JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23ABS05 – LINEAR ALGEBRA & CALCULUS

(Common to all Branches)

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- This course will illuminate the students in the concepts of calculus and linear algebra.
- 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: At the end of the course, the students will be able to

- **CO1:** Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- **CO2:** Utilize mean value theorems to real life problems (L3)
- **CO3:** Familiarize with functions of several variables which is useful in optimization (L3)
- **CO4:** Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- **CO5:** Students will become familiar with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates (L5)

UNIT – I: Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT – II: Linear Transformation and Orthogonal Transformation

Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT – III: Calculus

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT – IV: Partial differentiation and Applications (Multi variable calculus)

Partial derivatives, total derivatives, chain rule, change of variables, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

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UNIT – V: Multiple Integrals (Multi variable Calculus)
Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).
Text Books:
1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
Reference Books:
1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
3. H. K Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand,2021

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23ABS01 – ENGINEERING PHYSICS

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses.
- To identifying the importance of the optical phenomenon like interference, diffraction etc.
- To enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics.
- To introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

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

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.

CO2: Familiarize with the basics of crystals and their structures.

CO3: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.

CO4: Summarize various types of polarization of dielectrics and classify the magneticmaterials.

CO5: Explain the basic concepts of Quantum Mechanics and the band theory of solids. Identify the type of semiconductor using Hall effect.

UNIT – I: Wave Optics

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT – II: Quantum Mechanics and Free electron theory

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

UNIT – III: Crystallography and X-ray diffraction

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods.

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UNIT – IV: Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss, applications of dielectric materials.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials, applications of magnetic materials.

UNIT – V: Semiconductors and Superconductors

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation –Hall effect and its applications.

Superconductors: Introduction – Properties of superconductors – Meissner effect – Type I and type II superconductors – BCS theory – Josephson effects (AC and DC) – High Tc superconductors – Applications of superconductors.

Text Books:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar& TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010

Online Learning Resources:

- https://www.loc.gov/rr/scitech/selected-internet/physics.html
- https://archive.nptel.ac.in/courses/122/107/122107035/
- https://archive.nptel.ac.in/courses/122/104/122104016/
- https://archive.nptel.ac.in/courses/122/101/122101002/

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3	0	0	3

INTRODUCTION TO PROGRAMMING

(Common to All branches of Engineering)

Course Objectives:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

Course Outcomes: A student after completion of the course will be able to

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyse a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4: Understand more advanced features of C language.
CO5: Develop problem-solving skills and the ability to debug and optimize the code.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1									1	1	1	
CO2	1	2	1										1	1	
CO3	2	2	1										1	1	
CO4	2	1	1										1	1	
CO5	2	2	1										1	1	

UNIT I Introduction to Programming and Problem Solving

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program-Algorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III Arrays and Strings

Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV Pointers & User Defined Data types

Pointers, dereferencing and address operators, pointer and address arithmetic, **Dynamic memory allocation**, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT V Functions & File Handling

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, **Command line arguments,**

Basics of File Handling: why files, file opening and closing a data files, reading and writing a data file, processing data files.

Note: The syllabus is designed with C Language as the fundamental language of implementation.

Textbooks:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

Reference Books:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A ProblemSolving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23ABEE01 – BASIC ELECTRICAL & ELECTRONICS ENGINEERING

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

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

CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.

CO2: Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations.

CO3: Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.

CO4: Analyze different electrical circuits, performance of machines and measuring instruments.

CO5: Evaluate different circuit configurations, Machine performance and Power systems operation.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT – I:

DC & AC Circuits DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems. AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT – II:

Machines and Measuring Instruments Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines. Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT – III:

Energy Resources, Electricity Bill & Safety Measures Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation. Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

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Text books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition

Online Learning Resources:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

PART B: BASIC ELECTRONICS ENGINEERING

Course objectives:

This course provides the student with the fundamental skills to understand the principles of digital electronics, basics of semiconductor devices like diodes & transistors, characteristics and its applications.

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

CO1: Apply the concept of science and mathematics to understand the working of diodes, transistors, and their applications.

CO2: Explain the characteristics of diodes and transistors.

CO3: Familiarize with the number systems, codes, Boolean algebra and logic gates.

CO4: . Understand the working mechanism of different combinational, sequential circuits and their role in the digital systems.

UNIT – I:

SEMICONDUCTOR DEVICES: Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

UNIT – II:

BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION: Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

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UNIT – III:
DIGITAL ELECTRONICS: Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)
Text Books:
1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson 5 Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4 th Edition, Tata Mc Graw Hill, 2009
Reference Books:
1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, IntroductoryElectronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23AME01 – ENGINEERING GRAPHICS

(ME,CE, & ECE)

L	T	P	C
1	0	4	3

Course Objectives: The objectives of the course are to make the students learn about

- Understand the basic principles and conventions of engineering drawing use engineering instruments and draw engineering curves.
- Use orthographic projections and make the students to draw the projections of lines and planes inclined to both the planes.
- Draw the projections of the solids in different positions with respect to the reference planes.
- Understand the importance of sectioning and concept of development of surfaces and draw different sections and development of surfaces of solids.
- Represent and convert isometric views to orthographic views and vice versa.

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

CO1: Understand the principles of engineering drawing, including engineering curves, orthographic and isometric projections.

CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.

CO3: Understand and apply concepts of sectional views to represent and draw the details of solids in different positions and to draw their sectional views.

CO4: Gain a clear understanding of the principles behind development of surfaces and to draw how to unfold basic geometric shapes into flat patterns.

CO5: Develop the ability to draw isometric views and orthographic views and should be able to convert isometric views to orthographic views and vice versa.

UNIT – I: **8 Hrs**

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.

Curves: Construction of Ellipse, Parabola and Hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

UNIT – II: **10Hrs**

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Projections of Planes: Regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT – III: **8 Hrs**

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to other and axes inclined to both the reference planes.

UNIT – IV: **8Hrs**

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of regular solids - cube, prism, cylinder, pyramid and cone.

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UNIT – V:	**8Hrs**
Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views. **Computer graphics**: Creating 2D & 3D drawings of objects including PCB and Transformations using Auto CAD (*Not for end examination*).	
Text Books:	
1. Engineering Drawing, N.D.Bhatt and Panchal, Charotar Publishing House, 2016.	
2. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.	
3. Engineering Drawing + AUTO CAD, K.Venugopal and V.Prabhu Raja, 6th Edition, New Age International Publisher.	
Reference Books:	
1. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.	
2. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.	
Online Learning Resources:	
• https://ocw.mit.edu/courses/2-007-design-and-manufacturing-i-spring-2009/pages/related-resources/drawing_and_sketching/	
• https://nptel.ac.in/courses/112103019	
• https://archive.nptel.ac.in/courses/112/102/112102304/	
• https://www.youtube.com/watch?v=NI8pqCJghz0&pp=ygUaa2FkYXBhbmEgcGF2YW4ga3VtYXIgcmVkZHk%3D	
• https://archive.nptel.ac.in/courses/112/104/112104172/	

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23ABEE02– ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of the course are to make the students learn about

- To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

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

CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.

CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.

CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.

CO4: Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.

CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.

Activities:

1. Familiarization of commonly used Electrical & 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.
   - Provide some exercises so that hardware tools and instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, Multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
   - Provide some exercises so that measuring instruments are learned to be used by the students.
3. Components:
   - Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, color coding package, symbol, cost etc.
   - Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar, A. Chakrabarti, Dhanpat Rai & Co, 2013

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3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives: The objectives of the course are to make the students learn about

- To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

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

CO1: Identify & testing of various electronic components.

CO2: Understand the usage of electronic measuring instruments.

CO3: Plot and discuss the characteristics of various electron devices.

CO4: Explain the operation of a digital circuit.

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

Reference Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, IntroductoryElectronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

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L	T	P	C
0	0	3	1.5

COMPUTER PROGRAMMING LAB
(Common to All branches of Engineering)

Course Objectives:

The course aims to give students hands – on experience and train them on the concepts of the C-programming language.

Course Outcomes:

CO1: Read, understand, and trace the execution of programs written in C language.
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1									1	1	1	
CO2	1	2	1										1	1	
CO3	2	2	1										1	1	
CO4	2	1	1										1	1	
CO5	2	2	1										1	1	

UNIT I

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment

i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii) Exposure to Turbo C, gcc
iii) Writing simple programs using printf(), scanf()

WEEK 2

Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:

Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

i) Sum and average of 3 numbers
ii) Conversion of Fahrenheit to Celsius and vice versa
iii) Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.

i) Finding the square root of a given number
ii) Finding compound interest
iii) Area of a triangle using heron's formulae
iv) Distance travelled by an object

UNIT II

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

Lab4: Simple computational problems using the operator' precedence and associativity

i) Evaluate the following expressions.
    a. A+B*C+(D*E) + F*G
    b. A/B*C-B+A*D/3
    c. A+++B---A
    d. J= (i++) + (++i)
ii) Find the maximum of three numbers using conditional operator
iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5

Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Lab 5: Problems involving if-then-else structures.

i) Write a C program to find the max and min of four numbers using if-else.

ii) Write a C program to generate electricity bill.
iii) Find the roots of the quadratic equation.
iv) Write a C program to simulate a calculator using switch case.
v) Write a C program to find the given year is a leap year or not.

WEEK 6
Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:
Tutorial 6: Loops, while and for loops
Lab 6: Iterative problems e.g., the sum of series
i) Find the factorial of given number using any loop.
ii) Find the given number is a prime or not.
iii) Compute sine and cos series
iv) Checking a number palindrome
v) Construct a pyramid of numbers.

UNIT III

WEEK 7:
Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:
Tutorial 7: 1 D Arrays: searching.
Lab 7:1D Array manipulation, linear search
i) Find the min and max of a 1-D integer array.
ii) Perform linear search on1D array.
iii) The reverse of a 1D integer array
iv) Find 2's complement of the given binary number.
v) Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 8: Matrix problems, String operations, Bubble sort
i) Addition of two matrices
ii) Multiplication two matrices

iii) Sort array elements using bubble sort
iv) Concatenate two strings without built-in functions
v) Reverse a string using built-in and without built-in string functions

UNIT IV

WEEK9:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.
i) Write a C program to find the sum of a 1D array using malloc()
ii) Write a C program to find the total, average of n students using structures
iii) Enter n students data using calloc() and display failed students list
iv) Read student name and marks from the command line and display the student details along with the total.
v) Write a C program to implement realloc()

WEEK 10:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10 : Bitfields, linked lists
Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields
i) Create and display a singly linked list using self-referential structure.
ii) Demonstrate the differences between structures and unions using a C program.
iii) Write a C program to shift/rotate using bitfields.
iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT V

WEEK 11:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions
i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the lcm of two numbers.
iii) Write a recursive function to find the factorial of a number.
iv) Write a C Program to implement Ackermann function using recursion.
v) Write a recursive function to find the sum of series.

WEEK 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:
Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.
i) Write a C program to swap two numbers using call by reference.
ii) Demonstrate Dangling pointer problem using a C program.
iii) Write a C program to copy one string into another using pointer.
iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File operations
i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() and fwrite()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third file using command-line arguments.
v) Find no. of lines, words and characters in a file

vi) Write a C program to print last n characters of a given file.

Textbooks:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice-Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

ENGINEERING PHYSICS LAB

(Common for all branches of Engineering)

L	T	P	C
0	0	2	1

Course Objectives: To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to

- Operate optical instruments like travelling microscope and spectrometer. (L3)
- Estimate the wavelengths of different colors using diffraction grating.(L3)
- Plot the intensity of the magnetic field of circular coil carrying current with distance. (L2)
- Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively. (L3)
- Calculate the band gap of a given semiconductor. (L4)
- Identify the type of semiconductor using Hall effect. (L3)

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

References:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

Web resources

1. www.vlab.co.in
2. https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

Prof K. Balamurugan

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23ABS07 - NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

(Common to all branches)

L	T	P	C
0	0	1	0.5

Course Objectives:

- The objective of introducing this course is to impart discipline, character, fraternity, teamwork,social consciousness among the students and engaging them in selfless service.
- To help the students understand and build interpersonal and interpersonal skills that will enable them to lead meaningful professional life.

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

CO1: Understand the importance of discipline, character and service motto. (L1)

CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques. (L2)

CO3: Explore human relationships by analyzing social problems. (L3)

CO4: Determine to extend their help for the fellow beings and downtrodden people. (L4)

CO5: Develop leadership skills and civic responsibilities. (L5)

UNIT – 1: Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

1. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
2. Conducting orientations programs for the students –future plans-activities-releasingroad map etc.
3. Displaying success stories-motivational biopics- award winning movies on societalissues etc.
4. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT – II: *Nature & Care*

Activities:

1. Best out of waste competition.
2. Poster and signs making competition to spread environmental awareness.
3. Recycling and environmental pollution article writing competition.
4. Organising Zero-waste day.
5. Digital Environmental awareness activity via various social media platforms.
6. Virtual demonstration of different eco-friendly approaches for sustainable living.
7. Write a summary on any book related to environmental issues.

UNIT – III: Community Service

Activities:

1. Conducting One Day Special Camp in a village contacting village-area leaders- Surveyin the village, identification of problems- helping them to solve via media- authorities-experts-etc.

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2. Conducting awareness programs on Health-related issues such as General Health,Mental health, Spiritual Health, HIV/AIDS,
3. Conducting consumer Awareness. Explaining various legal provisions etc.
4. Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
5. Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, *A Text Book of National Service Scheme*
2. Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6).
3. *Red Book - National Cadet Corps* – Standing Instructions Vol I & II, DirectorateGeneral of NCC, Ministry of Defence, New Delhi
4. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering",McGraw Hill, New York 4/e 2008
5. Masters G. M., Joseph K. and Nagendran R. "Introduction to EnvironmentalEngineering and Scicncc", Pcarson Education, New Delhi. 2/e 2007
6. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.

General Guidelines:

- Institutes must assign slots in the Timetable for the activities.
- **Institutes are required to provide instructor to mentor the students.**

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23ABS08 – DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

(Common to All Branches)	L	T	P	C
	3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- 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: At the end of the course, the students will be able to

CO1: Solve the linear differential equations related to various engineering fields.

CO2: Solve the linear differential equations of higher order and finds the relevant applications.

CO3: Identify solution methods for partial differential equations that model physical processes.

CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence.

CO5: Estimate the work done against a field, circulation and flux using vector calculus and also to establish the relations between them using vector integral theorems.

UNIT – I: Differential equations of first order and first degree

Lincar differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits

UNIT – II: Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT – III: Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT – IV: Vector differentiation

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT – V: 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) and applications of these theorems.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2018.

2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23ABS03 – CHEMISTRY

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry, polymers, modern engineering materials.
- To introduce instrumental methods and to impart the concept of structure and bonding models.

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

CO.1: Compare the materials of construction for battery and electrochemical sensors.

CO.2: Explain the preparation, properties, and applications of thermoplastics & thermosetting plastics, elastomers & conducting polymers.

CO.3: Explain the principles of spectrometry, Chromatography in separation of solid and liquid mixtures.

CO.4: Apply the principle of Band diagrams in the application of conductors and semiconductors.

CO.5: Summarize and compare the concepts and applications of Instrumental methods

UNIT – I: Structure and Bonding Models

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo and heteronuclear diatomic molecules – energy level diagrams of O2, CO, and NO. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT – II: Modern Engineering Materials

Band theory of solids, Conductors, Semiconductors and Insulators, Semiconductor devices (p-n junction diode as rectifier and transistors)

Superconductors: Introduction, Basic concept and Applications.

Super capacitors: Introduction, Basic concept, Classification and Applications.

Nanomaterials: Introduction, classification, properties and applications of Fullerenes, carbon nanotubes and Graphenes.

UNIT – III: Electrochemistry

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems. Potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Na-Air Battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells, Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT – IV: Polymer Chemistry
Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation, Poly dispersity Index (PDI). Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6 and carbon fibres. Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Biodegradable polymers - Polyglycolic Acid (PGA), Polylactic Acid (PLA).
UNIT – V:
Electromagnetic spectrum, Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy: electronic transition, Instrumentation. IR spectroscopy: fundamental modes, selection rules and applications. Raman Spectroscopy : Principle , Instrumentation and selection rules . Chromatography: Basic Principle, Classification, HPLC: Principle, Instrumentation and applications.
Text Books:
1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.
3. K. Sesha Maheswaramma, Mridula Chugh, "Engineering Chemistry", Pearson Publications Pvt., Ltd., 2019 (ISBN 978-93-895-8839-2).
Reference Books:
1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Text Book of Polymer Science, Fred W. Billmayer Jr, 3rd Edition.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23AHS01 - COMMUNICATIVE ENGLISH

(Common to all Branches)

L	T	P	C
2	0	0	2

Course Objectives: The objectives of the course are to make the students learn about

- The main objective of introducing this course, *Communicative English,* is to facilitate effectivelistening, Reading, Speaking and Writing skills among the students.
- It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary.
- This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

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

1. **CO1**: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.. (L1)
2. **CO2:** Apply grammatical structures to formulate sentences and correct word forms. (L2)
3. **CO3:** Analyze discourse markers to speak clearly on a specific topic in informal discussions. (L3)
4. **CO4:** Evaluate reading / listening texts and to write summaries based on globalcomprehension of these texts. (L4)
5. **CO5:** Create a coherent paragraph, essay, and resume. (L5)

UNIT – 1

Lesson: HUMAN VALUES: Gift of Magi **(Short Story)**

Listening: Identifying the topic, the context and specific pieces of information by listeningto 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 ofinformation.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT – II

Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas afterlistening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structuretalks.

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Reading: Identifying sequence of ideas; recognizing verbal techniques that help to linkthe ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions. **Vocabulary:** Homonyms, Homophones, Homographs.

UNIT – III

Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what isdiscussed.

Reading: Readinga text in detail by making basic inferences -recognizing and interpretingspecific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Note-making, paraphrasing.

Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations.

Vocabulary: Compound words, Collocations.

UNIT – IV

Lesson: INSPIRATION: The Toys of Peace by Saki

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: Letter Writing: Official Letters, Resumes.

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice.

Vocabulary: Words often confused, Jargons.

UNIT – V

Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms, understanding concepts and answering a series ofrelevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar andusage (articles, prepositions, tenses, subject verb agreement).

Vocabulary: Technical Jargons.

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Text Books:

- Pathfinder: Communicative English for Undergraduate Students, 1st Edition, OrientBlack Swan, 2023 (Units 1,2 & 3).
- Empowering with Language by Cengage Publications, 2023 (Units 4 & 5).

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge,2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge UniversityPress, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building aSuperior Vocabulary. Anchor, 2014.

Online Learning Resources:

GRAMMAR

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year I Semester

23ACME01 – BASIC CIVIL AND MECHANICAL ENGINEERING

(EEE & CSE)

L	T	P	C
3	0	0	3

Part A – BASIC CIVIL ENGINEERING

Course Objectives: The objectives of the course are to make the students learn about

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

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

CO1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.

CO2: Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.

CO3: Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.

CO4: Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.

CO5: Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

UNIT – I: **8 Hrs**

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT – II: **10Hrs**

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.

UNIT – III: **8 Hrs**

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Text Books:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The objectives of the course are to make the students learn about

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

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

CO1: Understand the different manufacturing processes.
CO2: Explain the basics of thermal engineering and its applications.
CO3: Describe the working of different mechanical power transmission systems and power plants.
CO4: Describe the basics of robotics and its applications.

UNIT – I: **8 Hrs**

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT – II: **10Hrs**

Manufacturing Processes: Principles of Casting, Forming, Machining, Joining processes Introduction to CNC machines, 3D Printing, and Smart manufacturing.
Thermal Engineering – IC Engines, Otto cycle, Diesel cycle, 2-Stroke and 4-Stroke engines, SI & CI Engines, Working principle of Boilers, Refrigeration and Air-Conditioning cycles, Components of Electric and Hybrid Vehicles.

UNIT – III: **8 Hrs**

Power Plants – Working principle of Steam, Diesel, Hydro, Nuclear Power Plants.
Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.
Introduction to Robotics - Joints & links, configurations, and applications of robotics.
(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Text Books:

1. An Introduction to Mechanical Engineering, Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.
2. Elements of Mechanical Engineering, Dr.Sadhu Singh, S.Chand & Co Ltd.
3. Basic Civil and Mechanical Engineering, P.Selvaraj, M.Periyaswamy and S.Selvakumar, Scitech Publications,

Reference Books:

1. Robotics, Appuu Kuttan KK, I.K. International Publishing House Pvt. Ltd.
2. 3D Printing & Additive Manufacturing Technology, L. Jyothish Kumar, Pulak M Pandey, Springer publications
3. Thermal Engineering, Mahesh M Rathore, Tata McGraw Hill Publications (India) Pvt. Ltd.
4. Basic Civil and the Mechanical Engineering, G. Shanmugam and M.S.Palanisamy, Tata McGraw Hill publications (India) Pvt. Ltd.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23AEC01- NETWORK ANALYSIS

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- 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.

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

CO1: Understand basic electrical circuits with nodal and mesh analysis.

CO2: Analyse the circuit using network simplification theorems.

CO3: Find Transient response and Steady state response of a network.

CO4: Analyse electrical networks in the Laplace domain.

CO5: Compute the parameters of a two-port network.

UNIT – I:

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.

Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependent sources also.

UNIT – II:

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.

Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

UNIT – III:

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-LC circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

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UNIT – IV:
Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies. Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.
UNIT – V:
Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also. Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.
Text Books:
1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9 th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2 nd Edition, PHI
Reference Books:
1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7 th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23ABS04 – CHEMISTRY LAB

L	T	P	C
0	0	2	1

Course Objectives: The objectives of the course are to make the students learn about

Verify the fundamental concepts with experiments

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

CO1: Determine the cell constant and conductance of solutions

CO2: Prepare advanced polymer Bakelite materials.

CO3: Verification of Lambert-Beer's law.

CO4: Analyze the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb-Acid battery

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method.
2. Conductometric titration of strong acid vs. strong base.
3. Conductometric titration of weak acid vs. strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometry - determination of redox potentials and emf.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Estimation of Ferrous Iron by Dichrometry.
8. Verification of Lambert-Beer's law.
9. Simultaneous estimation of Mn and Cr ions by spectrophotometry in water samples.
10. Identification of functional groups in organic compounds by IR Spectroscopy.
11. Preparation of nanomaterials by precipitation method.
12. Preparation of a polymer (Bakelite).

Reference Books:

1. "Vogel's Quantitative Chemical Analysis 6th Edition, Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23AHS02 - COMMUNICATIVE ENGLISH LAB

(Common to all Branches)

L	T	P	C
0	0	2	1

Course Objectives: The objectives of the course are to make the students learn about

- The main objective of introducing this course, Communicative English Laboratory, is to exposethe students to a variety of self-instructional, learner friendly modes of language learning.
- Thestudents will get trained in basic communication skills and also make them ready to face job interviews.

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

- CO1: Understand the different aspects of the English language proficiency with emphasison LSRW skills. (L1)
- CO2: Apply communication skills through various language learning activities. (L2)
- CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable divisionfor better listening and speaking comprehension. (L3)
- CO4: Evaluate and exhibit professionalism in participating in debates and group discussions. (L4)
- CO5: Create effective Course Objectives: (L5)

UNIT – 1 **09 Hrs**

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Text Books:

- Pathfinder: Communicative English for Undergraduate Students, 1st Edition, OrientBlack Swan, 2023 (Units 1,2 & 3).
- Empowering with Language by Cengage Publications, 2023 (Units 4 & 5).

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018.
2. J. Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2nd Ed),Kindle, 2013.

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3. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India,2016.
4. Hewing's, Martin. Cambridge *Academic English* (B2). CUP, 2012.
Online Learning Resources:
Suggested Software • Walden Infotech • Young India Films
Spoken English: 1. www.esl-lab.com 2. www.englishmedialab.com 3. www.englishinteractive.net 4. https://www.britishcouncil.in/english/online 5. http://www.letstalkpodcast.com/ 6. https://www.youtube.com/c/mmmEnglish_Emma/featured 7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured 8. https://www.youtube.com/c/engvidAdam/featured 9. https://www.youtube.com/c/EnglishClass101/featured 10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists 11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw
Voice & Accent: 7. https://www.youtube.com/user/letstalkaccent/videos 8. https://www.youtube.com/c/EngLanguageClub/featured 9. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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L	T	P	C
0	0	3	1.5

ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Course Objectives:

To familiarize students with wood working, sheet metal operations, fitting operations and electrical house wiring skills, foundry operations, welding work and plumbing operations.

Course Outcomes:

- Identify workshop tools and their operational capabilities.
- Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
- Apply fitting operations in various applications.
- Apply basic electrical engineering knowledge for House Wiring Practice.
- Identify plumbing practice tools and apply plumbing operations.

SYLLABUS

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **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 d) Job on Wood working lathe

3. **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) Brazing d) Non metal sheet cutting and joining of glass, fibre glass and ceramic e) Riveting joint of two sheets/ Plates.

4. **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

5. **Electrical Wiring**: Familiarity 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

6. **Foundry Trade:** a)Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns b) Job on 3D printing Machine.
7. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019.
2. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edition. 2015.
3. Workshop practice manual by K.Venkat Reddy, 6th Edition, BS Publications, 2022.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14thedition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23AEC02 – NETWORK ANALYSIS AND SIMULATION LAB

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of the course are to make the students learn about

- 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

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

CO1: Verify Kirchoff's laws and network theorems.

CO2: Measure time constants of RL & RC circuits.

CO3: Analyze behavior of RLC circuit for different cases.

CO4: Design resonant circuit for given specifications.

CO5: Characterize and model the network in terms of all network parameters.

The following experiments need to be performed using both Hardware and simulation Software.

The experiments need to be simulated using software and the same need to be verified using the hardware.

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits
7. To study frequency response of various 1 st order RL & RC networks
8. To study the transient and steady state response of a 2 nd order circuit by varying its various parameters and studying their effects on responses.
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a twin-T network and study its frequency response.

Hardware Requirements:

Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components

Software requirements:

Multisim/ Pspice/Equivalent simulation software tool, Computer Systems with required specifications

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References:
1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9 th Edition 2020

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech I Year II Semester

23ABS06 - HEALTH AND WELLNESS, YOGA AND SPORTS

(Common to all branches)

L	T	P	C
0	0	1	0.5

Course Objectives:

1. The main objective of introducing this course is to make the students maintain their mental andphysical wellness by balancing emotions in their life.
2. It mainly enhances the essential traits required for the development of the personality.

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

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.(L1)

CO2: Demonstrate an understanding of health-related fitness components. (L2)

CO3: Compare and contrast various activities that help enhance their health. (L3)

CO4: Assess current personal fitness levels. (L4)

CO5: Develop Positive Personality. (L5)

UNIT – 1:

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index(BMI) of all age groups.

Activities:

i) Organizing health awareness programmes in community.
ii) Preparation of health profile.
iii) Preparation of chart for balance diet for all age groups.

UNIT – II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar.

UNIT – III

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning,2022.
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice.

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3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993.
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to SurvivingAnywhere Third Edition, William Morrow Paperbacks, 2014.
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. HumanKinetics, Inc.2014.

General Guidelines:

1) Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2) Institutes must provide field/facility and offer the minimum of five choices of as manyas Games/Sports.
3) Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year I Semester

23ABS34 – PROBABILITY & COMPLEX VARIABLES

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- The ideas of probability and random variables, operations on single & multiple random variables and various discrete and continuous probability distributions and their properties.
- Differentiation and integration of complex valued functions.

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

- **CO1:** Understand the concepts of Probability, Random Variables and their characteristics (L2,L3)
- **CO2:** Learn how to deal with multiple random variables, conditional probability, joint distribution and statistical independence. (L3,L5)
- **CO3:** Formulate and solve engineering problems involving random variables. (L3)
- **CO4:** Analyze limit, continuity and differentiation of functions of complex variables and Understand Cauchy-Riemann equations, analytic functions and various properties of analytic functions. (L2, L3)
- **CO5:** Understand Cauchy theorem,Cauchy integral formulas and apply these to evaluate complex contour integrals. Classify singularities and poles; find residues and evaluate complex integrals using the residue theorem (L3, L5)

UNIT – I: Probability & Random Variable

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

Random variables: Definition of a random variable - conditions for a function to be a random variable- discrete and continuous random variables - Mixed Random Variable. Distribution and Density functions and their properties. Gaussian random variable - Other distributions and density functions (Binomial, Poisson, Uniform, Exponential and Rayleigh).(Refer Text Book-1)

UNIT – II: Operations on Random variable

One Random Variable - Expectation: Expected value of a Random variable - Expected value of a function of a Random variable. Moments: Moments about the origin, Central moments, Variance and Skew. Functions that Give Moments: characteristic function - Moment generating functions.

Multiple Random Variables: Vector Random Variables, Joint Distribution and its properties: Joint distribution function - properties of joint distribution - Marginal Distribution Functions. -Joint density and its properties: joint density function-properties of Joint density-Marginal density functions. Conditional distribution and density-point conditioning. Statistical Independence.(Refer Text Book-1)

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UNIT – III: 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. (Refer Text Book-1)
UNIT – IV: Complex Variables - Differentiation
Introduction to functions of complex variables and elementary functions (exponential, trigonometric, hyperbolic and logarithmic functions)- Concept of Limit & continuity- Differentiation, analytic functions, Cauchy-Riemann equations (Cartesian & Polar), harmonic functions, finding harmonic conjugate - construction of analytic function by Milne Thomson method. (Refer Text Book-2&3)
UNIT – V: Complex Variable – Integration
Line integral-Contour integration, Cauchy's integral theorem (Simple Case), Cauchy Integral formula & generalized Cauchy's integral formula. Power series expansions: Taylor's and Laurent's series, zeros and singularities of analytic functions - Residues and evaluation of residues, Cauchy Residue theorem (without proof) and related problems (Refer Text Book-2&3).
Text Books:
1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH, 2002.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017, 44th Edition.
Reference Books:
1. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI, 2002
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India
3. Henry Stark and John W.Woods, "Probability and Random Processes with Application to Signal Processing," 3rd Edition, Pearson Education, 2002.
Online Learning Resources:
• https://onlinecourses.nptel.ac.in/noc20_ma50/preview
• https://onlinecourses.nptel.ac.in/noc21_ma66/preview#:~:text=This%20course%20provides%2 0random%20variable,and%20simple%20Markovian%20queueing%20models.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year I Semester

23AHS31 - UNIVERSAL HUMAN VALUES

(Common to all branches)

L	T	P	C
2	1	0	3

Course Objectives:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

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

CO1: Define the terms like Natural Acceptance, Happiness and Prosperity L1

CO2: Identify one's self, and one's surroundings (family, society nature) L2

CO3: Apply what they have learnt to their own self in different day-to-day settings in real life L3

CO4: Relate human values with human relationship and human society. L4

CO5: Justify the need for universal human values and harmonious existence L5

UNIT I: Introduction to Value Education (6 lectures and 3 tutorials for practice session)

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Lecture 2: Understanding Value Education

Tutorial 1: Practice Session PS1 Sharing about Oneself

Lecture 3: self-exploration as the Process for Value Education

Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations

Tutorial 2: Practice Session PS2 Exploring Human Consciousness

Lecture 5: Happiness and Prosperity – Current Scenario

Lecture 6: Method to Fulfill the Basic Human Aspirations

Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT – II: Harmony in the Human Being (6 lectures and 3 tutorials for practice session)

Lecture 7: Understanding Human being as the Co-existence of the self and the body.

Lecture 8: Distinguishing between the Needs of the self and the body

Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.

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Lecture 9: The body as an Instrument of the self Lecture 10: Understanding Harmony in the self Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self Lecture 11: Harmony of the self with the body Lecture 12: Programme to ensure self-regulation and Health Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body
UNIT – III : Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)
Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction Lecture 14: 'Trust' – the Foundational Value in Relationship. Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust. Lecture 15: 'Respect' – as the Right Evaluation. Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect. Lecture 16: Other Feelings, Justice in Human-to-Human Relationship. Lecture 17: Understanding Harmony in the Society. Lecture 18: Vision for the Universal Human Order. Tutorial 9: Practice Session PS9 Exploring Systems to fulfill Human Goal.
UNIT – IV : Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)
Lecture 19: Understanding Harmony in the Nature. Lecture 20: Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature. Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature. Lecture 21: Realizing Existence as Co-existence at All Levels. Lecture 22: The Holistic Perception of Harmony in Existence. Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.
UNIT – V : Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)
Lecture 23: Natural Acceptance of Human Values. Lecture 24: Definitiveness of (Ethical) Human Conduct. Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct. Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order. Lecture 26: Competence in Professional Ethics. Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education. Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies. Lecture 28: Strategies for Transition towards Value-based Life and Profession. Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order.
Practice Sessions

Practice Sessions for UNIT I – Introduction to Value Education

PS1 Sharing about Oneself.

PS2 Exploring Human Consciousness.

PS3 Exploring Natural Acceptance.

Practice Sessions for UNIT II – Harmony in the Human Being

PS4 Exploring the difference of Needs of self and body.

PS5 Exploring Sources of Imagination in the self.

PS6 Exploring Harmony of self with the body.

Practice Sessions for UNIT III – Harmony in the Family and Society

PS7 Exploring the Feeling of Trust.

PS8 Exploring the Feeling of Respect.

PS9 Exploring Systems to fulfill Human Goal.

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)

PS10 Exploring the Four Orders of Nature.

PS11 Exploring Co-existence in Existence.

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics

PS12 Exploring Ethical Human Conduct.

PS13 Exploring Humanistic Models in Education.

PS14 Exploring Steps of Transition towards Universal Human Order.

Text Books:

- R R Gaur, R Asthana, G P Bagaria, *A Foundation Course in Human Values and Professional Ethics*, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.
- R R Gaur, R Asthana, G P Bagaria,*Teachers' Manual for A Foundation Course in Human Values and Professional Ethics,* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2.

Reference Books

- *JeevanVidya: EkParichaya,* A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
- *Human Values*, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
- *The Story of Stuff* (Book).
- *The Story of My Experiments with Truth* - by Mohandas Karamchand Gandhi
- *Small is Beautiful* - E. F Schumacher.
- *Slow is Beautiful* - Cecile Andrews
- *Economy of Permanence* - J C Kumarappa
- *Bharat Mein Angreji Raj* – PanditSunderlal
- *Rediscovering India* - by Dharampal
- *Hind Swaraj or Indian Home Rule* - by Mohandas K. Gandhi
- *India Wins Freedom* - Maulana Abdul Kalam Azad
- *Vivekananda* - Romain Rolland (English)
- *Gandhi* - Romain Rolland (English)

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B.Tech II Year I Semester

23A04301– SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- To teach concepts of signals and systems and its analysis using different transform techniques.
- To provide basic understanding of random processes which is essential for the random signal and systems encountered in communications and signal Processing areas.

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

CO1: Understand the mathematical description and representation of continuous-time and discrete-time signals and systems, Also, understand the concepts of various transform techniques and Random Processes (L2)

CO2: Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems. (L3)

CO3: Formulate and solve engineering problems involving random processes. (L3)

CO4: Analyze the frequency spectra of various continuous-time signals using different transform methods. (L4)

CO5: Classify the systems based on their properties and determine the response of them. (L4)

UNIT – I:

Signals & Systems: Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and signals-Orthogonality, mean square error, Fourier series: Trigonometric & Exponential forms of Fourier series, Properties, Concept of discrete spectrum, Illustrative Problems.

UNIT – II:

Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Reconstruction of signal from its samples, Effect of under sampling – Aliasing. Illustrative Problems.

Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the s-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions, Illustrative Problems.

UNIT – III:

Signal Transmission through Linear Systems: Linear system, impulse response, Response of a linear system for different input signals, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between bandwidth and rise time, Energy and Power spectral densities, Illustrative Problems.

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UNIT – IV:
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, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.
UNIT – V:
Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.
Text Books:
1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH, 2002
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", 2nd Edition, PHI, 2009
Reference Books:
1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI, 2002.
3. Simon Haykin and Van Veen, "Signals & Systems", 2nd Edition, Wiley, 2005.
4. Matthew Sadiku and Warsame H. Ali, "Signals and Systems A primer with MATLAB", CRC Press, 2016.
5. Hwei Hsu, "Schaum's Outline of Signals and Systems", 4thEdition, TMH, 2019.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year I Semester

23AEC32– ELECTRONIC DEVICES AND CIRCUITS

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- Students will be able understand the basic principles of all semiconductor devices.
- Able to analyze diode circuits, various biasing and small signal equivalent circuits of amplifiers, compare the performance of BJTs and MOSFETs
- Able to design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.

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

CO1: Understand principle of operation, characteristics and applications of semiconductor diodes, special diodes, BJTs, JFET and MOSFETs. (L2)

CO2: Applying the basic principles solving the problems related to Semiconductor diodes, BJTs, and MOSFETs. (L3)

CO3: Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs. (L4)

CO4: Design of diode circuits and amplifiers using BJTs, and MOSFETs. (L4)

CO5: Compare the performance of various semiconductor devices. (L4)

UNIT – I:

PN junction diode: Review, diode current equation, Diode resistance, Transition and Diffusion Capacitance, effect of temperature on PN junction diode, Quantitative analysis of Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics, Clipping and Clamping circuits, Illustrative problems. Special Diodes: Construction, operation and VI characteristics of Tunnel Diode, Varactor Diode, LED, LCD, Photo Diode, SCR and UJT.

UNIT – II:

Review of Bipolar Junction Transistors, Characteristics, Transistor as an Amplifier and as a Switch, BJT Configurations, Limits of Operation, BJT Specifications.

Biasing and Stabilization: Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Collector to Base Bias, Self-Bias, Bias Stability, Thermal Runaway, Thermal Stability, Illustrative problems.

UNIT – III:

BJT Small Signal Operation and Models- the transconductance, input resistance at the base, input resistance at the emitter, Voltage gain, separating the Signal and the DC Quantities, The Hybrid π Model, the T Model. Single Stage BJT Amplifiers - Common-Emitter (CE) amplifier without and with emitter resistance, Common-Base (CB) amplifier, CommonCollector (CC) amplifier or Emitter Follower, Problem solving.

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UNIT – IV:
Junction Field Effect Transistor (FET): Construction, Principle of Operation, V–I Characteristics, Comparison of BJT and FET, FET as Voltage Variable Resistor. FET biasing. **MOS Field Effect Transistors:** Introduction, Device Structure and Physical Operation, CMOS, V–I Characteristics , MOSFET Circuits at DC, MOSFET as an Amplifier and as a Switch. Biasing in MOS Amplifier circuits - biasing by fixing VGS with and without source resistance, biasing using drain to gate feedback resistor, biasing using constant current source, body effect, Problem solving.
UNIT – V:
MOSFET Small Signal Operation Models– the dc bias, separating the DC analysis and the signal analysis, Small signal equivalent circuit models, the transconductance, the T equivalent circuit model, Single stage MOS Amplifiers – common source (CS) amplifier without and with source resistance, common gate (CG) amplifier, source follower, Problem Solving.
Text Books:
1. Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits – Theory and Applications", 6 th Edition, Oxford Press, 2013.
2. J. Milliman and C Halkias, "Integrated electronics", 2nd Edition, Tata McGraw Hill, 1991.
Reference Books:
1. Donald A Neamen, "Electronic Circuits – analysis and design", 3rd Edition, McGraw Hill (India), 2019.
2. Behzad Razavi, "Microelectronics", Second edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," 9th Edition, Pearson, 2006.
4. Jimmie J Cathey, "Electronic Devices and Circuits," Schaum's outlines series, 3 rd edition, McGraw-Hill (India), 2010.
5. Solid State Electronic Devices - Solid State Electronic Devices by Ben G. Streetman and Sanjay Kumar Banerjee 7 Edition.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year I Semester

23AEC33 – DIGITAL CIRCUITS DESIGN

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- Understand the properties of Boolean algebra, logic operations, and minimization of Boolean functions.
- Analyze combinational and analyze sequential logic circuits.
- Understand the concepts of FSM and compare various Programmable logic devices.
- Model combinational and sequential circuits using HDLs.

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

CO1: Understand the properties of Boolean algebra, logic operations, concepts of FSM (L2)

CO2: Apply techniques for minimization of Boolean functions (L3)

CO3: Analyze combinational and Sequential logic circuits. (L4)

CO4: Compare various Programmable logic devices. (L4)

CO5: Design and Model combinational and sequential circuits using HDLs. (L5, L6)

UNIT – I:

Boolean algebra, logic operations, and minimization of Boolean functions Review of Number Systems and Codes, Representation of unsigned and signed integers, Floating Point representation of real numbers, Laws of Boolean Algebra, Theorems of Boolean Algebra, Realization of functions using logic gates, Canonical forms of Boolean Functions, Minimization of Functions using Karnaugh Maps.

UNIT – II:

Combinational Logic Circuits Combinational circuits, Design with basic logic gates, design procedure, adders, subtractors, 4-bit binary adder/ subtractor circuit, BCD adder, carry look- a-head adder, binary multiplier, magnitude comparator, data selectors, priority encoders, decoders, multiplexers, demultiplexers.

UNIT – III:

Hardware Description Language Introduction to Verilog - structural specification of logic circuits, behavioral specification of logic circuits, hierarchical Verilog Code, Verilog for combinational circuits - conditional operator, if-else statement, case statement, for loop using sequential circuits with CAD tools.

UNIT – IV:

Sequential Logic Circuits Basic architectural distinction between combinational and sequential circuits, Design procedure, latches, flip-flops, truth tables and excitation tables, timing and triggering consideration, conversion of flip- flops, design of counters, ripple counters, synchronous counters, ring counter, Johnson counter, registers, shift registers, universal shift register. Verilog constructs for sequential circuits, flip-flop with clear capability, using Verilog constructs for registers and counters.

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UNIT – V:
Finite State Machines and Programmable Logic Devices Types of FSM, capabilities and limitations of FSM, state assignment, realization of FSM using flip-flops, Mealy to Moore conversion and vice-versa, reduction of state tables partition technique, Design of sequence detector. Types of PLD's: PROM, PAL, PLA, basic structure of CPLD and FPGA, advantages of FPGAs.
Text Books:
1. M. Morris Mano, "Digital Design", 3rd Edition, PHI. (Unit I to IV)
2. Stephen Brown and ZvonkoVranesic, "Fundamentals of Digital Logic with Verilog Design", 3rd Edition, McGraw-Hill (Unit V)
Reference Books:
1. Charles H. Roth, Jr, "Fundamentals of Logic Design", 4th Edition, Jaico Publishers.
2. ZviKohavi and NirajK.Jha, "Switching and Finite Automata Theory, 3rd Edition, Cambridge University Press, 2010.
3. Samir Palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis", 2 ndEdition, Prentice Hall PTR.
4. D.P. Leach, A.P. Malvino, "Digital Principles and Applications", TMH, 7th Edition.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year I Semester

23AEC37– ELECTRONIC DEVICES AND CIRCUITS LAB

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of the course are to make the students learn about

- Verify the theoretical concepts practically from all the experiments.
- Analyse the characteristics of Diodes, BJT, MOSFET, UJT.
- Design the amplifier circuits from the given specifications.
- Model the electronic circuits using tools such as PSPICE/Multisim.

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

CO1: Understand the characteristics and applications of basic electronic devices. (L2)

CO2: Plot the characteristics of electronic devices. (L3)

CO3: Analyze various biasing circuits and electronic circuits as amplifiers (L4).

CO4: Design MOSFET / BJT based amplifiers for the given specifications. (L5)

CO5: Simulate all circuits in PSPICE /Multisim. (L5).

LIST OF EXPERIMENTS: (Implement / execute any 12 experiments).

1. Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
2. Study and draw the Volt Ampere characteristics of UJT and determine η, IP, Iv, VP, &Vv from the experiment.
3. Verification of the input and output characteristics of BJT in Common Emitter configuration experimentally and find required parameters from the graphs.
4. Study and draw the input and output characteristics of BJT in Common Base configuration experimentally and determine required parameters from the graphs.
5. Verification of the input and output characteristics of BJT in Common Collector configuration experimentally and find required parameters from the graphs.
6. Study and draw the V- I characteristics of JFET experimentally.
7. Study and draw the output and transfer characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find Threshold voltage (VT), gm, & K from the graphs.
8. Study and draw the output and transfer characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find IDSS, gm, & VP from the graphs.
9. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
10. Design and analysis of self-bias circuit using MOSFET.
11. Design a suitable circuit for switch using BJT.
12. Design a suitable circuit for switch using MOSFET.
13. Design a small signal amplifier using MOSFET (common source) for the given specifications. Draw the frequency response and find the bandwidth.
14. Design a small signal amplifier using BJT(common emitter) for the given specifications. Draw the frequency response and find the bandwidth.

Tools / Equipment Required: Software Toollike Multisim/ Pspice or Equivalent, DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year I Semester

23AEC38– DIGITAL CIRCUITS & SIGNAL SIMULATION LAB

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of the course are to make the students learn about

- Verify the truth tables of various logic circuits.
- Design sequential/combinational circuit using Hardware Description Language and verify their functionality.
- Simulate various Signals and Systems through MATLAB
- Analyze the output of a system when it is excited by different types of deterministic and random signals.

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

CO1: Verify the truth tables of various logic circuits. (L2)

CO2: Understand how to simulate different types of signals and system response. (L2)

CO3: Design sequential and combinational logic circuits and verify their functionality. (L3, L4)

CO4: Analyze the response of different systems when they are excited by different signals and plot power spectral density of signals. (L4)

CO5: Generate different random signals for the given specifications. (L5)

List of Experiments: (Implement/Simulate any 6 experiments from Part A and 6 experiments from Part B)

PART-A

1. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
2. Verification of functional table of 3 to 8-line Decoder /De-multiplexer
3. Four variable logic function verification using 8 to1 multiplexer.
4. Design full adder circuit and verify its functional table.
5. a) Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output.
   b) Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
6. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
7. a) Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T Flip-Flops and Test It with a low frequency clock and sketch the output waveforms.
   b) Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.
8. (a) Draw the circuit diagram of a single bit comparator and test the output
   (b) Construct 7 Segment Display Circuit Using Decoder and7 Segment LED and test it.

Note: Design and verify combinational and sequential circuits using Hardware Description Language

References:

1. M. Morris Mano, "Digital Design", 3rd Edition, PHI

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PART-B
List of Experiments:
1. a) Write a program to generate various Signals and Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function. b) Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
2. a) Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings- Plot the discrete spectrum of the signal. b) Write a program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.
3. a) Write a program to convolve two discrete time sequences. Plot all the sequences. b) Write a program to find autocorrelation and cross correlation of given sequences.
4. a) Write a program to verify Linearity and Time Invariance properties of a given Continuous System. b) Write a program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.
5. Write a program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
6. Write a program to generate Complex Gaussian noise and find its mean, variance, Probability Density Function (PDF) and Power Spectral Density (PSD).
7. Generate a Random data (with bipolar) for a given data rate (say 10kbps). Plot the same for a time period of 0.2 sec.
8. To plot pole-zero diagram in S-plane of given signal/sequence and verify its stability.
Note: All the experiments are to be simulated using MATLAB or equivalent software.
References: Stephen J. Chapman, "MATLAB Programming for Engineers", Cengage, November 2012.

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B.Tech II Year I Semester

23AMC31-ENVIRONMENTAL SCIENCE

L	T	P	C
2	0	0	0

Course Objectives: The objectives of the course are to make the students learn about

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.
- Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21 st century.
- To save earth from the inventions by the engineer.
- Influence their society in proper utilization of goods and services.

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

CO1: Solve the environmental problems based fundamental concepts of Environmental Science.

CO2: Describe the structure and function of significant environmental systems

CO3: Differentiate Natural and Polluted environment and asses its impact different on the environmental components.

CO4: Apply the Pyramid of number, mass and Energy, Demonstrate about Renewable energy resources.

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

UNIT – I: Multidisciplinary Nature of Environmental Studies

Definition, Scope and Importance – Need for Public Awareness.

Natural Resources : Introduction to Natural resources and associated problems; Energy resources: Renewable and non-renewable resources : Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems –Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

UNIT – II: Ecosystems

Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem.
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

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

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UNIT – III: Environmental Pollution

Environmental Pollution: Definition, Cause, effects and control measures of: Air Pollution Water pollution- Soil pollution-Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards; Role of an individual in prevention of pollution. Pollution case studies.

Solid Waste Management Causes, effects and control measures of urban and industrial wastes (Reduce, Reuse, Recycle, and Recover);

Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV: Social Issues and the Environment

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns; Environmental ethics: Issues and possible solutions – Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and Holocaust. Case Studies – Wasteland reclamation. – Consumcrism and waste products. Environment Protection Act: Air (Prevention and Control of Pollution)Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act– Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V: Human Population and the Environment

Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets such as River/forest grassland/hill/mountain - Visit to a local polluted site like -Urban/Rural/Industrial/Agricultural ; Study of common plants, insects, and birds – river, hill slopes.

Text Books:

1. Erach Barouche ,(2013). Textbook of Environmental Studies for Undergraduate Courses for University Grants Commission (2 nd edition). Universities Press
2. Palaniswamy, (2014). "Environmental Studies"(2 nd edition) Pearson education.
3. S.AzeemUnnisa, "Environmental Studies" Academic Publishing Company
4. K.Raghavan Nambiar,(2008) "Textbook of Environmental Studies for Undergraduate Courses as per UGC model syllabus", (2 nd edtion) Scitech Publications (India), Pvt. Ltd.
5. Anubha kaushik ,C.P Kaushik (2016) " Text book of Environmental Science "(5 th edition) 2016 . New Age International Publishers.

Reference Books:

1. Deeksha DaveandE.SaiBabaReddy," Text book of Environmental Science ", Cengage Publications
2. M.AnjiReddy,"Textbook of Environmental Science sand Technology",B S Publication.
3. P.Sharma,Comprehensive Environmental studies, Laxmipublications.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciencesand Engineering", Prenticehall of India Private limited
5. G.R.Chatwal," A Text Book of Environmental Studies "Himalaya Publishing House.
6. GilbertM.MastersandWendellP.Ela,"IntroductiontoEnvironmentalEngineeringand Science, Prentice hall of India Private limited.

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IIYearB.Tech.CSE–ISemester

L	T	P	C
0	1	2	2

(23ACS49)PYTHONPROGRAMMING (SKILL ENHANCEMENT COURSE)

CourseObjectives: Themainobjectivesofthecourseareto

- IntroducecoreprogrammingconceptsofPythonprogramminglanguage.
- DemonstrateaboutPythondatastructureslikeLists,Tuples,Setsanddictionaries
- ImplementFunctions,ModulesandRegularExpressionsinPythonProgramming and to create practical and contemporary applications using these

CourseOutcomes: Aftercompletionofthecourse,studentswillbeableto

- ClassifydatastructuresofPython(L4)
- Apply Python programming concepts to solve a variety of computational problems (L3)
- Understand the principles of object-oriented programming (OOP) in Python,including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs (L3)
- Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas (L2)
- Exhibitcompetenceinimplementingandmanipulatingfundamental datastructures such as lists, tuples, sets, dictionaries (L3)
- Proposenewsolutionstocomputationalproblems(L6)

UNTI-I: History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.
Control Flow Statements: if statement, if-else statement, if...elif...else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

SampleExperiments:

1. Writeaprogramtofindthelargestelementamongthree Numbers.
2. WriteaProgramtodisplayallprime numberswithinaninterval
3. Writeaprogramtoswaptwonumberswithoutusingatemporaryvariable.
4. DemonstratethefollowingOperatorsinPythonwithsuitableexamples.
   i)ArithmeticOperatorsii)RelationalOperatorsiii)AssignmentOperatorsiv)Logical Operatorsv)BitwiseOperatorsvi)TernaryOperatorvii)MembershipOperators viii)IdentityOperators
5. Writeaprogramtoaddandmultiplycomplexnumbers
6. Writeaprogramtoprint multiplicationtableofagivennumber.

UNIT-II: Functions: Built-InFunctions, CommonlyUsedModules, FunctionDefinitionand Calling the function, return Statement and void Function, Scope and Lifetime of Variables,Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments. **Strings:**CreatingandStoringStrings,BasicStringOperations,AccessingCharactersin String by Index Number, String Slicing and Joining, String Methods, Formatting Strings. **Lists**: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-InFunctions Used on Lists, List Methods, del Statement.

SampleExperiments:

7. Writeaprogramtodefincafunctionwithmultiplereturnvalues.
8. Writeaprogramtodefineafunctionusingdefaultarguments.
9. Writeaprogramtofindthelengthofthestringwithoutusinganylibraryfunctions.
10. Writeaprogramtocheckifthesubstringispresentinagivenstringornot.
11. Writeaprogramtoperformthegivenoperationsonalist:
    i. Addition ii.Insertion iii.slicing
12. Writeaprogramtoperformany5 built-infunctionsbytakinganylist.

UNIT-III: Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.
Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozenset.

SampleExperiments:

13. Writeaprogramto createtuples(name, age, address, college) for at least twomembers and concatenate the tuples and print the concatenated tuples.
14. Writeaprogramtocountthenumberofvowelsinastring(Nocontrolflowallowed).
15. Writeaprogramtocheckifagivenkeyexists inadictionaryornot.
16. Writeaprogramtoaddanewkey-valuepairtoanexistingdictionary.
17. Writeaprogramtosumalltheitems inagivendictionary.

UNIT-IV:Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules.
Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance,Polymorphism.

<SampleExperiments:

18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Pythonprogramtoprint eachlineofafileinreverseorder.
20. Pythonprogramtocomputethenumberofcharacters,wordsandlinesina file.
21. Write a program to create, display, append, insert and reverse the order of the itemsin the array.
22. Writeaprogramtoadd,transposeand multiplytwomatrices.
23. Write a Python program to create a class that represents a shape. Include methods to calculate itsareaandperimeter.Implement subclassesfordifferent shapeslikecircle, triangle, and square.

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B.Tech II Year II Semester

23AEC41 – LINEAR CONTROL SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- Introduce the basic principles and applications of control systems.
- Learn the time response and steady state response of the systems.
- Know the time domain analysis and solutions to time invariant systems.
- Understand different aspects of stability analysis of systems in frequency domain.
- Understand the concept of state space, controllability and observability.

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

CO1: Summarize the basic principles and applications of control systems. (L2)

CO2: Understand the time response and steady state response of the systems. (L2)

CO3: Understand the concept of state space, controllability and observability. (L2)

CO4: Apply time domain analysis to find solutions to time invariant systems. (L3)

CO5: Analyze different aspects of stability analysis of systems in frequency domain. (L4)

UNIT – I:

Control Systems Concepts: 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. Controller components, DC Servomotor and AC Servomotortheir transfer functions, Synchros.

UNIT – II:

Time Response Analysis: Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Study of effects and Design of P, PI, PD and PID Controllers on second order system.

UNIT – III:

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

UNIT – IV:

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram - Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Phase margin and Gain margin-Stability Analysis. Compensation techniques – Study of Effects and Design of Lag, Lead, Lag-Lead Compensator design in frequency Domain on a second order system.

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UNIT – V:
State Space Analysis of Continuous Systems: 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 its Properties. System response through State Space models. The concepts of controllability and observability.
Text Books:
1. Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5 thedition, 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, 4 th Edition, McGraw Hill Education,2012.
2. Automatic Control Systems by B. C. Kuo and Farid Golnaraghi, John wiley and sons, 8th edition,2003.
3. Feedback and Control Systems, Joseph J Distefano III, Allen R Stubberud & Ivan J Williams, 2 nd 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, 6 th Edition, Pearson,2010.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AEC42– EM WAVES AND TRANSMISSION LINES

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

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

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

CO1: Learn the concepts of wave theory and its propagation through various mediums. (L2)

CO2: Understand the properties of transmission lines and their applications. (L2)

CO3: Apply the laws & theorems of electrostatic fields to solve the related problems (L3)

CO4: Gain proficiency in the analysis and application of magnetostatic laws and theorems (L4).

CO5: Analyze Maxwell's equations in different forms. (L4)

UNIT – I:

Review of Co-ordinate Systems, Electrostatics: Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

UNIT – II:

Magnetostatics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface, Illustrative Problems

UNIT – III:

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems. 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, Illustrative Problems.

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UNIT – IV:
Transmission Lines - I : Types, Parameters, T & π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Illustrative Problems.
UNIT – V:
Transmission Lines – II: Input Impedance Relations, Reflection Coefficient, VSWR, Average Power, Shorted Lines, Open Circuited Lines, and Matched Lines, Low loss radio frequency and UHF Transmission lines, UHF Lines as Circuit Elements, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching, Illustrative Problems.
Text Books:
1. Elements of Electromagnetics, Matthew N.O. Sadiku, 4 th Edition, Oxford University Press, 2008.
2. Elcctromagnetic Waves and Radiating Systems, E.C. Jordan and K.G. Balmain, 2 nd Edition, PHI, 2000.
Reference Books:
1. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, 2 nd Edition, Pearson Education, 2013.
2. Engineering Electromagnetics, William H. Hayt Jr. and John A. Buck, 7 th Edition, Tata McGraw Hill, 2006.
3. Electromagnetics, John D. Krauss, 3 rd Edition, McGraw Hill, 1988. 4. Networks, Lines, and Fields, John D. Ryder,2nd Edition, PHI publications, 2012.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AEC43– ELECTRONIC CIRCUITS ANALYSIS

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- Understand the characteristics of Differential amplifiers, feedback and power amplifier.
- Analyze the response of tuned amplifiers Analyze the response of tuned amplifiers
- Categorize different oscillator circuits based on the application c Design the electronic circuits for the given specifications and for a given application.

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

CO1: Understand the characteristics of differential amplifiers, feedback and power amplifiers. (L2)

CO2: Examine the frequency response of multistage and differential amplifier circuits using BJT & MOSFETs at low and high frequencies. (L3)

CO3: Investigate different feedback and power amplifier circuits based on the application. (L4)

CO4: Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillator circuits. (L4)

CO5: Evaluate the performance of different tuned amplifiers (L5)

UNIT – I:

Multistage & Differential Amplifiers: Introduction, Classification of Amplifiers, Distortion in amplifiers, Coupling Schemes, RC Coupled Amplifier using BJT, Cascaded RC Coupled BJT Amplifiers, Cascode amplifier, Darlington pair, the MOS Differential Pair, Small-Signal Operation of the MOS Differential Pair, The BJT Differential Pair, and other Nonideal Characteristics of the Differential Amplifier.

UNIT – II:

Frequency Response: Low-Frequency Response of the CS and CE Amplifiers, Internal Capacitive Effects and the High-Frequency Model of the MOSFET and the BJT, HighFrequency Response of the CE, Emitter follower, CS, CD, fβ,fΓ and gain bandwidth product.

UNIT – III:

Feedback Amplifiers: Introduction, The General Feedback Structure, Some Properties of Negative Feedback, The Four Basic Feedback Topologies, Series—Shunt, Series—Series, Shunt—Shunt, Shunt—Series. Oscillators: General Considerations, Phase Shift Oscillator, Wien-Bridge Oscillator, LC Oscillators, Relaxation Oscillator, Crystal Oscillators, Illustrative Problems.

UNIT – IV:

Power Amplifiers: Introduction, Class A amplifiers (Series fed, Transformer coupled, Push pull), Second Harmonic distortion, Class B amplifiers (Push pull, Complementary symmetry), Crossover distortion and Class AB operation, Class C amplifiers, Power BJTs, MOS power transistors.

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UNIT – V:
Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning and synchronous tuning. Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.
Text Books:
1. Adel. S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits," 6th Edition, Oxford University Press, 2011.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008.
3. Millman, C Chalkias, "Integrated Electronics", 4thEdition, McGraw Hill Education (India) Private Ltd., 2015.
Reference Books:
1. Behzad Razavi, "Fundamentals of Micro Electronics", Wiley, 2010.
2. Donald A Neamen, "Electronic Circuits – Analysis and Design," 3rdEdition, McGraw Hill (India), 2019.
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", 9th Edition, Pearson/Prentice Hall, 2006.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AEC44– ANALOG AND DIGITAL COMMUNICATIONS

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to make the students learn about

- Introduce various modulation and demodulation techniques of analog and digital communication systems.
- Analyze different parameters of analog and digital communication techniques.
- Understand function of various stages of AM, FM transmitters and Know characteristics of AM &FM receivers.
- Analyze the performance of various digital modulation techniques in the presence of AWGN.
-

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

CO1: Recognize the basic terminology used in analog and digital communication technique for transmission of information/data. (L1)

CO2: Explain the basic operation of different analog and digital communication systems at baseband and passband level. (L2)

CO3: Compute various parameters of baseband and passband transmission schemes by applying basic engineering knowledge. (L3)

CO4: Analyze the performance of different modulation & demodulation techniques to solve complex problems in the presence of noise. (L4)

CO5: Evaluate the performance of all analog and digital modulation techniques to know the merits and demerits of each one of them in terms of bandwidth and power efficiency. (L5)

UNIT – I:

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

UNIT – II:

FM and Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

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UNIT – III:
Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers
UNIT – IV:
Introduction to Noise: Types of Noise, Receiver Model, Noise in AM, DSB, SSB, and FM Receivers. Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM. Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding , Delta Modulation, DPCM, Noise in PCM and DM.
UNIT – V:
Digital Modulation Techniques: Coherent Digital Modulation Schemes – ASK, BPSK, BFSK, QPSK, Non-coherent BFSK, DPSK. M-ary Modulation Techniques, Power Spectra, Bandwidth Efficiency. Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.
Text Books:
1. Simon Haykin, "Communication Systems", JohnWiley& Sons, 4 th Edition, 2004.
2. Wayne Tomasi - Electronics Communication Systems-Fundamentals through Advanced, 5 thEd., PHI, 2009
3. B. P. Lathi, Zhi Ding " Modern Digital and Analog Communication Systems", Oxford press, 2011.
Reference Books:
1.Sam Shanmugam, "Digital and Analog Communication Systems",JohnWiley& Sons, 1999.
2. Bernard Sklar, F. J. harris"Digial Communications: Fundamentals andApplications", Pearson Publications, 2020.
3. Taub and Schilling, " Principles of Communication Systems", Tata McGraw Hill, 2007.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AHS03A - MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to all Branches)

L	T	P	C
2	0	0	2

Course Objectives: The objectives of the course are to make the students learn about

- To inculcate the basic knowledge of microeconomics and financial accounting.
- To make the students learn how demand is estimated for different products, input- output relationship for optimizing production and cost.
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

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

1. Define the concepts related to Managerial Economics, financial accounting and management. (L1)
2. Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets. (L2)
3. Apply the Concept of Production cost and revenues for effective Business decision. (L3)
4. Analyze how to invest their capital and maximize returns. (L4)
5. Develop the accounting statements and evaluate the financial performance of business entity.(L5)

UNIT – II Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT – III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT – IV Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay BackMethod, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

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UNIT – V Financial Accounting and Analysis
Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.
Text Books:
• Varshney & Maheswari: Managerial Economics, Sultan Chand.
• Aryasri: Business Economics and Financial Analysis, 4/e, MGH.
Reference Books:
1. A R Aryasri - Managerial Economics and Financial Analysis, TMH 2011.Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
2. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
3. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, 2011.
4. N. Appa Rao. & P. Vijaya Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi, 2011.
5. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.
Online Learning Resources:
https://www.slideshare.net/123ps/managerial-economics-ppt https://www.slideshare.net/rossanz/production-and-cost-45827016 https://www.slideshare.net/darkyla/business-organizations-19917607 https://www.slideshare.net/balarajbl/market-and-classification-of-market https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396 https://www.slideshare.net/ashu1983/financial-accounting

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AHS03B - ORGANIZATIONAL BEHAVIOR

(Common to all branches)

L	T	P	C
2	0	0	2

Course Objectives: The objectives of the course are to make the students learn about

- To enable student's comprehension of organizational behavior.
- To offer knowledge to students on self-motivation, leadership and management.
- To facilitate them to become powerful leaders.
- To impart knowledge about group dynamics.
- To make them understand the importance of change and development

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

1. Understand the nature and concept of Organizational behaviour. (L1)
2. Analyze the different theories of leadership. (L2)
3. Apply theories of motivation to analyze the performance problems. (L3)
4. Evaluate group dynamics. (L4)
5. Develop as powerful leader. (L5)

UNIT –I : Introduction to Organizational Behavior

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective -Understanding Individual Behaviour –Attitude -Perception - Learning – Personality.

UNIT – II: Motivation and Leading

Theories of Motivation- Maslow's Hierarchy of Needs - Hertzberg's Two Factor Theory - Vroom's theory of expectancy – Mc Cleland's theory of needs–Mc Gregor's theory X and theory Y– Adam's equity theory.

UNIT – III Organizational Culture

Introduction – Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader.

UNIT – IV Group Dynamics

Introduction – Meaning, scope, definition, Nature- Types of groups - Determinants of group behaviour - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building - Conflict in the organization– Conflict resolution.

UNIT – V Organizational Change and Development

Introduction –Nature, Meaning, scope, definition and functions- Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development.

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Text Books:
• Luthans, Fred, OrganisationalBehaviour, McGraw-Hill, 12 Th edition.
• P Subba Ran, OrganisationalBehaviour, Himalya Publishing House.
Reference Books:
1. McShane, Organizational Behaviour, TMH.
2. Nelson, OrganisationalBehaviour, Thomson.
3. Robbins, P. Stephen, Timothy A. Judge, OrganisationalBehaviour, Pearson.
4. Aswathappa, OrganisationalBehaviour, Himalaya.
Online Learning Resources:
https://www.slideshare.net/Knight1040/organizational-culture 9608857 https://www.slideshare.net/AbhayRajpoot3/motivation-165556714 https://www.slideshare.net/harshrastogi1/group-dynamics-159412405 https://www.slideshare.net/vanyasingla1/organizational-change-development-26565951

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B.Tech II Year II Semester

23AHS03C - BUSINESS ENVIRONMENT

(Common to all Branches)

L	T	P	C
2	0	0	2

Course Objectives: The objectives of the course are to make the students learn about

- To make the student understand about the business environment.
- To enable them in knowing the importance of fiscal and monitory policy.

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

- Apply the knowledge of Money markets in future investment. (L1)
- Analyze India's Trade Policy. (L2)
- Evaluate fiscal and monitory policy. (L3)
- Develop a personal synthesis and approach for identifying business opportunities. (L4)
- Understand various types of business environment. (L5)

UNIT – I: Overview of Business Environment

Introduction – meaning Nature, Scope, significance, functions and advantages. Types- Internal &External, Micro and Macro. Competitive structure of industries - Environmental analysis- advantages & limitations of environmental analysis.

UNIT – II: FISCAL & MONETARY POLICY

FISCAL POLICY - Public Revenues - Public Expenditure - Public debt - Development activities financed by public expenditure - Evaluation of recent fiscal policy of Government of India - Highlights of Budget - **MONETARY POLICY** - Demand and Supply of Money – RBI - Objectives of monetary and credit policy - Recent trends - Role of Finance Commission.

UNIT – III: TRADE POLICY

INDIA'S TRADE POLICY - Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank - **BALANCE OF PAYMENTS** – Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

UNIT – IV: WORLD TRADE ORGANIZATION

WORLD TRADE ORGANIZATION - Nature and Scope - Organization and Structure - Role and functions of WTO in promoting world trade - Agreements in the Uruguay Round – TRIPS, TRIMS, and GATT - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

UNIT – V: MARKETS

MONEY MARKETS AND CAPITAL MARKETS - Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI - Stock Exchanges - Investor protection and role of SEBI.

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Text Books:
• Francis Cherunilam (2009), "International Business": Text and Cases, Prentice Hall of India.
• K. Aswathappa, "Essentials of Business Environment": Texts and Cases & Exercises 13th Revised Edition.HPH2016.
Reference Books:
• K. V. Sivayya, V. B. M Das (2009), Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
• Sundaram, Black (2009), International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
• Chari. S. N (2009), International Business, Wiley India.
• E. Bhattacharya (2009), International Business, Excel Publications, New Delhi.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AEC47-ELECTRONIC CIRCUITS ANALYSIS LAB

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of the course are to make the students learn about

- Plot the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers and multivibrators.
- Categorize different oscillator circuits based on the application.
- Design the electronic circuits for the given specifications and for a given application.

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

CO1: Know about the usage of equipment/components/software tools used to conduct experiments in analog circuits. (L2)

CO2: Conduct the experiment based on the knowledge acquired in the theory about various analog circuits using BJT/MOSFETs to find the important parameters of the circuit experimentally. (L3)

CO3: Analyze the given analog circuit to find required important metrics of it theoretically. (L4)

CO4: Compare the experimental results with that of theoretical ones and infer the conclusions. (L4)

CO5: Design the circuit for the given specifications. (L6)

List of Experiments: (Implement / execute any 12 experiments).

1. Design and Analysis of Darlington pair.
2. Frequency response of CE – CC multistage Amplifier.
3. Design and Analysis of Cascode Amplifier.
4. Frequency Response of Differential Amplifier
5. Design and Analysis of any two topologies of feedback amplifies and find the frequency response of it.
6. Design and Analysis of Class A power amplifier.
7. Design and Analysis of Class AB amplifier.
8. Design and Analysis of RC phase shift oscillator.
9. Design and Analysis of LC Oscillator.
10. Frequency Response of Single Tuned amplifier
11. Design a Bistable Multivibrator and analyze the effect of commutating capacitors and draw the wave forms at base and collector of transistors.
12. Design an Astable Multivibrator and draw the wave forms at base and collector of transistors.
13. Design a Monostable Multivibrator and draw the input and output waveforms.
14. Draw the response of Schmitt trigger for gain of greater than and less than one.

Note: Use Multisim Software for simulation. Faculty members who are handling the laboratory shall see that students are given design specifications for a given circuit appropriately and monitor the design and analysis aspects of the circuit.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AEC48 - ANALOG AND DIGITAL COMMUNICATIONS LAB

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of the course are to make the students learn about

- Understand the basics of analog and digital modulation techniques.
- Integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
- Design and implement different modulation and demodulation techniques and their applications.
- Develop cognitive and behavioral skills for performance analysis of various modulation techniques.

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

CO1: Know about the usage of equipment/components/software tools used to conduct experiments in analog and digital modulation techniques. (L2)

CO2: Conduct the experiment based on the knowledge acquired in the theory about modulation and demodulation schemes to find the important metrics of the communication system experimentally. (L3)

CO3: Analyze the performance of a given modulation scheme to find the important metrics of the system theoretically. (L4)

CO4: Compare the experimental results with that of theoretical ones and infer the conclusions. (L4)

List of Experiments:

Design the circuits and verify the following experiments taking minimum of six from each section shown below.

Section-A

1. AM Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. Frequency Division Multiplexing
4. FM Modulation and Demodulation
5. Radio receiver measurements
6. PAM Modulation and Demodulation
7. PWM Modulation and Demodulation
8. PPM Modulation and Demodulation

Section-B

1. Sampling Theorem.
2. Time Division Multiplexing
3. Delta Modulation and Demodulation
4. PCM Modulation and Demodulation

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5. BPSK Modulation and Demodulation
6. BFSK Modulation and Demodulation
7. QPSK Modulation and Demodulation
8. DPSK Modulation and Demodulation
Note: Faculty members (who are handling the laboratory) are requested to instruct the students not to use readymade kits for conducting the experiments. They are advised to make the students work in the laboratory by constructing the circuits and analyzing them during the lab sessions.

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B.Tech II Year II Semester

23AEC49- PCB DESIGN AND PROTOTYPE DEVELOPMENT (SKILL ORIENTED COURSE -II)

L	T	P	C
0	1	2	2

Fundamental of basic electronics : Component identification, Component symbols & their footprints, Understand schematic, Creating new PCB, Browsing footprints libraries, Setting up the PCB layers, Design rule checking, Track width selection, Component selection, Routing and completion of the design.

Introduction to PCB: Definition and Need/Relevance of PCB, Background and History of PCB, Types of PCB, Classes of PCB Design, Terminology in PCB Design, Different Electronic design automation (EDA) tools and comparison.

PCB Design Process: PCB Design Flow, Placement and routing, Steps involved in layout design, Artwork generation Methods - manual and CAD, General design factors for digital and analogue circuits, Layout and Artwork making for Single-side, double-side and Multilayer Boards, Design for manufacturability, Design-specification standards .

Practice Exercises: Any twelve experiments are to be done

1.Practice following PCB Design steps
- Schematic Design: Familiarization of the Schematic Editor, Schematic creation, Annotation, Netlist generation.
- Layout Design: Familiarization of Footprint Editor, Mapping of components, Creation of PCB layout Schematic.
- Create new schematic components.
- Create new component footprints.

2. Regulator circuit using 7805

3. Inverting Amplifier or Summing Amplifier using op-amp

4. Full-wave Rectifier

5. Astable multivibrator using IC555

6. Monostable multivibrator using IC555

7. RC Phase-shift or Wein-bridge Oscillator using transistor

8. Full-Adder using half-adders.

9. 4-bit binary /MOD N counter using D-Flip flops.

10. Design a Development board for an open ended experiment of Analog applications.

11. Design a Development board for an open ended experiment of Digital applications.

12. One open-ended (analog/ digital/mixed circuit) experiments of similar nature and magnitude to the above are to be assigned by the teacher (Student is expected to solve and execute/simulate independently).

13. Design a Development board for Power section of a system consisting of IC7805, capacitor, resistor, headers, LED.

14. Fabricate a single-sided PCB, mount the components and assemble them in a cabinet for any one of the circuits mentioned in the above exercises.

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AMC41 - DESIGN THINKING & INNOVATION

(Common to all Branches)

L	T	P	C
1	0	2	2

Course Objectives: The objectives of the course are to make the students learn about

1. The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation.
2. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas.
3. To develop solutions for real-time problems.

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

1. Define the concepts related to design thinking. (L1)
2. Explain the fundamentals of Design Thinking and innovation (L2)
3. Apply the design thinking techniques for solving problems in various sectors. (L3)
4. Analyse to work in a multidisciplinary environment (L4)
5. Evaluate the value of creativity (L5)
6. Formulate specific problem statements of real time issues (L6)

UNIT – 1 Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, historyof Design Thinking, New materials in Industry.

UNIT – II Design Thinking Process

Design thinking process (empathize, analyse, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development.

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT – IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies.

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Activity: Importance of modelling, how to set specifications, Explaining their own product design.
UNIT – V Design Thinking in Business Processes
Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs- Design thinking for Startups- Defining and testing Business Models and Business Cases- Developing & testing prototypes. **Activity:** How to market our own product, About maintenance, Reliability and plan for startup.
Text Books:
• Tim Brown,Change by design, Harper Bollins (2009).
• Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.
Reference Books:
• David Lee, Design Thinking in the Classroom, Ulysses press.
• Shrutin N Shetty, Design the Future, Norton Press.
• William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter.
• Chesbrough.H, The Era of Open Innovation – 2013.
Online Learning Resources:
https://nptel.ac.in/courses/110/106/110106124/ https://nptel.ac.in/courses/109/104/109104109/ https://swayam.gov.in/nd1_noc19_mg60/preview .

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JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

ANALOG AND DIGITAL IC APPLICATIONS

UNIT I: ICs and OP-AMPS

Integrated Circuits and Operational Amplifier: Introduction, Classification of IC's, IC chip size and circuit complexity, basic information of Op-Amp IC741 and its features, the ideal Operational amplifier, Op-Amp internal circuit, Op-Amp characteristics - DC and AC, Features of 741 Op-Amp.

UNIT II: Applications of OP-AMP

Linear Applications of Op-Amp: Inverting, non-inverting, Differential amplifiers, adder, subtractor, Instrumentation amplifier, AC amplifier, V to I and I toV converters, Integrator and differentiator.

Non-Linear Applications of Op-Amp: Sample and Hold circuit, Log and Anti log amplifier, multiplier and divider, Comparators, Schmitt trigger, Multi vibrators, Triangular and Square waveform generators, Oscillators.

UNIT III: Active Filters and other ICs

Active Filters: Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and all pass filters.

Timer and Phase Locked Loops: Introduction to IC 555 timer, description of functional diagram, monostable and a stable operations and applications, Schmitt trigger, PLL - introduction, basic principle, phase detector/ comparator, voltage-controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL.

UNIT IV: Voltage Regulators and Converters

Voltage Regulator: Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator.

D to A and A to D Converters: Introduction, basic DAC techniques – weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A to D converters - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

UNIT V: Digital ICs

CMOS Logic: CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using CMOS logic.

Combinational Logic IC's: Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Encoders, Priority Encoders, Multiplexers, De multiplexers, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

Sequential Logic IC's: Familiarity with commonly available 74XX & CMOS40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Textbooks:

1. D.Roy Choudhury,Shail B.Jain,—Linear Integrated Circuitǁ,4th edition(2012),New Age International Pvt.Ltd., New Delhi, India
2. Floyd, Jain, —Digital Fundamentalsǁ,8th edition (2009), Pearson Education, New Delhi.

References:

1. Ramakant A. Gayakwad, —OP-AMP and Linear Integrated Circuitsǁ, 4th edition (2012), Prentice Hall / Pearson Education, New Delhi.
2. Sergio Franco (1997), Design with operational amplifiers and analog integrated circuits, McGraw Hill, New Delhi.
3. Gray, Meyer (1995), Analysis and Design of Analog Integrated Circuits, Wiley International, New Delhi.

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

ANTENNAS & WAVE PROPAGATION

UNIT-I

Antenna Basics & Dipole antennas:Definition of antenna,Radiation Mechanism –single wire, two wire, dipoles, Antenna Parameters - Radiation Patterns, Main Lobe and Side Lobes, Beam widths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Aperture Efficiency, Effective Height and length, Antenna Theorems. Radiation – Basic Maxwell's equations, Retarded potential-Helmholtz Theorem, Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Natural current distributions, far fields and patterns of Thin Linear Center-fed Antennas of different lengths, Illustrative problems.

UNIT-II

HF, VHF and UHF Antennas: Loop Antennas - Introduction, Small Loop, Comparison of far fields of small loop and short dipole, Radiation Resistances and Directives of small and large loops (Qualitative Treatment), Arrays with Parasitic Elements - Yagi - Uda Arrays, Folded Dipoles & their characteristics. Log periodic Antenna, Helical Antennas-Helical Geometry, Helix modes, Practical Design considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas- Types, Fermat's Principle, Optimum Horns, Design considerations of Pyramidal Horns, Illustrative Problems.

UNIT-III

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

UNIT-IV

Antenna Arrays: Point sources - Definition, Patterns, arrays of 2 Isotropic sources- Different cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broad side Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison, BSAa with Non-uniform Amplitude Distributions - General considerations and Bionomial Arrays, Illustrative problems.

Antenna Measurements: Introduction, Sources of errors, Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

UNIT-V

Wave Propagation: Introduction, Definitions, Characterizations and general classifications, different modes of wave propagation, Ray/Mode concepts, Ground wave propagation (Qualitative treatment) - Introduction, Plane earth reflections, Space and surface waves, wave tilt, curved earth reflections, Space wave propagation - Introduction, field strength variation with distance and height, effect of earth's curvature, absorption, Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, fading and path loss calculations, Sky wave propagation - Introduction, structure of Ionosphere, refraction and reflection of sky

waves by Ionosphere, Ray path, Critical frequency, MUF, LUF, OF, Virtual height and Skip distance, Relation between MUF and Skip distance, Multi-HOP propagation, Energy loss in Ionosphere, Summary of Wave Characteristics in different frequency ranges, Illustrative problems.

TEXT BOOKS:

1. JohnD. Kraus, RonaldJ. Marhefka and AhmadS. Khan,— Antennas and wave propagation‖, TMH, New Delhi, 4th Ed., 2010.
2. C.A. Balanis, —Antenna Theory- Analysis and Design‖, John Wiley & Sons, 2nd Edn.,2001.
3. K.D. Prasad and Satya Prakashan, —Antennas and Wave Propagation, New Delhi, Tech. India Publications, 2001.

REFERENCES:

1. E.C.Jordan and K.G.Balmain,—Electromagnetic Waves and Radiating Systems,2nd Edition, PHI, 2000.
2. G.S.N Raju,—Antenna and Wave Propagation,Pearson Education India,3rd Edition 2009.
3. R K Shev gaonkar, Electromagnetic Waves, Tata Mc Graw-Hill, 2006.

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

MICROPROCESSORS AND MICROCONTROLLERS

UNIT I

8086 Architecture: Introduction to Microprocessors based systems, Overveiw of 8085 microprocessor Architecture, 8086 microprocessor: Main features, pin diagram/description, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response, 8086 system timing, minimum mode and maximum mode configuration. Overveiw of 80X86 Microprocessor family.

UNIT II

8086 Programming: Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNIT III

8086 Interfacing: Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

UNIT IV

Microcontroller : Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V

Interfacing Microcontroller:- Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation - Comparison of Microprocessor, Microcontroller, PIC and ARM processors

Textbooks:

1. Douglas VHall, SSSP Rao, Microprocessors and Interfacing–Programming and Hardware Tata McGraw Hill Education Private Limited, 3rd Edition, 1994.
2. KM Bhurchandi, AK Ray, Advanced Microprocessors and Peripherals, 3rd edition, McGraw Hill Education, 2017.
3. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd edition, Pearson, 2012.

References:

1. Ramesh S Gaonkar, Microprocessor Architecture Programming and Applications with the 8085, 6th edition, Penram International Publishing, 2013.
2. Kenneth J. Ayala, The 8051Microcontroller, 3rd edition, Cengage Learning, 2004.

INTRODUCTION TO QUANTUM TECHNOLOGIES AND APPLICATIONS

(Qualitative Treatment) L T P C

3 0 0 3

Course Objectives (COBJ):

- Introduce fundamental quantum concepts like superposition and entanglement.
- Understand theoretical structure of qubits and quantum information.
- Explore conceptual challenges in building quantum computers.
- Explain principles of quantum communication and computing.
- Examine real-world applications and the future of quantum technologies.

Course Outcomes (CO):

- Explain core quantum principles in a non-mathematical manner.
- Compare classical and quantum information systems.
- Identify theoretical issues in building quantum computers.
- Discuss quantum communication and computing concepts.
- Recognize applications, industry trends, and career paths in quantum technology.

Unit 1: Introduction to Quantum Theory and Technologies

The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison, Quantum states and measurement: nature of observation, Overview of quantum systems: electrons, photons, atoms, The concept of quantization: discrete energy levels, Why quantum? Strategic, scientific, and technological significance, A snapshot of quantum technologies: Computing, Communication, and Sensing, National and global quantum missions: India's Quantum Mission, EU, USA, China

Unit 2: Theoretical Structure of Quantum Information Systems

What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (nonengineering view),Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract, The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences, Philosophical implications: randomness, determinism, and observer role

Unit 3: Building a Quantum Computer – Theoretical Challenges and Requirements

What is required to build a quantum computer (conceptual overview)?,Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers: Why maintaining entanglement is difficult, Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison),Superconducting circuits, Trapped ions, Photonics, Vision vs reality: what's working and what remains elusive, The role of quantum software in managing theoretical complexities

Unit 4: Quantum Communication and Computing – Theoretical Perspective

Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD),Role of Entanglement in Communication, The Idea of the Quantum Internet – Secure Global

Networking, Introduction to Quantum Computing, Quantum Parallelism (Many States at Once),Classical vs Quantum Gates, Challenges: Decoherence and Error Correction, Real World Importance and Future Potential

Unit 5: Applications, Use Cases, and the Quantum Future

Real-world application domains: Healthcare (drug discovery),Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum,Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization,Emerging careers in quantum: roles, skillsets, and preparation pathways,Educational and research landscape – India's opportunity in the global quantum race

Textbooks:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
3. Chris Bernhardt, Quantum Computing for Everyone, MIT Press, 2019.

Reference Books:

1. David McMahon, Quantum Computing Explained, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, An Introduction to Quantum Computing, Oxford University Press, 2007.
3. Scott Aaronson, Quantum Computing Since Democritus, Cambridge University Press, 2013.
4. Alastair I.M. Rae, Quantum Physics: A Beginner's Guide, Oneworld Publications, Revised Edition, 2005.
5. Eleanor G. Rieffel, Wolfgang H. Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
6. Leonard Susskind, Art Friedman, Quantum Mechanics: The Theoretical Minimum, Basic Books, 2014.
7. Bruce Rosenblum, Fred Kuttner, Quantum Enigma: Physics Encounters Consciousness, Oxford University Press, 2nd Edition, 2011.
8. GiulianoBenenti, GiulioCasati, GiulianoStrini, Principles of Quantum Computation and Information, Volume I: Basic Concepts, World Scientific Publishing, 2004.
9. K.B. Whaley et al., Quantum Technologies and Industrial Applications: European Roadmap and Strategy Document, Quantum Flagship, European Commission, 2020.
10. Department of Science & Technology (DST), Government of India, National Mission on Quantum Technologies & Applications – Official Reports and Whitepapers, MeitY/DST Publications, 2020 onward.

Online Learning Resources:

- IBM Quantum Experience and Qiskit Tutorials
- Coursera – Quantum Mechanics and Quantum Computation by UC Berkeley
- edX – The Quantum Internet and Quantum Computers
- YouTube – Quantum Computing for the Determined by Michael Nielsen
- Qiskit Textbook – IBM Quantum

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

COMPUTER ARCHITECTURE & ORGANIZATION (PE-I)

UNIT I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT II

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation. **IEEE Standard 754** floating point representation of numbers.
Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor arbitration, Inter-processor communication and synchronization, Cache Coherence.

Textbook:

1. Computer System Architecture–M. Moris Mano, Third Edition, Pearson/PHI.

References:

1. Computer Organization–Car Hamacher, Zvonks Vranesic, Safea Zaky, 5th Edition, McGraw Hill.
2. Computer Organization and Architecture–William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization–Andrew S.Tanenbaum, 4th Edition, PHI/Pearson.

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

INFORMATION THEORY AND CODING (PE-I)

UNIT I

Information Theory: Introduction, Definition of Entropy, Conditional Entropy, Relative Entropy, Basic Properties of Entropy, Mutual Information, Information Inequalities, Problem solving.

Block to Variable length Coding: Prefix-free Code, Coding a single Random Variable, Prefix, Free Code, Kraft Inequality, Bounds on optimal Code length, Coding a Single Random Variable, Rooted Tree with Probabilities, Shanon-Fano Coding, Free fix code, Coding an information Source, Huffman Coding, Example.

Variable to Block Length Coding: Proper message set, Assigning probabilities to K-ary rooted tree corresponding to a proper message set, Prefix free Coding of a proper message set, Tunstall message set, Tunstall coding.

UNIT II

Asymptotic Equi-partition Property, Chebyshev inequality, Weak law of large numbers, Typical Sequences, Block to Block Coding of DMS: Consequences of Asymptotic Equipartition Property, Problem solving.

Universal Source Coding: Lempel-Ziv Algorithm, LZ -77 Encoding and Decoding, Lempel-Ziv Welch (LZW) Algorithm, LZW Encoding, and Decoding.
Coding of Sources with memory, Channel Capacity, Noisy Channel Coding Theorem, Differential Entropy, Gaussian Channel, Rate Distortion Theory, Blahut-Arimoto Algorithm, problem solving.

UNIT III

Error Control Coding: Introduction to Error Control Codes, Error Probability with Repetition in the Binary Symmetric Channel, Parity Check Bit Coding for Error Detection, Block Coding for Error Detection and Correction, The Hamming Distance, The upper bound of the Probability of Error with Coding, Soft Decision Decoding, Hard Decision Decoding.

UNIT IV

Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Encoding Block Codes, Decoding of Block Codes, Single Parity Check bit Code, Repeated Codes, Hadamard Code, Hamming Code, Cyclic Codes, Generator and Parity-Check Matrices of Cyclic Codes, Encoding and Decoding of Cyclic Codes, BCH codes, Reed-Solomon Code.

UNIT V

Convolutional Coding, Code Generation, Decoding Convolutional Code, the Code Tree, Decoding in the presence of Noise, State and Trellis Diagrams, The Viterbi Algorithm, Comparison of Error Rates in Coded and Uncoded Transmission, Turbo Codes, LDPC codes, Hard and Soft Decision Decoding.

Textbooks:

1. Thomas M.Cover, Joy A. Thomas, Elements of Information Theory, John Wiley & Sons, 2nd Edition, 2006.
2. Herbert Taub, Donald L Shilling, Goutam Saha, Principles of Communication Systems, 4th Edition, McGraw Hill, 2017.

References:

1. ShuLin, DanielJ. CostelloJr. Error Control Coding, Pearson, Second Edition, 2013.
2. Simon Haykin, Communication Systems, John Wiley, 4th Edition, 2010.

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

DETECTION AND ESTIMATION THEORY (PE-I)

UNIT I

Statistical Decision Theory: Review of Gaussian variables and processes; problem formulation and objective of signal detection and signal parameter estimation in discrete-time domain. Bayesian, minimax, and Neyman-Pearson decision rules, likelihood ratio, receiver operating characteristics, composite hypothesis testing, locally optimum tests, detector comparison techniques, asymptotic relative efficiency.

UNIT II

Detection of Deterministic Signals: Matched filter detector and its performance; generalized matched filter; detection of sinusoid with unknown amplitude, phase, frequency and arrival time, linear model.

Detection of Random Signals: Estimator-correlator, linear model, general Gaussian detection, detection of Gaussian random signal with unknown parameters, weak signal detection

UNIT III

Nonparametric Detection: Detection in the absence of complete statistical description of observations, sign detector, Wilcoxon detector, detectors based on quantized observations, robustness of detectors.

UNIT IV

Estimation of Signal Parameters: Minimum variance unbiased estimation, Fisher information matrix, Cramer-Rao bound, sufficient statistics, minimum statistics, complete statistics; linear models; best linear unbiased estimation; maximum likelihood estimation, invariance principle; estimation efficiency; Bayesian estimation: philosophy, nuisance parameters, risk functions, minimum mean square error estimation, maximum a posteriori estimation.

UNIT V

Signal Estimation in Discrete-Time: Linear Bayesian estimation, Weiner filtering, dynamical signal model, discrete Kalman filtering.

Text books:

1. H. L. Van Trees, "Detection, Estimation and Modulation Theory: Part I, II, and III", John Wiley, NY, 1968.
2. H.V.Poor, "An Introduction to Signal Detection and Estimation", Springer, 2/e, 1998.

Reference books:

1. S. M. Kay, "Fundamentals of Statistical Signal Processing: Estimation Theory", Prentice Hall PTR, 1993.
2. S. M. Kay, "Fundamentals of Statistical Signal Processing: Detection Theory", Prentice Hall PTR, 1998.

SOFT SKILLS

(Common to all branches)

L	T	P	C
1	0	2	2

Course Objectives:

- To prepare to face global competition for employment and excellence in profession.
- To help the students understand and build interpersonal and interpersonal skills that will enable them to lead meaningful professional life.

UNIT – I: INTRODUCTIUON

Introductiuon- Emergence of life skills, Definition & Meaning, Importance & need, reasons for skill gap, Analysis--Soft Skills vs Hard skills, Linkage between industry and soft skills, Challenges, Personality Development vs. Soft Skills, Soft Skills vs English - Improving Techniques.

Learning Outcomes:

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

• Developing self-motivation, raised aspirations and belief in one's own abilities, defining and committing to achieving one's goals.	**L1**
• Learning to keep going when things don't go according to plan, coping with the unfamiliar, managing disappointment and dealing with conflict	**L2**

UNIT – II: *Intra-Personal:*

Definition-Meaning-Importance-SWOT analysis, johari windows - Goal Setting- quotient skills - Emotional Intelligence - Attitudinal skills - Right thinking- Problem Solving -Time management, stress management.

Learning Outcomes:

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

• A commitment to ethics and integrity in academic and professional relationships, within the community and the environment.	**L1**
• Describe how good communication with other can influence our working relationships	**L2**

UNIT – III: Inter-Personal:

Definition-Meaning-Importance-Communications skills- Team Work, managerial skills - Negotiation Skills-Leadership skills, corporate etiquettes.

Learning Outcomes:

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

• Compares verbal and nonverbal communication	**L1**
• Understand the functions of nonverbal communication	**L2**

UNIT – IV: *Verbal Skills*:

Definition and Meaning-Listening skills, need- types, advantages, Importance-Improving Tips

for Listening. Speaking , need- types. advantages. Importance-Improving Tips , Reading- Writing Skills. Report. Resume. statement of purpose. need- types. advantages. Importance-Improving Tips .

Learning Outcomes:

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

• Learner will be able to prepare his/ her own Resume and Cover letter.	L1
• Learner will understand the importance of etiquettes and learn the nuances of expected behaviour within a group, a social class and society at general	L2

UNIT – V: Non Verbal Skills **& Interview skills**

Definition and Meaning-Importance- Facial Expressions- Eye Contact- Proxemics- Haptics - Posture, cross cultural body language, body language in interview room, appearance and dress code -Kinetics- Para Language - tone, pitch, pause, neutralization of accent, use of appropriate language, Interview skills, interview methods and questions.

Learning Outcomes:

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

• Learner will be able to face interview questions and effectively present his /her. skills	L1
• Learner will manage how to plan and organize personal and professional life.	L2

Reference Books:

1. Sherfield, M. Robert at al ***Cornerstone Developing Soft Skills***, 4th ed. Pearson Publication, New Delhi, 2014.
2. Alka Wadkar, ***Life Skills for Success***, Sage Publications India Private Limited; First edition (1 May 2016)
3. Sambaiah.M. ***Technical English***, Wiley publishers India. New Delhi. 2014.
4. GANGADHAR JOSHI, ***From Campus to Corporate***, *SAGE TEXT*.
5. Alex.K, ***Soft Skills***, 3rd ed. S. Chand Publication, New Delhi, 2014.
6. Meenakshi Raman and Sangita Sharma, ***Technical Communication: Principle and Practice***, Oxford University Press. 2009.
7. Shalini Varma, ***Body Language for Your Success Mantra***, 4th ed, S. Chand Publication, New Delhi, 2014.
8. Stephen Covey, ***Seven Habits of Highly Effective People***, JMD Book, 2013.

Course Outcomes:

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

• The students will be able to assimilate and understood the meaning and importance of soft skills and learn how to develop them.	L1
• The students will understand the significance of soft skills in the working environment for professional excellence.	L2
• The students will be prepared to undergo the placement process with confidence and clarity.	L3
• The students will be ready to face any situation in life and equip themselves to handle them effectively.	L4
• The students will understand and learn the importance of etiquette in both professional and personal life	L5

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

B.Tech II Year II Semester

23AHS03A - MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to all Branches)

L	T	P	C
2	0	0	2

Course Objectives: The objectives of the course are to make the students learn about

- To inculcate the basic knowledge of microeconomics and financial accounting.
- To make the students learn how demand is estimated for different products, input- output relationship for optimizing production and cost.
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

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

- Define the concepts related to Managerial Economics, financial accounting and management. (L1)
- Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets. (L2)
- Apply the Concept of Production cost and revenues for effective Business decision. (L3)
- Analyze how to invest their capital and maximize returns. (L4)
- Develop the accounting statements and evaluate the financial performance of business entity. (L5)

UNIT – II Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT – III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT – IV Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay BackMethod, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT – V Financial Accounting and Analysis

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Text Books:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

Reference Books:

1. A R Aryasri - Managerial Economics and Financial Analysis, TMH 2011.Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
2. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
3. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, 2011.
4. N. Appa Rao. & P. Vijaya Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi, 2011.
5. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Online Learning Resources:
https://www.slideshare.net/123ps/managerial-economics-ppt
https://www.slideshare.net/rossanz/production-and-cost-45827016
https://www.slideshare.net/darkyla/business-organizations-19917607 https://www.slideshare.net/balarajbl/market-and-classification-of-market
https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396 https://www.slideshare.net/ashu1983/financial-accounting

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

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

ANALOG and DIGITAL IC APPLICATIONS LAB

List of Experiments :(At least 8 Linear and 4 Digital IC applications experiments shall be performed using IC's).

1. Design and Verify an Inverting and Non-inverting Amplifier using Op Amp and calculate gain.
2. Design and Verify Adder and Subtractor using Op Amp and verify addition and subtraction process.
3. Design and Verify a Comparator using Op Amp and draw the comparison results of A=B, A>B and A<B
4. Design and Verify a Integrator and Differentiator Circuits using IC741 and derive the required condition practically.
5. Design and Verify a Active LPF, HPF cutoff frequency of 2 KHZ and find the roll off of it.
6. Design and Verify a Circuit using IC741 to generate sinc/square/triangular wave with period of 1KHZ and draw the output waveform.
7. Construct Mono-stable Multivibrator using IC555 and draw its output waveform.
8. Construct Astable Multivibrator using IC555 and draw its output waveform and also find its duty cycle.
9. Design and Verify a Schmitt Trigger Circuit and find its LTP and UTP.
10. Design and Verify voltage regulator using IC 723, IC7805/7809/7912 and find its load regulation factor.
11. Design and Verify R-2R ladder DAC and find its resolution and write a truth table with respective voltages.
12. Design and Verify Parallel comparator type/ counter type/ successive approximation ADC and find its efficiency.
13. Design and Verify a 8x1 multiplexer using digital ICs.
14. Design and Verify a 4-bit Adder/Subtractor using digital ICs
15. Design and Verify a Decade counter and verify its truth table and draw respective wave forms.
16. Design and Verify a Up/down counter using IC74163 and draw read/write waveforms.
17. Design and Verify a Universal shift register using IC 74194/195 and verify its shifting operation.
18. Design and Verify a 8x3 encoder / 3x8 decoder and verify its truth table.

Reference books:

1. D.Roy Choudhury, Shail B. Jain, —Linear Integrated Circuit ,4th edition (2012), New Age International Pvt.Ltd., New Delhi, India
2. Floyd, Jain, —Digital Fundamentals, 8th edition (2009), Pearson Education, New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

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

MICROPROCESSORS AND MICROCONTROLLERS LAB

List of Experiments :(Any TEN of the experiments are to be conducted)

1. **Programs for 16 Bit Arithmetic Operations** (Using various addressing modes)

a) Write and execute an ALP to Perform Addition and Subtraction of Multiprecision numbers.

b) Write and execute an ALP to Perform Multiplication and division of signed and unsigned Hexadecimal numbers.

c) Write and execute an ALP to find square, cube and factorial of a given number.

2. Programs Involving Bit Manipulation Instructions

a) Write and execute an ALP to find the given data is positive or negative.

b) Write and execute an ALP to find the given data is odd or even.

c) Write and execute an ALP to find Logical ones and zeros in a given data.

3. Programs on Arrays for 8086

a) Write and execute an ALP to find Addition/subtraction of N no_s.

b) Write and execute an ALP for finding largest/smallest No.

c) Write and execute an ALP to sort given array in Ascending/descending order.

4. Programs on String Manipulations for 8086

a) Write and execute an ALP to find String length.

b) Write and execute an ALP for Displaying the given String.

c) Write and execute an ALP for Comparing two Strings.

d) Write and execute an ALP to reverse String and Checking for palindrome.

5. Programs for Digital Clock Design Using 8086

a) Write and execute an ALP for Designing clock using INT21H Interrupt.

b) Write and execute an ALP for Designing clock using DOS Interrupt Functions.

c) Write and execute an ALP for Designing clock by reading system time.

6. Interfacing Stepper Motor with 8086

a) Write and execute an ALP to 8086 processor to Interface a stepper motor and operate it in clockwise by choosing variable step-size.

b) Write and execute an ALP to 8086 processor to Interface a stepper motor and operate it in Anti-clockwise by choosing variable step-size.

7. Interfacing ADC/DAC with8086

a) Write and execute an ALP to 8086 processor to Interface ADC.

b) Write and execute an ALP to 8086 processor to Interface DAC and generate Square Wave/ Triangular Wave/ Step signal.

8. Communication between Two Microprocessors

a) Write and execute an ALP to have Parallel communication between two microprocessors using 8255

b) Write and execute an ALP to have Serial communication between two microprocessor kits using 8251.

9. Programs using Arithmetic and Logical Instructions for 8051

a) Write and execute an ALP to 8051 Microcontroller to perform Arithmetic operations like addition, subtraction, Multiplication and Division.

b) Write and execute an ALP to 8051 Microcontroller to perform Logical operations like AND, OR and XOR.

c) Programs related to Register Banks.

10. Programs to Verify Timers/Counters of 8051

a) Write and execute a program to create a delay of 25msec using Timer0 in mode 1 and blink all the Pins of P0.

b) Write and execute a program to create a delay of 50 μsec using Timer1 in mode 0 and blink all the Pins of P2.

c) Write and execute a program to create a delay of 75msec using counter0 in mode 2 and blink all the Pins of P1.

d) Write and execute a program to create a delay of 80 μsec using counter1 in mode 1 and blink all the Pins of P3.

11. UART Operation in 8051

a) Write and execute a program to transfer a character serially with a baud rate of 9600 using UART.

b) Write and execute a program to transfer a character serially with a baud rate of 4800 using UART.

c) Write and execute a program to transfer a character serially with a baud rate of 2400 using UART.

12. Interfacing LCD with 8051

a) Develop and execute the program to interface 16*2 LCD to 8051.

b) Develop and execute the program to interface LCD to 8051in 4-bit or 8-bit mode.

Reference Books:

1. Kenneth J.Ayala. The 8051 microcontroller, 3rd edition, Cengage learning, 2010.
2. Advanced microprocessors and peripherals-A.K ray and K.M. Bhurchandani, TMII 2nd edition 2006.
3. The 8051 Microcontroller and Embedded Systems: Using Assembly and C by Muhammad Ali Mazidi, Janice Gillispie Mazidi, Second Edition.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

III B.Tech– I semester **L – T – P – C** **2 – 0 – 0 – 1**

TINKERING LAB

The aim of tinkering lab for engineering students is to provide a hands-on learning environment where students can explore, experiment, and innovate by building and testing prototypes. These labs are designed to demonstrate practical skills that complement theoretical knowledge.

These labs bridge the gap between academia and industry, providing students with the practical experience. Some students may also develop entrepreneurial skills, potentially leading to start- ups or innovation-driven careers. Tinkering labs aim to cultivate the next generation of engineers by giving them the tools, space, and mind-set to experiment, innovate, and solve real-world challenges.

List of experiments:

1) Make your own parallel and series circuits using breadboard for any application of your choice.
2) Demonstrate a traffic light circuit using breadboard.
3) Build and demonstrate automatic Street Light using LDR.
4) Simulate the Arduino LED blinking activity in Tinker cad.
5) Build and demonstrate an Arduino LED blinking activity using Arduino IDE.
6) Interfacing IR Sensor and Servo Motor with Arduino.
7) Blink LED using ESP32.
8) LDR Interfacing with ESP32.
9) Control an LED using Mobile App.
10) Design and 3D print a Walking Robot
11) Design and 3D Print a Rocket.
12) Build a live soil moisture monitoring project, and monitor soil moisture levels of a remote plan in your computer dashboard.
13) Demonstrate all the steps in design thinking to redesign a motor bike.

1) Make your own parallel and series circuits using breadboard for any application of your choice.
2) Design and 3D print a Walking Robot
3) Design and 3D Print a Rocket.
4) Temperature & Humidity Monitoring System (DHT11 + LCD)
5) Water Level Detection and Alert System
6) Automatic Plant Watering System
7) Bluetooth-Based Door Lock System
8) Smart Dustbin Using Ultrasonic Sensor
9) Fire Detection and Alarm System
10) RFID-Based Attendance System
11) Voice-Controlled Devices via Google Assistant
12) Heart Rate Monitoring Using Pulse Sensor
13) Soil Moisture-Based Irrigation
14) Smart Helmet for Accident Detection
15) Milk Adulteration Detection System
16) Water Purification via Activated Carbon
17) Solar Dehydrator for Food Drying
18) Temperature-Controlled Chemical Reactor
19) Ethanol Mini-Plant Using Biomass
20) Smart Fluid Flow Control (Solenoid + pH Sensor)
21) Portable Water Quality Tester
22) AI Crop Disease Detection
23) AI-based Smart Irrigation
24) ECG Signal Acquisition and Plotting
25) AI-Powered Traffic Flow Prediction

26) Smart Grid Simulation with Load Monitoring
27) Smart Campus Indoor Navigator
28) Weather Station Prototype
29) Firefighting Robot with Sensor Guidance
30) Facial Recognition Dustbin
31) Barcode-Based Lab Inventory System
32) Growth Chamber for Plants
33) Biomedical Waste Alert System
34) Soil Classification with AI
35) Smart Railway Gate
36) Smart Bin Locator via GPS and Load Sensors
37) Algae-Based Water Purifier
38) Contactless Attendance via Face Recognition

Note: The students can also design and implement their own ideas, apart from the list of experiments mentioned above.

Note: A minimum of 8 to 10 experiments must be completed by the students.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

DIGITAL SIGNAL PROCESSING

UNIT I

Introduction to discrete time signals and systems:

Introduction to digital signal processing, Review of discrete-time signals and systems, Analysis of discrete-time linear time invariant systems, frequency domain representation of discrete time signals and systems

Z–Transform: Definition, ROC, Properties, Poles and Zeros in Z-plane, the inverse Z-Transform, System analysis, Transfer function, BIBO stability, System Response to standard signals, Solution ofdifferenceequations with initial conditions, Illustrative Problems, analysis of linear time-invariant systems in the z-domain, pole-zero stability.

UNIT II

Discrete FourierTransform: Introduction, Discrete Fourier Series, properties of DFS, Discrete Fourier Transform, Inverse DFT, properties of DFT, Linear and Circular convolution, convolution using DFT, sampling, Quantization effects.

Fast Fourier Transform: Introduction, Fast Fourier Transform, Radix-2 Decimation in timeand Decimation in frequency FFT, Inverse FFT (Radix-2).

UNIT III

IIR Filters: Introduction to digital filters, Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters by Impulse invariant and bilinear transformation methods, Frequency transformations, Basic structures of IIR Filters -Directform- I, Direct form-II, Cascade form and Parallel form realizations.

UNIT IV

FIR Filters: Introduction, Characteristics of FIR filters with linear phase, Frequency response of linear phase FIR filters, Design of FIR filters using Fourier series and windowing methods (Rectangular, Triangular, Raised Cosine, Hanging, Hamming, Blackman), Comparison of IIR & FIR filters, Basic structures of FIR Filters – Direct form, Cascade form, Linear phaserealizations.

UNIT V

Architectures for Programmable DSP Devices: Architecture of TMS320C5X: Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Register ALU, Index Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, some flags in the status registers, On- chip memory, On-chip peripherals.

Textbooks:

1. John G.Proakis, Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms, and Applications, Pearson Education, 2007.
2. A.V.OppenheimandR.W.Schaffer, Discrete Time Signal Processing, PHI.

References:

1. S.K.Mitra, Digital Signal Processing–A practical approach, 2nd Edition, Pearson Education, New Delhi, 2004.
2. M H Hayes, Digital Signal Processing, Schaum's Outline series, Tata Mc-Graw Hill, 2007.
3. Robert J. Schilling, Sandra L. Harris, Fundamentals of Digital Signal Processing using Matlab, Thomson, 2007.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

MICROWAVE AND OPTICAL COMMUNICATION

UNIT I

Waveguides: Introduction, Rectangular waveguides, Field expressions for TE and TM modes, Wave propagation in the guide, Phase and group velocities, Power transmission and attenuation, Waveguide current and mode excitation.

Circular waveguide – TE and TM modes, Wave propagation, Cavity resonators (**Qualitative treatment only**).

UNIT II

Passive Microwave Devices: Introduction to scattering parameters and their properties, Terminations, Variable short circuit, Attenuators, Phase shifters, Hybrid Tees (H-plane, E-plane, Magic Tees), Directional Couplers – Bethe hole and Two hole Couplers, Deriving Scattering matrix for Microwave passive devices. Microwave propagation in Ferrites, Gyrator, Isolator, and Circulator.

Microwave Amplifiers and Oscillators: Microwave Tubes: Linear Beam Tubes – Two cavity Klystron amplifier -velocity modulation, bunching process, output power, Reflex Klystron oscillator, power output and efficiency, Travelling Wave Tube (TWT) – Bunching process and amplification process (**Qualitative treatment only**).

Crossed Field Tubes – Magnetron oscillator, pi-mode operation, power output and efficiency, Hartree Condition.

UNIT III

Microwave Semiconductor Devices: Gunn Oscillator – Principle of operation, Characteristics, Two valley model, IMPATT, TRAPATT diodes.

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

UNIT IV

Introduction to Optical Fibers and Transmission Characteristics - The propagation of light in optical waveguides – Classification of optical fibers – Numerical aperture, Step index and Graded index fiber – Modes in cylindrical fiber – Linearly polarized modes, Attenuation: Absorption, Scattering, Bending losses. Modal dispersion and chromatic dispersion – Single mode fiber - waveguide dispersion– MFD – PMD

UNIT V

Optical Transmitters and Receivers: Optical Sources: - Light source materials – LED homo and hetero structures–surface and edge emitters–Quantum efficiency– Injection Laser Diode – Modes and threshold condition – Structures and Radiation Pattern. Optical detectors: – Physical principles – PIN and APD diodes – Photo detector noise

OpticalLinkDesign: Point-to-point links–System considerations –Link Power budget –Rise time budget.

Textbooks:

1. David M.Pozar, Microwave Engineering John Wiley & Sons, Inc.4th edition, 2012
2. Samuel Y.Liao, Microwave Devices and Circuits, PHI publications, Third Edition, 1997.
3. GerdKeiser—Optical FiberCommunications, McGraw Hill, Third Edition, 2000.

References:

1. R.E. Collin, —Foundations for Microwave Engineering, Wiley Student Edition, Second Edition, 2009.
2. Om.P. Gandhi, Microwave: Engineering and Applications, KaiFa Book Company,1981.
3. Reich H.J. etal, —Microwave Principles, MIT Press,1972.
4. FETerman,—Electronic and Radio Engineering, Mc Graw Hill, 4th Edition,1984

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

VLSI DESIGN

UNIT I

Introduction: Brief Introduction to IC technology MOS, PMOS, NMOS, CMOS & BiCMOS Technologies.Basic Electrical Properties of MOS and BiCMOS Circuits: I_{DS}-V_{DS} relationships, MOS transistor Threshold Voltage, figure of merit, Transconductance, Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT II

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Lambda(λ)-based design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT III

Gate level Design: Logic gates and other complex gates, Switch logic, Alternate gate circuits. Basic Circuit Concepts: Sheet Resistance Rs and its concepts to MOS, Area Capacitances calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out

UNIT IV

Subsystem Design: Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters. VLSI Design styles: Full-custom, Standard Cells, Gate-arrays, FPGAs, CPLDs and Design Approach for Full-custom and Semi-custom devices, parameters influencing low power design.

UNIT V

CMOS Testing: Need for testing, Design for testability - built in self-test (BIST) – testing combinational logic –testing sequential logic – practical design for test guide lincs – scan design techniques.

Textbooks:

1. Essentials of VLSI Circuits and Systems, Kamran Eshraghian, Eshraghian Dougles, A. Pucknell, 2005, PHI.
2. Modern VLSI Design –Wayne Wolf, 3 Ed., 1997, Pearson Education.

References:

1. CMOS VLSI Design-A Circuits and Systems Perspective, Neil H.E Weste, David Harris, Ayan Banerjee, 3rd Edn, Pearson, 2009.
2. Behzad Razavi,—Design of Analog CMOS Integrated Circuits, Mc Graw Hill, 2003.
3. Jan M.Rabaey,—Digital Integrated Circuits, Anantha Chandrakasan and Borivoje Nikolic, Prentice-Hall of India Pvt.Ltd, 2nd edition, 2009.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION (PE-II)

UNIT-I

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

UNIT-II

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

UNIT-III

Bridges: DC Bridges for Measurement of resistance: Wheat stone bridge, Kelvin's Bridge, AC Bridges for Measurement of inductance- Maxwell's bridge, Hay's Bridge, Anderson bridge. Measurement of capacitance- Schearing Bridge, Wien Bridge. Errors and precautions in using bridges.

UNIT-IV

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

UNIT-V

Sensors and Transducers - Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples and thermistors), Velocity, Acceleration, Vibration, pH measurement Signal Conditioning Circuits.

TEXT BOOKS:

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

REFERENCES:

1. DavidA.Bell, —Electronic Instrumentation & Measurements‖, 2nd Edition, PHI,2003.
2. K. LalKishore, —Electronic Measurements & Instrumentations‖, Pearson Education, 2009.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

EMBEDDED SYSTEMS and IOT (PE-II)

UNIT I

Introduction to Embedded Systems and Internet of Things (IoT): Introduction, Hardware & Software Architecture of Embedded Systems, Embedded Systems Development process, Architecture of Internet of Things, Physical Design & Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Tools, Applications of Embedded Systems and IoT, Design Methodology for IOT Products.

UNIT II

ARM Microcontrollers Architecture and Programming: Architecture, Pin Diagram, Register Set & Modes, Memory Organization, Instruction set, Programming ports, Timer/Counter, Serial communication, I/O System, Development Tools, interrupts in C, Introduction ARM mBed platform.

UNIT III

Fundamentals of Python Programming & Raspberry Pi: Introduction to python programming, Data Types & DataStructures, working with functions, Modules & Packages, File Handling, classes, REST full Web Services, Client Libraries, Introduction & programming Raspberry Pi3, Interfaces, Integrating Input Output devices with Raspberry Pi3

UNIT IV

IoT Technologies, Standards, Tools & M2M Network: Fundamental characteristics and high-level requirements of IoT, IoT Reference models; Introduction to Communication Technologies & Protocols of IoT: BLE, Wi-Fi, LoRA, 3G/4G Technologies and HTTP, MQTT, CoAP protocols; Relevant Practicals on above technologies, M2M Network, SDN (Software Defined Networking) & NFV (Network Function Virtualization) for IoT

UNIT V

IoT Platform, Cloud Computing Platforms & Data Analytics for IoT Development: IOT Platform Architecture (IBM Internet of Things & Watson Platforms); API Endpoints forPlatform Services; Devices Creation and Data Transmission; Introduction to NODE-RED and Application deployment, Introduction to Data Analytics, Apache Hadoop, Apache Oozie, Spark & Storm

TEXT BOOKS

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

REFERENCES

1. JonathanWValvano, —Embedded Microcomputer Systems: Real-Time Interfacing, 3rd Edition, Thomson Engineering, 2012.
2. Olivier Hersent,David Boswarthick,Omar Elloumi, —The Internet of Things: Key applications and Protocols, 2nd Edition, Wiley Publications, 2012.
3. Rene Beuchat, Andrea Guerrieri & Sahand Kashani—Fundamentals of System-on-Chip Design on Arm Cortex-M Microcontrollers, Paper back, 2 August 2021.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

SPEECH PROCESSING (PE-II)

UNIT I

Fundamentals of Digital Speech Processing: Anatomy & Physiology of Speech Organs, The process of Speech Production, The Acoustic Theory of Speech Production – Uniform lossless tube model, effect of losses in vocal tract and radiation at lips, Digital models for speech signals.

UNIT II

Time Domain Methods for Speech Processing: Time domain parameters of speech, methods for extracting the parameters: Zero crossings, Auto-correlation function, pitch estimation.

UNIT III

Frequency Domain Methods for Speech Processing: Short time Fourier analysis, Filter bank analysis, Spectrographic analysis, Formant extraction, Pitch extraction.

UNIT IV

Linear predictive Coding (LPC) for Speech: Formulation of linear prediction problem in time domain, solution of normal equations, Interpretation of linear prediction in auto correlation and spectral domains, Method of Solution of the LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT V

Homomorphic Speech Processing: Introduction Homomorphic Systems for Convolution: Properties of the Complex Cepstrum, Computational Considerations, The Complex Cepstrum of Speech, pitch Detection and Formant Estimation; Applications of speech processing – Speech Enhancement, Speech recognition, Speech synthesis and Speaker Verification.

Textbooks:

1. L.R. Rabinerand S.W. Schafer, Digital Processing of Speech Signals, Pearson Education.
2. Douglas O 'Shaughnessy, Speech Communications: Human &Machine,2nd Ed., Wiley-IEEE Press.

References:

1. Thomas F. Quatieri, Discrete Time Speech Signal Processing: Principles and Practice, 1st Ed., Pearson Education.
2. Ben Gold & Nelson Morgan, Speech and Audio Signal Processing: Processing and Perception of Speech and Music ,1st Ed., Wiley.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

DIGITAL IMAGE PROCESSING (PE-III)

UNIT I

Introduction: Introduction to Image Processing, Fundamental steps in digital image processing, components of an image processing system, image sensing and acquisition, image sampling and quantization, some basic relationships between pixels, an introduction to the mathematical tools used in digital image processing.

ImageTransforms: Need for image transforms, Discrete Fourier transform (DFT) of one variable, Extension to functions of two variables, some properties of the 2-D Discrete Fourier transform, Importance of Phase, Walsh Transform. Hadamard transform, Haar Transform, Slant transform, Discrete Cosine transform, KL Transform, SVD and Radon Transform, Comparison of different image transforms.

UNIT II

Intensity Transformations and Spatial Filtering: Background, some basic intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters, sharpening spatial filters, combining spatial enhancement methods Filtering in the Frequency Domain: Preliminary concepts, The Basics of filtering in the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering.

UNIT III

Image Restoration and Reconstruction: A model of the image degradation / Restoration process, Noise models, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations, Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering, constrained least squares filtering, geometric mean filter ,image reconstruction from projections.

UNIT IV

Image compression: Fundamentals, Basic compression methods: Huffman coding, Golomb coding, Arithmetic coding, LZW coding, Run-Length coding, Symbol-Based coding, Bit-Plane coding, Block Transform coding, Predictive coding Wavelets and Multiresolution Processing: Image pyramids, subband coding, Multiresolution expansions, wavelet transforms in one dimensions & two dimensions, Wavelet coding.

UNIT V

Image segmentation: Fundamentals, point, line, edge detection, thresholding, region –based segmentation. Morphological ImageProcessing: Preliminaries, Erosion and dilation, opening and closing, basic morphological algorithms for boundary extraction, thinning, gray-scale morphology, Segmentation using morphological watersheds.

Color image processing: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

Textbooks:

1. R.C. Gonzalez and R.E. Woods, Digital Image Processing,3rd edition, Prentice Hall, 2008.
2. Jayaraman, S. Esakkirajan, and T. Veerakumar, Digital Image Processing, Tata McGraw-Hill Education, 2011.

ReferenceBooks:

1. Anil K. Jain, —Fundamentals of Digital Image Processing, Prentice Hall of India, 9th Edition, Indian Reprint, 2002.
2. B.Chanda, D.Dutta Majumder,—Digital Image Processing and Analysis ,PHI,2009

OnlineLearningResources:

https://nptel.ac.in/courses/117105079
https://nptel.ac.in/courses/117105135

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (PE-III)

UNIT I

Introduction: What Is AI, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, The State of the Art, Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

UNIT II

Problem Solving: Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, informed (Heuristic) Search Strategies, Local Search Algorithms and Optimization Problems, Searching with Nondeterministic Actions.

UNIT III

Knowledge Representation: Knowledge-Based Agents, Logic, Propositional Logic: A Very Simple Logic, Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, The Internet Shopping World.

UNIT IV

Introduction to Machine Learning: Well-Posed Learning Problem, Designing a Learning system, Perspectives and Issues in Machine Learning.

Concept Learning and The General-to-Specific Ordering: Introduction, A Concept Learning Task, Concept Learning as Search, FIND-S: Finding a Maximally Specific Hypothesis, Version Spaces and the Candidate Elimination Algorithm, Remarks on Version spaces and Candidate-Elimination, Inductive Bias

UNIT V

Decision TreeLearning: Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning, The Basic Decision Tree Learning Algorithm, Hypothesis Space Search in Decision Tree Learning, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning.

Text Books:

1) Stuart Russell and Peter Norvig, —Artificial Intelligence: A Modern Approach, 3rd Edition, Pearson

2) Tom M. Mitchell, *Machine Learning,* McGraw Hill Edition, 2013

ReferenceBooks:

1) Saroj Kaushik, —Artificial Intelligence, Cengage Learning India, 2011

2) Elaine Richand Kevin Knight, —Artificial Intelligence, Tata Mc Graw Hill

3) David Poole and Alan Mackworth, —Artificial Intelligence: Foundations for Computational Agents‖, Cambridge University Press 2010.

4) Trivedi, M.C., —A Classical Approach to Artifical Intelligence‖, Khanna Publishing House, Delhi.

5) Christopher Bishop, Pattern Recognition and Machine Learning (PRML) , Springer, 2007. 6)ShaiShalev-Shwartz and Shai Ben-David, Understanding Machine Learning: From Theoryto
Algorithms (UML), Cambridge UniversityPress, 2014.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

SATELLITE COMMUNICATIONS (PE-III)

UNIT I

Elements of orbital mechanics. Equations of motion. Tracking and orbit determination. Orbital correction/control. Satellite launches systems. Multistage rocket launchers and their performance

UNIT II

Elements of communication satellite design. Space craft subsystems. Reliability considerations. Space craft integration.

UNIT III

Multiple access techniques: FDMA, TDMA, CDMA. Random access techniques. Satellite onboard processing.

UNIT IV

Satellite link design: Performance requirements and standards. Design of satellite links – DOMSAT, INSAT, INTELSAT and INMARSAT. Satellite - based personal communication. links.

UNIT V

Earth station design. Configurations. Antenna and tracking systems. Satellite broad casting.

Textbooks:

D.Roddy, Satellite Communication (4/e), Mc Graw-Hill,2009.

T.Pratt &C.W. Bostain, Satellite Communication, Wiley2000.

References:

B.N. Agrawal, Design of Geo synchrons Spacecraft, Prentice-Hall,1986.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

III B.Tech II Semester (E.C.E) **L–T–P–C0–1–2–2**

MACHINE LEARNING AND DSP (SEC-IV)

MACHINE LEARNING (Implement any sixconcepts)

Implement the followingconcepts using python with supporting applications.

1. Familiarizing with Anaconda and Jupyter for importing modules and dependencies for ML Familiarization with NumPy, Panda and Matplotlib by Loading Dataset in Python
2. **Linear regression**: Predict the profit of a company/House price from a dataset using the concept of linear regression. Implement the speech recognition model (NLP) from a speech/audio dataset using the concept of linear regression
3. **Logistic regression**:
   a) Identify whether the patient has diabetes or not from diabetes dataset using Logistic regression
   b) Implement the speech to textmodel (NLP-Speech recognitions system) from a speech dataset using the concept of linear regression
4. **Polynomial regression**:
   a. Determine the quality of wine using wine dataset with the help of polynomial regression
   b. Implementthe speech recognition model (NLP) from a speech / audio data set using the concept of polynomial regression.
5. **K-means clustering**: Apply the concept of K-means clustering for image segmentation problem (Brain tumor and Lung images)/Color quantization
6. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set to demonstrate the working of the decision tree based ID3 algorithm.
7. Write a program to implement the k-Nearest Neighbor algorithm for image classification and distancemetric learning for large margin with image classification applications using k-nearest neighbor.
8. **PCA/LDA:**Reduce the dimensionality of a dataset for Face recognition system
9. Design an Artificial neural network for Digit classification using Back Propagation Algorithm for MNIST Data set. Train MLP using Gradient descent algorithm by applying Linear, Sigmoid, tanh, and ReLu activation functions
10. **Digit recognition using CNN:**Identify the digits 0-9 from MNISTdata and CIFR10 set using CNN
11. Image Classification using CNN:Classify catsanddogs using CNN from the given dataset
12. LSTM (Long Short-Term Memory Networks)/ARIMA--- Implementation biomedical signals (like EEG, ECG, EMG) classifications and disease prediction.

DIGITAL SIGNAL PROCESSING (Implement any six concepts)

1. Generate the following standard discrete time signals.
   i) Unit Impulse ii) Unit step iii) Ramp iv)Exponential v)Sawtooth
2. Generate sum of two sinusoidal signals and find the frequency response (magnitudeand phase).
3. Implement and verify linear and circular convolution between two given signals.
4. Implement and verify autocorrelation for the given sequence and cross correlation betweentwo given signals.

5. Compute and implement the N-point DFT of a given sequence and compute the power density spectrum of the sequence.
6. Implement and verify N-point DIT-FFT of a given sequence and find the frequency response (magnitude and phase).
7. Implement and verify N-point IFFTof a given sequence.
8. Design IIR Butter worth filter and compare the irperformances with different orders (Low Pass Filter /High Pass Filter)
9. Design IIR Chebyshev filter and compare the irperformances with different orders (LowPass Filter /High Pass Filter).
10. Design FIR filter (Low Pass Filter/High PassFilter) using windowing technique.

i. Using rectangular window, ii. Using hamming window, iii. Using Kaiser window

11. Design and verify Filter (IIR and FIR) frequency response by using Filter design and Analysis Tool.
12. Compute the Decimation and Interpolation for the given signal.
13. Real time implementation of an audio signal using a digital signal processor.

Referencebooks:

1. S.N.SivanandamandS.N.Deepa, Introduction to neural networks using Matlab, 2006.
2. Simon Haykin,Neural Networks and Learning Machines, PHI, 2008, 3
3. Digital Signal Processing: AlonV.Oppenhelm,PHI
4. Digital Signal processing (II-Edition):S.K.Mitra,TMH

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

MICROWAVE AND OPTICAL COMMUNICATIONS LAB

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

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Attenuation Measurement
4. Directional Coupler Characteristics
5. VSWR Measurement
6. Impedance Measurements
7. Frequency and Wavelength measurement
8. Scattering Parameters of Directional coupler
9. Scattering Parameters of Magic TEE
10. Radiation pattern measurement of a Antenna
11. Antenna gain measurement

PartB: Optical Fiber Lab-Any five (5) Experiments

1. Characterization of LED
2. Characterization of Laser Diode
3. Intensity Modulation of Laser output through Optical fiber
4. Measurement of data rate for digital Optical link
5. Measurement of Numerical Aperture.
6. Measurement of Losses for Analog optical link

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

III B.Tech II Semester (E.C.E) **L–T–P–C0–0–3–1.5**

VLSI DESIGN LAB

List of Experiments: (Any TEN of the experiments are to be conducted)

1. **Design and analysis of CMOS Inverter**
   a) Implement CMOS inverter schematic using180 nm technology and design its symbol.
   b) Implement test bench for CMOS Inverter and check its output response.
   c) Perform DC and AC analysis for CMOS inverter.
   d) Check the performance of CMOS inverter using parametric sweep.

2. **Design and analysis of NAND and NOR Logic gates**
   a) Implement NAND/NOR schematic using180 nm technology and design its symbol.
   b) Implement test bench for NAND/NOR and check its output response.
   c) Perform DC and AC analysis for NAND/NOR.
   d) Check the performance of NAND/NOR using parametric sweep.

3. **Design and analysis of XOR and XNOR Logic gates**
   a) Implement XOR/XNOR schematic using180nm technology and design its symbol.
   b) Implement testbench for XOR/XNOR and check its output response.
   c) Perform DC and AC analysis for XOR/XNOR.
   d) Check the performance of XOR/XNOR using parametric sweep.

4. **Design of AOI logic**
   a) Design Schematic for AB+C_D and check its output response.
   b) Design Schematic for AB_+C_D and check its output response.
   c) Design Schematic for (A+B_)(C+D) and check its outpu tresponse.
   d) Design Schematic for (A+B_)(C_+D) and check its output response.

5. **Design and analysis of Fulladder**
   a) Design fulladder using Full custom IC design.
   b) Design fulladder using Semi custom IC design.

6. **Analysis of NMOS and PMOS characteristics**
   a) Implement testbench for NMOS/PMOS transistor.
   b) Perform DC and AC analysis for NMOS/PMOS transistor
   c) Check the performance of NMOS/PMOS transistor using parametric sweep.

7. **Design and analysis of Common source amplifier**
   a) Implement CS amplifier schematic using180nm technology and design its symbol.
   b) Implement test bench for CS amplifier and check its output response.
   c) Perform DC and AC analysis for CS amplifier.
   d) Check the performance of CS amplifier using parametric sweep.

8. **Design and analysis of Common drain amplifier**
   a) Implement CD amplifier schematic using180 nm technology and design its symbol.
   b) Implement test bench for CD amplifier and check its output response.
   c) Perform DC and AC analysis for CD amplifier.
   d) Check the performance of CD amplifier using parametric sweep.

9. **Design of MOS differential amplifier**
   a) Design differential amplifier schematic using180nm technology and its symbol.
   b) Implement test bench for differential amplifier and check its output response.

c) Perform DC and AC analysis for differential amplifier.
d) Check the performance of differential amplifier using parametric sweep.

10. Design of differential amplifier using FET/BJT

a) Design differential amplifier using FET/BJT schematic using 180 nm technologies and its symbol.
b) Implement test bench for two stage differential amplifier and check its output response.
c) Perform DC and AC analysis for differential amplifier.
d) Check the performance of differential amplifier using parametric sweep.

11. Design of Inverter Layout

a) Design and implement inverter schematic.
b) Design the layout for inverte rusing180nm tech file.
c) Perform LVS for schematic and layout
d) Check and removeal lDRC violations.
e) Extract parasitic R and Cin layout.

12. Design of NAND/NOR Layout

a) Design and implement NAND/NOR schematic.
b) Design the layout for inverter using180nm tech file.
c) Perform LVS for schematic and layout
d) Check and removeal lDRC violations.
e) Extract parasitic R and C in layout

The students are required to design the schematic diagrams using CMOS logic and to draw the layout diagrams to perform the experiments with the Industry standard EDA Tools.

Software Required: i. Mentor Graphics/ Synopsis/ Cadence / Equivalent Industry Standard Software. ii. Personal computer system with necessary software to run the programs and to implement.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

DATA COMMUNICATIONS AND NETWORKING

UNIT I

Overview of Data Communication and Networking: Introduction; Data communications: components, direction of data flow; network criteria, physical structure, categories of network (LAN, MAN, WAN); Internet: brief history, Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

UNIT II

Physical Layer: Overview of data (analog & digital), signal (analog & digital), transmission (analog & digital) & transmission media (guided & unguided), queuing theory, its applicationsin data communication, Data Encoding Techniques, Circuit switching, time division & space division switching.

UNIT III

Data link Layer: Types of errors, framing (character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC

Medium Access sub layer: Point to Point Protocol, Token Ring; Reservation, Polling, Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA Traditional Ethernet, fast Ethernet.

UNIT IV

Network layer: Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing: IP addressing, sub netting; Routing: techniques, static vs. dynamic routing, Unicast Routing Protocols: RIP, OSPF, BGP; Other Protocols: ARP, IP, ICMP, IPV6

Transport layer: Process to Process delivery; UDP; TCP; Congestion Control: Open Loop, Closed Loop choke packets; Quality of service: techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm.

UNIT V

Application Layer: Introduction to DNS, SMTP, SNMP, FTP, HTTP & WWW; Security: Cryptography (Public, Private Key based), Digital Signature, Firewalls.

Textbooks:

1. B.A.Forouzan——Data Communications and Networkig (3rdEd.)——TMH
2. A.S.Tanenbaum——Computer Networks (4thEd.)‖–Pearson Education/PHI

ReferenceBooks:

1. W.Stallings——Data and Computer Communications (5thEd.)‖–PHI/Pearson Education
2. KuroseandRose——Computer Networking-A top down approach featuring the internet‖ – Pearson Education
3. Leon,Garica,Widjaja——Communication Networks‖–TMH

IV B.Tech I Semester

Subject Code	BUSINESS ETHICS AND CORPORATE GOVERNANCE	L	T	P	C
	Management Course- II	2	0	0	2

COURSE OBJECTIVES : The objectives of this course are	
1	To make the student understand the principles of business ethics
2	To enable them in knowing about the ethics in management
3	To facilitate the student' role in corporate culture
4	To impart knowledge about the fair-trade practices
5	To encourage the student in knowing about the corporate governance

Syllabus

UNIT-I: Ethics

Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior.. Value systems - Business Ethics - Types, Characteristics, Factors, Contradictions and Ethical Practices in Management -Corporate Social Responsibility – Issues of Management – Crisis Management.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the meaning of loyalty and ethical Behavior
- Explain various types of Ethics
- Analyze issues & crisis of management

UNIT-II: ETHICS IN MANAGEMENT

Introduction- Ethics in production, finance, Human resource management and Marketing Management - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures - Culture and Individual Ethics – professional ethics and technical ethics.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the meaning of Ethics in various areas of management
- Compare and contrast professional ethics and technical ethics
- Develop ethical values in self and organization

UNIT-III : CORPORATE CULTURE

Introduction - Meaning, definition, Nature, and significance – Key elements of corporate culture, shared values, beliefs and norms, rituals, symbols and language - Types of corporate culture, hierarchical culture, market driven culture – Organization leadership and corporate culture, leadership styles and their impact on culture, transformational leadership and culture change.

LEARNING OUTCOMES:- After completion of this unit student will

- Define corporate culture
- Understand the key elements of corporate culture
- Analyze organization leadership and corporate culture

UNIT- IV: LEGAL FRAME WORK

Law and Ethics -Agencies enforcing Ethical Business Behavior - Legal Impact – Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers – Corporate law, Securities and financial regulations, corporate governance codes and principles.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand Law and Ethics
- Analyze Different fair trade practices
- Make use of Environmental Protection and Fair Trade Practices

UNIT -V: CORPORATE GOVERNANCE

Introduction - Meaning – Corporate governance code, transparency & disclosure -Role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work - Corporate scams - Committees in India and abroad, corporate social responsibility. BoDs composition, Cadbury Committee - Various committees - Reports - Benefits and Limitations.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand corporate governance code
- Analyze role of auditors, board of directors and shareholders in corporate governance
- Implementing corporate social responsibility in India.

Text books.

1. Murthy CSV: Business Ethics and Corporate Governance, HPH July 2017

2. Bholananth Dutta, S.K. Podder – Corporation Governance, VBH. June 2010

Reference books

1. Dr. K. Nirmala, KarunakaraReaddy. *Business Ethics and Corporate Governance*, HPH

2. H.R.Machiraju: *Corporate Governance*, HPH, 2013
3. K. Venkataramana, *Corporate Governance*, SHBP.

4. N.M.Khandelwal. *Indian Ethos and Values for Managers*

COURSE OUTCOMES: At the end of the course, students will be able to		**BTL**
CO1	Understand the Ethics and different types of Ethics.	L2
CO2	Understand business ethics and ethical practices in management	L2
CO3	Understand the role of ethics in management	L2
CO4	Apply the knowledge of professional ethics & technical ethics	L3
CO5	Analyze corporate law, ethics, codes & principles	L4
CO6	Evaluate corporate governance & corporate scams	L5

BTL = Bloom's Taxonomy Level

ONLINE RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc21_mg46/
2. https://archive.nptel.ac.in/courses/110/105/110105138/
3. https://onlinecourses.nptel.ac.in/noc21_mg54/
4. https://onlinecourses.nptel.ac.in/noc22_mg54/
5. https://archive.nptel.ac.in/courses/109/106/109106117/

IV B.Tech I Semester

Subject Code	E-BUSINESS Elective-2 (VII - SEMESTER)	L	T	P	C
		2	0	0	2

Course Objectives: The Objectives of this course are	
1	To provide knowledge on emerging concept on E-Business related aspect.
2	To understand various electronic markets & business models.
3	To impart the information about electronic payment systems & banking.
4	To create awareness on security risks and challenges in E-commerce.
5	To the students aware on different e-marketing channels & strategies.

Syllabus

Unit-I: Electronic Business

Introduction – Nature, meaning, significance, functions and advantages - Definition of Electronic Business - Functions of Electronic Commerce (EC)-Advantages & Disadvantages of E-Commerce –E-Commerce and E-Business, Internet Services, Online Shopping- E-Commerce Opportunities for Industries.

Learning Outcomes: -After completion of this unit student

- Understand the concept of E-Business
- Contrast and compare E-Commerce & E-Business
- Evaluate opportunities of E-commerce for industry

Unit-II: Electronic Markets and Business Models

Introduction –E-Shops-E-Malls E-Groceries - Portals - Vertical Portals-Horizontal Portals - Advantages of Portals - Business Models- Business to Business (B2B)-Business to Customers(B2C) - Business to Government(B2G)-Auctions-B2B Portals in India

Learning Outcomes: -After completion of this unit student will

- Understand the concept of business models
- Contrast and compare Vertical portal and Horizontal portals
- Analyze the B2B,B2C and B2G model

Unit-III: Electronic Payment Systems:

Introduction to electronic payment systems (EPS) -Types of electronic payments - Credit/debit cards, e-wallets, UPI, and crypto currencies -Smart cards and digital wallets: Features and usage -Electronic Fund Transfer (EFT): Role in business transactions -Infrastructure requirements and regulatory aspects of e-payments

Learning Outcomes: -After completion of this unit student will

- Understand the Electronic payment system
- Contrast and compare EFT and smart cards
- Analyze debit card and credit cards

Unit-IV:E-Security

Security risks and challenges in electronic commerce - Cyber threats - Phishing, hacking, identity theft, and malware - Digital Signatures & Certificates - Security protocols over public networks (HTTP, SSL, TLS) -Firewalls in securing e-business platforms.

Learning Outcomes: -After completion of this unit student will

- Understand E-Security
- Contrast and compare security protocols and public network
- Evaluate on Digital signature

Unit-V:E-Marketing:

Introduction – Online Marketing – Advantages of Online Marketing – Internet Advertisement – Advertisement Methods – Conducting Online Market Research– – E-marketing planning: Online branding, social media marketing, and email marketing - E-business strategies: Digital advertising, content marketing, and analytics – E-Customer Relationship Management (eCRM) E-supply chain management (e-SCM)

Learning Outcomes: -After completion of this unit student will

- Understand the concept of online marketing
- Apply the knowledge of online marketing
- Compare e-CRM and e-SCM

Text Books:

1. Arati Oturkar&Sunil Khilari. *E-Business*. Everest Publishing House, 2022
2. P.T.S Joseph. *E-Commerce*, Fourth Edition, Prentice Hall of India, 2011

References:

1. Debjani, Kamalesh K Bajaj. *E-Commerce*, Second Edition Tata McGraw-Hill's, 2005
2. Dave Chaffey.*E-Commerce E-Management,* Second Edition, Pearson, 2012.
3. Henry Chan. *E-Commerce Fundamentals and Application,* RaymondLeathamWiley India 2007
4. S. Jaiswal. *E-Commerce* GalgotiaPublication Pvt Ltd., 2003.

COURSE OUTCOMES: At the end of the course student will be able to		BTL
CO1	Remember E-Business & its nature, scope and functions.	L1
CO2	Understand E-market-Models which are practicing by the organizations	L2
CO3	Apply the concepts of E-Commerce in the present globalized world.	L3
CO4	Analyze the various E-payment systems & importance of net banking.	L4
CO5	Evaluate market research strategies & E-advertisements.	L5
CO6	Understand importance of E-security & control	L2

BTL = Bloom's Taxonomy Level

Online Resources:

https://www.slideshare.net/fatimahAlkreem/e-businessppt-67935771
https://www.slideshare.net/VikramNani/e-commerce-business-models
https://www.slideshare.net/RiteshGoyal/electronic-payment-system
https://www.slideshare.net/WelingkarDLP/electronic-security
https://www.slideshare.net/Ankitha2404/emarketing-ppt

IV B.Tech I Semester

Subject Code	Management Science Elective-2 (VII - SEMESTER)	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES : The objectives of this course are	
1	To provide fundamental knowledge on Management, Administration, Organization & its concepts.
2	To make the students understand the role of management in Production
3	To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, job evaluation and Merit rating concepts
4	To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management
5	To make the students aware of the contemporary issues in modern management

UNIT- IINTRODUCTION TO MANAGEMENT

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both. Schools of Management Thought - Taylor's Scientific Theory-Henry Fayol's principles - Elton Mayo's Human relations - **Organizational Designs** - Line organization - Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization - Committee form of Organization - Social responsibilities of Management.

LEARNING OUTCOMES: At the end of the Unit, the students will be able to

- Understand the concept of management and organization
- Apply the concepts & principles of management in real life industry.
- Analyze the organization chart & structure of an enterprise.

UNIT - II OPERATIONS MANAGEMENT

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study - Statistical Quality Control- **Material Management** - Objectives - Inventory-Functions - Types, Inventory Techniques - EOQ-ABC Analysis - **Marketing Management** - Concept - Meaning - Nature-Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

LEARNING OUTCOMES: At the end of the Unit, the students will be able to

- Understand the core concepts of Operations Management
- Apply the knowledge of Quality Control, Work-study principles in real life industry.
- Evaluate Materials departments & Determine EOQ
- Analyze Marketing Mix Strategies for an enterprise.
- Create and design advertising and sales promotion

UNIT - III HUMAN RESOURCES MANAGEMENT (HRM)

HRM - Definition and Meaning – Nature - Managerial and Operative functions - Job Analysis - Human Resource Planning(HRP) - Employee Recruitment-Sources of Recruitment - Employee Selection - Process - Employee Training and Development - methods - Performance Appraisal Concept - Methods of Performance Appraisal – Placement - Employee Induction - Wage and Salary Administration

LEARNING OUTCOMES: At the end if the Unit, the students will be able to

- Understand the concepts of HRM, Recruitment, Selection, Training & Development
- Analyze the need of training
- Evaluate performance appraisal
- Design the basic structure of salaries and wages

UNIT - IV STRATEGIC & PROJECT MANAGEMENT

Definition& Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis - **Project Management** - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

LEARNING OUTCOMES: At the end of the Unit, the students will be able to

- Understand Mission, Objectives, Goals & strategies for an enterprise
- Apply SWOT Analysis to strengthen the project
- Analyze Strategy formulation and implementation
- Evaluate PERT and CPM Techniques

UNIT - V CONTEMPORARY ISSUES IN MANAGEMENT

Customer Relations Management(CRM) - Total Quality Management (TQM) - Six Sigma Concept - Supply Chain Management(SCM) - Enterprise Resource Planning (ERP) - Performance Management – employee engagement and retention - Business Process Re-engineering and Bench Marking - Knowledge Management – change management – sustainability and corporate social responsibility.

LEARNING OUTCOMES At the end if the Unit, the students will be able to

- Understand modern management techniques
- Apply Knowledge in Understanding in TQM, SCM
- Analyze CRM, BPR
- Evaluate change management & sustainability

Text Books:

1. Frederick S. Hillier, Mark S. Hillier. *Introduction to Management Science*, October 26, 2023
2. A.R Aryasri, *Management Science*, TMH, 2019

References:

1. Stoner, Freeman, Gilbert.*Management*, Pearson Education, New Delhi, 2019.
2. Koontz & Weihrich, *Essentials of Management*, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich, *Management Principles and Guidelines*, Biztantra.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Samuel C.Certo, *Modern Management*, 9/e, PHI, 2005

COURSE OUTCOMES: At the end of the course, students will be able to		**BTL**
CO1	Remember the concepts & principles of management and designs of organization in a practical world	**L1**
CO2	Understand the knowledge of Work-study principles & Quality Control techniques in industry	**L2**
CO3	Apply the process of Recruitment & Selection in organization.	**L3**
CO4	Analyze the concepts of HRM & different training methods.	**L4**
CO5	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.	**L5**
CO6	Create awareness on contemporary issues in modern management & technology.	**L3**

BTL = Blooms Taxonomy Level

ONLINE RESOUECES:

1. https://www.slideshare.net/slideshow/introduction-to-management-and-organization-231308043/231308043
2. https://nptel.ac.in/courses/112107238
3. https://archive.nptel.ac.in/courses/110/104/110104068/
4. https://archive.nptel.ac.in/courses/110/105/110105069/
5. https://onlinecourses.nptel.ac.in/noc24_mg112/

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

RADAR ENGINEERING (PE-IV)

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNITV

Detection of Radar Signals in Noise: Introduction, Noise Figure and Noise Temperature, Matched Filter Receiver – Response Characteristics and Derivation, Correlation detection, Detection criteria, Detector Characteristics, Automatic Detection, Constant False Alarm Rate Receiver. Introduction to Software Defined Radio, Introduction to Stealth technology.

Radar Receivers: Introduction to Phased Array Antennas- Basic Concepts, Electronically Steered Phased Array Antennas, Phase Shifters, Frequency – scan Arrays, Radiation for Phased Array, Architecture for Phased Arrays. Radiation Pattern. Beam Steering and Beam Width changes. Navigational Aids: Direction Finder, VOR, ILS and Loran.

TEXT BOOKS:

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

REFERENCES:

1. Peebles, —Radar Principles, Wiley, NewYork, 1998.
2. G.S.N. Raju, —Radar Engineering and Fundamentals of Navigational Aids, I.K. International Pvt. Ltd.
3. G.Sasi BhushanRao,—Microwave and Radar Engineering‖,Pearson Education,2014

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

IVB.Tech I Semester (E.C.E) **L – T – P – C** **3–0–0–3**

DSP PROCESSORS & ARCHITECTURES (PE-IV)

UNIT-I

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

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

UNIT-II

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

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

UNIT-III

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

UNIT-IV

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

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

UNIT-V

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

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, —Digital Signal Processing Implementation‖, 1st Edition, Cengage Learning, 2004.
2. Lapsleyetal.S.ChandandCo, —DSP Processor Fundamentals, Architectures & Features‖, 2000.

REFERENCES:

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

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

CELLULAR & MOBILE COMMUNICATIONS (PE-IV)

UNIT I

Cellular Mobile Radio Systems: Introduction to Cellular Mobile system, basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

UNIT II

Elements of Cellular Radio System Design: General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system, Cell splitting, consideration of the components of cellular system.

Interference: Introduction to Co-channel interference, real time co-channel interference, Co-channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

UNIT III

Cell Coverage for Signal and Traffic: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long-distance propagation antenna height gain, form of a point-to-point model.

UNIT IV

Cell Site and Mobile Antennas: Sum and difference patterns and their synthesis, Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

FrequencyManagementandChannelAssignment: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT V

Handoff: Handoff, dropped calls and cell splitting, types of handoffs, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

System Evaluations: Performance evaluation, Signal evaluation, Measurement of average received level and level crossings, Spectrum efficiency evaluation.

TEXT BOOKS:

1. W.C.Y. Lee, —Mobile cellular telecommunications, Tata Mc-Graw Hill, 2nd Edition,2006.
2. Theodore. S. Rapport, —Wireless communications, Pearson Education, 2nd Edn.,2002.

REFERENCES:

1. Gordon L. Stuber, —Principles of Mobile communications, Springer International 2nd Edition, 2007.
2. Lee, —Wireless and Mobile Communications, Mc Graw Hills, 3rd Edition,2006.
3. JonW.Mark and Weihua Zhqung, —Wireless communications and Networking, PHI,2005.
4. R. Blake, —Wireless communication Technology, Thompson Asia Pvt.Ltd.,2004.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

IVB.Tech I Semester (E.C.E) **L – T – P – C 3–0–0–3**

LOW POWER VLSI DESIGN (PE-V)

UNIT I

Fundamentals: Need for Low Power Circuit Design, Sources of Power Dissipation – Static and Dynamic Power Dissipation, Short Circuit Power Dissipation, Glitching Power Dissipation,Short Channel Effects –Drain Induced Barrier Loweringand Punch Through, Surface Scattering, Velocity Saturation, Impact Ionization, Hot Electron Effect.

UNIT II

Low-Power Design Approaches: Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach –Pipelining and Parallel Processing Approaches. Switched Capacitance Minimization Approaches: System Level Measures, Circuit Level Measures, Mask level Measures.

UNIT III

Low-Voltage Low-Power Adders: Introduction, Standard Adder Cells, CMOS Adder's Architectures – Ripple Carry Adders, Carry Look Ahead Adders, Carry Select Adders, Carry Save Adders, Low-Voltage Low-Power Design Techniques – Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

UNIT IV

Low-Voltage Low-Power Multipliers: Introduction, Overview of Multiplication, Types of Multiplier Architectures, Braun Multiplier, Baugh Wooley Multiplier, Booth Multiplier, Introduction to Wallace Tree Multiplier.

UNIT V

Low-Voltage Low-Power Memories: Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Precharge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

Textbooks:

1. CMOS Digital Integrated Circuits–Analysis and Design–Sung-MoKang, Yusuf Leblebici, TMH, 2011.
2. Low-Voltage, Low-Power VLSI Subsystems–Kiat-SengYeo, Kaushik Roy, TMH Professional Engineering.

References:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011.
2. Low Power CMOS Design–Anantha Chandrakasan, IEEE Press/Wiley International, 1998.
3. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons,2000.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

IVB.TechISemester (E.C.E) **L – T – P– C 3 – 0 – 0 – 3**

WIRELES SSENSOR NETWORKS (PE-V)

UNIT I

Overview of Wireless Sensor Networks: Single-Node Architecture - Hardware Components- Network Characteristics- unique constraints and challenges, Enabling Technologies for Wireless Sensor Networks- Types of wireless sensor networks.

UNIT II

Architectures: Nctwork Architccturc- Sensor Networks- Scenarios- Design Principle, Physical Layer and Transceiver Design Considerations, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT III

NetworkingmSensors: MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols and Wakeup Concepts - SMAC, - B-MAC Protocol, IEEE 802.15.4 standard and ZigBee, the Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols Energy-Efficient Routing, Geographic Routing.

UNIT IV

Infrastructure Establishment: Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V

Sensor Network Platforms and Tools: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node level Simulators, State-centric programming.

Textbooks:

1. Holger Karl & Andreas Willig, "Protocols and Architectures for Wireless Sensor networks, John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, — Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007

ReferenceBooks:

1. Waltenegus Dargie, Christian Poellabauer, —Fundamentals of Wireless Sensor Networks Theory and Practice, By John Wiley & Sons Publications, 2011
2. Kazem Sohraby, Daniel Minoli, &Taieb Znati, —Wireless Sensor Networks-technology, Protocols, and Applications, John Wiley, 2007.
3. Anna Hac,—Wireless Sensor Network Designs, John Wiley,2003

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

IV B.Tech I Semester (E.C.E) L – T – P – C 3–0–0–3

5G COMMUNICATIONS (PE-V)

UNIT I

5GRadioSpectrum:5G spectrum land scape and requirements, Spectrum access modes and sharing scenarios, 5G spectrum technologies.

5G Channel Model: The 5G wireless Propagation Channels: Channel modeling requirements, propagation scenarios and challenges in the 5G modeling.

5G Use Cases and System Concept: Use cases andrequirements, 5G system concept.

UNIT II

Radio Interface Architecture: 5G architecture options, core network architecture, RAN architecture. 5G PHYSICAL LAYERS: Physical channels and signals, 5G frame structure, physical layer procedures (MIMO, Power control, link adaptation, beam forming).

UNIT III

5G Radio-Access Technologies: Access design principles for multi-user communications, multi-carrier with filtering: a new waveform, non-orthogonal schemes for efficient multiple access

UNIT IV

Introductionto5GNetworkSlicing: Network Slicing, E2E Slicing, SDN and NFV Slicing

Vehicular Communications: From V2V to AV2X, key standards, VC architectures, V2X Use cases

UNIT V

Mobility and Handoff Management in 5G: Network deployment types, Interference management in 5G, Mobility management in 5G, Dynamic network reconfiguration in 5G.

Textbooks:

1. Afif Osseiran, Jose F Monserrat, Patrick Marsch, — 5G Mobile and Wireless Communications Technology‖,Cambridge University Press,2016
2. SaadZ.Asif,—5G Mobile Communications Concepts and Technologies‖,CRC Press, Taylor &Francis Group, First Edition, 2018
3. HarriHolma,AnttiToskala,TakehiroNakamura,—5G Technology 3G PPNEWRADIO‖, John Wiley & Sons First Edition,2020

References:

1. GordonL.Stuber,—Principles of Mobile Communication‖, KLUWER ACADEMIC PUBLISHERS, 2nd Edition, 2002
2. Joseph C. Liberti, Theodore S. Rappaport, —Smart Antennas for Wireless Communications‖,Prentice Hall PTR,1999
3. Ying Zhang, —Network FunctionVirtualization Concepts and Applicability in 5G Networks, John Wiley & Sons, 2018.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

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

RF SYSTEM DESIGN TOOLS (SEC-V)

Basic Concepts in RF Design: Introduce any RF design software and orient students with the tools of the laboratory. Practice the tool to use it for significant design. Introduction to RF Design, Time Variance and Nonlinearity, Effects of nonlinearity, Passive impedance transformation, Scattering parameters, impedance matching, Lmatch, Pimatch, Tmatch, Passive IC Components-Resistors, capacitors Inductors, Schottky Diode, and RF Switch.

RF Power Amplifiers and Filters: RF Power amplifier design examples, gain equalizers, Voltage controlled oscillators, Phase locked loops, Linearized PLL models, PLL design examples, High frequency oscillators, Loop filters, lumped filter. LPF, HPF and BPF.

LNA, VCO and Mixers: General considerations, Problem of input matching, Low Noise Amplifiers design in various topologies, Gain Switching, Band Switching, Voltage Controlled Oscillators, Mixers-General considerations, Passive down conversion mixers, Active down conversion mixers, Up conversion mixers.

Microstrip transmission lines and discontinuities: S parameters of a Microstrip Transmission Line, Smith Chart, Analysis of Microstrip Transmission Line standing wave patterns at various frequencies, Different types ofTransmission lines like CPW, Microstrip and Co-axial cable. Different types of Microstrip discontinuities like Bend, T, Via, Gap etc., Microstrip Ring Resonator.

Antennas and Microwave Integrated Circuits: Radiation Pattern, Gain, S Parameters, Return loss and VSWR. Design considerations of Microstrip Patch Antenna and Microstrip Array, Yagi Uda Antenna and Horn Antenna. Hybrid Microwave Integrated Circuits, Monolithic Microwave Integrated Circuits, Microwave Integrated Circuits: MMIC Amplifier.

Any twelve experiments are to be done:

1. Design and simulate Impedance matching circuits like L-Matching, PiMatching and T-Matching.
2. Design and Simulate a Schottky Diode and RF Switch.
3. Design and simulate a RF BJT Amplifier and LNA.
4. Design and simulate a Power Amplifier and Gain Equalizer.
5. Analyse and measure the gain of a Power Amplifier and equaliseits gain using an Equalizer.
6. Design and simulate a High Frequency Oscillator and Lumped Filter.
7. Measurement of insertion loss,-3dB Cut of frequency of LPF, HPF and BPF.
8. Design and Simulate a VCO and RF Mixer.
9. Measure the Sparameters of a MicrostripTransmission Line and plot the normalised impedance on a smith chart
10. Analysis of MicrostripTransmission Line standing wave pattern at various frequencies.

11. Study of different types of Transmissionlines like CPW, Microstrip and Co-axial and find/measure its Insertion Loss (S21 and S12)
12. Study of different types of Microstrip discontinuities like Bend, T, Via, Gap etc and find/measure its Insertion loss.
13. Determine the Bandwidth and Quality Factor of a Microstrip Ring Resonator.
14. Design and simulate the Radiation Pattern, gain, S_{11} and VSWR of a Microstrip Patch Antenna and Microstrip Array.
15. Design and simulate the Radiation Pattern, gain, S_{11} and VSWR of a Yagi Uda Antenna and Horn Antenna.
16. Design and Simulate a MMIC Amplifier.

EquipmentRequired

1. RF Circuit Design and Simulation Software
2. RF Training System
3. Antenna Measurement System with Antenna Design Software.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

IVB.Tech I Semester (E.C.E) **L – T – P – C 0 – 1 – 2 – 2**

INDUSTRIAL IOT AND AUTOMATION (SEC-V)

(All the modules need to be conducted and minimum one project to be done)

MODULE 1: Introduction & Architecture

What is IIoT and connected world? The difference between IoT and IIoT, Architecture of IIoT, IOT node, Challenges of IIOT.Practice

1. Introduction to Arduino, Introduction to raspberryPi.

https://www.youtube.com/watch?v=AQdLQV6vhbk

MODULE 2: IIOT Components

Fundamentals of Control System, introductions, components, closed loop & open loop system. Introduction to Sensors (Description and Working principle): What is sensor? Types of sensors, working principle of basic Sensors -Ultrasonic Sensor, IR sensor, MQ2, Temperature and Humidity Sensors (DHT-11).Digital switch, ElectroMechanical switches.

Practice

1. Measurement of temperature &pressure valus of the process using raspberrypi/nodemcu.
2. Modules and Sensors Interfacing (IR sensor, Ultrasonic sensors, Soil moisture sensor) using Raspberry pi/node mcu.
3. Modules and Actuators Interfacing (Relay, Motor, Buzzer) using Raspberrypi/nodemcu.

MODULE 3: Communication Technologies of IIoT

Communication Protocols: IEEE802.15.4, ZigBee, Bluetooth, BLE, NFC, RFIDIndustry standards communication technology (MQTT), wireless network communication.

Practice

1. Demonstration of MQTT communication.

MODULE 4: Visualization and Data Types of IIoT

Connecting an Arduino/Raspberrypi to the Web: Introduction, setting up the Arduino/Raspberry pi development environment, Options for Internet connectivity with Arduino, Configuring your Arduino/Raspberry pi board for the IoT.

Practice

1. Visualization of diverse sensor data using dash board (partofIoT's_controlpanel')
2. Sending alert message to the user.ways to control and interact with your environment)

MODULE 5: Retrieving Data

Extraction from Web: Grabbing the content from a web page, Sending data on the web, Troubleshooting basic Arduino issues, Types of IoT interaction, Machine to Machine interaction (M2M).

Practice

1. Device control using mobile Apps or through Webpages.
2. Machine to Machine communication.

MODULE 6: Control & Supervisory Level of Automation

Programmable logic controller (PLC), Real-time control system, Supervisory Control & Data Acquisition (SCADA).

Practice

1. Digital logic gates programming using ladder diagram.
2. Implementation of Boolean expression using ladder diagram.
3. Simulation of PLC to understand the process control concept.

Projects:

IIoT based smart energy meter

Smart Agriculture system

Automation using controller via Bluetooth

Temperature controlled Fan/cooler using controller

Automatic Street light

Smart BaggageTracker

Textbooks

1. The Internet of Things in the Industrial Sector, Mahmood, Zaigham(Ed.) (Springer Publication)
2. Industrial Internet of Things: Cyber manufacturing System, Sabina Jeschke,Christian Brecher, Houbing Song, Danda B. Rawat (Springer Publication)
3. Industrial IoT Challenges, Design Principles, Applications, and Security by IsmailButun (editor)

R 23 Regulations

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA – 516 390

Dept. of Humanities & Social Sciences

GENDER SENSITIZATION

(w.e.f Academic Year 2023-24)

(Common to All Branches of Engineering)

Course Code	Gender Sensitization		L	T	P	C
			0	0	2	0
Pre-requisite		Semester				

Course Objectives:

- To enable students to understand the gender related issues, vulnerability of women and men
- To familiarize them about constitutional safeguard for gender equality
- To expose the students to debates on the politics and economics of work
- To help students reflect critically on gender violence
- To make them understand that gender identities and gender relations are part of culture as they shape the way daily life is lived in the family as well as wider community and the workplace.

Course Outcomes (CO):

COs	Statements	Blooms level
CO1	Define the basic concepts of gender and its related terminology	L1, L2,
CO2	Identify the biological, sociological, psychological and legal aspects of gender.	L1, L2
CO3	Use the knowledge in understanding how gender discrimination works in our society and how to counter it.	L3
CO4	Analyze the gendered division of labour and its relation to politics and economics.	L4
CO5	Appraise how gender-role beliefs and sharing behaviour are associated with more well-being in all culture and gender groups	L5
CO6	Develop students' sensibility with regard to issues of gender in contemporary India	L3

SYLLABUS

Unit-1 UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit-2 GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix - Missing Women-Sex Selection and its Consequences- Declining Sex Ratio- Demographic Consequences-Gender Spectrum -

Unit-3 GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction- Unrecognized and Unaccounted work -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit-4 GENDER-BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment - Domestic Violence - Different forms of violence against women - Causes of violence, impact of violence against women - Consequences of gender-based violence

Unit-5 GENDER AND CULTURE

Gender and Film - Gender and Electronic Media - Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language- Just Relationships

Prescribed Books

1. A.Suneetha, Uma Bhrugubanda, et al. *Towards a World of Equals: A Bilingual Textbook on Gender*", Telugu Akademi, Telangana, 2015.
2. Butler, Judith. *Gender Trouble: Feminism and the Subversion of Identity.* UK Paperback Edn. March 1990

Reference Books

1. Wtatt, Robin and Massood, Nazia, *Broken Mirrors: The dowry Problems in India,* London : Sage Publications, 2011
1. Datt, R. and Kornberg, J.(eds), *Women in Developing Countries, Assessing Strategies for Empowerment,* London: Lynne Rienner Publishers, 2002