JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS), PULIVENDULA
YSR (KADAPA) Dist 516 390, (A.P) INDIA

COURSE STRUCTURE(R19)
ELECTRONICS & COMMUNICATION ENGINEERING

Semester - 0 (Theory - 8, Lab - 7) Common for All Branches of Engineering				
S.No	**Course No**	**Course Name**	**Category**	**L-T-P-C**
1		Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2		Career Counseling	MC	2-0-2-0
3		Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4		Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5		Proficiency Modules & Productivity Tools	ES	2-1-2-0
6		Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7		Remedial Training in Foundation Courses	MC	2-1-2-0
8		Human Values & Professional Ethics	MC	3-0-0-0
9		Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10		Concepts of Programming	ES	2-0-2-0

Semester – 1				**(Theory - 4, Lab - 4)**	
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19ABS06	LINEAR ALGEBRA AND CALCULUS	BS	3-1-0	4
2.	19ABS03	CHEMISTRY	BS	3-0-0	3
3.	19ACS01	PROBLEM SOLVING & PROGRAMMING	ES	3-1-0	4
4.	19AHS01	COMMUNICATIVE ENGLISH 1	HS	2-0-0	2
5.	19AEC01	ELECTRONICS & COMMUNICATION ENGINEERING WORKSHOP	PC	0-0-2	1
6.	19ABS04	CHEMISTRY LAB	BS	0-0-3	1.5
7.	19ACS02	PROBLEM SOLVING & PROGRAMMING LAB	ES	0-0-3	1.5
8.	19AHS02	COMMUNICATIVE ENGLISH – 1 LAB	HS	0-0-2	1
				Total	**18**

Semester - 2				**(Theory - 5, Lab - 4)**	
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19AEC02	NETWORK THEORY	ES	3-0-0	3
2.	19ABS07	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BS	3-1-0	4
3.	19ABS09	APPLIED PHYSICS	BS	3-0-0	3
4.	19ACS05	DATA STRUCTURES	ES	3-0-0	3
5.	19AME02	ENGINEERING WORKSHOP	LC	0-0-3	1.5
6.	19AME01	ENGINEERING GRAPHICS	ES	1-0-3	2.5
7.	19AEC03	NETWORK THEORY LAB	ES	0-0-3	1.5
8.	19ABS10	APPLIED PHYSICS LAB	BS	0-0-3	1.5
9.	19ACS06	DATA STRUCTURES LAB	ES	0-0-3	1.5
				Total	**21.5**

Semester – 3					**(Theory - 6, Lab - 3)**
S.No	Course No.	Course Name	Category	L – T - P	Credits
1.	19ABS12	COMPLEX VARIABLES & TRANSFORMS	BS	3 - 0 - 0	3
2.	19AEC04	ELECTRONIC DEVICES & CIRCUITS	PC	3 - 0 - 0	3
3.	19AEC06	SWITCHING THEORY & LOGIC DESIGN	PC	3 - 0 - 0	3
4.	19AEC07	SIGNALS & SYSTEMS	PC	3 - 0 - 0	3
5.	19AEE07	CONTROL SYSTEMS	PC	3 - 0 - 0	3
6.	19AEE05	ELECTRICAL TECHNOLOGY	ES	3 - 0 - 0	3
7.	19AEC05	ELECTRONIC DEVICES & CIRCUITS LAB	PC	0 - 0 - 3	1.5
8.	19AEC08	SIGNALS AND SYSTEMS LAB	PC	0 - 0 - 2	1
9.	19AEE06	ELECTRICAL TECHNOLOGY LAB	ES	0 – 0–2	1
10.	19AHS04	CONSTITUTION OF INDIA	MC	3 – 0 - 0	0
				Total	21.5

Semester – 4 (Theory - 6, Lab -3)					
S.No.	Course No.	COURSE NAME	Category	L - T - P	Credits
1.	19AEC15	PROBABILITY THEORY & STOCHASTIC PROCESSES	ES	3 - 0 - 0	3
2.	19AEC16	ELECTRONIC CIRCUIT ANALYSIS AND DESIGN	PC	3 - 0 - 0	3
3.	19AEC17	EM WAVES AND TRANSMISSION LINES	ES	3 - 0 - 0	3
4.	19AEC18	ANALOG COMMUNICATIONS	PC	3 - 0 - 0	3
5.	19AEC20	LINEAR INTEGRATED CIRCUITS & APPLICATIONS	PC	3 - 0 - 0	3
6.	19AEC21	DIGITAL INTEGRATED CIRCUITS & APPLICATIONS	PC	3 - 0 - 0	3
7.	19AEC23	ELECTRONIC CIRCUIT ANALYSIS AND DESIGN LAB	ES	0 - 0 - 3	1.5
8.	19AEC19	ANALOG COMMUNICATIONS LAB	PC	0 - 0 - 2	1
9.	19AEC22	INTEGRATED CIRCUITS & APPLICATIONS LAB	PC	0 - 0 - 2	1
10.	19ABS14	ENVIRONMENTAL SCIENCE	MC	3 – 0 - 0	0
11.	19AHS03	UNIVERSAL HUMAN VALUES		2 – 0 - 0	2
				Total	23.5

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: PULIVENDULA
DEPARTMENT OF MATHEMATICS
I B.TECH – I SEMESTER (Common to all Branches of Engineering)
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
	Linear Algebra and Calculus	3	1	-	4

COURSE OBJECTIVES	
1	This course will illuminate the students in the concepts of calculus and linear algebra.
2	To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications

COURSE OUTCOMES	
CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications
CO2	Utilize mean value theorems to real life problems
CO3	familiarize with functions of several variables which is useful in optimization
CO4	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
CO5	Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

Unit I: Matrix Operations and Solving Systems of Linear Equations **10 hrs**

Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit II: Mean Value Theorems **06 hrs**

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof);

Unit III: Multivariable calculus **08 hrs**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers for three variables

Unit IV: Double Integrals **08 hrs**

Double integrals, change of order of integration, change of variables, areas enclosed by plane curves

Unit V: Multiple Integrals and Special Functions **08 hrs**

Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates, Beta and Gamma functions and their properties, relation between beta and gamma functions.

Textbooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

References:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: PULIVENDULA
DEPARTMENT OF CHEMISTRY
I B.TECH – II SEMESTER (common to EEE, ECE & CSE)
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
19A53201	Chemistry	3		-	3

COURSE OBJECTIVES	
1	To familiarize engineering chemistry and its applications
2	To train the students on the principles and applications of electrochemistry and polymers
3	To introduce instrumental methods, molecular machines and switches

COURSE OUTCOMES	
CO1	**apply** Schrodinger wave equation to hydrogen and particle in a box, **illustrate** the molecular orbital energy level diagram of different molecular species, **explain** the band theory of solids for conductors, semiconductors and insulators **discuss** the magnetic behaviour and colour of complexes.
CO2	**apply** Nernst equation for calculating electrode and cell potentials, **differentiate** between pH metry, potentiometric and conductometric titrations, **explain** the theory of construction of battery and fuel cells, **solve** problems based on cell potential
CO3	**explain** the different types of polymers and their applications, **explain** the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, **describe** the mechanism of conduction in conducting polymers, **discuss** Buna-S and Buna-N elastomers and their applications
CO4	**explain** the different types of spectral series in electromagnetic spectrum, **understand** the principles of different analytical instruments, **explain** the different applications of analytical instruments
CO5	**explain** the band theory of solids for conductors, semiconductors and insulators, **explain**supramolecular chemistry and self assembly, **demonstrate** the application of Rotaxanes and Catenanes as artificial molecular machines

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

Unit 1: Structure and Bonding Models: (10 hrs)

Planck's quantum theory, dual nature of matter, Schrodinger Wave equation, significance of Ψ and Ψ^2 , applications to hydrogen, particle in a box and their applications for conjugated molecules, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order, crystal field theory – salient features – splitting in octahedral and tetrahedral geometry,

magnetic properties and colour, band theory of solids – band diagrams for conductors, semiconductors and insulators, role of doping on band structures.

Unit 2: Electrochemistry and Applications: (10 hrs)

Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode) electrochemical cell, Nernst equation, cell potential calculations, numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations), photovoltaic cell – working and applications, photogalvanic cells with specific examples. Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc- MnO_2 battery (Laclanche cell), Secondary cells – lead acid and lithium ion batteries- working of the batteries including cell reactions. Fuel cells, hydrogen-oxygen, methanol – oxygen fuel cells – working of the cells- Applications.

Unit 3: Polymer Chemistry:(10 hrs)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – Bakelite, carbon fibres, Biodegradable polymers, Conducting polymers – polyacetylene, polyaniline, mechanism of conduction and applications.

Unt 4: Instrumental Methods and Applications: (10 hrs)

Electromagnetic spectrum, Absorption of radiation: Principle and applications of UV-Visible, IR and Basic concepts of Chromatographic techniques and their applications. pH metry, potentiometry and conductometry,

Unit 5: Advanced Engineering Materials:(10 hrs)

(i) Concepts and terms of supra molecular chemistry, complementarity, Basic Lock and Key principle, examples of Supramolecules, Applications of Supra molecules (sensors, catalysts, gas storage, medical and molecular switches)

ii) Semiconducting and Super Conducting materials-Principles and some examples

iii) Electrical Insulators or Dielectric materials: Definition and classification, Characteristics of electrical insulators and applications of electrical insulating materials, Super capacitors.

(iv) Nanochemistry: Introduction, classification of nanomaterials properties and applications of Fullerenes, Carbon nano tubes and Graphines nanoparticles.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, Foruth Edition, New Delhi
2. A Text Book of Enigneering Chemistry, Jain and Jain, Dhanapathi Rai Publications, New Delhi

References:

1. A Text book of Engineering Chemistry by K. Sesha Maheswaramma and Mridula Chugh, Pearson's Publications Pvt. Ltd., (PAN India Title)
2. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi
3. Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Pubblications India Pvt Limited.
4. A Text book of Engineering Chemistry by Prasanta Rath, B. Rama Devi, Ch.Venkata Ramana Reddy and Subhendu Chakroborty, Cengage learning India Pvt.Ltd.
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy and Andranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

Problem Solving and Programming

(Common to All Branches of Engineering)

B. Tech – I Semester | **L-T-P-C**
3-1-0-4

Course Objectives:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non-computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language
6. Illustrate the methodology for solving Computational problems

Outcomes:

Student should be able to

1. Identify the different peripherals, ports and connecting cables in a PC (L2)
2. Illustrate the working of a Computer (L3)
3. Select the components of a Computer in the market and assemble a computer (L4)
4. Solve complex problems using language independent notations (L3)

Unit 1:

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited, Introduction to Operating systems, Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Unit 2:

Introduction to problem solving: Introduction, the problem-solving aspect, Design and implementation of algorithms – Topdown design, Analysis of Algorithms, the efficiency of algorithms, the analysis of algorithms.

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

Learning Outcomes: Student should be able to

1. Solve Computational problems (L3)
2. Apply Algorithmic approach to solving problems (L3)
3. Analyze the algorithms (L4)

Unit 3:

Types, Operators, and Expressions: Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.

Input and output: standard input and output, formatted output-Printf, formatted input-Scanf

Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops-Dowhile, break and continue, goto and labels.

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

Learning Outcomes: Student should be able to

1. Recognize the programming elements of C Programming language (L1)
2. Select the control structure for solving the problem (L4)
3. Apply modular approach for solving the problem (L3)

Unit 4:

Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers, generating prime numbers.

Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, Multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions, complicated declarations.

Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the k^{th} smallest element.

Learning Outcomes: Student should be able to

1. Solve mathematical problems using C Programming language (L3)
2. Structure the individual data elements to simplify the solutions (L6)
3. Facilitate efficient memory utilization (L6)

Unit 5:

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, table lookup, typedef, unions, bit-fields.

Some other Features: Variable-length argument lists, formatted input-Scanf, file access, Error handling-stderr and exit, Line Input and Output, Miscellaneous Functions.

Learning Outcomes: Student should be able to

1. Select sorting algorithm based on the type of the data (L4)
2. Organize heterogeneous data (L6)
3. Design a sorting algorithm (L6)

Text Books:

1. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. Pradip Dey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.

Reference Books:

1. RS Bichkar "Programming with C", 2012, Universities Press.
2. Pelin Aksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage
3. Byron Gottfried and Jitender Kumar Chhabra, "Programming with C", 4th Edition, 2019, McGraw Hill Education.

Course Outcomes:

1. Construct his own computer using parts (L6).
2. Recognize the importance of programming language independent constructs (L2)
3. Solve computational problems (L3)
4. Select the features of C language appropriate for solving a problem (L4)
5. Design computer programs for real world problems (L6)
6. Organize the data which is more appropriated for solving a problem (L6)

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HUMANITIES & SOCIAL SCIENCES DEPARTMENT

COMMUNICATIVE ENGLISH - 1

Subject Code	Title of the Subject	L	T	P	C
	Communicative English - 1	2	0	0	2

COURSE OBJECTIVES	
1	Facilitates effective listening skills for better comprehension of academic lectures and English spoken by native speakers.
2	Helps to improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations.
3	Imparts effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information.
4	Provides knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

COURSE OUTCOMES	
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO2	Apply grammatical structures to formulate sentences and correct word forms
CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO5	Create a coherent paragraph interpreting a figure/graph/chart/table

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Unit 1

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Reading for Writing :**Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learners will be able to

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

Unit 2

Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. **Grammar and Vocabulary:** Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend short talks on general topics
- participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
- understand the use of cohesive devices for better reading comprehension
- write well structured paragraphs on specific topics
- identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit 3

Lesson: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension. **Writing:** Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. **Grammar and Vocabulary:** Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend short talks and summarize the content with clarity and precision
- participate in informal discussions and report what is discussed
- infer meanings of unfamiliar words using contextual clues
- write summaries based on global comprehension of reading/listening texts
- use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit4

Lesson: Inspiration: Chindu Yellamma

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. **Writing:** Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. **Grammar and Vocabulary:** Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Learning Outcomes

At the end of the module, the learners will be able to

- infer and predict about content of spoken discourse
- understand verbal and non-verbal features of communication and hold formal/informal conversations
- interpret graphic elements used in academic texts
- produce a coherent paragraph interpreting a figure/graph/chart/table
- use language appropriate for description and interpretation of graphical elements

Unit 5
Lesson: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. **Speaking:** Formal oral presentations on topics from academic contexts - without the use of PPT slides. **Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences. **Grammar and Vocabulary:** Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes
At the end of the module, the learners will be able to

- take notes while listening to a talk/lecture and make use of them to answer questions
- make formal oral presentations using effective strategies
- comprehend, discuss and respond to academic texts orally and in writing
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

Prescribed Text:

1. English all round: Communication Skills for Undegurdation Learners Vol. I, Orient BlackSwan Publisers, First Edition 2019, Authored by Y.Prabhavathi, M.Lalitha Sridevi and Ruth Z Hauzel.

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
- Oxford Learners Dictionary, 12th Edition, 2011.

I B.Tech I Sem

COURSE NO. - ECE WORKSHOP

L	T	P	C
0	0	2	1

Course Objectives:

- To introduce electronic components, measuring instruments and tools used in electronic workshop.
- To give hands on experience with the use of laboratory equipment.
- To equip with the knowledge of understanding data sheets.
- To give working experience with prototype board, solder and de-solder the electronic components on a project board.
- To introduce EDA tools
- To provide knowledge in understanding working of various communication systems

List of Exercises / Experiments

1. Familiarization/Application of commonly used Electronic Workshop Tools : Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
2. Familiarization/Application of testing and measuring instruments like Voltmeter, Ammeter, Multimeter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
3. Familiarization/Identification of electronic components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, color coding, package, symbol, cost etc.
4. Testing of electronic components like Resistor, Capacitor, Diode, Transistor etc. using Multimeter.
5. Study of CRO and to i) find the Amplitude and Frequency using CRO Ii) measure the Unknown Frequency & Phase difference using CRO
6. Interpret data sheets of discrete components and IC's, estimation and costing.
7. Introduction to EDA Tools: MULTISIM/PSPICE/TINA schematic capture tool, learning of basic functions of creating a new project, getting and placing parts, connecting placed parts, simulating the schematic, plotting and analyzing the results.
8. Assembling and testing of simple electronic circuits on breadboards, assembling and soldering components on a PCB (Kit Assembling)
9. Familiarization of the following electronic systems
   - Assembling and dismantling of desktop computer/laptop/mobile phones.
   - PA system with different microphones, loud speakers, mixer etc.
10. Demonstrate working of various Communication Systems like Radio receiver, Television and Mobile communication system

References:

1. Dr. B.S. Chowdhry & Ahsan A. Ursani, The First Practical Book on Electronic Workshop, Mehran Infotech Consultants, Hyderabad.
2. Paul Horowitz & Ian Robinson, "Laboratory Manual for Art of Electronics", Cambridge University Press.
3. S M Dhir, Electronic Components & Materials, 2nd Edition, Tata McGraw - Hill Publishing Company Limited
4. Dr.S.K.Bhattacharya, Dr. S.Chatterji, Textbook of Projects in Electrical, Electronics, Instrumentation and Computer Engineering, S. Chand Publishers., New Delhi.
5. Sengupta R., Textbook of Principles and Reliable Soldering Techniques, New Age International Ltd.

Course Outcomes:

- Identify discrete components and ICs
- Perform soldering- de-soldering techniques
- Assemble simple electronic circuits over a PCB
- Perform measurements using various electronic instruments such as Cathode ray oscilloscope, multimeter and function generator
- Testing of various components
- Interpret specifications (ratings) of the component
- Demonstrate working of various communication systems

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: PULIVENDULA
****** DEPARTMENT OF CHEMISTRY ******
I B.TECH – II SEMESTER(common to EEE, ECE & CSE)
(CHEMISTRY LAB)

Subject Code	Title of the Lab	L	T	P	C
19A53202	Chemistry lab	-	-	3	1.5

COURSE OBJECTIVES	
1	Verify the fundamental concepts with experiments

COURSE OUTCOMES	
CO1	**determine** the cell constant and conductance of solutions
CO2	**prepare** advanced polymer materials
CO3	**measure** the strength of an acid present in secondary batteries
CO4	**analyse** the IR and NMR of some organic compounds

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

LIST OF EXPERIMENTS

1. Conductometric titration of strong acid vs strong base
2. Conductometric titration of weak acid vs. strong base
3. Determination of cell constant and conductance of solutions
4. Potentiometry - determination of redox potentials and emf
5. Estimation of Ferrous Iron by Dichrometry.
6. Determination of strength of an acid in Pb-Acid battery
7. Preparation of a polymer
8. Verify Lambert-Beer's law
9. Thin layer chromatography
10. Identification of simple organic compounds by IR
11. Separation of Organic mixtures by paper chromatography.
12. Preparation of Copper/Silver colloidal Nano materials

TEXT BOOKS:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, Pearson Education.
2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera

Problem Solving and Programming Laboratory

(Common to All Branches of Engineering)

B.Tech – I Semester **L-T-P-C**
0-0-3-1.5

Laboratory Experiments #

1. Assemble and disassemble parts of a Computer
2. Design a C program which reverses the number
3. Design a C program which finds the second maximum number among the given list of numbers.
4. Construct a program which finds the k^{th} smallest number among the given list of numbers.
5. Design an algorithm and implement using C language the following exchanges
   $a \leftarrow b \leftarrow c \leftarrow d$
6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
7. Implement the C program which computes the sum of the first n terms of the series
   Sum = 1 – 3 + 5 -7 + 9
8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.
9. Design an algorithm and implement using a C program which finds the sum of the Infinite series $1 - x^2/2! + x^4/4! - x^6/6! + ...$
10 Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.
12. Develop an algorithm which computes the all the factors between 1 to 100 for a given number and implement it using C.
13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
14. Design a C program which reverses the elements of the array.
15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.
16. Implement the sorting algorithms
    a. Insertion sort b. Exchange sort c. Selection sort d. Partitioning sort.
17. Illustrate the use of auto, static, register and external variables.
18. Design algorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.
19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
20. Design a C program which sorts the strings using array of pointers.

The above list is not exhaustive. Instructors may add some experiments to the above list. Moreover, 50% of the experiments are to be changed every academic year. Instructors can choose the experiments, provided those experiments are not repetitions.

Course outcomes: Student should be able to

1. Construct a Computer given its parts (L6)
2. Select the right control structure for solving the problem (L6)
3. Analyze different sorting algorithms (L4)
4. Design solutions for computational problems (L6)
5. Develop C programs which utilize the memory efficiently using programming constructs like pointers.

References:

1. B. Govindarajulu, "IBM PC and Clones Hardware Trouble shooting and Maintenance", Tata McGraw-Hill, 2nd edition, 2002.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS), PULIVENDULA - 516390, A.P, INDIA.
HUMANITIES AND SOCIAL SCIENCES DEPARTMENT

COMMUNICATIVE ENGLISH - 1 LAB

Subject Code	Title of the Subject	L	T	P	C
	Communicative English - 1 Lab	0	0	2	1

COURSE OBJECTIVES	
1	To expose the students to variety of self-instructional, learner friendly modes of language learning.
2	To help the students cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.
3	To enable them to learn better pronunciation through stress, intonation and rhythm.
4	To train them to use language effectively to face interviews, group discussions, public speaking.
5	To initiate them into greater use of the computer in resume preparation, report writing, format making etc.

COURSE OUTCOMES	
CO1	To remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO2	To apply communication skills through various language learning activities.
CO3	To analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4	To evaluate and exhibit acceptable etiquette essential in social and professional settings.
CO5	To create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Unit 1

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes

At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit 2

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes

At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit 3

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

Learning Outcomes

At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit4

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes

At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

Unit 5

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes

At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors

Suggested Software

- Young India Films
- Walden Infotech
- Orell

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
- A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

I B.Tech II Sem

COURSE NO. - NETWORK THEORY

L	T	P	C
3	0	0	3

Course Objectives:

- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
- To impart knowledge on applying appropriate theorem for electrical circuit analysis
- To explain transient behavior of circuits in time and frequency domains
- To teach concepts of resonance
- To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

UNIT 1: INTRODUCTION TO ELECTRICAL CIRCUITS

Passive components and their V-I relations, Energy sources - Ideal, Non-ideal, Independent and dependent sources, Source transformation Kirchoff's laws, Star–to-Delta or Delta-to-Star Transformations, Mesh analysis and Nodal analysis problem solving, Super node and Super mesh for DC Excitations.

Unit Outcomes

- Gain knowledge on basic network elements, voltage and current laws
- Apply Kirchhoff's laws, network reduction techniques on simple electrical circuits with dependent & independent sources
- Solve complex circuits using mesh and nodal analysis techniques

UNIT 2: NETWORK THEOREMS

Superposition theorem, Thevenin & Norton theorems, Maximum power transfer theorem, Reciprocity theorem, Millman theorem, Miller Theorem, Compensation theorem - problem solving using dependent sources also, Duality and dual networks.

Unit Outcomes:

- Understand significance of duality and dual networks
- Select appropriate theorem for network simplification
- Determine maximum power transfer to the load

UNIT 3: AC CIRCUITS AND TRANSIENTS

A.C Circuits: Characteristics of Sine wave, phase relation in pure Resistor, Inductor and Capacitor, Impedance, Admittance, Series and Parallel circuits, Power, problem solving using R-L-C elements with DC excitation and AC excitation.

Transients: Steady state and Transient response, DC Response of R-L, R-C and R-L-C, circuits, Sinusoidal Response of R-L, R-C and R-L-C circuit, Circuit elements in S-domain.

Unit Outcomes:

- Understand behavior of circuit elements under switching conditions
- Analyze response of RL, RC & RLC circuits in time & frequency domains
- Evaluate initial conditions in RL, RC & RLC circuits

UNIT 4: RESONANCE AND COUPLED CIRCUITS

Resonance: Series Resonance, Voltages and Currents in a Series Resonant Circuit, Quality factor and its effect on Bandwidth, Parallel resonance, Magnification.
Coupled Circuits: Introduction to Coupled circuits, Self Inductance Mutual inductance, dot convention, Coefficient of Coupling, Series and Parallel connection of Coupled Coils.

Unit Outcomes:

- Understand magnetically coupled circuits
- Determine resonant frequency and bandwidth of a simple series or parallel RLC circuit
- Determine voltages and currents in a resonant circuit

UNIT 5: TWO PORT NETWORKS & NETWORK FUNCTIONS

Two-Port Networks: Two port networks, Open circuit Impedance (Z) parameters, Short circuit Admittance (Y) parameters, Transmission (ABCD) parameters, Inverse Transmission (A'B'C'D') parameters, Hybrid (h) parameters, Inverse hybrid (g) parameters, Inter- relationships of different parameters, Inter-connection of two-port networks, T and π Representation.
Concept of complex frequency, driving point and transfer functions for one port and two port network, poles & zeros of network functions, Restriction on Pole and Zero locations of network function

Unit Outcomes:

- Determine network parameters for given two port network
- Relate different two port network parameters
- Represent transfer function for the given network

Text Books:

1. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw HillEducation, 2013.
2. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.

References:

1. D. Roy Choudhury, "Networks and Systems", New Age International Publications,1998.

2. Network lines and Fields by John. D. Ryder 2nd edition, Asia publishing house.
3. Joseph Edminister and Mahmood Nahvi, "Electric Circuits", Schaum's Outline Series, Fourth Edition, Tata McGraw Hill Publishing Company, New Delhi, 2003.
4. Network Analysis by A. Sudhakar and Shyammohan S palli. McGraw-Hill, 5th Edition.

Course Outcomes:

- Solve network problems using mesh and nodal analysis techniques
- Analyze networks using Thevenin, Norton, Maximum power transfer, Superposition, Miller and Millman theorems
- Compute responses of first order and second order networks using time & frequency domain analysis
- Design resonant circuits for given bandwidth
- Utilize Z, Y, ABCD and h parameters for analyzing two port circuit behavior

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA
DEPARTMENT OF MATHEMATICS
I B.TECH – II SEMESTER (Common to all Branches of Engineering)
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
	Differential Equations and Vector Calculus	3	1	-	4

COURSE OBJECTIVES	
1	To enlighten the learners in the concept of differential equations and multivariable calculus
2	To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

COURSE OUTCOMES	
CO1	solve the differential equations related to various engineering fields
CO2	Identify solution methods for partial differential equations that model physical processes
CO3	interpret the physical meaning of different operators such as gradient, curl and divergence
CO4	estimate the work done against a field, circulation and flux using vector calculus

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

UNIT I: Linear Differential Equations of Higher Order

Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral, method of variation of parameters.

UNIT II: Equations Reducible to Linear Differential Equations and Applications

Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficients, Applications: Mass spring system and L-C-R Circuit problems.

UNIT III: Partial Differential Equations **08 hrs**

First order partial differential equations, solutions of first order linear and non-linear PDEs.
Solutions to homogenous and non-homogenous higher order linear partial differential equations.

UNIT IV: Multivariable Calculus (Vector differentiation)

Scalar and vector point functions, gradient, divergent, curl and their properties (Identities and applications)

UNIT V: Multivariable Calculus (Vector integration)

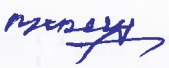
Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof).

Textbooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

References:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
3. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018
4. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
5. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.

1. 
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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: PULIVENDULA
DEPARTMENT OF PHYSICS
I B.TECH – II SEMESTER (common to EEE, ECE & CSE)
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
	Applied Physics	3	0	-	3

COURSE OBJECTIVES	
1	To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
2	To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
3	To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and semiconductors in the functioning of electronic devices.
4	To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices
5	To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications. Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their properties and applications in modern emerging technologies are to be elicited.

COURSE OUTCOMES	
CO1	**Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** engineering applications of interference including homodyne and heterodyne detection (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary polarized light and extraordinary polarized light (L2)
CO2	**Explain** various types of emission of radiation (L2). **Identify** the role of laser in engineering applications (L3). **Describe** the construction and working principles of various types of lasers (L1). **Explain** the working principle of optical fibers (L2). **Classify** optical fibers based on refractive index profile and mode of propagation (L2). **Identify** the applications of optical fibers in medical, communication and other fields (L2). **Apply** the fiber optic concepts in various fields (L3).
CO3	**Describes** the dual nature of matter (L1). **Explains** the significance of wave function (L2). **Identify** the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). **Identify** the role of classical and quantum free electron theory in the study of electrical conductivity (L3). **Classify** the energy bands of semiconductors (L2). **Outline** the properties of n-type and p-type semiconductors and charge carriers (L2). **Interpret** the direct and indirect band gap semiconductors (L2). **Identify** the type of semiconductor using Hall effect (L2). **Identify** applications of semiconductors in electronic devices (L2)
CO4	**Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics (L2). **Classify** the magnetic

	materials based on susceptibility and their temperature dependence (L2). **Explain** the applications of dielectric and magnetic materials (L2). **Apply** the concept of magnetism to magnetic devices (L3)
CO5	**Explain** how electrical resistivity of solids changes with temperature (L2). **Classify** superconductors based on Meissner's effect (L2). **Explain** Meissner's effect, BCS theory& Josephson effect in superconductors (L2). **Identify** the nano size dependent properties of nanomaterials (L2). **Illustrate** the methods for the synthesis and characterization of nanomaterials (L2). **Apply** the basic properties of nanomaterials in various Engineering branches (L3).

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS OF APPLIED PHYSICS

Unit-I: Physical Optics

Interference-Principle of superposition –Interference of light – Conditions for sustained interference- Interference in thin films (reflected light)- Newton's Rings: determination of wavelength - Engineering applications of Interference

Diffraction- Fraunhofer Diffraction-Single and Double slits - Diffraction Grating – Grating Spectrum - Engineering applications of diffraction.

Polarization-Polarization by double refraction-Nicol's Prism--Half wave and Quarter wave plates-Engineering applications of polarization.

Unit-II: Lasers and Fiber optics

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Pumping mechanisms – Nd:YAG laser – He-Ne laser – Applications of lasers.

Fiber optics- Introduction to Optical Fibers-Total Internal Reflection -Acceptance Angle-Numerical Aperture-Classification of fibers based on refractive index profile –Propagation of electromagnetic wave through optical fibers – Modes -Importance of V-number –Block diagram of fiber optic communication system– Applications

Unit III: Quantum Mechanics, Free Electron Theory and Semiconductors

Quantum Mechanics: Dual nature of matter – de Broglie Hypothesis, Schrodinger's time independent wave equation – Significance of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory – Sources of electrical resistance – Equation for electrical conductivity – Quantum free electron theory– Fermi-Dirac distribution- Band theory of Solids.

Semiconductors: Origin of energy bands - Classification of solids based on energy bands – Intrinsic semiconductors – Intrinsic carrier concentration-Fermi energy – Electrical conductivity - extrinsic semiconductors P-type & N-type - Dependence of Fermi energy on carrier concentration and temperature- Direct and Indirect band gap semiconductors-Hall effect- Hall coefficient and its applications - Drift and Diffusion currents (Qualitative) - Continuity equation - Applications of Semiconductors.

Unit-IV: Dielectric and Magnetic Materials

Dielectric Materials -Dielectric polarization-Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations: Electronic, Ionic and Orientation polarizations (Qualitative) - Lorentz (internal) field- Clausius-Mossotti equation-Applications of dielectrics: Ferroelectricity and Piezoelectricity.

Magnetic Materials - Introduction-Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment –Bohr Magneton, Classification of magnetic materials - Hysteresis - soft and hard magnetic materials-Applications

Unit – V: Superconductors and Nanomaterials

Superconductors: Properties of superconductors – Meissner effect– Type I and Type II superconductors – ac and dc Josephson effects – BCS theory (qualitative treatment) – Applications of superconductors.

Nanomaterials: Introduction – Surface to volume ratio and quantum confinement – Physical properties: optical, mechanical, electrical and magnetic- Synthesis of nanomaterials: Top-down: Ball Milling, Bottom-up: Chemical Vapour Deposition – Applications of nanomaterials.

Text books:

1. M. N. Avadhanulu, P.G.Kshirsagar& TVS Arun Murthy" A Text book of Engineering Physics"- S.Chand Publications, 11th Edition 2019.
2. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2012.

Reference Books:

1. K Thyagarajan " Engineering Physics", Mc Graw Hill Publishing Company Ltd., 2016
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons
3. Shatendra Sharma, Jyotsna Sharma, " Engineering Physics", Pearson Education, 2018
4. T Pradeep "A Text book of Nano Science and Nano Technology"- Tata Mc Graw Hill, 2013
5. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
6. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
7. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc Graw Hill
8. Introduction to Nanotechnology – C P Poole and F J Owens, Wiley

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11. Study of Energy gap of a material using p-n junction diode
12. Study of variation of Magnetic field along the axis of a current carrying coil – Stewart-Gee's Method
13. Determination of mobility of charge carriers in semiconductor by Hall effect.
14. Measurement of resistance of a semiconductor with varying temperature
15. Measurement of magnetic susceptibility by Kundt's tube method.

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.
2. R. Padma Suvarna, K. Thyagarajan "Engineering Physics Practicals" – NU Age Publishing House.

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Data Structures

(Common to All Branches of Engineering)

B. Tech – II Semester **L-T-P-C**
3-0-0-3

Course Objectives:

1. To teach the representation of solution to the problem using algorithm
2. To explain the approach to algorithm analysis
3. To introduce different data structures for solving the problems
4. To demonstrate modeling of the given problem as a graph
5. To elucidate the existing hashing techniques

Unit – 1: Introduction

Algorithm Specification, Performance analysis, Performance Measurement, Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions, Sorting: Motivation, Quick sort, how fast can we sort, Merge sort, Heap sort

Learning Outcomes:

Student should be able to

1. Analyze the given algorithm to find the time and space complexities (L4)
2. Select appropriate sorting algorithm (L4)
3. Design a sorting algorithm (L6)

Unit – 2: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning outcomes: Student should be able to

1. Evaluate expressions (L5)
2. Develop the applications using stacks and queues (L3)
3. Construct the linked lists for various applications (L6)

Unit – 3: Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, **Counting Binary Trees,** Optimal Binary search Trees, AVL Trees. B-Trees: BTrees, B + Trees.

Learning outcomes

1. Explain the concept of a tree (L2)
2. Compare different tree structures (L4)
3. Apply trees for indexing (L3)

Unit – 4: Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure.

Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning outcomes:
Student should be able to
1. Recognize the importance of Graphs in solving real world problems (L2)
2. Apply various graph traversal methods to applications (L3)
3. Design a minimum cost solution for a problem using spanning trees (L6)
4. Select the appropriate hashing technique for a given application (L5)
5. Design a hashing technique (L6)

Unit – 5: Files and Advanced Sorting & Searching
File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.
Advanced sorting and searching: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning outcomes: Student should be able to
1. Organize data in the form of Files (L6)
2. Apply sorting on large amount of data (L3)

Text Books:
1. Ellis Horowitz, Sartaj Sahni and Susan Anderson Freed "Fundamentals of Data Structures in C", 2nd Edition, University Press, 2007.
2. Alan L. Tharp, "File Organization and Processing", Wiley and Sons, 1988.

Reference Books:
1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education.
2. D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
3. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016
4. Richard F.Gilberg, Behrouz A.Forouzan, "Data Structures A Pseudo code Approach with C", Second Edition, Cengage Learning 2005.

Course Outcomes:
Students should be able to
1. Select Appropriate Data Structure for solving a real world problem (L4)
2. Select appropriate file organization technique depending on the processing to be done (L4)
3. Construct Indexes for Databases (L6)
4. Analyze the Algorithms (L4)
5. Develop Algorithm for sorting large files of data (L3)

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

I YEAR I SEMESTER

ENGINEERING WORKSHOP (19AME02)
(Common to CE, MECH & CSE)

L	T	P	C
0	0	3	1.5

Course Objectives:

- To bring awareness about workshop practices for Engineers.
- To familiarize how wood working operations can be performed.
- To teach the practices for sheet metal operations.
- To develop the technical skills related to fitting and electrical wiring.

Section 1 : Wood Working

Familiarity with different types of woods and tools used in wood working and make following joints

a) Half – Lap joint
b) Mortise and Tenon joint
c) Corner Dovetail joint or Bridle joint

Section 2 : Sheet Metal Working

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing

Section 3 : Fitting

Familiarity with different types of tools used in fitting and do the following fitting exercises

a) V-fit b) Dovetail fit c) Semi-circular fit
d) Bicycle tire puncture and change of two wheeler tyre

Section 4 : Electrical Wiring

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series b) Two way switch c) Godown lighting d) Tube light
e) Three phase motor f) Soldering of wires

Text Books:

1. K.Venkata Reddy., Workshop Practice Manual, 6/e BS Publications.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 2/e, Scitech publishers.
3. John K.C., Mechanical Workshop Practice. 2/e, PHI 2010.

Course Outcomes:

At the end of this Course the student will be able to

- Apply wood working skills in real world applications. (L6)
- Apply fitting operations in various applications. (L6)
- Build different parts with metal sheets in real world applications. (L5)
- Demonstrate soldering and brazing. (L4)
- Apply basic electrical engineering knowledge for house wiring practice. (L6)

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA

DEPARTMENT OF MECHANICAL ENGINEERING

(Common to all branches)

Subject Code	Title of the Subject	L	T	P	C
19A03102	Engineering Graphics	1	0	3	2.5

	COURSE OBJECTIVES
1	To bring awareness that Engineering Drawing is the Language of Engineers.
2	To familiarize how industry communicates technical information.
3	To teach the practices for accuracy and clarity in presenting the technical information.
4	To develop the engineering imagination essential for successful design.
5	To instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
6	To train the usage of 2D and 3D modeling.
7	To instruct graphical representation of machine components.

COURSE OUTCOMES	
CO1	**Draw** various curves applied in engineering.
CO2	**Show** projections of Lines, planes and solids..
CO3	**Draw** the sections of solids and development of surfaces of solids.
CO4	**Use** computers as a drafting tool.
CO5	**Draw** isometric and orthographic drawings.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	3	1						1	1
CO2	3	3	1	3	1						1	1
CO3	3	3	1	3	1						1	1
CO4	3	3	1	3	1						1	1
CO5	3	2	1	3	1						1	1

UNIT – I:

Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance – Conventions in drawing – Lettering – BIS conventions.

a) Conic sections including the rectangular hyperbola – general method only.
b) Cycloids, Epicycloids and Hypocycloids.
c) Involutes

(2L + 6P hrs)

1. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]

6 –
7 –
8 [illegible]
9 [illegible]

UNIT – II:

Projection of Points, Lines and Planes: Projection of points in any quadrant, Lines inclined to one and both planes, Finding true lengths, Angle made by line. Projections of regular plane surfaces.

(2L + 6P hrs)

UNIT – III:

Projections of Solids: Projections of regular solids inclined to one and both planes by rotational and auxiliary views method.

Sections of Solids: Section planes and sectional view of right regular solids – Prism, Cylinder, Pyramid and Cone. True shapes of the sections. **(2L + 6P hrs)**

UNIT – V:

Development of Surfaces: Development of surfaces of right regular solids – Prism, Cylinder, Pyramid, Cone and their sectional parts. **(1L + 6P hrs)**

UNIT – V:

Orthographic Projections: Systems of projections, Conventions and Application to Orthographic Projections.

Isometric Projections: Principles of Isometric Projection – Isometric scale, Isometric views – Lines, Planes, Figures, Simple and Compound Solids. **(5L + 15P hrs)**

Text Books:

1. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009.
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013.
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

I B.Tech II Sem

COURSE NO. - NETWORKS LAB

L	T	P	C
0	0	3	1.5

Course Objectives:

- To gain hands on experience in verifying Kirchoff's laws and network theorems
- To analyze transient behavior of circuits
- To study resonance characteristics
- To determine 2-port network parameters

List of Experiments:

Any 10 of the following experiments are to be conducted in Hardware/Simulation (Multisim/Open source software):

1. Verification of Kirchoff's Laws
2. Verification of Superposition & Reciprocity Theorem
3. Verification of Thevenin's and Norton's Theorem
4. Verification of Maximum Power Transfer Theorem
5. Verification of Millman and Miller Theorm
6. Measure and calculate RC time constant for a given RC circuit
7. Measure and calculate RL time constant for a given RL circuit
8. Measure and analyze (settling time, overshoot, undershoot, etc.) step response of for a given series RLC circuit for following cases:
   (i) $\zeta = 1$ (critically damped system)
   (ii) $\zeta > 1$(over damped system)
   (iii) $\zeta < 1$ (under damped system)
   Choose appropriate values of R, L, and C to obtain each of above cases one at a time.
9. Design a series RLC resonance circuit. Plot frequency response and find resonance frequency , Bandwidth , Q – factor.
10. Design a parallel RLC resonance circuit. Plot frequency response and find resonance frequency , Bandwidth , Q – factor.
11. Measure and calculate Z, Y parameters of two-port network.
12. Measure and calculate ABCD & h parameters of two-port network.

Course Outcomes:

- Verify Kirchoff's laws and network theorems
- Measure time constants of RL & RC circuits
- Analyze behavior of RLC circuit for different cases
- Design resonant circuit for given specifications
- Characterize and model the network in terms of all network parameters

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

Applied Physics Laboratory

(Common to I B.Tech II Semester ECE, EEE & CSE)

L	T	P	C
0	0	3	1.5

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

EXP No.1: Determination of the thickness of thin object using wedge shape method

Learning Outcomes:

At the end of this experiment, the student will be able to

- **Operates** optical instrument like travelling microscope **L2**
- **Estimate** the thickness of the wire using wedge shape method **L2**
- **Identifies** the formation of interference fringes due to reflected light from non-uniform thin film. **L2**

EXP No. 2 : Determination of the radius of curvature of the lens by Newton's rings

Learning Outcomes:

At the end of this experiment, the student will be able to

- **Operates** optical instrument like travelling microscope. **L2**
- **Estimate** the radius of curvature of the lens **L2**
- **Identifies** the formation of interference fringes due to reflected light from non-uniform thin film. **L2**
- **Plots** the square of the diameter of a ring with no. of rings **L3**

EXP No. 3: Determination of wavelengths of various spectral lines of mercury source using diffraction grating in normal incidence method

Learning Outcomes:

At the end of this unit, the student will be able to

- **Operates** optical instrument like spectrometer. **L2**
- **Estimate** the wavelength of the given source **L2**
- **Identifies** the formation of grating spectrum due diffraction. **L2**

EXP No. 4: Determination of dispersive power of prism

Content of the Unit – IV

Learning Outcomes:

At the end of this unit, the student will be able to

- **Operates** optical instrument like spectrometer. **L2**
- **Estimate** the refractive index and dispersive power of the given prism **L2**
- **Identifies** the formation of spectrum due to dispersion. **L2**

EXP No. 4: Determination of dispersive power of prism.

Learning Outcomes:
At the end of this unit, the student will be able to

- **Operates** optical instrument like spectrometer. **L2**
- **Estimate** the refractive index and dispersive power of the given prism **L2**
- **Identifies** the formation of spectrum due to dispersion. **L2**

EXP No. 5: Determination of wavelength using diffraction grating by laser source.

Learning Outcomes:
At the end of this unit, the student will be able to

- **Operates** various instrument **L2**
- **Estimate** the wavelength of laser source **L2**
- **Identifies** the formation of grating spectrum due diffraction. **L2**

EXP No. 6: Determination of particle size by laser source

Learning Outcomes:
At the end of this unit, the student will be able to

- **Operates** various instrument **L2**
- **Estimate** the Particles size using laser **L2**
- **Identifies** the application of laser **L2**

EXP No. 7: Determination of numerical aperture and acceptance angle of an optical fiber

Learning Outcomes:
At the end of this unit, the student will be able to

- **Operates** various instruments and connect them as per the circuit. **L2**
- **Estimate** the numerical aperture and acceptance angle of a given optical fiber. **L2**
- **Identifies** the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications **L2**

EXP No. 8: Study of variation of Magnetic field along the axis of a current carrying coil – Stewart-Gee's Method.

Learning Outcomes:
At the end of this unit, the student will be able to

- **Operates** various instruments and connect them as per the circuit. **L2**
- **Estimate** the magnetic field along the axis of a circular coil carrying current. **L2**
- **Plots** the intensity of the magnetic field of circular coil carrying current with distance **L3**

EXP No. 9: Study of B-H curve of Ferromagnetic material.

Learning Outcomes:
At the end of this unit, the student will be able to

- **Operates** various instruments and connect them as per the circuit. **L2**
- **Estimate** the hysteresis loss, coercivity and retentivity of the ferromagnetic material **L2**
- **Classifies** the soft and hard magnetic material based on B-H curve. **L2**
- **Plots** the magnetic field H and flux density B **L3**

EXP No. 10: Study of Energy gap of a material using p**-**n junction diode

Learning Outcomes:

At the end of this unit, the student will be able to

- **Operates** various instruments and connect them as per the circuit. **L2**
- **Estimate** the hysteresis loss, coercivity and retentivity of the ferromagnetic material. (L2) **L2**
- **Classifies** the soft and hard magnetic material based on B-H curve. **L2**
- **Estimate** the energy gap of a semiconductor. **L2**
- **Illustrates** the engineering applications of energy gap. **L3**
- **Plots 1/T** with log R **L3**

Reference Books:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

Course Outcomes:

At the end of this Course the student will be able to

- **Operate** optical instruments like microscope and spectrometer **L2**
- **Determine** thickness of a hair/paper with the concept of interference **L2**
- **Estimate** the wavelength of different colors using diffraction grating and resolving power **L2**
- **Plot** the intensity of the magnetic field of circular coil carrying current with distance **L3**
- **Evaluate** the acceptance angle of an optical fiber and numerical aperture **L3**
- **Determine** the resistivity of the given semiconductor using four probe method **L3**
- **Identify** the type of semiconductor i.e., n-type or p-type using hall effect **L3**
- **Calculate** the band gap of a given semiconductor **L3**

Data Structures Lab

(Common to All Branches of Engineering)

B. Tech – II Semester **L-T-P-C**
0-0-3-1.5

Course Objectives:

1. To introduce to the different data structures
2. To elucidate how the data structure selection influences the algorithm complexity
3. To explain the different operations that can be performed on different data structures
4. To introduce to the different search and sorting algorithms.

Laboratory Experiments:

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue.
   While implementing you should be able to store elements equal to the size of the queue.
   No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file
15. Reversing the links (not just displaying) of a linked list.
16. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using 'Ladies first' principle. You may create new linked lists if necessary.
17. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.
18. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table.

The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table.
User may like to remove row/column. Create table data type and support different operations on it.

Course Outcomes:

At the end of the course students should be able to

1. Select the data structure appropriate for solving the problem (L5)
2. Implement searching and sorting algorithms (L3)
3. Design new data types (L6)
4. Illustrate the working of stack and queue (L4)
5. Organize the data in the form of files (L6)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS), PULIVENDULA
B.Tech – II-I Sem (R19)

L	T	P	C
3	0	0	3

COMPLEX VARIABLES AND TRANSFORMS

(Common to ECE & EEE)

Course Objective:

This course aims at providing the student to acquire the knowledge on the calculus of function of complex variables. The student develops the idea of using continuous/discrete transforms.

Unit-I: Complex Variables – Differentiation:

Introduction to functions of complex variable-concept of Limit & continuity- Differentiation, Cauchy-Riemann equations in Cartesian and Polar coordinates (without proof), analytic functions, harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method.

Properties of elementary functions of exponential, trigonometric, hyperbolic, and logarithm. Conformal mappings-standard and special transformations (z^2, sin z, cos z, e^z, lnz) Mobius transformations (bilinear) and their properties.

Unit Outcomes:
Students will be able to

- Understand functions of Complex variable and its properties.
- Find derivatives of complex functions.
- Understand the analyticity of complex functions.
- Understand the conformal mappings of complex functions.

Unit-II: Complex Variables – Integration:

Line integral-Contour integration, Cauchy's integral theorem (with proof), Cauchy Integral formula, generalized Cauchy Integral formula (All theorems without Proof).

Power series expansions: Taylor's series and Laurent's series (without proof); zeros of analytic functions, singularities.

Residues: Evaluation of residue by formula and by Laurent's series, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals (around unit circle, semi-circle with f(z) not having poles on real axis).

Unit Outcomes:
Students will be able to

- Understand the integration of complex functions.
- Apply Cauchy's integral theorem and Cauchy's integral formula.
- Understand singularities of complex functions.
- Evaluate improper integrals of complex functions using Residue theorem.

Unit-III: Laplace Transforms

Definition-Laplace transform of standard functions-existence of Laplace Transform – 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 transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Unit Outcomes:
Students will be able to

- Understand the concept of Laplace transforms and finds the Laplace transforms of elementary functions.
- Find the Laplace transforms of general functions using its properties.
- Understand Laplace transforms of special functions (Unit step function, Unit Impulse & Periodic).
- Apply Laplace transforms to solve Differential Equations.

Unit-IV: Fourier series &Fourier transforms
Fourier Series : Fourier coefficients (Euler's formulae) – Dirichlet conditions for the existence of Fourierseries – functions having discontinuity-Fourier series of Even and odd functions – Fourier seriesin an arbitrary interval – Half-range Fourier sine and cosine expansions.

Fourier Integrals & Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals-complex form ofFourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem – Finite Fourier Sine and Cosine transforms.

Unit Outcomes:
Students will be able to

- Understand finding Fourier series expression of the given function.
- Determine Fourier coefficients (Euler's) and identify existence of Fourier series of the given function.
- Expand the given function in Fourier series given in Half range interval.
- Find Fourier Sine and cosine integrals.

- Understand Fourier transforms.
- Apply properties of Fourier transforms.

Unit-V: Z Transforms:

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

Unit Outcomes:
Students will be able to
- Understand Z transforms.
- Apply properties of Z transforms.
- Apply Z transforms to solve difference equations.

Course Outcomes:
After the completion of course, students will be able to
- Understand the analyticity of complex functions and conformal mappings.
- Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
- Understand the usage of Laplace Transforms, Fourier Transforms and Z transforms.
- Evaluate the Fourier series expansion of periodic functions.

Text Books:
1. B.S.Grewal, "Higher Engineering Mathematics", Khanna publishers.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India

Reference Books:
1. B.V.Ramana, Higher, "Engineering Mathematics", McGraw Hill publishers.
2. Alan Jeffrey, "Advanced Engineering Mathematics", Elsevier.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C** **3 - 0 – 0 - 3**

ELECTRONIC DEVICES AND CIRCUITS

COURSE OBJECTIVES:

1. To provide a comprehensive idea about semiconductors, working of PN junction diode.
2. To acquire knowledge about special diodes and applications of PN junction diode like rectifiers, clippers and clampers.
3. To explain the construction and working of Bipolar junction transistors and Field effect transistors.
4. To introduce various biasing and stabilizationcircuits.
5. To analyze BJT modeling using h-parameters and to find h-parameters of BJT in different configurations.

UNIT I

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

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

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the semiconductor materials properties and their importance in semiconductor devices.
- Appreciate the working of PN Junction diode and its parameters.

UNIT II

Special Diodes: Zener and Avalanche Breakdowns, VI Characteristics of Zener diode, Zener diode as voltage regulator, Construction, operation and VI characteristics of Tunnel Diode, LED, Solar cell, Schottky Barrier Diode, Varactor Diode, Photo Diode, SCR and UJT.

Diode applications: Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics, Clipping and Clamping circuits, Voltage doubler , Illustrative problems.

Learning Outcomes:

At the end of the unit, the student will be able to

- Know the usage of special diodes in different applications.
- Use the PN junction diode for different applications.
- Compare the working of rectifier circuits with and without filters.

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.

Field Effect Transistors: The Junction Field Effect Transistor (Construction, Principle of Operation), Pinch off Voltage, VI Characteristics, CG,CS and CD configurations,FET as Voltage Variable Resistor, Comparison between BJT and FET, MOSFET Construction, VI Characteristicsand working in depletion and enhancement mode

Learning Outcomes:

At the end of the unit, the student will be able to

- Know the construction, operation, characteristics and applications of BJT &FET's.
- Compare the working of BJT & FET's in different configurations.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Know the importance of DC, AC Load lines & Biasing.
- Apply biasing and compensation circuits for providing stability against variations in I_{CO}, V_{BE}andβ.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Determine and measure h-parameters of a BJT.
- Analyze CE, CB & CC Configurations using h-parameters.

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 Universitypress. 2008.

REFERENCE BOOKS:

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

COURSE OUTCOMES:

After the completion of the course, students will be able to

1. Get a comprehensive idea about semiconductors, working of PN junction diode.
2. Acquire knowledge about special diodes and applications of PN junction diode like rectifiers, clippers and clampers.
3. Understand the construction and working of Bipolar junction transistors and Field effect transistors.
4. Explain the working of variousbiasing and stabilization circuits.
5. Analyze and find h-parameters of BJT in different configurations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C** **3 - 0 – 0 - 3**

SWITCHING THEORY AND LOGIC DESIGN

COURSE OBJECTIVES:

1. To acquire knowledge about various number systems, binary codes, error detection and correction codes, Boolean algebra and logic gates.
2. To learn simplification of Boolean functions and their realization using logic gates.
3. To understand and design various combinational logic circuits.
4. To study the design of sequential logic circuits in synchronous and asynchronous modes.
5. To introduce programmable logic devices and to realize switching functions using them.

UNIT I: NUMBER SYSTEM & BOOLEAN ALGEBRA

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

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand and apply different number systems.
- Explain importance of different coding schemes and functionality of logic gates.

UNIT II: 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 Q-M tabulation Method.

Learning Outcomes:

At the end of the unit, the student will be able to

- Apply basic laws to simplify Boolean expressions.
- Compare K- Map and Q-M methods of minimizing logic functions.

UNIT III: ANALYSIS AND SYNTHESIS OF COMBINATIONAL CIRCUITS:

Combinational circuits, Analysis & Design procedure, Binary Adder, Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoders, Encoders, Multiplexers, De-multiplexers.

Learning Outcomes:

At the end of the unit, the student will be able to

- Apply Boolean algebra for describing combinational digital circuits.
- Design and analyse various Combinational logic circuits.

UNIT IV: ANALYSIS AND SYNTHESIS OF SEQUENTIAL CIRCUITS:

Sequential Circuits – Latches and FlipFlops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers, Shift Registers, Counters – Ripple Counters, Synchronous counters and other counters.

Learning Outcomes:

At the end of the unit, the student will be able to

- Describe behaviour of Flip-Flops and Latches.
- Design sequential circuits using flip flops , registers and counters

UNITV: 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, Error detection and correction, ROM, PLA, PAL, PLD.

Learning Outcomes:

At the end of the unit, the student will be able to

- Describe functional differences between different types of memories.
- Compare different types of Programmable Logic Devices.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

After the completion of the course, students will be able to

1. Understand various number systems, binary codes, error detection and correction codes, Boolean algebra and functioning of logic gates.

2. Simplify Boolean functions and realize them using logic gates.
3. Design various combinational logic circuits.
4. Analyse the sequential logic circuits in synchronous and asynchronous modes.
5. Appreciate realization of switching functions using programmable logic devices.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C 3 - 0 – 0 - 3**

SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

1. To understand the basic properties ofsignal&systems and LTI systems.
2. Tolearn Fourierseriesrepresentationof periodic signals.
3. To study representation of signals in continuous and discretetimeFouriertransform
4. To analyze thesampling theorem and characterizesignals & systems in time & frequency domain.
5. To apply Laplacetransform andZtransform to study about thestabilityofsystems.

UNIT I

Signals and Systems: Continuous and Discrete Time Signals, Transformations of the Independent Variable, Elementary Signals-Unit Impulse, Unit Step Functions, Ramp Signal, Rectangular function, Signum Function, Sinc& Sa Function, Exponential and Sinusoidal Signals, Classification of Signals & Systems, Continuous and Discrete Time Systems, Basic System Properties, Linear Time Invariant (LTI) Systems, Discrete-Time LTI Systems, Convolution Sum, Continuous Time LTI Systems, Convolution Integral, Properties of LTI Systems, Causal LTI Systems described by Differential and Difference Equations, Singularity Functions.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand different types of signals and systems.
- State the properties of LTI systems.

UNIT II

Fourier series representation of periodic signals: Response of LTI Systems to Complex Exponentials. Fourier Series Representation of Continuous Time Periodic Signals, Trigonometric, Polar, Exponential fourier Series & related problems, 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,

Learning Outcomes:

At the end of the unit, the student will be able to

- Describe continuous time signals and discrete time signal.
- Analyze the periodic signals by applying Fourier series.

UNIT III

The Continuous-Time Fourier Transform: Representation of aperiodic Signals, Continuous Time Fourier Transform, Fourier Transform for Periodic Signals, Properties of

the Continuous Time Fourier Transform, Systems characterized by Linear constant coefficient differential equations, Discrete Time Fourier Transform - Representation of Aperiodic Signals, Discrete Time Fourier Transform, Frequency Response, Systems Characterized by Linear Constant-Coefficient Difference Equations.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the differences between Fourier series and Fourier transforms.
- Represent the signals in continuous and discretetimeFouriertransform.

UNIT IV

Time & Frequency Characterization of Signals and Systems: The Magnitude Phase Representation of the Fourier Transform, 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, Examples of Continuous time filters and Discrete time filters described by differential equations, First-Order and Second-Order Continuous and 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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the impulse response, transfer characteristics of LTI system and various filters.
- Analyse filter characteristics and physical realisation of LTI system.

UNIT V

Laplace and z-Transforms: The Laplace Transform, Region of Convergence for Laplace Transforms, 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, Z-Transform - Region of Convergence for the z-Transform, 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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the continuous time signals, discrete time signals and systems using Laplace and Z transforms.
- Apply transform techniques to analyse discrete-time signals and systems.

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.

REFERENCE BOOKS:

1. Signals & Systems, Simon Haykin and B. Van Veen, 2nd Edition, John Wiley, 2003.
2. Signals and systems, NarayanaIyer 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.

COUSE OUTCOMES:

After the completion of the course, students will be able to

1. Explain the basic properties ofsignal& systems and LTI systems.
2. Apply Fourierseries to represent periodic signals.
3. Represent signals in continuous and discretetimeFouriertransform
4. Analyze thesamplingtheoremand characterizesignals & systems in time & frequency domain.
5. Study thestabilityofsystems by applying Laplace transform andZtransform.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C 3 - 0 – 0 - 3**

CONTROL SYSTEMS

COURSE OBJECTIVES:

1. Merits and demerits of open loop and closed loop systems; the effect of feedback.
2. The use of block diagram algebra and Mason's gain formula to find the overalltransfer function.
3. Transient and steady state response, time domain specifications and the concept of Root loci.
4. Frequency domain specifications, Bode diagrams and Nyquist plots.
5. State space modelling of Control system

UNIT–I

Control SystemsConcepts: 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, Analogous Systems, Block diagram reduction methods – Signal flow graphs - Reduction using Mason's gain formula. Principle of operation of DC and AC Servo motor, Transferfunction of DC servo motor - AC servo motor,Synchros.

Learning Outcomes:

At the end of the unit, the student will be able to

- Write the differential equations for mechanical and electricalsystems.
- Obtain the transfer function from block diagrams, servo motors and signal flowgraphs.

UNIT-II

Time ResponseAnalysis: 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, Study of effects and Design of P, PI, PD and PID Controllers on second order system.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the time domainspecifications.
- Calculate the steady stateerrors.
- Understand about Proportional, Integral and Derivative controllers along withcombinations.

UNITIII

Stability Analysis in TimeDomain: 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 rootloci.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the concept of stability in timedomain
- Apply the concept of Routh's stability and Root locus in timedomain

UNIT–IV

Frequency ResponseAnalysis: 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-StabilityAnalysis.

Compensation techniques – Study of Effects and Design of Lag, Lead, Lag-Lead Compensator design in frequency Domain on a second order system.

Learning Outcomes:

At the end of the unit, the student will be able to

- Evaluate the frequency domain specifications from Bode, Polar and Nyquistplots
- Design Compensators for varioussystems
- Deducing transfer functions from Bode Plots
- Understand difference between Phase and Gainmargins

UNIT–V

State Space Analysis of ContinuousSystems: Concepts of state, state variables and state model - differential equations & Transfer function models - Block diagrams. Diagonalization, Transfer function from state model, 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, Duality between controllability andobservability.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concept of state space, controllability andobservability
- Obtain the transfer function from sate space and viceversa
- Understand the state transition method of solving time invariant stateequations

TEXTBOOKS:

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 by M.Gopal, 4th Edition, McGraw Hill Education,2012.
2. Automatic Control Systems by B. C. Kuo and FaridGolnaraghi, John wiley and sons, 8th edition,2003.
3. Feedback and Control Systems, Joseph J Distefano III, Allen R Stubberud& Ivan J Williams, 2nd Edition, Schaum's outlines, McGraw Hill Education,2013.
4. Control System Design by Graham C. Goodwin, Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. Feedback Control of Dynamic Systems by Gene F. Franklin, J.D. Powell and Abbas Emami- Naeini, 6th Edition, Pearson,2010.

COURSE OUTCOMES:

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

1. Understandtheconceptsofcontrolsystemsclassification,feedbackeffect,mathematical modelling, time response and frequency responsecharacteristics, state space analysis
2. Apply the concepts of Block diagram reduction, Signal flow graph method and state space formulation for obtaining mathematical and Root locus, Bode, Nyquist, Polar plots for stability calculations, controllability and observability and demonstrate the use of thesetechniques.
3. Analyse time response analysis, error constants, and stability characteristics of a given mathematical model using different methods.
4. Design and develop different compensators, controllers and their performance evaluation for various conditions. Implement them in solving various engineering applications.

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COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C 3 - 0 – 0 - 3**

ELECTRICALTECHNOLOGY

COURSE OBJECTIVES:

1. The constructional features of DC machines, different types of DC machines and theircharacteristic.
2. The constructional details of single phase transformer and their performancecharacteristics by conducting suitabletests.
3. The analysis of three phase balanced and unbalanced circuits, three phase induction motors and theircharacteristics.
4. The constructional feature and operation of synchronousmachines.

UNIT I

DCGenerators: Generators – Principle of Operation – Constructional Features – 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 - Load Characteristics of Shunt, Series and Compound Generators-Applications

Learning Outcomes:

- To know about principle of operation of a DC machine working as agenerator
- To distinguish between self and separately excited generators andclassification
- To know how Emf isdeveloped
- To distinguish between critical field resistance and criticalspeed
- To know about various characteristics of different types ofgenerators

UNIT–II

D.C.Motors: 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. Three Point Starter-Losses – Constant & Variable Losses – Calculation of Efficiency - Swinburne'sTest.

Learning Outcomes:

- To know about principle of operation of DC machine working as amotor
- To know about torquedeveloped
- To know about how to control speed of DC shuntmotor
- To know about necessity ofstarter
- To know about various load characteristics of various types of DCmotors

UNIT-III

Single Phase Transformers & Three Phase A.C. Circuits: Introduction - Single Phase Transformers- Constructional Details and Applications - Emf Equation - Operation on No Load and on Load - Phasor Diagrams-Equivalent Circuit - Losses and Efficiency-Regulation-OC and SC Tests - Predetermination of Efficiency and Regulation. Analysis of Balanced Three Phase Circuits – Phase Sequence- Star and Delta Connection - Relation between Line and Phase Voltages and Currents in Balanced Systems - Measurement of Active and Reactive Power in Balanced and Unbalanced Three PhaseSystems.

Learning Outcomes:

- To understand the principle of operation of 1-ϕtransformer
- To understand computation and predetermination of regulation of a 1-ϕtransformer
- To know about basics of three phasecircuits
- To distinguish between phase voltages, currents, line values and phasevalues
- To distinguish between balanced and unbalanced three phase circuits and powermeasurement

UNIT-IV

3-Phase InductionMotors: Polyphase Induction Motors-Construction Details and Applications of Cage and Wound Rotor Machines- - Principle of Operation – Slip- Rotor Emf and Rotor Frequency - Torque Equation- Torque Slip Characteristics – Losses andefficiency.

Learning Outcomes:

- To know about principle of operation of three phase inductionmotor
- To distinguish between squirrel cage and slip ring inductionmotors
- To know about various losses and computation of efficiency of inductionmotor
- To know about the torque developed by the inductionmotor
- To understand various characteristics of inductionmotor

UNIT–V

Synchronous Machines: Principle and Constructional Features of Salient Pole and Round Rotor Machines – E.M.F Equation- Applications , Voltage Regulation by Synchronous Impedance Method- Theory of Operation of Synchronous Motor.

Learning Outcomes:

- To know about principle of working ofalternator
- To distinguish between salient pole and cylindrical rotor machines
- To know about emfequation
- To know about predetermination of regulation of alternator by synchronous impedance method
- To know about principle of operation of synchronousmotor

TEXT BOOKS:

1. I.J.Nagrath&D.P.Kothari, "Electric Machines", 7th Edition, Tata McGraw Hill,2005
2. T.K.Nagsarkar and M.S. Sukhija, " Basic Electrical Engineering", 3rd Edition, Oxford UniversityPress2017.

REFERENCE BOOKS:

1. B. R. Gupta, "Fundamentals of Electric Machines", VandanaSinghal, 3rd Edition, New age International Publishers,2005.
2. S. Kamakashiah, "Electromachanics – III", overseas publishers Pvt.Ltd.
3. V.K. Mehta and Rohit Mehta, "Principles of Electrical Engineering", S.Chand Publications,2005.

COURSE OUTCOMESS:

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

1. Calculate the e.m.f. generated on DC Generator also able to control speed of different DC motors.
2. Conduct open circuit and short circuit tests on single phase transformer for knowing their characteristics.
3. Analyse three phase circuits, three induction motor operating principle and know their torque slip characteristics.
4. Able to have knowledge on synchronous machine with which he/she can able to apply the above conceptual things to real-world problems and applications

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COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C** **0 - 0 – 3 – 1.5**

ELECTRONIC DEVICES AND CIRCUITS LABORATORY

COURSE OBJECTIVES: -

1. To verify the VI Characteristics of PN Junction Diode, Zener Diode, FET, SCR & UJT
2. To demonstrate the working of Half Wave and Full Wave Rectifiers without and with filters.
3. To analyze the characteristics of BJT and FET in various configurations.
4. Differentiate the working of BJT and FET as amplifier in various configurations.

List of Experiments: (Any 12 Experiments are to be conducted)

1. P-N Junction Diode Characteristics
2. Zener Diode Characteristics
3. Half Wave Rectifiers (without and with filter)
4. Full Wave Rectifiers (without and with filter)
5. CB Characteristics
6. CE Characteristics
7. CC Characteristics
8. FET Characteristics
9. SCR Characteristics
10. UJT Characteristics
11. CE Amplifier
12. CC Amplifier
13. FET-CS Amplifier
14. FET –CD Amplifier

COURSE OUTCOMESS:-

After completion of this laboratory students will be able to

1. Use PN Junction Diode, Zener Diode, FET, SCR & UJT for practical applications.
2. Demonstrate the working of Half Wave and Full Wave Rectifiers without and with filters.
3. Analyze the characteristics of BJT and FET in various configurations.
4. Differentiate the working of BJT and FET as amplifier in various configurations.

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COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C** **0 – 0 – 2 – 1**

SIGNALS AND SYSTEMS LAB

List of Experiments:

COURSE OBJECTIVES:

1. To provide practical exposure to generate and simulate basic signals.
2. To analyze signals and sequences using Fourier, Laplace and Z-transforms.
3. To write programs for signal processing applications.

List of Experiments:

1. Write a program to generate various Signals and Sequences
2. Write a program to perform operations on Signals and Sequences
3. Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal and reconstruct the signal.
4. Write a program to find Fourier transform of a given signal. Write a program to convolve two discrete time sequences.
5. Write a program to find autocorrelation and cross correlation of given sequences.
6. Write a program to verify Linearity and Time Invariance properties of a given Continuous/Discrete System.
7. Write a program to generate discrete time sequence.
8. Write a program to find magnitude and phase response of first order low pass and high pass filter.
9. Write a program to find response of a low pass filter and high pass filter, when a speech signal is passed through these filters.
10. Write a program to generate Complex Gaussian noise and find its mean, variance, PDF and PSD.
11. Generate a Random data (with bipolar) for a given data rate .
12. To plot pole-zero diagram in S-plane/Z-plane of given signal/sequence and verify its stability.

Note:

- All the experiments are to be simulated using MATLAB or equivalent software.

COURSE OUTCOMES:

After completion of this laboratory students will be able to

1. Generate signals and sequences to the systems to perform various operations.
2. Analyze signals using Fourier, Laplace and Z-transforms.
3. Write programs for signal processing applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech I Sem (E.C.E) **L – T – P – C** **0 – 0 – 2 – 1**

ELECTRICAL TECHNOLOGY LAB

COURSE OBJECTIVES:

1. To do experiments on DC generators and DC motors
2. To do experiments on 1-ϕ transformer
3. To do power measurements in 3-ϕ balanced and unbalanced circuits
4. To do tests on 3-ϕ Induction motors
5. To do experiment on Alternator
6. To do experiment on Synchronous motor

List of Experiments:

1. OCC of a separately excited DC generator
2. Load characteristics of DC shunt generator
3. Load characteristics of DC shunt motor
4. Swinburne's test
5. Speed control of DC shunt motor
6. OC & SC tests on a 1-ϕ transformer
7. Measurement of Active and reactive powers in a 3-ϕ balanced circuit
8. Measurement of 3-ϕ power using two wattmeter method in unbalanced circuit
9. Load test on Squirrel cage Induction motor
10. Load test on Slip ring Induction motor
11. Predetermination of regulation of alternator by Synchronous impedance method
12. V and Inverted V curves of Synchronous motor

Note: Student has to perform at least 10 experiments

COURSE OUTCOMES:

1. To understand various characteristics of DC generators and DC motors
2. To predetermine the efficiency and regulation of a 1-ϕ transformer
3. To know power measurement in 3-ϕ circuits
4. To understand various characteristics of Induction motors, Synchronous machines

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
College of Engineering (Autonomous), Pulivendula - 516390, A.P, INDIA.

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Constitution of India

Course Objectives:

1. To enable the student to understand the importance of constitution.
2. To understand philosophy of fundamental rights and duties.
3. To understand the structure of executive, legislature and judiciary.
4. To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
5. To understand the central and state relation financial and administrative.

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

Learning Outcomes:

At the end of this unit students will be able to:

1. Understand the concept of Indian constitution.
2. Apply the knowledge on directive principle of state policy.
3. Analyze the History, features of Indian constitution.
4. Evaluate Preamble Fundamental Rights and Duties.

UNIT-II

Democratic forms of Constitution, Union Government and its Administration Structure of the Indian Union: Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

Learning Outcomes:

At the end of this unit students will be able to:

1. Understand the structure of Indian government.
2. Differentiate between the state and central government.
3. Explain the role of President and Prime Minister.
4. Know the Structure of supreme court and High court.

UNIT-III

Federalism, Political relations, Financial relations of State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

Learning Outcomes:

At the end of this unit students will be able to:

1. Understand the structure of state government.
2. Analyze the role Governor and Chief Minister.
3. Explain the role of state Secretariat.
4. Differentiate between structure and functions of state secrateriate.

UNIT-IV

A. Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

Learning Outcomes:

At the end of this unit students will be able to:

1. Understand the local Administration.
2. Compare and contrast district administration role and importance.
3. Analyze the role of Myer and elected representatives of Municipalities.
4. Evaluate Zilla panchayat block level Organisation.

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate , State Election Commission, Supreme Court, High Court.

Learning Outcomes:

At the end of this unit students will be able to:

1. Know the role of Election Commission apply knowledge.
2. Contrast and compare the role of Chief Election commissioner and Commissiononerate.
3. Analyze role of state election commission.
4. Evaluate various commissions of viz SC/ST/OBC and women.

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi.
2. Subash Kashyap, Indian Constitution, National Book Trust.
3. J.A. Siwach, Dynamics of Indian Government & Politics.
4. D.C. Gupta, Indian Government and Politics.
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication.
6. J.C. Johari, Indian Government and Politics Hans.

Course Outcomes:

1. Understand historical background of the constitution making and its importance for building a democratic India.
2. Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
3. Understand the value of the fundamental rights and duties for becoming good citizen of India.
4. Analyze the decentralization of power between central, state and local self-government.
5. Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
6. Know the sources, features and principles of Indian Constitution.
7. Learn about Union Government, State government and its administration.
8. Get acquainted with Local administration and Pachayati Raj.
9. Be aware of basic concepts and developments of Human Rights.
10. Gain knowledge on roles and functioning of Election Commission.

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COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Sem (E.C.E) **L – T – P – C** **3 – 0 – 0 – 3**

PROBABILITY THEORY AND STOCHASTIC PROCESSES

COURSE OBJECTIVES:

1. To study the probability theory and operations on single random variable.
2. To understand multiple random variables and operations on them.
3. To gain knowledge of random processes and their temporal characteristics.
4. To describe spectral characteristics of random processes.
5. To analyze the linear systems with stationary random process as input.

UNIT I

Probability: Probability introduced through sets and relative frequency**:** experiments and sample spaces, discrete and continuous sample spaces, events, probability definitions and axioms, mathematical model of experiments, probability as a relative frequency, joint probability, conditional probability, total probability, Bayes' theorem, independent events, problem solving.

The Random Variable: Definition of a random variable, conditions for a function to be a random variable, discrete, continuous, mixed random variable, distribution and density functions, binomial, Poisson, uniform, Gaussian, exponential, Rayleigh, conditional distribution, conditional density, properties. Expectation of a random variable, moments-moments about the origin , central moments, variance and skew, Chebyshev's inequality, moment generating function, characteristic function, problem solving.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concept of probability theory and random variables.
- Solve problems related to single random variable and operations on them.

UNIT II

Multiple Random Variables: Vector random variables, joint distribution function, properties of joint distribution, marginal distribution functions, conditional distribution and density – point conditioning, 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 of Gaussian random variables, transformations of multiple random variables.

Learning Outcomes:

At the end of the unit, the student will be able to

- Gain knowledge on multiple random variables.
- Evaluate statistical properties of multiple random variables.

UNIT III

Random Processes-Temporal Characteristics: The random process concept, classification of processes, deterministic and nondeterministic processes, distribution and density functions, concept of stationarity and statistical independence, first-order stationary processes, second-order and wide-sense stationarity, n-order and strict-sense stationarity. Time averages and Ergodicity, mean-Ergodic processes, correlation-Ergodic processes, autocorrelation function and its properties, cross-correlation function and its properties, covariance functions, Gaussian random processes, Poisson random process.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concept of random processes and Ergodic random processes.
- Analyze the concepts and properties of auto correlation and cross correlation.

UNIT IV

Random Processes-Spectral Characteristics: The power density spectrum and its properties, relationship between power spectrum and autocorrelation function, the cross-power density spectrum and its properties, relationship between cross-power spectrum and cross-correlation function.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand and analyze spectral characteristics of random processes.
- Learn the relationship between power spectrum and correlation.

UNIT V

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.

Noise Definitions: White Noise, colored noise and their statistical characteristics, Ideal low pass filtered white noise, RC filtered white noise.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the response of linear systems for random inputs.
- Understand the concepts of noise and their statistical characteristics.

TEXT BOOKS:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH,2002.

2. Athanasios Papoulis and S. UnnikrishnaPillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI,2002.

REFERENCES:

1. Simon Haykin, "Communication Systems", 3rd Edition, Wiley,2010.
2. Henry Stark and John W.Woods, "Probability and Random Processes with Application to Signal Processing," 3rd Edition, Pearson Education,2002.
3. George R. Cooper, Clave D. MC Gillem, "Probability Methods of Signal and System Analysis," 3rd Edition, Oxford,1999.

COURSE OUTCOMES:

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

1. Understand the probability theory and operations on single random variable.
2. Perform operations on multiple random variables.
3. Gain knowledge of random processes and their temporal characteristics.
4. Describe spectral characteristics of random processes.
5. Analyze the linear systems with stationary random process as input.

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COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Sem (E.C.E) **L – T – P – C** **3 – 0 – 0 – 3**

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

COURSE OBJECTIVES:

1. To gain the knowledge of analysis of BJT amplifiers at high frequencies.
2. To study about the multistage amplifiers and their performance characteristics.
3. To understand the effect of negative feedback on amplifier characteristics.
4. To learn the basic principles and working of oscillator circuits.
5. To get a basic idea about large signal amplifiers and tuned amplifiers.

UNIT I

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concepts and equivalent circuit models of BJT at high frequencies.
- Analyze high frequency models and performance parameters of BJT amplifier circuits.

UNIT II

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 problems.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyse the inter-stage coupling and performance parameters of multistage amplifiers.
- Design multiple stage amplifier circuits.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concept of feedback and determine itson amplifier characteristics.
- Analyse the characteristics of various types of feedback configurations.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the basic working principle of oscillator.
- Analyse different types of oscillators circuits.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Know about common classes of power amplifier and their basic characteristics.
- Evaluate the resonant frequency and analyse the characteristics of tuned amplifiers.

TEXT BOOKS:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, 2nd Edition, McGraw 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..
5. Introductory Electronic Devices and Circuits, Robert T. Paynter, 7th edition, PEI, 2009.

COURSE OUTCOMES:

After the completion of the course, students will be able to

1. Gain the knowledge of high frequenciesanalysis of BJT amplifiers.
2. Know about the multistage amplifiers and their performance characteristics.
3. Understand the effect of negative feedback on amplifier characteristics.
4. Explain the basic principles and working of oscillator circuits.
5. Describe about the large signal amplifiers and tuned amplifiers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Sem (E.C.E) **L – T – P – C** **3 – 0 – 0 – 3**

EM WAVES AND TRANSMISSION LINES

COURSE OBJECTIVES:

1. To understand and analyze different laws and theorems of electrostatic fields.
2. To study and analyze different laws and theorems of magnetostatic fields.
3. To analyze Maxwell's equations in different forms.
4. To learn the concepts of wave theory and its propagation through various mediums.
5. To get an exposure to the properties of transmission lines.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand vector algebra, vector calculus andconcepts related to electrostatic Fields.
- Analyze and solve the problems related to electrostatic fields.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Comprehend the laws, concepts and proofs related to Magnetostatic Fields.
- Analyze and solve the problems related to magnetic fields.

UNIT III

Maxwell's Equations : 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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the significance and utility of Maxwell's Equations.
- Appreciate the importance of boundary conditions in electromagnetics.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the characteristics of Uniform Plane Waves (UPW)
- Understand the propagation of electromagnetic waves in different media.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Determine the basic transmission line equations and their characteristics,
- Understand the smith chart and its applications.

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.

COURSE OUTCOMES:

At the end of this course the student will be able to:

1. Analyze and apply the laws & theorems of electrostatic fields to solve the problems.
2. Gain proficiency in the analysis and application of magnetostatic laws and theorems.
3. Analyze Maxwell's equations in different forms.
4. Learn the concepts of wave theory and its propagation through various mediums.
5. Understand the properties of transmission lines and their applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Semester (E.C.E) **L – T – P – C** **3 – 0 – 0 – 3**

ANALOG COMMUNICATIONS

COURSE OBJECTIVES:

1. To gain an understanding of basics of analog communication systems, various amplitude modulation and demodulation techniques
2. To study different types of angle modulation and demodulation schemes.
3. To learn and analyze the effects of noise for different modulation techniques.
4. To understand different pulse modulation schemes, radio transmitters and receivers
5. To acquire the knowledge about information theory and channel coding.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the basic concepts of the analog communication systems.
- Appreciate the uses and applications of different amplitude modulation and demodulation techniques

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Learn the concepts of frequency modulation and phase modulation
- Compare NBFM and WBFM, analyze FM and PM.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Know about different types of noise and their effects.
- Analyze the performance of different modulation methods in the presence of noise.

UNIT IV

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

Radio Transmitters and Receivers:AM Transmitter, FM Transmitter, Super-heterodyne AM and FM receiver, Sensitivity, Selectivity, Image rejection ratio and fidelity.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand different types of analog pulse modulation methods.
- Gain knowledge on radio transmitters and receivers.

UNIT- V

Information Theory & Channel Coding: 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, Huffman coding, 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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concepts of information theory and coding techniques.
- Derive the channel capacity and design the channel performance.

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.

COURSE OUTCOMES:

At the end of this course the student will be able to:

1. Understand the basics of analog communication systems, various amplitude modulation and demodulation techniques
2. Gain the knowledge of different types of angle modulation and demodulation schemes.
3. Analyze the effects of noise for different modulation techniques.
4. Comprehend different pulse modulation schemes, radio transmitters and receivers
5. Acquire the knowledge about information theory and channel coding.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Semester (E.C.E) **L – T – P – C** **3 – 0 – 0 – 3**

LINEAR INTEGRATED CIRCUITS & APPLICATIONS

COURSE OBJECTIVES:

1. To study differential amplifiers and their characteristics, characteristics of Op-amp and its applications.
2. To understand the operation of op-amp with negative feedback and its frequency response.
3. To design and analyze amplifiers, filters and converters
4. To develop oscillators and Multivibrators using Linear IC's.
5. To learn about various techniques to design A/D and D/A convertors.

UNIT I

Differential Amplifiers: Basic BJT and FET Differential Amplifiers and its qualitative description, Differential amplifier configurations Balanced and unbalanced output differential amplifiers, current mirror, level translator.

Operational Amplifiers: Classification of IC's, Package Types, Op-amp Block diagram, Ideal Op-Amp, Equivalent circuit, Voltage Transfer curve, open loop op-amp configurations, 741 Op-Amp and its features, Introduction to dual OP-AMP TL082 as a general purpose JFET-input Operational Amplifier.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the differential amplifiers and their characteristics.
- Analyze the linear and non-linear applications of operational amplifiers.

UNIT II

OP-AMP with Negative Feedback and Frequency 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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Learn the feedback configurations of OP-AMP.
- Explain the frequency response of op-amp circuits.

UNIT III

OP-AMP Applications-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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Design and analyze different amplifiers using op-amp.
- Understand the working of converters and filters using op-amp.

UNIT-IV

OP-AMP Applications-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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Design oscillators using op-amps.
- Learn the design of Multivibrators and PLL's using timer IC.

UNIT V

Analog to Digital and Digital to Analog Converters: Analog and Digital Data Conversions, D/A Converters – 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..

Learning Outcomes:

At the end of the unit, the student will be able to

- Learn the techniques for designing Digital to Analog Converters.
- Implement Analog to Digital Converters in different methods.

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.

COURSE OUTCOMES:

At the end of this course the student will be able to:

1. Learn about differential amplifiers and their characteristics, characteristics of Op-amp and its applications.
2. Understand the operation of op-amp with negative feedback and its frequency response.
3. Design and analyze amplifiers, filters and converters
4. Develop oscillators and Multivibrators using Linear IC's.
5. Study various techniques to design A/D and D/A convertors.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Semester (E.C.E) **L – T – P – C3 – 0 – 0 – 3**

DIGITAL INTEGRATED CIRCUITS & APPLICATIONS

COURSE OBJECTIVES:

1. To introduce digital logic families and interfacing concepts for implementing digital systems.
2. To gain knowledge on VHDL fundamentals, compilers, simulators and synthesis tools.
3. To design and implement different combinational logic circuits.
4. To understand how to implementsequential logic circuits.
5. To get a comprehensive idea about different types of memories.

UNITI

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

Bipolar Logic And Interfacing: Bipolar logic, Transistor logic, Transistor-transistor logic (TTL) families,Integrated injection logic (I^2L), CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emittercoupled logic, Comparison of logic families, Familiarity with standard 74XXand CMOS 40XX seriesICs, Specifications.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the structure of digital integrated circuit families and their characteristics.
- Learn how to interface different logic families.

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 designelements, time dimension and simulation synthesis.

Learning Outcomes:

At the end of the unit, the student will be able to

- Learn the Hardware Description Language (VHDL).
- Model the complex digital systems at different levels of abstractions.

UNITIII

Combinational Logic Design: Decoders (74x138), Dual Decoder (74x139), 8 to 3 Encoders, Priority Encoder (74x148), three state devices, multiplexers (74x151) and de-multiplexers (74x155), Code Converters, EX-OR gates and parity circuits, comparators (74x85), adders

&subtractors, ALUs, Combinational multipliers, Design considerations of the above mentioned combinational logic digital IC's, VHDL models for the above ICs.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the implementation of different combinational logic circuits.
- Design and analyze combinational logic circuits using VHDL.

UNIT- IV

Sequential logic Design: Latches & flip flops, counters (74x163), shift register (74x164 and 74x166)and PLDs.Design considerations of the above mentioned sequential logic digital IC's, VHDL models for the above ICs. Design process of FSM: Moore and Mealy machines and their VHDL models, Synchronous design methodology and it's impediments.

Learning Outcomes:

At the end of the unit, the student will be able to

- Acquire knowledge about differentsequential logic circuits.
- Implement sequential logic circuits using VHDL.

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.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the internal architectures of ROM and RAM.
- Use ROM and RAM for different memory applications.

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. Morris Mano M, Michael D. Ciletti, "Digital Design",Pearson Education, 4th Edition, 2007
2. Charles H. Roth Jr., "Digital System Design Using VHDL," 2nd Edition, PWS Publications, 2008.
3. Stephen Borwn and ZvonkoVramesic, "Fundamentals of Digital Logic with VHDL Design," 2nd Edition, McGraw Hill, 2005.

COURSE OUTCOMES:

At the end of this course the student will able to:

1. Learn about digital logic families and interfacing concepts for implementing digital systems.
2. Gain knowledge on VHDL fundamentals, compilers, simulators and synthesis tools.
3. Design and implement different combinational logic circuits.
4. Understand how to implement sequential logic circuits.
5. Get a comprehensive idea about different types of memories.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Sem (E.C.E) **L – T – P – C** **0 – 0 – 3 – 1.5**

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN LAB

COURSE OBJECTIVES:

1. To design, simulate and test single and multistage amplifiers.
2. To verify the effect of feedback on amplifier parameters.
3. To understand the functioning of oscillator circuits
4. To design and analyse power amplifiers and tuned amplifiers.

List of Experiments (Any 12 experiments to be done)

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

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

COURSE OUTCOMES:

After completion of these laboratory students able to:

a. Design, simulate and test single and multistage amplifiers.
b. Verify the effect of feedback on amplifier parameters.
c. Learn the functioning of oscillator circuits
d. Design and analyse power amplifiers and tuned amplifiers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Sem (E.C.E) **L – T – P – C** **0 – 0 – 2 – 1**

ANALOG COMMUNICATIONS LAB

COURSE OBJECTIVES:

1. To gain an understanding on analog modulation and demodulation techniues.
2. To recognize the importance of pre-emphasis and de-emphasis.
3. To know the need for diode detector, and AGC.
4. To understand different pulse modulation and demodulation techniques.
5. To perform radio receiver measurements like sensitivity, selectivity and fidelity.

List of Experiments: (Any 10 Experiments are to be conducted)

1. Amplitude Modulation & Demodulation.
2. AM - DSB SC - Modulation & Demodulation.
3. Diode Detector.
4. Pre-emphasis & De-emphasis.
5. Frequency Modulation & Demodulation.
6. Automatic Gain Control Circuits.
7. Verification of Sampling Theorem.
8. Pulse Amplitude Modulation & Demodulation.
9. Pulse Width Modulation & Demodulation.
10. Pulse Position Modulation & Demodulation.
11. Phased Locked Loop.
12. Spectral analysis of modulated signals using Spectrum Analyzer.
13. Radio receiver measurements – sensitivity, selectivity and fidelity.

COURSE OUTCOMES:

After completion of the course the students will be able to

1. Gain an understanding on analog modulation and demodulation techniques.
2. Recognize the importance of pre-emphasis and de-emphasis.
3. Demonstrate the need for diode detector, and AGC.
4. Understand different pulse modulation and demodulation techniques.
5. Measure radio receiver characteristics like sensitivity, selectivity and fidelity.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (Autonomous) PULIVENDULA

II B.Tech II Sem (E.C.E) **L – T – P – C** **0 – 0 – 2 – 1**

INTEGRATED CIRCUITS & APPLICATIONS LAB

COURSE OBJECTIVES:

1. To design and analyze various applications of op-amp and waveform generation circuits.
2. To get exposure to design and analysis of multivibrators and filters.
3. To get the knowledge about functionality of A/D and D/A converters.
4. To use computer-aided design tools for development of complex digital logic circuits
5. To understand the functionality of various Digital ICs.

Part A: Linear IC Applications

List of Experiments: (any six using Hardware)

1. Differential Amplifer (BJT, FET)
2. Op-Amp applications-Adder, subtractor, comparator, Integrator, differentiator
3. Study the characteristics of negative feedback amplifier
4. Design of an Instrumentation amplifier
5. Monostable and Astable multivibrator using IC 555 Timer
6. Filter applications – LPF, HPF (First order)
7. Design of Analog filters (2^{nd} order bandpass filter and Notch filter)
8. D/A Converters(R-2R Ladder)
9. A/D Converters (Successive Approximation)
10. Design of a function generator
11. Design of a Voltage Controlled Oscillator (VCO)
12. Design of a Phase Locked Loop (PLL)

Part-B: Digital IC Applications

List of Experiments: (any six 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. Universal shift register – 74194/74195
9. Priority encoder- 74LS148
10. ALU Design.

COURSE OUTCOMES:

After completion of the course the students will be able to

1. Design and analyze various applications of op-amps and waveform generation circuits.
2. Get exposure to design and analysis of Multivibrators and filters.
3. Understand the functionality of A/D and D/A converters.
4. Use computer-aided design tools for development of digital logic circuits
5. Learn the functionality of various Digital ICs.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: PULIVENDULA
DEPARTMENT OF CHEMISTRY
II B.TECH – I/II SEMESTER Mandate Course (MC)
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
	Environmental Science	3	0	-	0

COURSE OBJECTIVES	
1	To make the student understand multi disciplinary nature of environment and its components.
2	To investigate the relationship between human life and environment from scientific prospective.
3	To impart knowledge to the students about fundamental concepts of Ecosystem and Biodiversity
4	Necessasity of analyzing regional, national and global environmental problems
5	To understand and apply the fundamentals of Environmental science to important local, regional, national and global environmental problems and potential issues

COURSE OUTCOMES	
CO1	Able to solve the environmental problems based fundamental concepts of Environmental Science.
CO2	Enable the students to understand the structure and function of significant environmental systems
CO3	Knowledge of concepts makes them differentiate Natural and Polluted environment..
CO4	Enable to apply the Pyramid of number, mass and Energy, understand about Renweable energy resources. Illustrate the Forest ecosystem, Discuss about Grass and Net biomass productivity
CO5	Differentiate between Forest and desert Ecosystems, Critically evaluate arguments regarding environmental issues. Illustrate the Food chain and food web, Identify the applications of rain water harvesting, Interpret advantages of In-situ and Ex-situ conservation of biodiversity

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

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. Dams, benefits 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

c) Earth: Geomorphology, Weathering, Structure of Earth - inner core, outer core, mantle and the crust, magma.

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

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

- 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.

Types of some ecosystems: -

a. Forest ecosystem b. Desert ecosystem

d. Aquatic ecosystems (ponds, 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, India as a mega-diversity nation.

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-III:

Environmental Pollution and Disaster management:

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

Disaster management: floods, earthquake, cyclone and landslides.
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

UNIT-IV:

Social Issues and the Environment

From Unsustainable to Sustainable development. Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

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, 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 simple ecosystems-pond, river, hill slopes, etc.

Text Books:

1. Shashi Chawla, A Text Book of Environmental Studies, Mc Graw Hill Education, 4th edition, 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.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING PULIVENDULA(AUTONOMOUS) -PIN: 516390(A.P.)

L	T	P	C
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UNIVERSAL HUMAN VALUES

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 – Self interest - Spirituality, Moral dilemmas- Consensus and controversy.

Unit II: PERSONALITY DEVELOPMENT

Concept of personality, types of personalities, Knowing of self(SWOT), improving personality – techniques, interpersonal skills, intrapersonal skills, building right attitude, developing the spirit of universal human goodness.

Unit III: ENGINEERING AS SOCIAL EXPERIMENTATION AND

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.

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 the safety.

UNIT IV: UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY.

Understanding Harmony in the family – the basic unit of human interaction, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the harmony

in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family.

UINIT V: GLOBAL ISSUES

Globalization – Cross culture 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).

Outcomes:

- 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"** by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
2. **Engineering Ethics includes Human Values**" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
3. **"Ethics in Engineering"** by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill– 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. **"Indian Culture, Values and Professional Ethics"** by PSR Murthy-BS Publication.

7. **"Professional Ethics and Human Values"** by Prof.D.R.Kiran.