT 5: Green Processes For Green Nanoscience

Introduction and traditional methods in the nanomaterials synthesis, Translating green chemistry principles for practicing Green Nanoscience. Green Synthesis of Nanophase Inorganic Materials and Metal Oxide Nanoparticles: Hydrothermal Synthesis, Reflux Synthesis, Microwave-Assisted Synthesis, Other methods for Green synthesis of metal and metal oxide nanoparticles, Green chemistry applications of Inorganic nanomaterials

Text Books :

1. M. Lancaster, Green Chemistry an introductory text, Royal Society of Chemistry, 2002.
2. Paul T. Anastas and John C. Warner, Green Chemistry Theory and Practice, 4th Edition,

   Oxford University Press, USA

References :

1. Green Chemistry for Environmental Sustainability, First Edition, Sanjay K. Sharma and Ackmez Mudhoo, CRC Press, 2010.
2. Edited by Alvise Perosa and Maurizio Selva , Hand Book of Green chemistry Volume 8:

   Green Nanoscience, wiley-VCH, 2013.

Course Outcomes:

Upon completion of this course the students should recognize and acquire green chemistry concepts and apply these ideas to develop respect for the inter connectedness of our world and an ethic of environmental care and sustainability.

II B.Tech – I Sem

15ABS16-INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- To understand the principles of different instruments
- To apply the instruments for analysis of various species in different matrices
- To apply instrumental methods for framing project works

UNIT – I: Molecular Spectrophotometry

Absorption spectra, Lamberts Law, Beer's Law - Combined law equation; Derivations from Beer's Law. Block diagram of a uv- visible spectrophotometer – quantitative analysis ; Direct method for the determination of metal ions; Chromium, Manganese, Iron etc in alloys.

UNIT – II: Infrared Spectroscopy

Interaction of infra-red radiation with molecules, Sources of IR Radiation ; Spectral regions; Block diagram of IR Spectrometer , Function of each component; Sampling Techniques; Application of IR Spectroscopy to functional group analysis (-OH, $-NH_2$, -CHO, -CO-R, -CONH).

UNIT III: Chromatography

Gas Chromatography: Principles of Gas Chromatography, block diagram of gas chromatograph, Function of each component, Detectors (FID, ECD), stationary phase for column, mobile phase, chromatogram, qualitative analysis, quantitative analysis, retention time, retention volume, capacity factor, area., normalization method. Analysis of gaseous and volatile impurities.

HPLC: Principles of high performance liquid chromatography, Block diagram of HPCL, Systems, functions of each component, stationary phases, eluting solvents, pumps, detectors, quantitative applications of HPLC for environmental analysis.

UNIT IV: Atomic Spectrophotometry

Principle of atomization, atomic absorption spectrometer, applications for metal ions, Atomic emission, application and principle of ICP-OES, X-ray fluorescence spectrometry- Applications

UNIT V: Thermal methods of analysis

TGA- Thermo Gavimetry – Principle, instrumentation and applications
DTA- Differential Thermal Analysis- Principle, instrumentation and applications
DSC- Differential Scanning Coulometry- Principle, instrumentation and applications

Text BOOK:

1. Principles of Instrumental Analysis, 6th Edition, Douglas A. Skoog, James Holler. J, Stanley R. Crouch, Cengage Learning, New Delhi, 2014.
2. Instrumentaiotn methods of analysis, Chatwal & Anand, Himalaya Publ;ications, 2003

REFERENCES:

1. Instrumental methods of analysis, Willand merrit and dean, caps publications & Distribution, 1999.
2. Vogels Text book of Quantitative chemical analysis, 6th edition ,Mendham J, Denny R.C,Barnes J.D, Thomas M.J.K, pearson education, 2002.
3. Modern Analytical Chemistry, 1St edition, David Harvey, McGraw-Hill Higher Education, 2010.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Differentiate between classical and instrumental methods of Chemical analysis.
2. Apply different types of Instrumental methods for analysis of various samples in water and other environmental samples

II B.Tech – I Sem

15ABS17-CHEMISTRY OF NANO MATERIALS AND APPLICATIONS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- To understand synthetic principles of Nanomaterials by various methods
- And also characterisae the synthetic nanomaterials by various instrumental methods
- To enumerate the applications of nanomaterials in engineering

Unit I:

Introduction:Scope of nanoscience and nanotecnology, nanoscience in nature, classification of nanostructured materials, importance of nano materials.

Synthetic Methods: Bottom-Up approach:- Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and sonochemical synthesis.

UNIT-II

Top-Down approach:- Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling.

UNIT-III

Techniques for characterization: Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterilas, BET method for surface area analysis, dynamic light scattering for particle size determination.

UNIT-IV

Studies of Nano-structured Materials: Synthesis, properties and applications of the following nanomaterials, fullerenes, carbon nanotubes, core-shell nanoparticles, nanoshells, self-assembled monolayers, and monolayer protected metal nanoparticles, nanocrystalline materials, magnetic nanoparticles and important properties in relation to nanomagnetic materials, thermoelectric materials, non-linear optical materials, liquid crystals.

UNIT.V

Engineering Applications of Nanomaterials

TEXT BOOKS:

1. NANO: The Essentials : T Pradeep, MaGraw-Hill, 2007.
2. Textbook of Nanoscience and nanotechnology: B S Murty, P Shankar, Baldev Rai, BB Rath and James Murday, Univ. Press, 2012.

REFERENCE BOOKS:

1. Concepts of Nanochemistry; Ludovico Cademrtiri and Geoffrey A. Ozin & Geoffrey A. Ozin, Wiley-VCH, 2011.

2. Nanostructures & Nanomaterials; Synthesis, Properties & Applications: Guozhong Cao, Imperial College Press, 2007.
3. Nanomaterials Chemistry, C. N. R. Rao, Achim Muller, K.Cheetham, Wiley-VCH, 2007.

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

- Understand the state of art synthesis of nano materials
- Characterize nano materials using ion beam, scanning probe methodologies, position sensitive atom probe and spectroscopic ellipsometry.
- Analyze nanoscale structure in metals, polymers and ceramics
- Analyze structure-property relationship in coarser scale structures
- Understand structures of carbon nano tubes

II B.Tech – **I Sem**

15AHS08-CAMPUS RECRUITMENT TRAINING & SOFT SKILLS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

1. To develop awareness in students of the relevance and importance of soft skills.
2. To provide students with interactive practice sessions to make them internalize soft skills.
3. To prepare the students for placements.
4. To train students to use language appropriately for interviews, group discussion and public speaking
5. To help the students to understand interpersonal skills.
6. To support them in building interpersonal skills.
7. To better the ability to work with others

Outcome:

After completing this course,

- The students would have Understood of what Soft Skills is,
- Understood the significance of soft skills in the working environment
- Turning out engineering students with a clear concept of soft skills and equipping them with readiness to implement them at work place.

UNIT I: Interview Dynamics-Preparation-Power Selling- Cracking the top Questions-Stress Control.

UNIT II: Intra Personal Skills: Knowing Strengths & Weaknesses – Goal Setting-Quotient Skills- Positive thinking- Problem Solving-analytical Skills.

UNIT III: Intra Personal Skills: Managerial Skills, Group dynamics- Negotiation Skills-Time Management.

UNIT IV: Verbal Skills: Dynamics of listening, Speaking, Reading & Writing skills- Email writing.

UNIT V: Non Verbal Skills: Body Language- Body Posture, Gestures, Eye Contact, Facial Expressions, Appearance, Space Distance /Proxemics , Touch/Haptics,. Para Language-Tone, Pace, Pause, Volume , Quality .

REFERENCE BOOKS:

1. M. Ashraf Rizvi: Effective Technical Communication, Tata McGraw Hill, New Delhi, 2014.
2. Alex.k, soft skills, 3rd ed. S. Chand Publication, New Delhi, 2014.
3. Technical Communication, Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009.

4. Sherfield, M. Robert at al Cornerstone Developing Soft Skills, 4th ed. Pearson Publication,
New Delhi, 2014.
5. Shalini Varma, Body Language for your success mantra, 4th ed, S. Chand Publication, New Delhi, 2014.

II B.Tech – I Sem

15AHS09-COMPETITIVE & SPOKEN ENGLISH

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence.
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To train students to use language appropriately for interviews, group discussion and public speaking
- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

Expected Outcomes:

- Becoming active participants in the learning process and acquiring proficiency in spoken English of the students.
- Speaking with clarity and confidence thereby enhancing employability skills of the students.
- Accomplishment of sound vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities.

UNIT I: ~~Creating~~ cracking the unknowing passage-Reading Comprehension- Listening Comprehension.

UNIT II: Correction of the Sentences Nouns – Pronouns – Verbs- Tenses- Articles- Prepositions- Sentences.

UNIT III: Competitive Vocabulary – Word Building – Memory techniques

UNIT IV: Functional English – Sentences – Construction – Neutralization of accent – Intonation.

UNIT V: Dynamics of Speaking – Communication Skills – Speech Preparation – Speaking Practices.

Reference books:

1. M. Ashraf Rizvi: **Effective Technical Communication**, Tata McGraw Hill, New Delhi, 2014.
2. Wren and Martin, **High School English Grammar and Composition,** S. Chand Publication, New Delhi, 2014.
3. Hari Mohan Prasad, **Objective English for Competitive Examination,** Tata McGraw Hill, New Delhi, 2014.
4. R.S. Aggarwal , **Objective General English,** S. Chand Publication, New Delhi.
5. R.K Bansal, **Spoken English : Manual of Speech and Phonetics,**4th Edition, Orient Black swan Pvt Ltd.-New Delhi, 2013.

II B.Tech – I Sem

15ACE09-GREEN BUILDINGS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I Introduction :Concept of Green Building, Need for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, Key Requisites for Constructing a Green Building, Important Sustainable features for Green Building,

UNIT-II Green Building Concepts and Practices Indian Green Building Council, Green Building Moment in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation;
Green Building Opportunities And Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency,

UNIT-III Green Building Design Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximise System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources. Ecofriendly captive power generation for factory, Building requirement,

UNIT-IV Air Conditioning Introduction,CII Godrej Green business centre,Design philosophy,Design interventions,Energy modeling, HVAC System design,Chiller selection,pump selection,Selection of cooling towers,Selection of air handing units,Precooling of fresh air,Interior lighting system,Key feature of the building. Eco-friendly captive power generation for factory,Building requirement.

UNIT-V Material Conservation Handling of non process waste, waste reduction during construction,materials with recycled content,local materials,material reuse,certified wood ,Rapidly renewable building materials and furniture; Indoor Environment Quality And Occupational Health: Air conditioning, Indore air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels,

Text Books:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.

2. Green Building Hand Book by Tomwoolley and Samkimings, 2009.

Reference Books: 1. Complete Guide to Green Buildings by Trish riley
2. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009

II B.Tech – I Sem

15ACE10-DISASTER MANAGEMENT AND MITIGATION

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I - Introduction To Disaster :Meaning, Nature, Importance of Hazard, Risk, Vulnerability and Disaster- Dimensions & Scope of Disaster Management - India's Key Hazards – Vulnerabilities - National disaster management framework - Disaster Management Cycle.

UNIT-II - Natural Disaster :Natural Disasters- Meaning and nature of natural disaster; their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

UNIT-III - Anthropogenic DisasteR :Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation and industrial waste water pollution.

UNIT-IV - Approaches In Disaster Management :Pre- disaster stage (preparedness) - Preparing hazard zonation maps, Predictability/ forecasting & warning - Preparing disaster preparedness plan - Land use zoning - Preparedness through Information, education. Emergency Stage - Rescue training for search & operation - Immediate relief - Assessment surveys. Post Disaster stage – Rehabilitation - Social Aspect - Economic Aspect and Environmental Aspect.

UNIT-V - Disaster Mitigation :Meteorological observatory - Seismological observatory - Hydrology Laboratory and Industrial Safety inspectorate. Technology in Disaster Management - Emergency Management Systems (EMS) in the Disaster Management Cycle - Remote Sensing and Geographic Information Systems(GIS) in Disaster Management. 2

Text Book:

1. Sharma.S.R, "Disaster management", A P H Publishers, 2011.

REFERENCES:

1. VenuGopalRao.K, "Geoinformatics for Disaster Management", Manglam Publishers and Distributors, 2010.
2. Singh.R.B, "Natural Hazards and Disaster Management: Vulnerability and Mitigation", Rawat Publications, 2006.

3. Gupta.H.K, "Disaster Management", University Press, India, 2003.
4. Gupta.M.C, "Manuals on Natural Disaster management in India", National Centre for Disaster Management,IIPA, New Delhi, 2001.

II B.Tech I-Sem

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
COLLEGE OF ENGINEERING: PULIVENDULA (AUTONOMOUS)

II Year B.Tech (Civil Engineering) I Semester

T	L	C
1	3	3

15ACE11 – **WATER HARVESTING AND CONSERVATION**
(CBCC)

OBJECTIVE: *The course aims at bringing awareness about the need for conservation of Water. The student will be taught different methods of Water Harvesting and also the methods of Water Conservation. He will also learn the principles of Watershed Management.*

UNIT – I

Origin, Occurrence & Movement of Groundwater:-Introduction-sources of ground water – Hydro geological Cycle – Infiltration – natural openings in rocks – zones of aeration , saturation and water table – classification of ground water – laboratory and field methods of sampling ground water- aquifers – aquifuges- aquicludes – aquitards – ill effects due to lowering of water table -Artificial recharge.

UNIT – II

Water Harvesting: Principles of water harvesting-methods of rainwater harvestingdesign of rainwater harvesting structures-Purification Techniques for direct use-Harvesting of surface runoff-onsite detention basin - ponds - types - Recycling of harvested water

UNIT – III

Water Recovery and Reuse: Perspective on recycle and reuse- factors affecting the development of water reclamation and reuse criteria- elements/components of water reclamation and reuse criteria / guidelines- sewage irrigation- Waste water reclamation-waste water recharge for reuse – Treatment Requirements for Water Reuse-methods.

UNIT – IV

Sustainable Watershed Approach & Watershed Management Practices: Concept of watershed-Introduction to watershed management- Integrated water resources management- natural resources management-agricultural practices-integrated farming-Conjunctive use of water resources-Community participation-Watershed Management Practices in Arid and Semiarid Regions-Case studies-Short term and long term strategic planning.

UNIT – V

Soil and Water Conservation: Scope of soil and water conservation-Mechanics and types of erosion-their causes-Soil erosion control measures - bank protectionvegetative barriers-contour bund- contour trenches-contour stone walls-contour ditchesterraces-outlets and grassed waterways-Gully control structures - temporary and permanent - design of permanent soil conservation structures-Design of farm ponds and percolation ponds.

TEXT BOOKS:

1. Watershed Management by Murty, J.V.S, New Age Intl., New Delhi .
2. Water Resources Conservation and Management by Chatterjee, S. N.,Atlantic Publishers.
3. Ground Water by S.Ramakrishnan, SCITECH Publishers.

REFERENCE BOOKS:

1. Advances in Soil and Water Conservation by Pierce, F.J. and Frye, W. W. (1998):, Ann Arbor Press, Michigan.
2. Soil and Water Conservation Engineering, 4th Ed. By Schwab, G. O., Fangmeier, D. D., Elliot, W. J. and Frevert, R. K. (1993), John Wiley and Sons Inc., USA
3. Watershed Management in India by Murthy, J.V.S., Wiley Eastern, New Delhi, 1994 .
4. Irrigation Water Management - Principles and Practice by Dilip Kumar Majumdar,, PHI Pvt.Ltd.NewDelhi-1.
5. Irrigation and Water Power Engineering by Madan Mohan Das & Mimi Das Saikia, PHI learning Pvt. Ltd., NewDelhi-1

Course Outcomes: *On completion of the course, the student will be able to*

a) Appreciate the importance of Water Conservation
b) Understand the methods of Water Harvesting
c) Understand the principles of Watershed Management and its importance in sustainability

II B.Tech – **I Sem**

15AEC08-BASIC ELECTRONICS
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT – I:
Semiconductor devices: Diode, BJT, their structures and principle of operations.
Amplifiers: Functionality, specifications-voltage gain, current gain, input resistance, output resistance, dynamic range, bandwidth, linearity, power efficiency

UNIT- II:
Power electronics: Half wave and full wave rectification, filtering, regulation with Zener diode and linear regulators.
Filters: Low pass, high pass, band pass and band stop filters, specifications-cutoff frequency, roll off.

UNIT – III
Feedback Amplifiers: Basic concept of negative and positive feedback, application of negative feedback in amplifiers, effect on gain, bandwidth, input resistance, output resistance and de-sensitivity to parameter variations.
Oscillators: Barkhausen criterion, RC phase shift, Wien bridge, Colpitts, Hartley and Crystal oscillators, applications of oscillators.

UNIT – IV
Operational amplifier: Differential mode of operation, common mode rejection, typical op-amp specifications-open loop gain, differential input resistance, unity gain-bandwidth, inverting amplifier, non-inverting amplifier, summing amplifier, Instrumentation Amplifier, concept of active filters.

UNIT – V
Digital electronics: Review of Boolean algebra and signed number representation schemes in binary, implementation of Boolean functions using various logic gates, concept of combinatorial and sequential circuits, registers and counters from functional viewpoint.

Text Books:

1. Electronics Devices and Circuits, J.Millman and Christos. C. Halkias, 3rd edition, Tata McGraw Hill, 2006.
2. Electronics Devices and Circuits Theory, David A. Bell, 5th Edition, Oxford University press., 2008.

References:

1. Electronics Devices and Circuits Theory, R.L.Boylestad,Lousis Nashelsky and K.Lal Kishore, 12th edition, 2006, Pearson, 2006.
2. Electronic Devices and Circuits, K. Lal Kishore, 3rd Edition, BSP, 2008.
3. Electronic Devices and Circuits, N.Salivahanan, and N.Suresh Kumar, 3rd Edition, TMH, 2012

II B.Tech – I Sem

15AEC09-FUNDAMENTALS OF DIGITAL ELECTRONICS
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I:

Binary Systems: Introduction of Digital Computers and Digital Systems, Binary numbers, Base Conversion: Binary, Decimal, Hex, Octal. Complements: R's Complement, 2's and 10's Complement, (R-1)'s Complement, 1's and 9's Complement, Binary Codes: Decimal Codes, Error Detection codes, Reflected Code.

UNIT-II:

Binary Logic And Boolean Algebra: Basic Binary logic, Logic Gates: AND, OR, INVERTER, Postulates, Boolean algebra, Two value Boolean algebra, Basic theorems of Boolean algebra: De-Morgan's Theorems, Boolean functions Boolean forms: Canonical, Standard.

UNIT-III:

Boolean Function Implementation: Need for simplification, K–Map method: 2–Variable K–map, 3–Variable K–map, 4–variable K–map, K–Map using Don't care condition, Universal Gates: NAND, NOR, NAND Implementation, NOR Implementation.

UNIT-IV:

Basic Combinational Logic: Design procedure of combinational logic, Adder: Half Adder, Full Adder, Subtractor, Half Subtractor, Full Subtractor, Code Conversion, BCD – Excess-3 conversion.

UNIT-V:

Combinational Logic Using MSI And LSI: Binary Parallel Adder, Magnitude Comparator: 2 Input Comparator, Decoder: 2–4 Decoder, 3–8 Decoder, Encoder: 4–2 Encoder, 8–3 Encoder, Multiplexer: 4–1 multiplexer, Demultiplexers: 1–4 Demultiplexers.

Text Book:

1. Digital Design, M.Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, Zvi Kohavi and Nirah K.Jha, 2nd Edition, Tata McGraw Hill, 2005.

Reference Books:

1. Fundamentals of Digital Circuits, Anand Kumar, Prentice-Hall of India, Latest Edition
2. Digital electronics Principles, Malvino & Leech, Tata McGraw-Hills publication, Latest Edition.

II B.Tech – **I Sem**

15AEC10-ELECTRONIC MEASUREMENTS & INSTRUMENTATION
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives for electrical measurements and instrumentation:

1. This course introduces the basic principles of different types of electrical instruments for the Measurement of voltage, current, power factor, power and energy.
2. It also explains the measurements of RLC parameters using bridge principles.
3. The principles of magnetic measurements are also explained.
4. The principle of working of CRO and its applications are explained.

Course outcomes for electrical measurements and instrumentation:

1. Use wattmeters, pf meters, and energy meters in a given circuit.
2. Extend the range of ammeters and voltmeters
3. Measure active power, reactive power, power factor, and energy in both 1-phase and 3-phase circuits
4. Determine the resistance values of various ranges, L and C values using appropriate a.c bridges

UNIT – I:

Fundamentals of Measurements: Introduction, types of measurements, static & dynamic characteristics of measurement system, types of Errors, error sources and remedies.
Multimeter: Principle of measurement of D.C. Voltage and current, A.C. Voltage and current, Resistance, AC and DC sensitivity, Specifications.

UNIT – II:

Fundamentals of Cathode Ray Oscilloscope: Block diagram, CRO probes, Delay line, types of Oscilloscopes. Measurement of: Signal voltage, Current, Phase & Frequency using Lissajous patterns, Industrial applications of CRO.

UNIT – III:

Review of DC Bridges: Wheatstone bridge, Wien Bridge, errors and precautions in using bridges,
AC bridges: Measurement of inductance-Maxwell's bridge, Anderson Bridge. Measurement of capacitance- Shearing Bridge. Kelvin Bridge, Q-meter.

UNIT – IV:

Signal generator-fixed and variable, AF oscillators, function generators, pulse, random noise, sweep waveform generators, and their standards, specifications and principles of working (Block diagram approach).

UNIT – V:

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, pH measurement Signal Conditioning Circuits.

Text Books:

1. A course in electrical & electronic measurements and instrumentation – AK Sawhney, Puneet Sawhney, 4th Edition, Dhanpat Rai & Sons Educational and technical publisher, 2012.
2. Modern Electronic Instrumentation and Measurement Techniques, Albert D.Helfrick and William D.Cooper, Pearson / Prentice Hall of India, 2007

References:

1. Measurement Systems- Application and Design, Ernest O. Doebelin, TMH, 2007.
2. Electronic Instrumentation, H.S.Kalsi, 2nd edition, Tata McGraw Hill, 2004.
3. Principles of Measurements and Instrumentation, Alan. S. Morris, 2nd Edition, Prentice Hall of India, 2003.

II B.Tech – I Sem

15AME11-ROBOTICS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives

- To design, develop and complete robotic activities and challenges
- This course aims at providing the students the fundamental knowledge of the various subscriptions such as kinematics, Dynamics, controls, sensors, actuators, etc.
- It is aimed to provide adequate background in both analysis and design of robots.

UNIT – I

Fundamentals of Robots: Introduction, definition, classification and history of robotics, robot characteristics and precision of motion, advantages, disadvantages and applications of robots. Introduction to matrix representation of a point in a space a vector in space, a frame in space, Homogeneous transformation matrices, representation of a pure translation, pure rotation about an axis.

UNIT – II

Kinematics of robot: Forward and inverse kinematics of robots- forward and inverse kinematic equations for position and orientation, Denavit-Hartenberg(D-H) representation of forward kinematic equations of robots, The inverse kinematic of robots, Degeneracy and Dexterity, simple problems with D-H representation.

Differential motions and Velocities: Introduction, differential relationship, Jacobian, differential motions of a frame-translations, rotation, rotating about a general axis, differential transformations of a frame. Differential changes between frames, differential motions of a robot and its hand frame, calculation of Jacobian, relation between Jacobian and the differential operator, Inverse Jacobian.

UNIT – III

Control of Manipulators: Open- and Close-Loop Control, the manipulator control problem, linear control schemes, characteristics of second-order linear systems, linear second-order SISO model of a manipulator joint, joint actuators, partitioned PD control scheme, PID Control Scheme, computer Torque control, force control of robotic manipulators, description of force-control tasks, force control strategies, hybrid position/force control, impedance force/torque control.

UNIT – IV

Robot Vision: Industrial applications of vision-controlled robotic systems, process of imaging, architecture of robotic vision system, Image acquisition, description of other components of vision system, image representation, image processing.

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UNIT – V

Robot Cell Design and Programming: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work cell design, Work cell control, Inter locks, Error detection, Work cell controller.

Methods of robot programming, WAIT, SIGNAL, and DELAY commands, Robotic languages, VAL system.

Text Books:

1. Industrial Robotics – Mikell P. Groover and Mitchell Weiss, Roger N. Nagel,Nicholas G.Odrey – Mc Graw Hill, 1986.
2. Robotics and control – R K Mittal and I J Nagrath, - Tata Mc Graw Hill

References:

1. Introduction to Robotics – Analysis, System, Applications by Saeed B. Niku, PHI Publications
2. Robot Analysis and Control - H. Asada and J.J.E. Slotine John Willey & Sons.
3. Fundamentals of Robotics: Analysis and control, Robert J. Schilling, Prentice Hall, 1990.
4. A robot Engineering text book – Mohsen shahinpoor, Harper & Row Publishers,1987
5. Introduction to Robotics: Mechanics and Control, John.J.Craig, Addison- Wesley, 1999
6. Robotics: Control, sensing, vision, and intelligence – K.S. FU, R.C. Gonzalez and C.S.G Lee. Mc Graw Hill, 1987.
7. Robotic Engineering an integrated approach- Richard D. Klafter Thomas – PHI publications

Course outcomes

By studying this course, students will be

- Familiar with the history, concept development and key components of robotics technologies.
- Understand basic mathematic manipulation of spatial coordinate representation and transformation.
- Understand and able to solve basic robot forward and inverse kinematic problems.
- Understand and able to solve robotic dynamics, path planning and control problems.
- Able to undertake practical robotics experiments that demonstrate the above skills.

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II B.Tech – I Sem

15AME12-MECHANICAL MANUFACTURING PROCESSES

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

The objectives of this course are to introduce to demonstrate the various manufacturing processes. To develop knowledge and importance of surface treatment, processing of powder metals, glass, ceramics plastics. To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes and acquire knowledge on advanced manufacturing processes.

UNIT – I

Surface treatment: Scope, Cleaners, Methods of cleaning, Surface coating types, and ceramic and organic methods of coating, economics of coating. Electro forming, Chemical vapour deposition, thermal spraying, Ion implantation, diffusion coating, Diamond coating and cladding.

UNIT – II

Processing of Powder metals, Glass and Superconductors: Introduction, production of metal powders, compaction of metal powders, sintering, secondary and finishing operations, design considerations for powder metallurgy, Process capabilities, economics of powder metallurgy, forming and shaping of Glass, techniques for strengthening and treating Glass, design considerations for Glass, processing of superconductors.

Processing of ceramics: Applications, characteristics, classification .Processing of particulate ceramics, Powder preparations, consolidation, Drying , sintering, Hot compaction, Area of application , finishing of ceramics.

UNIT – III

Fabrication of Microelectronic devices: Crystal growth and wafer preparation, Film Deposition oxidation, lithography, bonding and packaging, reliability and yield, Printed Circuit boards, computer aided design in microelectronics, surface mount technology, Integrated circuit economics. E-Manufacturing, nanotechnology, and micromachining, High speed Machining

UNIT – IV

Processing Of Plastics, injection and blow moulding, calendaring, thermo forming, compression moulding, transfer moulding, High energy rate forming methods Rapid manufacturing: - Introduction - concepts of rapid manufacturing, information flow for rapid prototyping, classification of rapid prototyping process, sterer holography fused deposition modeling, selective laser sintering, Applications of rapid prototyping process

UNIT – V

Processing of Composites: Composite Layers, Particulate and fiber reinforced composites, Elastomers, Reinforced plastics, MMC, CMC, Polymer matrix composites.

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Text Books:

1. Manufacturing Engineering and Technology, Schmid and kalpakjin, Pearson Education.
2. Manufacturing Technology, Foundry forming and welding, Vol I , P.N. Rao,TMH
3. Rapid Prototyping Principles and Applications, RafiqNoorani, Wiely Pub

Reference Books:

1. Production Technology, R.K. Jain, Khanna Publishers,17th edition, 2012
2. Process and materials of manufacturing -Lindberg, PE
3. Principles of Metal Castings, Rosenthal.
4. Welding Process, Parmar, Khanna publication.
5. Manufacturing Technology, R.K. Rajput, Laxmi Pub

Course Outcomes:

After completion of this course student will be able to

- Understand the principles of processing of various powder metals, glass, ceramics and semiconductors.
- Understand the applications of rapid prototyping and processing of plastics

Suggested Links:

- www.casde.iitb.ac.in/store/events/2003/IAT-Pune.../DFMA.ppt
- www.rose-hulman.edu/~stienstr/ME470/DFA.ppt
- www.design4manufacturability.com/DFM_article.htm
- http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm

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II B.Tech – I Sem

15AME13-NON-CONVENTIONAL SOURCES OF ENERGY

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objective:

- To explain concept of various forms of renewable energy
- To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications
- To analyse the environmental and cost economics of using renewable energy sources compared to fossil fuels.

UNIT - I

Principles Of Solar Radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Solar Energy Storage And Applications :

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications solar heating technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

Wind Energy : Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Bio-Mass : Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engineoperation and economic aspects.

UNIT-IV

Geothermal Energy : Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy : OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, principles of DEC.

Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux,

MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion,

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economic aspects.Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Text Books:

1. Renewable energy resources, Tiwari and Ghosal, Narosa.
2. Non-Conventional Energy Sources ,G.D. Rai

References :

1. Renewable Energy Sources, Twidell& Weir
2. Solar Energy, Sukhatme
3. Solar Power Engineering,B.S.Magal Frank Kreith&J.F.Kreith.
4. Principles of Solar Energy, Frank Krieth& John F Kreider.
5. Non-Conventional Energy, Ashok V Desai, Wiley Eastern 6. Non-Conventional Energy Systems, K Mittal , Wheeler.

Course Outcome:

At the end of the course the student will

1. Have knowledge about various renewable energy sources
2. Be able to choose the appropriate renewable energy as an alternate for conventional power in any application.

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II B.Tech – **I Sem**

15AEE08-PRINCIPLES OF ELECTRICAL ENGINEERING

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives for Principles of Electrical Engineering:

1. Students can learn about fundamental concepts circuits, DC, AC Machines.
2. Students can learn about Electrical instruments.
3. Student learn how to apply electrical principles in their applications.
4. Student can able verify theorems such as super position, thevinins and maximum power transfer and the measurements of RLC parameters using bridge principles

UNIT I: Fundamentals of Electrical Circuits

Circuit Concept–R-L-C Parameters -Kirchhoff's Laws – Network Reduction Techniques-Series, Parallel, Series Parallel, Star-to-Delta or Delta-to-Star Transformation. R.M.S, Average Values and Form Factor for Different Periodic Wave Forms – Sinusoidal Alternating Quantities – Phase and Phase Difference. Concept of Power Factor-Concept of Reactance, Impedance, Susceptance and Admittance-Real and Reactive Power, Complex Power. Examples. Star Delta Transformation Technique. Thevenin's, Norton's and Superposition Theorems for D.C Excitations.

UNIT II: DC Machines

Principle of Operation of DC Machines, Constructional features, EMF equation, Types of Generators, Magnetization and load characteristics of DC Generators.

DC motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne's Test, Speed control of DC Shunt and series Motors, Flux and Armature voltage control methods.

UNIT III: Transformers & Induction machines

Principle of Operation of Single Phase transformer, Types, Constructional Features, EMF equation, Phasor Diagrams for no load and loaded conditions, efficiency of Transformer and regulation, OC and SC Tests, predetermination of Efficiency and Regulation (Simple Problems). Concept of rotating field, Principle of Operation of induction motors.

UNIT IV: Special Machines

Principle of operation of Shaded pole motors, Capacitor motors, AC Servo motors, AC Tachometers, Synchros, Stepper motors and its characteristics.

V.Sara

BOS – chairman

UNIT V: Electrical Measurements

Moving Coil & Moving Iron Instruments (Ammeter & Voltmeter).Dynamometer Type Watt meters & Energy Meters(operating principles).

Course outcomes for Principles of Electrical Engineering:

1. Students able to demonstrate knowledge on fundamental concepts circuits, DC, AC Machines.
2. Students able to demonstrate knowledge on how to measure the electrical quantities using measuring instruments.
3. Students are able to apply electrical principles in their applications.
   Students are able to determine the RLC parameters using bridge principles.

Text Books

1. Network Analysis – A Sudhakar, Shyammohan S.Palli, 3 ed., 2009. TMH.
2. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, 2008, TMH.

References:

1. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers, 3rd Edition, 2004.
2. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co.

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II B.Tech – **I Sem**

15AEE01-ELECTRICAL ENGINEERING MATERIALS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives for Electrical Engineering material:

1. To aquire knowledge on general properties of different conductors.
2. To learn the fundamental properties of dielectric materials and high resistivity materials.
3. To gain knowledge on different insulating materials.
4. To learn about different types of wiring and wiring materials.

UNIT-I Conducting Materials:

Introduction – classification of materials – Metals and Non metals, physical, thermal, mechanical and electrical properties of materials – classification of electrical materials – concept of atom – electron configuration of atom, conductors, general properties of conductors, factors effecting resistivity of electrical materials –electrical/mechanical/thermal properties of copper, aluminum, iron, steel, lead, tin and their alloys – applications.

UNIT-II Dielectric Materials And High Resistivity Materials :

Introduction – solid, liquid and gaseous dielectrics, leakage current, permittivity, dielectric constant, dielectric loss – loss angle – loss constant, Breakdown voltage and dielectric strength of – solid, liquid and gaseous dielectrics, effect of break down– electrical and thermal effects ,Polarization – electric, ionic and dipolar polarization. Effect of temperature and Frequency on dielectric constant of polar dielectrics. High Resistivity materials – electrical / thermal / mechanical properties of Manganin, Constantan, Nichrome, Tungsten, Carbon and Graphite and their applications in electrical equipment.

UNIT-III Insulating Materials-I:

Introduction – characteristics of a good electrical insulating materials – classification of insulating materials – electrical, thermal, chemical and mechanical properties of solid insulating materials, electrical, thermal and mechanical properties of, Asbestos, Bakelite, rubber, plastics, thermo plastics. Resins, polystyrene, PVC, porcelain, glass, cotton and paper.

UNIT-IV Insulating Materials-II:

Liquid insulating materials – Mineral oils, synthetic liquids, fluorinated liquids – their Electrical, thermal and chemical properties – transformer oil – properties – effect of moisture on insulation properties Gaseous insulators – classification based on dielectric strength – dielectric loss, chemical stability properties and their applications .

BOS- chairman

UNIT-V Domestic Wiring:

Wiring materials and accessories – Types of wiring – Types of Switches - Specification of Wiring – Stair case wiring - Fluorescent lamp wiring-Godown wiring – Basics of Earthing – single phase wiring layout for a residential building

Course outcomes for Electrical Engineering material:

1. Able to demonstrate the knowledge on different types of electrical materials.
2. Able to evaluate the leakage current, loss angle, permittivity, dielectric constant and loss constant of different dielectrics.
3. Able to understand the fundamentals of different insulating materials

Able to demonstrate knowledge on types of switches and wiring.

Text Books:

1. Electrical engineering materials by G.K. Mittal, Khanna publication 2nd edition.
2. A course in Electrical Engineering Materials by R.K .RAJPUT, Laxmi publications.
3. Electrical technology volume-I by B.L. Theraja, SChand publications.

Reference Books:

1. "An Introduction to electrical engineering materials" by C.S. Indulkar and S. Thiruvengadam, SChand & Company.
2. "Electrical engineering Materials" by T.T.T.I, Madras, Tata McGraw Hill
3. "A course in electrical engineering materials" by S.P. Seth, Dhanapatrai & Sons, New Delhi

V. Seth
BOS-chairman

II B.Tech – I Sem

15AEE09-ELECTRICAL MEASURING INSTRUMENTS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objective:

Electrical measurements course introduces the basic principles of all measuring instruments. It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements and Digital Meters

UNIT- I Measuring Instruments

Classification – Deflecting, Control and Damping Torques – Ammeters and Voltmeters – PMMC, Dynamometer, Moving Iron Type Instruments – Expression for the Deflecting Torque and Control Torque – Errors and Compensations, Extension of range using Shunt and Series Resistance. Cathode Ray Oscilloscope- Cathode Ray tube-Time base generator- Horizontal and Vertical Amplifiers – Application of CRO – Measurement of Phase , Frequency, Current & Voltage- Lissajous Patterns

UNIT – II Measurement Of Power And Energy

Single Phase Dynamometer Wattmeter, LPF and UPF, Double Element and Three Element Dynamometer Wattmeter, Expression for Deflecting and Control Torques. Types of P.F. Meters – Dynamometer and Moving Iron Type – 1-ph and 3-ph Meters. Single Phase Induction Type Energy Meter – Driving and Braking Torques – Errors and Compensations. Three Phase Energy Meter.

UNIT – III Instrument Transformers And Potentiometers

CT and PT – Ratio and Phase Angle Errors – Design Considerations.

Potentiometers: Principle and Operation of D.C. Crompton's Potentiometer – Standardization – Measurement of unknown Resistance, Current, Voltage.

A.C. Potentiometers: Polar and Coordinate types- Standardization – Applications.

UNIT – IV D.C & A.C Bridges

Method of Measuring Low, Medium and High Resistance – Sensitivity of Wheatstone's Bridge – Kelvin's Double Bridge for Measuring Low Resistance, Measurement of High Resistance – Loss of Charge Method. Measurement of Inductance - Maxwell's Bridge, Anderson's Bridge. Measurement of Capacitance and Loss Angle - Desauty Bridge. Wien's Bridge – Schering Bridge.

BOS - chairman

UNIT – V Magnetic Measurements

Ballistic Galvanometer – Equation of Motion – Flux Meter – Constructional Details, Comparison with Ballistic Galvanometer. Determination of B-H Loop Methods of Reversals - Six Point Method – A.C. Testing – Iron Loss of Bar Samples.

Text Books:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, 5th Edition, Reem Publications.

Reference Books:

1. Electronic Instrumentation by H. S. Kalsi, Tata Grawhill Mc, 3rd Edition.
2. Electrical Measurements – by Buckingham and Price, Prentice – Hall
3. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers
4. Electrical & Electronic Measurement & Instrumentation by R. K. Rajput, 2nd Edition, S. Chand & Co.

V. Sarma
BOS - Chairman

II B.Tech – I Sem

15ACS04-DATA STRUCTURES

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I

Stacks & Queues: stacks, stacks using dynamic arrays, Queues, circular queues using dynamic arrays, amazing problem, evaluation of expressions.

Linked List: single linked list and chains, representing chains in C, Linked stacks and queues, polynomials, additional list operations, equivalence classes, sparse matrices, double linked list.

UNIT –II

Trees : Introduction, Binary tree, Binary tree traversals , Additional binary tree operations, Threaded binary trees, Heaps, Binary search trees, Selection trees, Forests, Representation of disjoint sets, Counting binary trees.

UNIT-III

Graphs: The graph abstract datatype, Elementary graph operations, Minimam cost spanning trees, Shortest paths and transitive closure.

Sorting: Motivation, Insertion sort, Quick sort, Merge sort , Heap sort, sorting on several keys, list and table sorts, external sorting.

UNIT –IV

Hashing: Introduction, Static hashing, dynamic hashing, Bloom Filters.

Priority Queues: Single ended and double ended priority queues, leftist trees, Binominal Heaps, Fibonacci Heaps, Pairing Heaps, Symmetric Min-Max Heaps, and Interval Heaps.

UNIT-V

Efficient binary search trees: Optimal binary search trees, AVL Trees, RED Black Trees, Splay Trees, M- Way search trees, B-Trees, B+ -Trees.

Text Books:

1. Fundamentals of Data structures in C 2nd edition HOROWITZ , SAHNI, ANDERSON-FREED.

II B.Tech I Sem

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANATHAPURAMU
COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA
REGULATION - R15

15ACS11– OBJECT ORIENTED PROGRAMMING (CBCC)

L T P C
3 1 0 3

Learning Objectives:

- This subject will help to improve the analytical skills of object oriented programming
- Overall development of problem solving and critical analysis
- Formal introduction to Java programming language

Learning Outcomes: On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard
- Understand the basic principles of the object-oriented programming
- Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

Unit-I :

Introduction to Java : Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

Unit-II :

Objects and Classes : Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

Unit-III :

Inheritance and Polymorphism : Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

Unit-IV :

Event and GUI programming : Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.

Unit-V :

Multithreading in java : Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.

Text Books:

1 Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.

2 Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.

3 Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.

Reference Books:

4 Core Java Volume-I Fundamentals, Eight Edition, Horstmann& Cornell, Pearson Education.

5 The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.

6 Java Programming, D. S. Malik, Cengage Learning.

II B.Tech – **I Sem**

15ACS08-OPERATING SYSTEMS

L	T	P	C
3	1	0	3

Course Objective

- To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection.
- To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications

Course Outcomes

- Understand what makes a computer system function and the primary PC components.
- Understand past and current trends in computer technology.
- Use basic software applications.
- Add functionality to the exiting operating systems
- Design new operating systems

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Kernel data Structures, Computing Environments, Open- Source Operating Systems

Operating System Structure: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

UNIT II

Threads: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit threading, Threading Issues.

Process Synchronization: The critical-section problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple- Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

UNIT III

Memory Management: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory- Mapped Files, Allocating Kernel Memory

Deadlocks: System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT IV

Mass-storage structure: Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.

File system Interface: The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection.

File system Implementation: File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.

UNIT V

I/O systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Ninth Edition, 2012, Wiley.
2. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition, 2009, Pearson Education.

Reference Books:

1. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
2. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, Second Edition, TMH.
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.

B.TECH - R15 REGULATIONS

CHOICE BASED CREDIT COURSES (INTER DEPARTMENT)

OFFERED

IN

III YEAR II SEMESTER

w.e.f.

2015 ADMITTED BATCH

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA

PULIVENDULA – 516390, Y.S.R. (DIST), ANDHRA PRADESH, INDIA

ANNEXURE-II

Choice Based Credit Course of Inter Department

offered in

B.TECH III YEAR II SEMESTER

BRANCH	SUBJECT CODE	SUBJECT NAME
MATHEMATICS	15ABS18	FUZZY SETS AND APPLICATIONS
	15ABS19	OPTIMIZATION TECHNIQUES
CHEMISTRY	15ABS20	CHEMISTRY ENERGY MATERIALS
	15ABS21	CHEMISTRY OF LIFE
	15ABS22	CHEMISTRY OF POLYMERS AND THEIR APPLICATIONS
CE	15ACE35	REMOTE SENSING & GIS
	15ACE36	ENVIRONMENTAL IMPACT ASSESTMENT & MANAGEMENT
	15ACE37	FINITE ELEMENT METHODS
EEE	15AEE34	RENEWABLE ENERGY SOURCES
	15AEE19	POWER ELECTRONICS
	15AEE35	UTILIZATION OF ELECTRICAL ENERGY
ME	15AME35	OPTIMIZATION TECHNIQUES BY MATLAB
	15AME36	MECHATRONICS & MEMS
	15AME37	AUTOMOTIVE ELECTRONICS
ECE	15AEC34	FUNDAMENTALS OF COMMUNICATION SYSTEMS
	15AEC35	INDUSTRIAL ELECTRONICS
	15AEC36	NEURAL NETWORKS & FUZZY LOGIC
CSE	15ACS35	MOBILE COMPUTING
	15ACS36	OPTIMIZATION TECHNIQUES
	15ACS37	MACHINE LEARNING

III B.Tech II Semester

15ABS18-FUZZY SETS AND APPLICATIONS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- *This course aims at providing the student with the basic concepts of Fuzzy sets, along with the properties and applications.*

UNIT – I

Fuzzy sets - basic definitions, α-level sets, convex fuzzy sets.

UNIT – II

Basic operations on fuzzy sets, types of fuzzy sets

UNIT – III

Cartesian products, algebraic products, bounded sum and difference, t-norms and t-conorms. Fuzzy sets in contrast of probability theory.

UNIT – IV

The extension principle - the Zadeh's extension principle, image and inverse image of fuzzy sets.

UNIT – V

Fuzzy numbers, elements of fuzzy arithmetic,Fuzzy relations and fuzzy graphs, composition of fuzzy relations, min-max composition and its properties, fuzzy equivalence relations, fuzzy relational equations, fuzzy graphs.

Course Outcomes: *The student will be able to analyze several real time problems effectively, under fuzziness.*

TEXT BOOKS:

1. Klir, G. J. and Yuan, B. Fuzzy Sets and Fuzzy Logic : Theory and Applications, (Prentice Hall of India, New Delhi, 1997)

REFERENCES:

1. Zimmermann, H. J. Fuzzy set theory and its Applications (Allied publishers Ltd., New Delhi, 1991).
2. M.Ganesh, Introduction to Fuzzy sets and Fuzzy Logic (PHI Publications,2001)

27.7.18

III B.Tech II Semester

15ABS19-OPTIMIZATION TECHNIQUES

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- *This course aims at providing the student with the basic concepts and several methods of optimization .*

UNIT – I

Linear programming I : Simplex Method

Introduction , Applications of Linear Programming, Standard form of a Linear Programming Problem, Geometry of Linear Programming Problems, Basic Definitions in Linear Programming. Simplex Method, Simplex Algorithm and Two phase Simplex Method.

UNIT – II

Linear programming II : Duality in Linear Programming

Symmetric Primal-Dual Relations, General Primal-Dual Relations, Duality Theorem, Dual Simplex Method and Transportation Problem.

UNIT – III

Non-linear programming: Unconstrained optimization techniques

Introduction: Classification of Unconstrained minimization methods,

Direct Search Methods : Random Search Methods : Random jumping Method, Random Walk method. Grid Search Method

UNIT – IV

Non-linear programming: Constrained optimization techniques

Introduction , Characteristics of a constrained problem, Random Search Methods, complex method, Sequential linear programming, Basic approach in methods of Feasible directions, Zoutendijk's method of feasible directions: direction finding problem, determination of step length, Termination criteria.

UNIT-V

Geometric Programming

Unconstrained Minimization Problems : solution of unconstrained geometric programming using differential calculus and arithmetic-geometric inequality.

Constrained minimization Problems : Solution of a constrained geometric programming problem, primal-dual programming in case of less-than inequalities, geometric programming with mixed inequality constraints.

Course Outcomes: *The student will be able to analyze optimization problems in engineering and technology using various elegant optimization technique.*

2.7.18

TEXT BOOKS:

Singiresu S Rao., Engineering Optimization: Theory and Practices, New Age Int. (P) Ltd. Publishers, New Delhi.

REFERENCES:

1. Chong, E.K.P.and Zak, S. H.. An Introduction to Optimization, John Wiley & Sons, N.Y.
2. Peressimi A.L., Sullivan F.E., Vhl, J.J..Mathematics of Non-linear Programming, Springer – Verlag.

2.7.18

III B.Tech II Semester

15ABS20-CHEMISTRY ENERGY MATERIALS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- *To make the student understand basic electrochemical principles such as standard electrode potentials, emf and applications of electrochemical principles in the design of batteries.*
- *To understand the basic concepts of processing and limitations of fossil fuels and Fuel cells & their applications.*
- *To impart knowledge to the students about fundamental concepts of hydrogen storage in different materials and liquification method*
- *Necessasity of harnessing alternate energy resources such as solar energy and its basic concepts.*
- *To understand and apply the basics of calculations related to material and energy flow in the processes.*

UNIT-1: Electrochemical Systems: Galvanic cell, standard electrode potential, application of EMF, electrical double layer, dipole moments, polarization, Batteries-Lead-acid and Lithium ion batteries

UNIT-2: Fuel Cells: Fuel cell working principle, Classification of fuel cells, Polymer electrolyte membrane (PEM) fuel cells, Solid-oxide fuel cells (SOFC), Fuel cell efficiency, Basic design of fuel cell,.

UNIT-3: Hydrogen Storage: Hydrogen Storage, Chemical and Physical methods of hydrogen storage, Hydrogen Storage in metal hydrides, metal organic frame works (MOF), Carbon structures, metal oxide porous structures, hydrogel storage by high pressure methods. Liquifaction method.

UNIT-4: Solar Energy: Solar energy introduction and prospects, photo voltaic (PV) technology, concentrated solar power (CSP), Solar Fuels, Solar cells.

UNIT-5: Photo and Photo electrochemical Conversions: Photochemical cells and applications of photochemical reactions, specificity of photo electrochemical cell, advantage of photoelectron catalytic conversions.

Course Outcome:

- *Ability to perform simultaneous material and energy balances.*
- *Student learn about various electrochemical and energy systems*
- *Knowledge of solid, liquid and gaseous fuels*
- *To know the energy demand of world, nation and available resources to fulfill the demand*
- *To know about the conventional energy resources and their effective utilization*
- *To acquire the knowledge of modern energy conversion technologies*
- *To be able to understand and perform the various characterization techniques of fuels*
- *To be able to identify available nonconventional (renewable) energy resources and techniques to utilize them effectively*

References :

1. **Physical chemistry by** Ira N. Levine
2. **Essentials of Physical Chemistry,** Bahl and Bahl and Tuli.
3. **Inorganic Chemistry,** Silver and Atkins
4. **Fuel Cell Hand Book 7th Edition**, by US Department of Energy (EG&G technical services and corporation)
5. **Hand book of solar energy and applications** by Arvind Tiwari and Shyam.
6. **Solar energy fundamental, technology and systems** by Klaus Jagar et.al.
7. **Hydrogen storage** by Levine Klebonoff

CBCC ANEXURE-II R-15

III B.Tech II Semester

15ABS21-CHEMISTRY OF LIFE

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives:

- *To impart knowledge in chemistry to the students about Structure and function of bio-molecules such as protein & nucleic acid, metabolism, and regulation that are particularly relevant to the biological and life sciences.*

UNIT-1: Cell Chemistry:

Introduction to cell as the basic unit of Life; Types of cells; Procaryotes and Eucaryotes – examples; Characteristics of Plant & Animal cells; Structure of Cell and its Organelles and their functions;

A Chemical probe into the Cell: - Cell Walls composition - (G+) & (G-) Procaryotes, Plant and Animal cells i) Minerals ii) Carbohydrates iii) Proteins iv) Lipids v) Nucleic acids vi) Enzymes vii) Vitamins viii) Hormones, etc. their biological functions.

UNIT -2: Lipids and Membranes:

Introduction: Lipid Structure - Acyl glycerol, Phospho glycerides (Phospholipids), ether lipids and sphingolipids. Bio-synthesis of lipids. Biological membranes – their role, structural complexity and compositions; Plasma membrane, Membrane lipids, Membrane proteins; Lipid bilayers, Fluid Mosaic Model of biological membrane. Dyanamic nature of lipid bilayers and membrane. Protein and Glycoprotein components of membrane. Membrane transport pores and channels, active transport and passive transport.

UNIT -3: Enzyme, Catabolic and Anabolic processes:

Definition, classification and nomenclature; Factors affecting the enzyme catalysed reactions. Advantages and limitations of enzymes in organic synthesis – mechanistic aspects of enzyme catalysis – Lock and Key mechanism, Induced – Fit mechanism, Desolvation and Solvation – substitution theory, Three- point attachment rule. Factors affecting the enzyme catalysed reactions. Enzyme selectivity – chemo, regio, diastereo and enatio selectivity – illustration with suitable examples. Regulation of enzyme activity – Allosteric enzymes. Enzyme inhibition – reversible inhibition – competitive, non-competitive and uncompetitive inhibition of enzymes. Immobilised enzymes – immobilization by physical and chemical methods. Co-Enzymes involved in Oxidation-Reduction processes. Role of metal ions in biological processes, physiology of digestion.

Catabolic and Anabolic processes: Energy transfer processes, role and significance of ATP; The electron transport system - Oxidative phosphorylation; Photosynthesis and its mechanism (cyclic and non-cyclic).

UNIT -4: Bio-Chemistry of Carbohydrates, Respiration and Carbohydrate Metabolism:

Bio-Chemistry of Carbohydrates: Classification of Carbohydrates; Stereoisomerism; Optical isomerism; Optical activity projection and perspective formulas; D-glyceride as a reference compound; Cyanohydrin synthesis; Structure of glucose; monosaccharides, disaccharides and polysaccharides; Polysaccharides and Glycoproteins in cells.

Respiration and Carbohydrate Metabolism: Glycolysis and Kreb's Cycle; Physiology of respiration in mammals, respiratory exchange and transport of respiration at cellular level. Interconversion of glycogen and glucose in liver and the role of insulin.

UNIT -5: Chemistry and Bio-Chemistry of Amino Acids & Proteins:

General properties of Amino acids; Proteins - Classification and Function; Structure of Proteins – Primary, Secondary, Tertiary and Quaternary Structure of Proteins. Synthesis of Peptides and Poly Peptides. Determination of Structure of Poly Peptides -N-terminal and C- terminal residue analysis.

Bio-Chemistry of Nucleic Acids: Introduction; Hydrolysis of Nucleic acids; Structure, Physical and Chemical properties of Heterocyclic bases - Adenine, Guanine, Uracil and Thymine; Structure of DNA: Primary, Secondary, Tertiary structures of DNA. A,B,C and Z forms of DNA. Structure of RNA – types of RNA – mRNA, rRNA and tRNA.; Definition and explanation of Replication, Transcription, Translation. Genetic Code – Codons – Protein synthesis.

Course outcome:

Students will gain an understanding of:

- *the chemical basis for biological phenomena and cellular structure*
- *how physiological conditions (esp. the chemistry of water) influence the structures and reactivities of biomolecules*
- *the chemical properties of amino acids, cofactors, and sugar*
- *the basic principles of protein and polysaccharide structure*
- *enzyme kinetics and their application to the elucidation of catalytic mechanisms*
- *constructing reasonable electron-pushing mechanisms for enzyme-catalyzed reactions*
- *the chemical logic of metabolism*
- *nucleic acid structure – building blocks of both DNA and RNA, secondary structures, tertiary structures and higher order packaging of genomic DNA*
- *translation – process for translation of messenger RNA into polypeptides, interpreting the genetic code, mechanism of ribosomal action*

References:

1. **"*Outlines of Bio-Chemistry*",** by E.E. Conn & Stumpf, John Wiley & Sons, New York, **(2000).**
2. **"*Text Book of Bio-Chemistry*",** by West, Todd et.al, Oxford and & BH Manohar Publishers & Distributers.
3. **"*Priciples of Bio-Chemistry*"** by White, Handler, Smith et.al.
4. **"*Bio-Chemistry*",** by Lehninger, W.H. Freeman and Companies, USA.
5. **" *Bio-Chemistry*"** by L.Stryer and W.H.Freeman and Companies, USA..
6. **"*Organic Chemistry*",** by R.T.Morison and R.N.Boyd, Allyn & Bacon Inc., (printed in Singapore) **(2001).**

CBCC ANEXURE-II R-15

III B.Tech II Semester

15ABS22-CHEMISTRY OF POLYMERS AND THEIR APPLICATIONS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

The objectives of this course are:

- *To impart the students the knowledge of polymer materials, their formation mechanisms, properties and uses*
- *provides students with an opportunity to identify different types of polymers in our surrounding*
- *introduces hydrogels of polymer networks in drug delivery system and study of surface phenomenon.*
- *introduces students to the practical application of polymers*

UNIT – 1 : Polymers-Basics and Characterization

Basic concepts: monomers, degree of polymerization, linear, branched and network polymers, classification of polymers, Polymerization: condensation, addition and copolymerization, Mechanism of free radical, chain, ionic and coordination polymerization. Average molecular weight concepts: number, weight, viscosity average molecular weights, polydispersity and molecular weight distribution.

Measurement of molecular weight: End group, viscosity, light scattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

UNIT – 2 : Synthetic Polymers

Addition and condensation polymerization processes – Bulk, Solution, Suspension and Emulsion polymerization.

Preparation and significance, classification of polymers based on physical properties, Thermoplastics, Thermosetting plastics, Fibers and elastomers, General Applications.

Preparation, properties and applications of Polymers based on different types of monomers, Olefin polymers, Diene polymers, nylons,

Urea - formaldehyde, phenol - formaldehyde and melanine Epoxy and Ion exchange resins. Characterization of polymers by IR, NMR, GPC and XRD.

UNIT – 3 : Natural Polymers & Modified cellulosics

Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils, gums and proteins.

Modified cellulosics: Cellulose esters and ethers such as Ethyl cellulose, CMC, HPMC, cellulose acetals, Liquid crystalline polymers; speciality plastics- PES, PAES, PEEK, PEAK.

UNIT -4: Hydrogels of Polymer networks and Drug delivery

Definitions of Hydrogel, polymer networks, Types of polymer networks, Methods involved in hydrogel preparation, Classification, Properties of hydrogels, Introduction to drug to drug delivery systems including, drug development, regulation, absorption and disposition, routes of administration and dosage forms. Advanced drug delivery systems and controlled release. Applications of hydrogels in drug delivery.

UNIT – 5 : Surface phenomena

Surface tension, adsorption on solids, electrical phenomena at interfaces including electrokinetics, micelles, reverse micelles, solubilization. Application of photoelectron spectroscopy, ESCA and Auger spectroscopy to the study of surfaces.

Course outcome:

Upon successful completion of this course, the students will be able to:

- *differentiate between natural and man-made polymers.*
- *explain polymerization methods*
- *understand polymerization kinetics*
- *understand drug and drug delivery systems and*
- *applications and uses of polymers.*

References :

1. A Text book of Polymer science, Billmayer
2. Organic polymer Chemistry, K.J.Saunders, Chapman and Hall
3. Advanced Organic Chemistry, B.Miller, Prentice Hall
4. Polymer Chemistry – G.S.Mishra
5. Polymer Chemistry – Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar
6. Physical Chemistry –S. Glasston & K.J Laidler
7. Drug Delivery- Ashim K. Misra

III B.Tech II Semester

15ACE35-REMOTE SENSING & GIS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives:

- *To Know the concept of photogrammetry.*
- *Analysis of RS and GIS data and interpreting the data for modelling applications.*
- *To educate of GIS in civil engineering field.*

UNIT I

INTRODUCTION TO PHOTOGRAMMETRY:

Principles& types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducially points, parallax measurement using fiducially line.

UNIT II

REMOTE SENSING :

Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT III

GEOGRAPHIC INFORMATION SYSTEM:

Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

TYPES OF DATA REPRESENTATION:

Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT IV

GIS SPATIAL ANALYSIS:

Computational Analysis Methods(CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT V

WATER RESOURCES APPLICATIONS:

Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics. Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

Course Outcomes:

On completion of the course the students will have knowledge on

- *Understanding the concept of photogrammetry.*
- *Analysis of RS and GIS data and interpreting the data for modelling applications.*
- *Understand Application of GIS in civil engineering field.*

TEXT BOOKS:

1. Remote Sensing and GIS by B.Bhatta, Oxford University Press,New Delhi.
2. Advanced surveying: Total station GIS and remote sensing – Satheesh Gopi – Pearson publication.

REFERENCE BOOKS:

1. Fundamentals of remote sensing by gorge Joseph , Universities press, Hyderabad.
2. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
3. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
4. Remote sensing and GIS by M.Anji reddy ,B.S.Pubiliications,New Delhi.
5. *Remote Sensing and its applications by LRA Narayana University Press 1999.*
6. *GIS by Kang – tsung chang, TMH Publications & Co.,*
7. *Principals of Geo physical Information Systems – Peter A Burragh and Rachael Mc Donnell,Oxford Publishers 2004*

III B.Tech II Semester

15ACE36-ENVIRONMENTAL IMPACT ASSESTMENT & MANAGEMENT

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives:

- *To apply knowledge acquired to the process of environmental impact modeling and prediction as a design tool with application to a number of case studies.*
- *To adapt skills in GIS to environmental management systems*

UNIT I

INTRODUCTION:

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT II

EIA METHODOLOGIES:

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost/benefit Analysis.

UNIT III

IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE:

Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT IV

ASSEMENT OF IMPACT ON VEGETATION AND WILDLIFE:

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

ENVIRONEMNTAL AUDIT:

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT V

ENVIRONEMENTAL ACTS (PROTECTION AND PREVENTION):

Post Audit activities, The Environmental protection Act, The water preventation Act, The Air (Prevention & Control of pollution Act.), Wild life Act.Case studies and preparation of Environmental Impact assessment statement for various Industries.

Course outcomes

- *an understanding of current EIA methods and the techniques and tools used.*
- *To develop an understanding of current assessment methods and legislation.*
- *To develop an understanding of current environmental monitoring systems.*

Text Books:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

Reference Books:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katari & Sons Publication.,New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

III B.Tech II Semester

15ACE37-FINITE ELEMENT METHODS (CBCC)

L	T	P	C
3	1	0	3

Course objectives:

- *To know FEM Principles to displacement*
- *Students will apply matrix in constructions*

UNIT –I

INTRODUCTION: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

UNIT –II

PRINCIPLES OF ELASTICITY: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT –III

ONE DIMENSIONAL ELEMENTS: Stiffness matrix for bar element – shape functions for one dimensional elements – one dimensional problems. Different types of elements for plane stress and plane strain analysis – Displacement models –generalized coordinates – shape functions – convergent and compatibility requirements– Natural coordinate system

UNIT –IV

GENERATION OF ELEMENT : Generation of element stiffness and nodal load matrices for 3-node triangular element and four noded rectangular elements. Concepts of, isoparametric elements for 2D analysis –formulation of CST element, 4 –Noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.

UNIT-V

AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4-noded iso-parametric axi-symmetric element – Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Course Outcomes:

- *Students can understand FEM Principles*
- *Students can apply matrix in construction*

TEXT BOOK:

1. Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla and Ashok D. Belegundu – Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age internationalpublishers
3. Finite Element methods for Engineers by U.S.Dixit, Cengage Publishers, New Delhi.
4. Finite element analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.
5. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers

REFERENCES:

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi
3. Applied Fem by Rammurthy, I.K.International Publishers PVt. Ltd., New Delhi.
4. Fem by J.N.Reddy, Mcjraw, TMH Publications, New Delhi.

III B.Tech II Semester

15AEE19-POWER ELECTRONICS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- *The basic power semiconductor switching devices and their principles of operation..*
- *This course covers characteristics of semi conductor devices, ac-dc, dc-dc, ac-ac and dc-ac converters.*
- *The importance of using pulse width modulated techniques to obtain high quality power supply is also discussed in detail in this course.*

UNIT – I POWER SEMI CONDUCTOR DEVICES

Power Semiconductor Diodes, Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power Transistor - Power MOSFET – Power IGBT - TRIACs, GTOs - Characteristics and Principles of Operation and other Thyristors – Basic Theory of Operation of SCR – Static Characteristics – Turn On and Turn Off Methods- Dynamic Characteristics of SCR - Two Transistor Analogy – Triggering Circuits – Series and Parallel Connections of SCR's – Snubber Circuits – Specifications and Ratings of SCR's, BJT, IGBT - Numerical Problems –Commutation Circuits.

UNIT – II PHASE CONTROLLED CONVERTERS

Phase Control Technique – Single Phase Line Commutated Converters – Mid Point and Bridge Connections – Half Controlled Converters, Fully Controlled Converters with Resistive, RL and RLE loads– Derivation of Average Load Voltage and Current – Line Commutated Inverters - Active and Reactive Power Inputs to the Converters without and with Free Wheeling Diode, Effect of Source Inductance – Numerical Problems.

Three Phasé Line Commutated Converters – Three Pulse and Six Pulse Converters – Mid Point and Bridge Connections - Average Load Voltage with R and RL Loads – Effect of Source Inductance–Dual Converters (Both Single Phase and Three Phase) - Waveforms –Numerical Problems.

UNIT – III DC – DC CONVERTERS

Buck converters, boost converters and buck boost converters. Steady state analysis, voltage and current ripple, design of inductor and capacitor values.

UNIT – IV INVERTERS

Inverters – Single Phase Inverter – Basic Series Inverter – Basic Parallel Capacitor Inverter Bridge Inverter – Waveforms –sine-triangle PWM, Three Phase VSI in 120^0 And 180^0 Modes of Conduction. unipolar, bipolar inverter PWM techniques selective harmonic elimination - Voltage Control Techniques for Inverters Pulse Width Modulation Techniques – Numerical Problems.

UNIT – V AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS

AC Voltage Controllers – Single Phase Two SCR's in Anti Parallel – With R and RL Loads – Modes of Operation of Triac – Triac with R and RL Loads – Derivation of RMS Load Voltage, Current and Power Factor Wave Forms – Firing Circuits -Numerical Problems - Thyristor Controlled Reactors; Switched Capacitor Networks.

BOS - chairman

Cyclo Converters – Single Phase Mid Point Cyclo Converters With R and RL loads (Principle of Operation only) – Bridge Configuration Of Single Phase Cyclo Converter with R and RL loads (Principle of Operation only) – Waveforms

Course Outcomes:

- *Basic operating principles of power semiconductor switching devices*
- *The operation of power electronic converters, choppers, inverters, AC voltage controllers, and cycloconverters, and their control.*
- *To understand the working of inverters and application of PWM techniques for voltage control and harmonic mitigation.*
- *How to apply the learnt principles and methods to practical applications.*

TEXT BOOKS:

1. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing Company, 1998.
2. Power Electronics : Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998

REFERENCE BOOKS:

1. Power Electronics – by P. S. Bimbra, Khanna Publications.
2. Power electronics, Essentials and applications – L. Umanand Wiley Publications
3. Power Electronics – by Vedam Subramanyam, New Age International (P) Limited, Publishers
4. Power Electronics - by V. R. Murthy , 1st edition -2005, OXFORD University Press
5. Power Electronics-by P. C. Sen, Tata Mc Graw-Hill Publishing.
6. The power electronics (hand book) : Timothy L. Skgarnina
7. Theory of Power Electronics- by KL Rao, Ch Sai Babu, S Chand Publications Revised Edition 2009

V. Sen
BOS-chairman

III B.Tech II Semester

15AEE34-RENEWABLE ENERGY SOURCES

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

This course enables the students to

- *Identify the use of renewable energy sources for electrical power generation*
- *Know the environmental effects of energy conversation*
- *Analyze the different types of turbines for ocean energy conversations*
- *Understand the concept of fuel cells and preventive measurements on pollution*

UNIT-I:

Photo voltaic power generation ,spectral distribution of energy in solar radiation, solar cell configurations, voltage developed by solar cell, photo current and load current, practical solar cell performance, commercial photo voltaic systems, test specifications for PV systems, applications of super conducting materials in electrical equipment systems.

UNIT-II:

Principles of MHD power generation, ideal MHD generator performance, practical MHD generator, MHD technology.

Wind Energy conversion: Power from wind, properties of air and wind, types of wind Turbines, operating characteristics.

UNIT-III:

Tides and tidal power stations, modes of operation, tidal project examples, turbines and generators for tidal power generation.

Wave energy conversion: properties of waves and power content, vertex motion of Waves, device applications. Types of ocean thermal energy conversion systems Application of OTEC systems examples,

UNIT-IV:

Miscellaneous energy conversion systems: coal gasification and liquifaction, biomass conversion, geothermal energy, thermo electric energy conversion, principles of EMF generation, description of fuel cells, Co-generation and energy storage, combined cycle co-generation, energy storage.

Global energy position and environmental effects: energy units, global energy position.

UNIT-V:

Types of fuel cells, H_2-O_2 Fuel cells, Application of fuel cells – Batteries, Description of batteries, Battery application for large power. Environmental effects of energy conversion systems, pollution from coal and preventive measures steam stations and pollution, pollution free energy systems.

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Course Outcomes:

The student will have the knowledge on the following concepts

- *Find different renewable energy sources to produce electrical power*
- *Solar radiation on earth surface and concept of photo voltaic cells.*
- *Find the various types of turbines and design of energy systems*
- *Estimate the global energy position on miscellaneous energy conversation systems.*

TEXT BOOKS:

1. "Energy conversion systems" by Rakosh das Begamudre, New age International publishers, New Delhi - 2000.
2. John twidell & wier, renewable energy sources, CRC press, 2009.
3. G. D. Rai – non conventional sources, Khanna Publishers.

References books:

1. D.P Kothari, Rakesh Ranjan, renewable energy sources and emerging technologies, PHI, 2009.
2. C.S Solaniki, solar Photo Voltaic- Fundamentals-Principals and applications, PHI 2009

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CBCC ANEXURE-II R-15

III B.Tech II Semester

15AEE35-UTILIZATION OF ELECTRICAL ENERGY

Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

This course enables the students to

- *Understand different types of heating and welding techniques.*
- *Study the basic principles of illumination and its units of Illumination.*
- *Understand different lighting design schemes for various applications.*
- *Learn basic principles of traction system & speed time curves for different traction system.*
- *Understand the fundamentals of environmental aspects of hybrid electric vehicles.*
- *Study the concepts of economic aspects of utilizing electrical energy.*

UNIT–I ILLUMINATION:

Definition – Laws of Illumination–Polar Curves – Calculation of MHCP and MSCP. Lamps: Incandescent Lamp, Sodium Vapour Lamp, Fluorescent Lamp. Requirement of Good Lighting Scheme – Types, Design and Calculation of Illumination. Street Lighting and Factory Lighting – Numerical Problems.

UNIT–II ELECTRIC HEATING & WELDING:

Electrical Heating: Advantages. Methods of Electric Heating – Resistance, Arc, Induction and Dielectric Heating.

Electric Welding: Types – Resistance, Electric Arc, Gas Welding. Ultrasonic, Welding Electrodes of Various Metals, Defects in Welding.

Electrolysis - Faraday's Laws, Applications of Electrolysis, Power Supply for Electrolysis.

UNIT–III INTRODUCTION TO HYBRID ELECTRIC VEHICLES:

History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

UNIT–IVELECTRIC TRACTION:

Introduction – Systems of Electric Traction. Comparison Between A. C And D. C Traction – Special Features of Traction Motors - Methods of Electric Braking – Plugging, Rheostatic and Regenarative Types. Mechanics of Train Movement. Speed-Time Curves of Different Services – Trapezoidal and Quadrilateral, Speed-Time Curves – Numerical Problems. Calculations of Tractive Effort, Power, Specific Energy Consumption - Effect of Varying Acceleration and Braking Retardation, Adhesive Weight and Coefficient of Adhesion – Problems.

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UNIT–V ECONOMIC ASPECTS OF UTILISING ELECTRICAL ENERGY:

Power Factor Improvement, Improvement of Load Factor, Off Peak Loads- Use of Exhaust Steam, Waste Heat Stations, Pit Head Generation, Diesel Plant, General Comparison of Private Plant and Public Supply- Initial Cost and Efficiency, Capitalization of Losses, Choice of Voltage, Cost of Renewals.

Course Outcomes:

The students will have knowledge on the following concepts to:

- *Identify most appropriate heating & welding techniques for suitable applications*
- *Design the levels of illumination based on the applications*
- *Determine speed-time curves, acceleration & retardation of different traction services.*
- *Estimate energy consumption levels at various modes of operation in traction systems*
- *Identify the economic aspects of utilizing electrical energy*

TEXT BOOKS:

1. Utilization of Electric Energy – by E. Openshaw Taylor and V. V. L. Rao, Universities Press.
2. Art & Science of Utilization of electrical Energy – by Partab, Dhanpat Rai & Co.
3. Utilization of Electrical Energy & Traction – J.B.Gupta, Rajeev Manglik,Rohit Manglik – Published by S.K Kataria & Sons.

REFERENCE BOOKS:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers, 1996.
2. Utilization of Electrical Power – by R. K. Rajput, Laxmi Publications
3. Generation, distribution and utilization of electrical energy by C.L Wadhwa,wiley Eastern Limited-1993
4. Electrical Power,S.L Uppal Khanna Publisher – 1988.

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III B.Tech II Semester

15AME35-Optimization Techniques by MATLAB
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objective:

To engage in learning of optimization principles, be able to effectively setup and solve real-world optimization problems, and develop technical and communication skills. The course also aims to teach how to use computer programs such as MATLAB to solve mathematical models.

UNIT I

Introduction to MAT LAB: Overview, MATLAB Preliminaries, Basics of MATLAB, Beyond the Basics of MATLAB, Popular Functions and Commands, Plotting using MATLAB, Optimization with MATLAB.

UNIT II

Introduction to Optimization: Statement of an optimization problem, Classifications of optimization Problems: Single variable optimization, Multi variable optimization with no constraints, Multi variable optimization with equality constraints, Multi variable optimization with inequality constraints, Convex and Concave programming.

UNIT III

Single Variable Optimization: Finite difference method, Central difference method, Runge-Kutta method, interval halving method, golden section method with MATLAB code.

UNIT IV

Multi Variable Optimization: Conjugate gradient method, Newton's method, Powell's method, Flectcher- Reeves method, Hook and Jeeves method, interior penalty function with MATLAB code.

UNIT V

Evolutionary Algorithms: Overview, Genetic Algorithms: Basics of Genetic Algorithms, Options in MATLAB, Multi Objective Optimization using Genetic Algorithms, Ant Colony Optimization, Simulated Annealing, Particle Swarm Optimization.

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***Course Outcomes*:**

after completion of this course the student can be able to,

- Define and use optimization terminology and concepts, and understand how to classify an optimization problem.
- know the Application of Optimization Methods to Engineering Problems.
- implement basic optimization algorithms in a computational setting and apply existing optimization software packages (MATLAB) to solve engineering problems.

Text books:

1. "MATLAB An introduction with applications" Rao V.Dukkipati, New age international publications.
2. "Optimization in practice with MATLAB" Achille Messac, Cambridge University Press.
3. "Introduction to optimum design" Jasbir S Arora, Academic Press, Elsevier Publications.

References:

1. "MATLAB Optimization Techniques" Cesar Perez Lopez, Academic press, Springer publications.
2. "Applied Numerical Methods with MATLAB for Engineers and scientists" Steven C.Chapra. Mc,Graw Hill Publications.
3. "Nonlinear optimization" Benny Yakir, open source from net.

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III B.Tech II Semester

15AME36-MECHATRONICS AND MEMS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- *To understand the technologies behind modern mechatronic systems.*
- *To provide methodological fundamentals for the development of fully automated system.*
- *To teach students how to develop a robotic or automated system project focusing on the hardware and software integration, and*
- *To apply the acquired knowledge for developing a mechatronic system.*

UNIT – I

Introduction: Definition of Mechatronics, Need for Mechatronics in Industry, Objectives of mechatronics, mechatronics design process, Mechatronics key elements, mechatronics applications – Computer numerical control (CNC) machines, Tool monitoring systems, Flexible manufacturing system (FMS), Industrial Robots, Automatic packaging systems, Automatic inspection systems.

UNIT – II

Sensors: Static characteristics of sensors, Displacement, Position and Proximity Sensors, Force and torque sensors, Pressure sensors, Flow sensors, Temperature sensors, Acceleration sensors, Level sensors, Light sensors, Smart material sensors, Micro and Nano sensors, Selection criteria for sensors.

UNIT – III

Actuators: Mechanical, Electrical, Hydraulic and Pneumatic Actuation systems, Characteristics and their limitations, Design of Hydraulic and Pneumatic circuits, Piezoelectric actuators, Shape memory alloys, Selection criteria for actuators.

UNIT – IV

Microprocessors, Microcontrollers and Programmable Logic Controllers: Architecture of of Microprocessor, Microcontroller and Programmable Logic Controller, PLC Programming using ladder diagrams, logics, latching, sequencing, timers relays and counters, data handling, Analog input/output, selection of -.

UNIT – V

Micro Electro Mechanical Systems (MEMS): History, Effect of scaling, Fabrication Techniques: Oxidation, Physical Vapor disposition, Chemical Vapor Deposition, Lithography, Etching, Wafer bonding, LIGA, DRIE, Applications: Lab on chip.

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Course Outcomes

Upon successful completion of this unit, the student will be able to:

- *Define the discipline of mechatronics.*
- *Identify examples of mechatronic systems that are encountered in real life.*
- *Identify the components of a typical mechatronic system.*

Text books:

1. Mechatronics, W.Bolton, Pearson Education
2. Mechatronic System Design, Devadas Shetty and Richard A Kolk, Cengage learning
3. Mechatronics an integrated approach, Clarence W. de Silva, CRC Press
4. Micro Electro Mechanical Systems Design, James J Allen, CRC Press Taylor & Francis group
5. Mechatronics, Ganesh S Hedge, Jones and Bartlett Publishers

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III B.Tech II Semester

15AME37-AUTOMOTIVE ELECTRONICS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- *To understand the use of electronics in the automobile.*
- *To appreciate the various electronic and the instrumentation systems used in automobile.*

UNIT 1

Introduction to microcomputer: Microcomputer: Buses, memory, timing, CPU registers; Microprocessor architecture: Initialization, operation codes, program counter, branch and jump instructions, subroutine. Analog to digital converters and Digital to analog converters, sampling, polling and interrupts, digital filters, lookup table.

UNIT 2

Sensors and actuators: Speed sensors, Pressure sensors: Manifold Absolute Pressure sensor, knock sensor, Temperature sensors: Coolant and Exhaust gas temperature, Exhaust Oxygen level sensor, Position sensors: Throttle position sensor, accelerator pedal position sensor and crankshaft position sensor, Air mass flow sensor. Solenoids, stepper motors and relays.

UNIT 3

Electronic engine management system: Electronic engine control: Input, output and control strategies, electronic fuel control system, fuel control modes: open loop and closed loop control at various modes, EGR control, Electronic ignition systems – Spark advance correction schemes, fuel injection timing control.

UNIT 4

Electronic vehicle management system: Cruise control system, Antilock braking system, electronic suspension system, electronic steering control, traction control system, Transmission control, Safety: Airbags, collision avoiding system, low tire pressure warning system.

UNIT 5

Automotive instrumentation system: Input and output signal conversion, multiplexing, fuel quantity measurement, coolant temperature and oil pressure measurement, display devices-LED, LCD, VFD and CRT, Onboard diagnostics(OBD), OBD-II, off board diagnostics.

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Course outcomes:

After completion of this course the student can be able to:

1. *Obtain an overview of automotive components, like sensors, actuators, communication protocols and safety systems employed in today's automotive industry .*
2. *Interface automotive sensors and actuators with microcontrollers.*
3. *Know, the various display devices that are used in automobiles.*

Text Books:

1. Understanding Automotive Electronics, William B Ribbens, Newne Butterworth-Heinermann, 6th edition 2003.
2. Crouse W H, Automobile Elctrical Equipment, McGraw Hill Book Co.Inc, Newyork 2005

References:

1. Bechhold "Understanding Automotive Electronics", SAE, 1998.
2. Robert Bosch "Automotive Hand Book", SAE (5th Edition), 2000.
3. Tom Denton,"Automobile Electrical and Electronic Systems" 3rd edition- Edward Arnold, London - 2004.
4. Eric Chowanietz - 'Automotive Electronics' - SAE International USA – 1995

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III B.Tech II Semester

15AEC34-FUNDEMENTALS OF COMMUNICATION SYSTEMS (QUALITATIVE TREATMENT ONLY)

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

1. *To study the fundamental concept of the analog communication systems.*
2. *To analyze various analog modulation and demodulation techniques.*
3. *To know the working of various transmitters and receivers.*
4. *To understand the influence of noise on the performance of analog communication systems, and to acquire the knowledge about information and capacity.*

UNIT- I

Elements of communication systems, need for Modulation, Modulation Methods, Baseband and carrier communication, Amplitude Modulation (AM), Generation of AM signals, Rectifier detector, Envelope detector, sideband and carrier power of AM, Double sideband suppressed carrier (DSB-SC) modulation & its demodulation, Switching modulators, Ring modulator, Balanced modulator, Single sideband (SSB) transmission, VSB Modulation.

UNIT- II

Angle Modulation & Demodulation: 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, Pre-emphasis, & De-emphasis, Illustrative Problems.

UNIT -III

Pulse Analog Modulation Techniques

Pulse analog modulation techniques, Generation and detection of Pulse amplitude modulation, Pulse width modulation, Pulse position modulation.

Multiple Access Techniques

Introduction to multiple access techniques, FDMA, TDMA, CDMA, SDMA: Advantages and applications.

UNIT IV

Digital Communication (Qualitative Approach only)

Pulse Code Modulation, DPCM, Delta modulation, Adaptive delta modulation, Overview of ASK, PSK, QPSK, BPSK and M- PSK techniques

Unit-V

Modern Communication Trends (Qualitative Approach only)

Basics of Spectrum utilizations, Comparison of 2G, 3G, Types of Ethernet, Modems – Types of Modems, 100Mbps, 1Gbps modems, Role of IPV6 in Present trends.

Course Outcomes:

This course provides the foundational education in Analog Communication systems, and applications. The students are provided the learning experience through class room teaching and solving assignment & tutorial problems. At the end of course, students should be able to:

1. *Acquire knowledge on the basic concepts of Analog Communication Systems.*
2. *Analyze the analog modulated and demodulated systems.*
3. *Verify the effect of noise on the performance of communication systems.*
4. *Know the fundamental concepts of information and capacity.*

TEXT BOOKS:

1. Sham Shanmugam, "Digital and Analog Communication Systems", Wiley-India edition, 2006.
2. Wayne Tomasi, Electronic Communications System: Fundamentals Through Advanced, 2nd editions, PHI, 2001.

REFERENCES:

1. Simon Hakin, "Communication Systems," Wiley India Edition, 4th Edition, 2011.
2. Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", 5th Edition, McGraw-Hill International Edition, 2010.

III B.Tech II Semester

15AEC35-INDUSTRIAL ELECTRONICS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objective:

1. *To get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.*
2. *To study the characteristics of AC to DC converters.*
3. *To know about the practical applications Electronics in industries.*

UNIT – I:

SEMICONDUCTOR DEVICES: Scope of industrial Electronics, Semiconductors, Merits of semiconductors, crystalline structure, Intrinsic semiconductors, Extrinsic semiconductors, current flow in semiconductor, Open-circuited p-n junction, Diode resistance, Zener diode, Photoconductors and junction photo diodes, Photo voltaic effect, Light emitting diodes (LED)

UNIT – II:

JUNCTION TRANSISTORS: Introduction, The junction transistor, Conventions for polarities of voltages and currents, Open circuited transistor, Transistor biased in the active region, Current components in transistors, Currents in a transistor, Emitter efficiency, Transport factor and transistor-α, Dynamic emitter resistance, Transistor as an amplifier, Transistor construction, Letter symbols for semiconductor Devices, Characteristic curves of junction transistor in common configuration, static characteristic curves of PNP junction transistor in common emitter configuration, The transistor in common collector Configuration.

UNIT – III:

AC TO DC CONVERTORS: AC to DC converters- Introduction, Classification of Rectifiers, Half wave Rectifiers, Full wave Rectifiers, Comparison of Half wave and full wave rectifiers, Bridge Rectifiers, Bridge Rectifier meter, Voltage multiplying Rectifier circuits, Capacitor filter, LC Filter, Metal Rectifiers, Regulated Power Supplies, Classification of Voltage Regulators, Short period Accuracy of Regulators, Long period Accuracy of Voltage Regulator, Principle of automatic voltage Regulator, Simple D.C. Voltage stabilizer using Zener diode, D.C. Voltage Regulators, Series Voltage Regulators, Complete series voltage regulator circuit, Simple series voltage regulator.

UNIT – IV: INDUSTRIAL APPLICATIONS – I

Resistance welding controls: Introduction, Resistance welding process, Basic Circuit for A.C. resistance welding, Types of Resistance welding, Electronic welding control used in Resistance welding, Energy storage welding.

Induction heating: Principle of induction heating, Theory of Induction heating merits of induction heating, Application of induction heating, High frequency power source of induction heating

Dielectric heating: Principle of dielectric heating, theory of dielectric heating, dielectric properties of typical materials, electrodes used in dielectric heating, method of coupling of electrodes to the R.F. generator, Thermal losses in Dielectric heating, Applications.

UNIT – V: INDUSTRIAL APPLICATIONS - II

Ultrasonics: Introduction, Generation of Ultrasonic waves, Application of Ultrasonic waves, Ultrasonic stroboscope, ultrasonic as means of communication, ultrasonic flaw detection, Optical image on non-homogeneities, ultrasonic study of structure of matter, Dispersive study of structure of matter, Dispersive and colloidal effect of Ultrasonic, Coagulating action of Ultrasonic, separation of mixtures by ultrasoni8c waves, cutting and machining of hard materials by ultrasonic vibrations, Degassing of liquids by ultrasonic waves, Physico-chemical effects of ultrasonics, chemical effects of ultrasonics, Thermal effects of Ultrasonics, soldering and welding by ultrasonics, Ultrasonic Drying

Course Outcome: *After completion of the course the students will be able to*

a. *Get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.*
b. *Understand the characteristics of AC to DC converters.*
c. *Understand about the practical applications Electronics in industries.*

Text Books:

1. G. K. Mithal, "Industrial Electronics", Delhi, Khanna Publishers, 2000.
2. J.Gnanavadivel, R.Dhanasekaran, P.Maruthupandi, "Industrial Electronics", Anuradha Publications, 2011.

Reference Books:

1. F. D. Petruzulla, "Industrial Electronics", Singapore, McGraw Hill, 1996.
2. M. H. Rashid, "power Electronics Circuits, Devices and Application", 3rd edition, PHI, 2004.

III B.Tech II Semester

15AEC36-NEURAL NETWORKS & FUZZY LOGIC

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

1. To Know the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward and Feedback Networks
2. To understand the Applications of Neural Networks in pattern recognition, speech and decision making.
3. To study the basic concepts of Fuzzy Logic, Fuzzy sets and Fuzzy system design implementation.
4. To Know the Associate Memories , FAM neural networks and encoding Adaptive Resource theory- network for ART

UNIT-I

Neural Networks Characteristics: History of Development in neural networks, Artificial neural net terminology, model of a neuron, Topology, Types of learning. Supervised, Unsupervised learning. Basic Learning laws, Hebb's rule, Delta rule, widrow and Hoff LMS learning rule, correlation learning rule instar and ouster learning rules.

UNIT-II

Unsupervised Learning: Competitive learning, K-means clustering algorithm, Kohonen's feature maps. Radial Basis function neural networks- recurrent networks, Real time recurrent and learning algorithm. Introduction to Counter propagation Networks- CMAC Network, ART networks, Application of NN in pattern recognition, optimization, Control, Speech and decision making.

UNIT-III

Neural Network models: neural network models, layers in neural network and their connections. Instar, outstar, weights on connections, threshold function, application- Adaline and madaline. Back propagation: feed forward back propagation network- mapping, layout, training, BPN applications

UNIT-IV

Fuzzy Logic: Basic concepts of Fuzzy logic, Fuzzy vs Crisp set, Linguistic variables, membership functions, operations of Fuzzy sets, Fuzzy if-then rules, Variables inference techniques, defuzzification techniques, basic Fuzzy interference algorithm, application of fuzzy logic , Fuzzy system design implementation , useful tools supporting design.

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UNIT-V

Bidirectional Associative Memory (BAM), inputs and outputs, weights and training. FAM-fuzzy associative memory, association, FAM neural networks, encoding Adaptive Resource theory-network for ART, processing in ART

Course Outcomes: After completion of the course, the student can able to

a. Comprehend the concepts of feed forward neural networks
b. Analyze the various feedback networks
c. Understand the concept of fuzziness involved in various systems and fuzzy set theory.
d. Comprehend the fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
e. Analyze the application of fuzzy logic control to real time systems.

Text Books:

1. Berkin Riza C and Trubatch, "Fuzzy System design principles- Building Fuzzy IF-THEN rule bases", IEEE Press.
2. Yegna Narayanan, "Artificial Neural Networks". 8th Printing, PHI, 2003.

Reference Books:

1. Simon Haykin, "Neural Networks," Pearson Education.
2. Yen and Langari, "Fuzzy Logic: Intelligence, Control and Information", Pearson Education.

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III B.Tech II Semester

15ACS35- MOBILE COMPUTING

(Choice based credit course of inter department)

L	T	P	C
3	1	0	3

Course Objective:

- To make the students understand the basic information about mobile computing and its concepts such as Applications, Impediments, Architecture, New Data Services like GPRS, CSHSD, DECT,Mobile IP Networks, MANET's and Linux for Mobile devices.
- To get acquaintance with the class of abstractions offered by the mobile computing system that develops the User App applications

UNIT-I

Introduction: Mobile Communications, Mobile Computing–Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT–II

Medium Access Control in Wireless (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. MAC protocols for GSM, Wireless LAN (IEEE802.11), Collision Avoidance (MACA, MACAW) Protocols. **Mobile IP Network Layer:** IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization,DHCP.

UNIT–III

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.
Database Issues: Database Hoarding & Caching Techniques, C–S Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT–IV

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Methods, Digital Audio and Video Broadcasting (DAB & DVB). Data Synchronization –Introduction, Software, and Protocols

UNIT-V

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery.
Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices.

Course Outcome:

•Students able to use mobile computing more effectively

• Developing mobile application programs to exploit the mobile operating system

TEXTBOOKS:

1. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

REFERENCEBOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook ofWireless Networks and Mobile Computing", Wiley, 2002, ISBN0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press,Oct 2004,

III B.Tech II Semester

15ACS36- OPTIMIZATION TECHNIQUES

(Choice based credit course of inter department)

L	T	P	C
3	1	0	3

Course Objective:

• To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.

• To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.

• To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

UNIT-I

Introduction to optimization: Requirements for the Application of Optimization Methods, Applications of Optimization in Engineering, Structure of Optimization Problems, Functions of a Single Variable: Properties of Single-Variable Functions, Optimality Criteria, Region Elimination Methods, Polynomial Approximation or Point Estimation Methods.

UNIT-II

Functions of a Several Variables: Optimality Criteria, Direct-Search Methods, Gradient Based Methods, Comparison of Methods and Numerical Results.2013-2014

UNIT-III

Linear Programming: Formulation of Linear Programming Models, Graphical Solution of Linear Programming in Two Variables, Linear Programming in Standard Form, Principles of the SimplexMethod,Applications.

UNIT-IV

Constrained Optimality Criteria: Equality-Constrained Problems, Lagrange Multipliers, Economic Interpretation of Lagrange Multipliers, Kuhn-Tucker Conditions, Kuhn-Tucker Theorems, Saddle point Conditions, Second-Order Optimality Conditions, Generalized Lagrange Multiplier Method, and Generalization of Convex Functions.

UNIT-V

Transformation Methods: Penalty Concept, Algorithms, Codes, and Other Contributions, Method of Multipliers, Constrained Direct Search: Problem Preparation, Adaptations of Unconstrained Search Methods, Random-Search Methods.

Course Outcomes: At the end of the course students will be able to:

• Use various optimization techniques such as Quadratic programming, Dynamic Programming and select the ones most suitable to the problem at hand.

• Subdivide a complex system in to smaller disciplinary models, manage their interfaces and reintegrate them in to an overall system model.

• Rationalize and quantify a system architecture or product design problem by selecting appropriate objective function, design variables, parameters and constraints.

- Interpret the mathematical conditions for optimality and give physical explanation.
- Make recommendations based on solutions, analysis and limitations of models.

TEXTBOOKS:

1. Engineering Optimization- Methods and Applications, A.Ravindran, K. M. Ragsdell, G.V. Reklaitis, Second Edition, Wiley India Edition.

2. Introductory Operation Research- Theory and Applications, H.S. Kasana, K.D. Kumar, Springer International Edition.

REFERENCES:

1. Optimization Methods in Operations Research and Systems Analysis, K.V. Mital and C. Mohan, New Age International (P)Limited, Publishers, Third Edition, 1996.
2. Operations Research, Dr. J.K.Sharma, Mc Millan.

3. Operations Research: An Introduction, H.A. Taha, PHI Pvt. Ltd.,

III B.Tech II Semester

15ACS37-MACHINE LEARNING

(Choice based credit course of inter department)

L	T	P	C
3	1	0	3

Course Objectives:

1. Machine Learning is the discipline of designing algorithms that allow machines (e.g.,a computer)
2. To learn patterns and concepts from data without being explicitly programmed.
3. This course will be an introduction to the design (and some analysis) of Machine Learning Algorithms, with a modern outlook focusing on recent advances, and examples of real-world applications of Machine Learning algorithms.

UNIT I

Introduction- Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning.

Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm and Their Remarks,

UNIT II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems and issues for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning,

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm with their Remarks.

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT III

Bayesian learning – Introduction, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm.

Computational learning theory–introduction: probably approximately correct (PAC) learning. Sample complexity: quantifying the number of examples needed to PAC learn. Computational complexity of training.Sample complexity for finite hypothesis spaces, kDNF, and kCNF. Sample complexity for infinite hypothesis spaces, Vapnik-Chervonenkis dimension

Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

UNIT IV

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

UNIT V

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators.

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming.

Course Outcomes:

1. Develop an appreciation for what is involved in learning from data.
2. Understand a wide variety of learning algorithms.
3. Understand how to apply a variety of learning algorithms to data.
4. Understand how to perform evaluation of learning algorithms and model selection.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH.
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)
3. Bishop.C(2006)pattern recognition and machine learning .Berlin:Springer-Verlag.

REFERENCES:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.
4. Baldi.P and Brunak.S(2002) Bioinformatics : A Machine Learning Approach Cambridge:
5. HalDaumé III, A Course in Machine Learning, 2015