AR- 23

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRONICS AND COMMUNICATION ENGINEERING

For

B.TECH. FOUR YEAR DEGREE PROGRAMME
(Applicable for the batches admitted from 2023-2024)

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AUTONOMOUS)
Approved by AICTE, Accredited
by NBARecognised under
2(f),12(b) of UGC
Permanently Affiliated to JNTUGV, Vizianagaram K.Kotturu, Tekkali,
Srikakulam-532 201, Andhra Pradesh.

Aditya Institute of Technology and Management, Tekkali
AR23 – COURSE STRUCTURE (1st B.Tech.)

Electronics and Communication Engineering

Year/Sem.	Category	Code	Theory/Lab	L	T	P	C
I B. Tech. (1st Sem)	MC	23MCS101	Induction Program	3 weeks			0
	BH	23BHT102	Linear Algebra and Calculus	3	0	0	3
	BH	23BHT104	Engineering Physics	2	1	0	3
	ES	23EST101	Basic Electrical Engineering	3	0	0	3
	ES	23EST105	Introduction to Programming	3	0	0	3
	ES	23ESL103	Engineering Drawing	1	0	4	3
	BH	23BHL102	Engineering Physics Lab	0	0	3	1.5
	ES	23ESL101	Basic Electrical Engineering Lab	0	0	3	1.5
	ES	23ESL105	Computer Programming Lab	0	0	3	1.5
	MC	23MCS102	NSS/NCC/Scouts &Guides/Community Service	0	0	1	0.5
Total				**12**	**1**	**14**	**20**

Year/Sem.	Category	Code	Theory/Lab	L	T	P	C
I B. Tech. (2nd Sem)	BH	23BHT101	Communicative English	3	0	0	3
	BH	23BHT103	Differential Equations and Vector Calculus	2	1	0	3
	BH	23BHT105	Chemistry	3	0	0	3
	PC	23ECT101	Electronic Devices and Circuits	3	0	0	3
	PC	23ECT102	Network Analysis	3	0	0	3
	ES	23ESL104	Engineering Workshop	0	0	3	1.5
	BH	23BHL101	Communicative English Lab	0	0	3	1.5
	BH	23BHL104	Chemistry Lab	0	0	3	1.5
	MC	23MCS103	Health and Wellness, Yoga and Sports	0	0	1	0.5
Total				**14**	**1**	**10**	**20**

Aditya Institute of Technology and Management, Tekkali

AR23 – COURSE STRUCTURE (2nd B.Tech.)

Electronics and Communication Engineering

Year/Sem.	Category	Code	Theory/Lab	L	T	P	C
II B. Tech. (1st Sem)	BH	23BHT210	Probability and Stochastic Processes	3	0	0	3
	ES	23EST206	Python Programming	3	0	0	3
	PC	23ECT203	Control Systems	2	0	0	2
	PC	23ECT204	Analog Electronic Circuits	3	0	0	3
	PC	23ECT205	Signals and Systems	3	0	0	3
	ES	23ESL207	Python Programming Lab	0	0	3	1.5
	PC	23ECL201	Analog Electronic Circuits Lab	0	0	3	1.5
	PC	23ECL202	Simulation Lab	0	0	3	1.5
	SC	23ECS204	Skill Enhancement course – I	1	0	1	1.5
	MC	23MCT204	Environmental Studies	2	0	0	0
Total				**17**	**0**	**10**	**20**

Year/Sem.	Category	Code	Theory/Lab	L	T	P	C
II B. Tech. (2nd Sem)	BH	23BHT207	Universal Human Values	2	0	0	2
	PC	23ECT206	Analog and Digital Communications	3	0	0	3
	PC	23ECT207	Digital Electronics	3	0	0	3
	PC	23ECT208	Electro Magnetic Waves & Transmission lines	3	0	0	3
	PC	23ECT209	Pulse Circuits and IC Applications	3	0	0	3
	ES	23ESL208	Competitive Programming Lab – I	0	0	3	1.5
	PC	23ECL203	Analog and Digital Communications Lab	0	0	3	1.5
	PC	23ECL204	Pulse Circuits and IC Applications Lab	0	0	3	1.5
	SC	23ECS205	Skill Enhancement course – II	1	0	1	1.5
	BH	23BHT208	Design Thinking	1	0	2	2
Total				**16**	**0**	**12**	**22**
Mandatory Community Service Project Internship of 02 weeks duration during summer vacation.							

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem

LINEAR ALGEBRA AND CALCULUS
(Common to All Branches)

Subject Code: 23BHT102	L	T	P	C
	3	0	0	3

Course Objectives:

To equip the students with standard concepts and tools of mathematics to handle various real-worldproblems and their applications as follows.

- Develop proficiency in fundamental algebraic techniques. Apply algebraic concepts to solve engineering problems and practical applications.
- Understand the principles of linear transformations. Explore the concept of orthogonal transformations. Apply these transformations in engineering contexts and problem-solving.
- Gain a deep understanding of calculus concepts. Apply calculus to analyze and solve real-world problems. Explore the applications of calculus in engineering and related fields.
- Understand the concept of functions with multiple variables. Explore optimization techniques using functions of several variables. Apply these concepts in engineering optimization problems
- Learn the concepts of double integrals in two dimensions. Understand triple integrals in three dimensions. Apply integration techniques for calculating areas and volumes in engineering applications.

Course Outcomes:

The student will be able to:

CO 1. Develop matrix algebra techniques that is needed by engineers for practical applications.
CO 2. To find the eigen values and eigen vectors and solve the problems by using linear transformation
CO 3. Learn important tools of calculus in higher dimensions.
CO 4. Familiarize with functions of several variables which is useful in optimization.
CO 5. Familiarize with double and triple integrals of functions of several variables in two and three dimensions.

UNIT – I

Matrices: Rank of a matrix by echelon form, normal form. Inverseof 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, Eigen vectors and their properties (without Proof), 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.

UNIT – V

Multiple Integrals (Multi variable Calculus): Double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integration, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Text Books:

1. B.S.Grewal,HigherEngineeringMathematics,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 ScienceInternational Ltd.,2021 (9th reprint).
2. George B. Thomas, Maurice D.Weir and Joel Hass, Thomas Calculus,14/e, PearsonPublishers, 2018.
3. Glyn James, Advanced Modern Engineering Mathematics, 5/e, Pearson publishers, 2018.
4. Michael Greenberg, Advanced Engineering Mathematics, 9thedition, Pearson edn
5. H. K Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand,2021.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem

ENGINEERING PHYSICS

(Common for all branches)

Subject Code: 23BHT104	L	T	P	C
	2	1	0	3

Course Objectives:

- Bridging the gap between the Physics in school at 10+2 level and UG level engineering courses.
- To identify the importance of the optical phenomenon. interference, diffraction and polarization related to its Engineering applications
- Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of de Broglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals.
- To Understand the Physics of Semiconductors and their working mechanism, Concept utilization of transport phenomenon of charge carriers in semiconductors.

Course Outcomes:

Students will be able to

CO 1. Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2).

CO 2. Classify various crystal systems (L2). Identify different planes in the crystal structure (L3). Analyze the crystalline structure by Bragg's X-ray diffractometer (L4).

CO 3. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius- Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2).

CO 4. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one- dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3).

CO 5. Classify the crystalline solids (L2). Outline the properties of charge carriers in semiconductors(L2). Identify the type of semiconductor using Hall effect (L2). Apply the concept of effective mass of electron (L3).

Unit – I (12 hrs)

Wave Optics: Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors 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 & Diffraction Grating (Qualitative).

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

Unit Outcomes

The students will be able to

- Explain the need of coherent sources and the conditions for sustained interference (L2)
- Identify engineering applications of interference (L3)
- Illustrate the concept of polarization of light and its applications (L2)
- Classify ordinary polarized light and extraordinary polarized light (L2)

Unit – II (8 hrs)

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 (h k l) planes. Bragg's law - X-ray Diffractometer – crystal structure determination by Laue method and Powder method.

Unit Outcomes

The students will be able to

- **Classify** various crystal systems (L2)
- **Identify** different planes in the crystal structure (L3)
- **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4)

Unit – III (8 hrs)

Dielectric and Magnetic Materials : Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability - Classification of magnetic materials: Dia, Para, Ferro, Antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism (Qualitative) - Hysteresis - soft and hard magnetic materials.

Unit Outcomes

The students will be able to

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence(L2)

Unit – IV (10 hrs)

Quantum Mechanics and Free electron theory: Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance andproperties 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 and its temperature dependence.

Unit Outcomes

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)
- **Interpret** the concepts of classical and quantum free electron theories (L2)

Unit – V (10 hrs)

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Extrinsic semiconductors: density of charge carriers - Drift and diffusion currents – Einstein's equation - Hall effect and its Applications.

Unit Outcomes

The students will be able to

- **Outline** the properties of charge carriers in semiconductors (L2)
- **Understand** the carrier transportation in semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)

Text Books:

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

Reference books:

1. "Fundamentals of Physics" - Halliday, Resnick and Walker, John Wiley &Sons.
2. "Engineering Physics" - M.R. Srinivasan, New Age international publishers (2009).
3. "Engineering Physics" - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
4. "Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
5. "Semiconductor physics and devices:Basic principle" - A. Donald, Neamen, Mc GrawHill.
6. "Engineering Physics" - B.K. Pandey and S. Chaturvedi, Cengage Learning
7. "Solid state physics" – A.J.Dekker ,Pan Macmillan publishers
8. "Introduction to Solid State Physics" - Charles Kittel ,Wiley

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem

BASIC ELECTRICAL ENGINEERING

Subject Code: 23EST101	L	T	P	C
	3	0	0	3

Course Objectives:

- To introduce the basic knowledge of electric circuits
- To illustrate knowledge with network reduction techniques.
- To analyze AC circuits.
- To become familiar with DC Generators.
- To become familiar with DC Motors.

Course Outcomes:

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

CO 1. Able to summarize different electrical circuits.
CO 2. Able to construct network reduction techniques
CO 3. Able to outline the basics of AC circuits.
CO 4. Able to examine DC Generators.
CO 5. Able to describe DC Motors.

Unit - I

Introduction to Electric Circuits: Basic definitions, Electrical circuit elements (R, L and C), Voltage and current sources Independent and dependent sources, Ohm's Law, Series & Parallel circuits, Source transformation, Faraday's laws of electromagnetic induction, Lenz's law, simple problems.

Unit - II

Network Reduction Techniques: Kirchhoff's Laws, Star-Delta transformation, Nodal Analysis, Mesh analysis, -Problems.

Unit - III

AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series only), real power, reactive power, apparent power, power factor, simple problems.

Unit - IV

DC Generator: Generator-Principle of Operation, Construction, EMF equation, Classification of D.C generators, O.C.C, internal and externalcharacteristics of shunt generator, Applications.

Unit - V

DC Motor: Motor-principle of operation, Torque equation, Classification of D.C Motors Speed Control Methods, Operation of 3pointstarter, Applications.

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Text Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.
2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand& Co.

Reference Books:

1. Basic Electrical Engineering Dr.K.B.MadhuSahuscitech publications (india) pvt.ltd.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
4. Schaum's Outline of Basic Electrical Engineering (SCHAUMS' ENGINEERING) by J. J. Cathey (Author), Syed A. Nasar (Author).
5. Electrical Engineering Fundamentals, 2e by Vincent Deltoro (Author)

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

INTRODUCTION TO PROGRAMMING
(Common to all branches)

Subject Code: 23ESTI05	L	T	P	C
	3	0	0	3

Course objectives:

- To impart adequate knowledge on the need of programming languages and problem-solving techniques and develop programming skills.

Course outcomes:

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

CO 1. Understand the fundamentals of Computers and C programming
CO 2. Develop programs using control structures and Arrays to store and manipulate data
CO 3. Design modular programs using functions and storage classes
CO 4. Use structures and pointers to manipulate record based data
CO 5. Implement and manipulate files on secondary storage media

Unit –I

Introduction to Programming: Introduction to components of Computer system, Algorithm, Flow chart, Program development steps, C Tokens, Data Types, Operator precedence and associativitiy, Structure of C program, simple programs using Basic I/O statements.

Unit-II

Control Structures: Decision statements: if, if-else, nested if, if-else-if ladder, and switch

Iterative statements: while loop, do-while loop, for loop, nested loops

Branching: Break, continue

Arrays: Definition, Types: Single Dimensional arrays, Multi Dimensional arrays, declaration, initialization, accessing elements, Matrix operations and String Handling.

Unit-III

Functions: Definition, Declaration, Types of Functions, Parameter passing, Call byvalue and call by reference, Passing Arrays to functions, Recursion, Scope and lifetime of variables, Command line arguments, Storage classes.

Pointers: Definition, Declaration, Initialization, Pointer arithmetic, functions and pointers, Pointer to pointer, Uses of Pointers, arrays and pointers.

Unit-IV

Structures: Definition, Declaration, Accessing the structure elements, Array of structures, Arrays with in structures, pointer to structure, Self referential structure, passing structure to function, nested structures and unions, Dynamic memory allocation.

Unit-V

File Handling: Introduction, Types of files, Defining and Opening a File, Closing a File, Input/Output operations on Files, Error Handling during I/O operations, Random Access to Files.

Text Books:

1. B. W Kernighan, Dennis M. Ritchie. The C – Programming Language. 2nd Edition, PHI.
2. Behrouz A. Forouzan, "A Structured Approach Using C" Richard F. Gilberg 3rd Edition

Reference Books:

1. Yashwant Kantikar. 2012. Let Us C, 8th Ed. PBP Publications.
2. E. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.

Website References:

1. https://www.tutorialspoint.com › C programming › C – Home
2. https://www.programiz.com/c-programming

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ENGINEERING DRAWING
(Common for ECE/EEE/CSE/IT/CSM/CSD)

Subject Code: 23ESL103	L	T	P	C
	1	0	4	3

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To make the students understand the viewing perception of a solid object in Isometric and
- Perspective projections.

Course Outcomes:

On completion of this course, students should be able to:

CO 1. To draw general constructions and conic sections
CO 2. To draw the projection of points and lines with respect to HP & VP
CO 3. To project and draw straight lines, and project plane surfaces with respective to one reference plane
CO 4. Develop the projections for a simple solids and their inclinations with respect to one reference plane.
CO 5. Convert orthographic views into isometric projections and vice-versa.

List Of Exercises:

Geometrical Constructions

Drawing Instruments and their uses, Types of Lines and Dimensioning, Line bisecting, Angle bisecting, Line divided into equal number of parts, Construction of Regular Polygons (Pentagon and Hexagon).

Construction of Conics: General method, Oblong method and Concentric circles method.

Simple Projections

Introduction to Orthographic Projections (First Angle Projection only).

Projections of Points: A point situated in I,II,III & IV quadrants.

Projections of Straight Lines: Line parallel to one or both the of the planes, Line contained by one or both the planes, Line perpendicular to one of the planes, Line inclined one plane and parallel to other.

Projections of Planes: Types of planes, Traces of planes, planes parallel to one of the planes and plane inclined to one reference plane.

Projections of Solids

Polyhedra: Types of Solids, Projections of Solids in simple positions, Projections of Solids axis inclined to the V.P. and parallel to the H.P. Projections of Solids axis inclined to the H.P. and parallel to the V.P. Solids of Revolution: Projections of Solids axis inclined to the V.P. and parallel to the H.P. Projections of Solids axis inclined to the H.P. and parallel to the V.P.

Orthographic-Isometric Projections

Conversion of pictorial view (Isometric views) into orthographic views.

Isometric Projections: Isometric axes, lines & planes. Isometric scale, Isometric drawing, Isometric drawing of plane figures, prisms and pyramids. Conversion of orthographic views into Isometric views.

Text Books:

1. Engineering Drawing, N. D. Bhatt, V. M. Panchal, Charotar Pub.
2. Engineering Drawing, K. L .Narayana, P.Kanniah, Scitech Pub.

Reference Books:

1. Engineering Drawing and Graphics, 2nd ed., K. Venugopal, New Age International Pub.
2. Fundamentals of Engineering Drawing, 11th ed., Luzadder, J. Warren, D.M. Jon, Prentice Hall India Pub.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ENGINEERING PHYSICS LAB
(Common for all branches)

Subject Code: 23BHL102	L	T	P	C
	0	0	3	1.5

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:

On completion of this course, students should be able to:

CO 1. Operate optical instruments like travelling microscope and spectrometer.
CO 2. Estimate the wavelengths of different colours using diffraction grating.
CO 3. Discuss the magnetic, electrical and electronic properties of materials.
CO 4. Analyze the mechanical and thermal properties of materials.
CO 5. Calculate the band gap of a given semiconductor.
CO 6. Identify the type of waves and verify the laws of stretched string.

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. Determination of width of a slit using diffraction phenomenon.
4. Determination of wavelength of Laser light using diffraction grating.
5. Estimation of Planck's constant using photo cell.
6. To study V-I characteristics of a PN junction diode in forward and reverse biasing conditions.
7. Magnetic field along the axis of a current carrying circular coil by Stewart Gee'sMethod.
8. Determination of Hall voltage and Hall coefficient of a given semiconductor using Halleffect.
9. Determination of temperature coefficients of a thermistor.
10. Determination of acceleration due to gravity and radius of Gyration by using acompound pendulum.
11. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
12. Sonometer: Verification of laws of stretched string.
13. Determination of Frequency of electrically maintained tuning fork by Melde'sexperiment.
14. Determination of energy bandgap of a given semiconductor
15. Determination of thickness of a thin object using wedge shaped film.
16. Determination of crystal structure and lattice parameter of a given crystal using powder diffraction data.
17. Determination of Young's modulus of the given beam by non-uniform bending.

18. Determination of dielectric constant using resonance method.

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

Reference Books:

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

Website References:

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

BASIC ELECTRICAL ENGINEERING LAB

Subject Code: 23ESL101	L	T	P	C
	0	0	3	1.5

Course Objective:

- To introduce the student to study different electrical components and to verify the basic lawsrelated to electrical engineering and Speed control of D.C. motor.

Course Outcomes:

Students will be able to

CO 1. Label various types of electrical components.
CO 2. Demonstrate various basic electrical laws.
CO 3. Demonstrate speed control DC motor & Characteristics of generator.
CO 4. Experiment to determine power factor.
CO 5. Examine tariff calculation.

List of Experiments*:*

1. Study of electrical components.
2. To verify Ohm's law.
3. To verify Kirchhoff's current law
4. To verify Kirchhoff's voltage law.
5. To verify the total resistance of the series and parallel connected circuits.
6. Find armature resistance, field resistance and filament Lamp Resistance using V-I method.
7. Magnetization characteristics of DC shunt generator.
8. Speed control of D.C. Shunt motor by a) Armature Voltage control b) Field flux control method
9. To find voltage current relationship for series RL circuit and determine power & power factor.
10. Energy meter reading and tariff calculation with lamp load.

Additional Experiments*:*

11. Soldering & bread board practice
12. Fan internal wring.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

COMPUTER PROGRAMMING LAB
(Common to all Branches)

Subject Code: 23ESL105	L	T	P	C
	0	0	3	1.5

Course Objectives

- To gain experience about structured programming
- To help students to understand the implementation of C language
- To understand various features in C

Course Outcomes

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

CO 1. Solve the given problem using the syntactical structures of C language.
CO 2. Design programs involving decision structures and loops.
CO 3. Apply programming to solve different operations on arrays and strings.
CO 4. Develop modularity concept using functions and write programs for allocating memory dynamically.
CO 5. Construct C program that uses structures and unions and implement file operations ongiven application.

LIST OF EXPERIMENTS:

1. Write the C programs to calculate the following
    a) Area of triangle when sides are given.
    b) Program for Type Casting.
    c) Interchanging values of two variables.

2. Write the C programs to perform the following
    a) Conversion of Fahrenheit to Celsius and vice versa
    b) Simple interest calculation
    c) Square root of a given number

3. Write the C programs to perform the following
    a) Read lower case character and convert into upper case.
    b) Find maximum of 3 values using conditional operator.
    c) Calculate area and perimeter of circle.

4. Write C programs for the following using decision making statements
    a) Find roots of quadratic equation.
    b) Find the max and min of three numbers using if-else.
    c) Calculate the grades of a student.
    d) Find the given year is a leap year or not.

5. Write the C programs to perform the following
    a) Arithmetical operations using switch-case.
    b) Read a number and display in reverse.

c) Check for Armstrong number property

6. Write the C programs to perform the following
   a) Find factorial of given number
   b) Check a number is palindrome property
   c) Generate Fibonacci series.
   d) Generate Prime numbers between two numbers.
7. Implement the following using arrays
   a) Largest and smallest from a list of elements.
   b) Program for Linear Search.
   c) Program for Bubble Sort.
8. Implement the following using arrays
   a) Matrix addition.
   b) Matrix Multiplication.
   c) Transpose of a matrix.
   d) Program using string handling functions.
9. Write the C programs to perform the following
   a) Factorial using recursion and non recursion.
   b) GCD using recursion and non recursion.
10. Write the C programs to perform the following
    a) Find the sum and average of list of elements using DMA Functions
    b) Implementation of call by value and call by reference.
11. Write the C programs to perform the following
    a) Implementation of array of structure.
    b) Demonstration of Union.
12. Write the C programs to perform the following
    a) Write a C program to write and read text into a binary file using fread() and fwrite()
    b) Copy the contents of one file into another.
    c) Count the number of characters, words and lines in a file.

Text Books:

1. B. W Kernighan, Dennis M. Ritchie. The C – Programming Language. 2nd Edition, PHI.
2. Behrouz A. Forouzan, "A Structured Approach Using C" Richard F. Gilberg 3rd Edition

Reference Books:

1. Yashwant Kantikar. 2012. Let Us C, 8th Ed. PBP Publications.
2. E. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.

Website References:

1. https://www.tutorialspoint.com › C programming › C – Home
2. https://www.programiz.com/c-programming

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

COMMUNICATIVE ENGLISH

(Common to ECE / EEE / ME / CE)

Subject Code: 23BHT101	L	T	P	C
	3	0	0	3

Course Objectives:

- To enable students to build vocabulary appropriate to their levels and to make students understand printed texts of different genres
- To enhance basic writing skills of the students in different forms of written communication
- To assist students implicitly synthesize the rules of grammar for the production of accurate sentences
- To aid students to acquire appropriate and adequate letter writing skills
- To get students enhance their essay writing skills and develop reading skills

Course Outcomes:

By Studying this Course Student will be able to

CO 1. Comprehend printed texts of different genres easily and they will be able to make appropriate word choice for writing.
CO 2. Write short texts efficiently.
CO 3. Construct grammatically correct sentences.
CO 4. Communicate through letters effectively.
CO 5. Write essays and comprehend unfamiliar passages.

Unit – I

A Power of a Plate of Rice by Ifeoma Okoye

Skimming and Scanning — Capital letters and Punctuation — Spellings — Parts of speech — Root words — Prefixes and Suffixes — Synonyms and Antonyms

Unit – II

Night of the Scorpion by Nissim Ezekiel

Sequencing — Paragraph writing — Cohesive devices — Articles — Prepositions — Homonyms, Homographs, homophones

Unit-III

Biography of Steve Jobs

Drawing inferences — Paraphrasing, Summarizing, Note-making — Verbs and Tenses, Subject-verb agreement —Compound words — Collocations

Unit – IV

The Toys of Peace by Saki

Data interpretation — Official letters and Résumé — Direct and Indirect speech — Academic reporting verbs — Active and passive voice — Words often confused — Jargon

Unit – V

The Power of Intrapersonal Communication (An Essay)

Reading comprehension — Essay writing — Correcting errors — Technical Jargon

Text Books:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient BlackSwan, 2023 (Units 1, 2 & 3)
2. Empowering English 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 University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Website References:

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to All Branches of Engineering)

Subject Code: 23BHT103	L	T	P	C
	2	1	0	3

Course Objectives

To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications as follows

- To furnish the learners in the concept of first order and first degree differential equations and multivariable calculus.
- To enlighten the learners in the concept of higher order differential equations with constant coefficients.
- To furnish the learners with solution methods for partial differential equations that model physical processes
- To equip knowledge with basic concepts and techniques to interpret the physical meaning of different operators such as gradient, curl and divergence by handling various real-world applications
- To furnish the learners with basic concepts and techniques the work done against a field, circulation and flux using vector calculus by handling various real-world applications.

Course Outcomes

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

CO 1. Solve the differential equations related to various engineering fields.
CO 2. Model engineering problems as higher order differential equations and solve analytically.
CO 3. Identify solution methods for partial differential equations that model physical processes.
CO 4. Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO 5. Estimate the work done against a field, circulation and flux using vector calculus.

Unit – I

Differential equations of first order and first degree: Exact equations and equations reducible to exact form. Linear differential equations – Bernoulli's equations. 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 particular integral, method of variation of parameters. L-C-R Circuit problems.

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 problems on these theorems.

Text Books:

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

Reference Books:

1. Dennis G.Zill and Warren S.Wright, Advanced Engineering Mathematics, Jones andBartlett, 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, PearsonPublishers, 2018.
4. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
5. B.V. Ramana, Higher Engineering Mathematics, McGraw Hill Education, 2017

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

CHEMISTRY

(Common to CSE, CSM, CSD, IT, ECE and EEE)

Subject Code: 23BHT105	L	T	P	C
	3	0	0	3

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods and spectroscopic techniques.

Course Outcomes:

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

CO 1. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.

CO 2. Summarize the concepts of Instrumental methods and distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques

CO 3. Compare the materials of construction for battery and electrochemical sensors.

CO 4. Demonstrate the preparation, properties, and applications of thermoplastics, thermosetting, elastomers, conducting polymers and bio-degradable polymers.

CO 5. Apply the principle of Band diagrams in the application of conductors and semiconductors.

Unit - I

Structure and Bonding Models: Types of Hybridisations - valency shell electron pair repulsion theory (VSEPR), molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of N2, O2, CO and NO. π-molecular orbitals of butadiene and benzene, calculation of bond order.

Unit – II

Instrumental Methods and Applications: Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, Instrumentation, electronic transition, Definition of Chromophore – Definition of Auxochrome – Absorption and Intensity Shifts, IR spectroscopies, Instrumentation fundamental modes and Fingerprint Region. NMR – Principle - Equivalent and Non- Equivalent Protons - Chemical Shift- Splitting – Coupling Constant.

Unit - III

Electrochemistry and Applications: Electrochemical cell, Nernst equation, cell potential (EMF) calculations and numerical problems (EMF), potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid- base titrations). Electrochemical sensors (definition and working principle), reference electrodes – calomel electrode – NHE (or) SHE.

Primary cells – Zinc-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 addition polymerization.

Plastics –Thermoplastics and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, Polyester resin(PET).

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications.

Bio-Degradable polymers - Polyhydroxy alkanoates (PHA), Polyl Lactic Acid (PLA).

Unit - V

Modern Engineering materials: Semiconductors – Introduction, Basic concepts (Salient features of band theory- Definition semiconductor- Elementalsemiconductors -intrinsic semiconductor and extrinsic semiconductors), applications.

Super conductors – Introduction- Basic Concept (Preparation of $YBa_2Cu_3O_{7-y}$ by ceramic method), Properties-applications.

Supercapacitors: Introduction, Principle & Mechanism of Supercapacitors - Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphinesnanoparticles.

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.

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. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ELECTRONIC DEVICES AND CIRCUITS

Subject Code: 23ECT101	L	T	P	C
	3	0	0	3

Course Objectives:

- To understand the working, characteristics of PN Junction diode, Zener diode, Tunnel diode, Varactor diode and LED.
- To describe the working, parameters of rectifiers and filters.
- To explain the working, characteristics of transistor (BJT) in different configurations, JFET, MOSFET and UJT.
- To explore the transistor biasing methods and to determine the stability factors.
- To describe h-parameter models of BJT and compare transistor amplifier configurations.

Course Outcomes:

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

CO 1. Describe the working principle of PN Junction diode, Zener diode, Tunnel diode, Varactor diode , LED, photodiode.

CO 2. Explain the operation and analyze the parameters of rectifiers and filters.

CO 3. Describe the working and behaviour of transistor (BJT) in different configurations, JFET, MOSFET and UJT.

CO 4. Explain the transistor biasing methods and determine the stability factors.

CO 5. Analyze h-parameter models of BJT and compare transistor amplifier configurations.

Unit- I

Diode Characteristics: Introduction to semiconductor physics, V-I characteristics of PN Junction diode.

Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms Zener Diode Characteristics, Zener Diode as a Voltage Regulator, Tunnel diode, Varactor Diode, LED, Photo diode

Unit- II

Rectifiers and Filters: Half wave rectifier, Full wave rectifier, Bridge rectifier, Derivations of parameters of rectifiers. Derivation of ripple factor for C- Filter, L- filter, LC- Filter, π- filter.

Unit- III

Transistor Characteristics: Bipolar junction transistors (BJTs)- input & output characteristics of transistor in CB, CE, CC configurations, Early effect and punch through, relations between current gain parameters (alpha, beta and gamma), JFET characteristics and parameters, MOSFET (enhancement and depletion), characteristics of UJT.

Unit- IV

Biasing and Stability: Need for biasing, criteria for fixing the operating point, Biasing methods-fixed bias, collector to base bias, self bias, stabilization against variations in V_{BE}, I_{co} and β, stability factors (S,S^1,S^{11}), thermal runaway, thermal stability

Unit- V

Small Signal Low Frequency Transistor Amplifier Models: Two port networks, Transistor hybrid model, h-parameter representation of a transistor, Analysis of CB, CE and CC amplifiers using exact and approximate h-parameter models, comparison of transistor configurations in terms of A_v , A_i , R_i , R_o , A_{vs} , A_{is}.

Text Books:

1. Integrated Electronics – Jacob Millman, Chritos C. Halkies, Tata Mc-Graw Hill, 2nd edition
2. Electronic Devices - FLOYD 5th Edition, Pearson Education.

Reference books:

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9thEdition.

Website References:

1. http://www.vidyarthiplus.in/2011/11/electronic-device-and-circuits-edc.html

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

NETWORK ANALYSIS

Subject Code: 23ECT102	L	T	P	C
	3	0	0	3

Course objectives:

- To knows how to apply theorems to RLC circuits.
- To familiar with Two Port Networks and Ladder Networks.
- To gains knowledge on AC circuit analysis.
- To educate on the concept of resonance
- To analyze Transient response of DC & AC circuits

Course Outcomes:

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

CO 1. Apply the basic circuit analysis and theorems to solve complex circuits.
CO 2. Define Two Port Network parameters
CO 3. Evaluate steady state analysis of AC circuits.
CO 4. Explain about resonance in electric circuits
CO 5. Analyze steady state and Transient response DC and AC circuits

Unit - I

Network Theorems-I: Review of Kirchhoff s laws, Nodal analysis and Mesh analysis. Superposition, Thevenin's and Norton's theorems.

Network Theorems-II: Reciprocity, Substitution, Maximum Power Transfer and Tellegens theorems (dependent and independent sources).

Unit - II

Two-port networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, Inverse Transmission line parameters, h-parameters, Inverse h-parameters, relationship between parameter sets, series and parallel connection of two port networks (dependent and independent sources), Image and iterative impedance.

Unit - III

Steady State Analysis of AC Circuits: Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, series R-L, R-C, R-L-C circuits (explanation with relevant theory and problems).

Unit -IV

Resonance: Introduction, phenomenon of resonance, bandwidth of response definition of Q, series resonance, bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Locus diagrams.

Unit -V

D.C Transient Analysis: Transient response of R-L, R-C, R-L-C series circuits for D.C excitation-Initial conditions-solution method using differential equation and Laplace transforms.
A.C Transient Analysis: Transient response of R-L, R-C, R-L-C series circuits for sinusoidal excitations-Initial Conditions-Solution method using differential equations and Laplace transforms.

Text Books:

1. Network Analysis -ME Van Valkenburg, Prentice Hall of India, 3/e.
2. Network Analysis- A. Sudhakar and Shyammohan S. Palli, McGraw Hill Education

References Books:

1. Network lines and Fields -John. D. Ryder, Asia publishing house, 2/e.
2. Schaum's outlines of basic circuit analysis -John O' Malley, McGraw Hill, 2/e.

Website References:

1. https://nptel.ac.in/courses/108/105/108105159/

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ENGINEERING WORKSHOP
(Common to ME/CE/ECE/EEE)

Subject Code: 23ESL104	L	T	P	C
	0	0	3	1.5

Course Objectives:

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

Course Outcomes:

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

CO 1. Identify workshop tools and their operational capabilities.
CO 2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
CO 3. Apply fitting operations in various applications.
CO 4. Apply basic electrical engineering knowledge for House Wiring Practice
CO 5. Apply the Plumbing tools in 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 or Bridle joint
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) Elbow pipe d) Brazing
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:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
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.

Text Books:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

COMMUNICATIVE ENGLISH LAB

(Common to ECE / EEE / ME / CE)

Subject Code: 23BHL101	L	T	P	C
	0	0	3	1.5

Course Objectives:

- To enable students to cultivate proper speech habits
- To enhance the ability of students to make extempore speeches
- To help students master techniques of being successful in debates and group discussions
- To assist students to acquire effective and adequate presentation skills
- To prepare students to face interviews in an assertive manner

Course Outcomes:

CO 1. Students will be able to pronounce words accurately.
CO 2. Students will be able to speak spontaneously.
CO 3. Students will be able to participate in debates and group discussions and contribute proactively.
CO 4. Students will be able to present data on select topics using pre-existing slides.
CO 5. Students will be able to face interviews confidently.

Course Syllabus

Unit – I: Phonetics — Neutral English Accent

Unit – II: JAM session — Role play

Unit – III: Debate — Group Discussion

Unit – IV: Poster Presentation — PPT Presentations

Unit – V: Cover letter — Résumé — Interview Skills

Suggested Software:

- Walden InfoTech
- Young India Films

Text Books:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press. 2018.
2. Samson T : Innovate with English, Foundations
3. Grant Taylor: English Conversation Practice, Tata McGraw-Hill Education India, 2016.
4. Jayashree, M Let's Hear them Speak: Developing Listening-Speaking skills in English Sage Publications.
5. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
6. T. Balasubramanyam, A Textbook of English Phonetics for Indian Students, (3rd Ed.) Trinity Press

Website References:

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
12. https://www.linguahouse.com/en-GB
13. https://www.ted.com/watch/ted-ed

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

CHEMISTRY LABORATORY

(Common to CSE, CSM, CSD, IT, ECE and EEE)

Subject Code: 23BHL104	L	T	P	C
	0	0	3	1.5

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes:

At the end of the course, the students will be able to

CO 1. Determine the cell constant, conductance and potential of solutions.
CO 2. CO2: Prepare advanced polymer Bakelite materials.
CO 3. CO3: Measure the strength of an acid present in secondary batteries by pH metry.
CO 4. CO4: Analyse the sample using spectroscopic techniques.
CO 5. CO5: Measure molecular/system properties such as chloride content, hardness of water, dissolved oxygen, of surface tension and viscosity etc

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 emfs.
6. Determination of Strength of an acid in Pb-Acid battery. (pH metry)
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law. (Colurimetric estimation of iron)
9. Wavelength measurement of sample through UV-Visible Spectroscopy.
10. Identification of simple organic compounds by IR.
11. Preparation of nanomaterials by precipitation method.
12. Estimation of Ferrous Iron by Dichrometry.
13. Determination of surface tension and viscosity.
14. Determination of Hardness of water sample by EDTA Method
15. Determination of Dissolved Oxygen present in the given water sample by Modern Winkler's Method.
16. Determination of Chloride content present in given water sample

Reference Books:

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

PROBABILITY AND STOCHASTIC PROCESSES
(ECE ONLY)

Subject Code: 23BHT210	L	T	P	C
	3	0	0	3

Course Objectives:

- To provide mathematical background of probability to solve probabilistic problems in signal processing and communication.
- To study the concept of random variables, operations on random variable, concept of probability distributions and central limit theorem
- To understand the overview of multiple random variables.
- To understand the basic theoretical concepts of random process using temporal characteristics.
- To understand the need of spectral analysis of a random process and application to the signal processing in the communication system.

Course Outcomes:

On completion of this course, students will be able to

CO 1. Recall the mathematical concepts related to probability theory.

CO 2. Understand random variables and distribution functions, probability distributions and central limit theorem and its mathematical expectation on one random variable.

CO 3. Understand multiple random variables and distribution functions and its mathematical expectations on multiple random variables.

CO 4. Understand random process and its temporal characteristics.

CO 5. Discriminate the power spectrum estimation in time and frequency.

Unit – I

Probability (8hrs) : Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definition and Axioms, Conditional Probability, Independent Events, Bayes' Theorem.

Unit- II

Random variables (10 hrs) : Definition of a Random Variable, Conditions for a function to be a Random Variable, Discrete, Continuous and Mixed Random Variables. Distribution and Density functions, Properties, Uniform, Gaussian, Exponential.

Operation on one random variable: Expected Value of a Random Variable, function of a Random Variable, Moments about the Origin, Central Moments, Skewness and Kurtosis, moment generating function and characteristic function and Central Limit Theorem.

Unit-III

Multiple random variables (10 hrs) : Vector random variables, joint distribution function, properties of joint distribution, marginal distribution functions, conditional distribution, density functions, statistical independence and sum of two random variables.

Operation on multiple random variables: Expected value of a function of random variables, joint moments about the origin, joint central moments.

Unit – IV

Stochastic Processes – Temporal Characteristics (10hrs) : The random process concept, classification of processes, Deterministic and Nondeterministic processes, concept of stationary and statistical independence. First – order, second – order, wide – sense and strict – sense stationary. Time average and Ergodicity and mean – Ergodic Processes. Autocorrelation function and its properties and Cross-Correlation Function and Its Properties.

Unit – V

Stochastic Processes – Spectral Characteristics (8 hrs) : Power spectrum Properties, Relationship between power spectrum and autocorrelation function, cross – power density spectrum and its properties-Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 2001, 4/e.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unni krishna Pillai, PHI, 2002, 4/e.

Reference Books:

1. Probability, Statistics and Random Processes – K. Murugesan and P. Gurusamy, Anuradha Publications.
2. Probability Methods of Signal and System Analysis - George R. Cooper, Clave D. MC Gillem, Oxford, 1999, 3/e

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem

PYTHON PROGRAMMING

Subject Code: 23EST206	L	T	P	C
	3	0	0	3

Course Objectives:

- Python programming course aims to empower students with the knowledge, skills, and practical experience essential for becoming proficient Python programmers. By mastering Python fundamentals, exploring its rich ecosystem, and learning software development best practices, students develop problem-solving abilities and gain the confidence to tackle real-world challenges.

Course Outcomes:

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

CO 1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.

CO 2. Demonstrate proficiency in handling Strings and File Systems.

CO 3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

CO 4. Implement file handling functions and user defined functions in python.

CO 5. Interpret the concepts of Object-Oriented Programming as used in Python and Regular Expressions.

Unit – I

Introduction to Python: History, Features, Installing Python, Running Python, Operators, Statements and Expressions.

Control Structures: Conditional Statements, Loops

Unit – II

Data Types: Mutable vs immutable data type, Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules. Sequences - Strings, Lists, and Tuples, Dictionaries and Set Types

Unit – III

Functions: Definitions, Declaration, Parameter passing, calling functions

File Handling: creating a file, opening a file, I/O with file (read, write, append), closing a file

Unit – IV

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules.

Unit – V

Classes in Python: Principles of Object Orientation, Creating Classes, Instance Methods, Special Methods, class Variables and Inheritance, Data base connectivity.

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python

Textbooks:

1. Wesley J .C hun "Core Python Applications Programming", 3rd Edition, 2012, Prentice Hall.
2. Brian jones, David Beazley "Python Cookbook ", 3rd Edition.

Reference Books:

1. Mark Lutz "Programming Python, 4th Edition" O'Reilly Media.
2. Think Python, Allen Downey, Green Tea Press

Reference Links:

1. https://docs.python.org/3/tutorial/index.html
2. https://pythonprogramminglanguage.com

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem

CONTROL SYSTEMS

Subject Code: 23ECT203	L	T	P	C
	2	0	0	2

Course Objectives:

- To describe the feedback controls with basic components of control systems.
- To formulate mathematical models of physical systems and block diagram representation.
- To analyze stability of the system from transfer function approach.
- To describe and analyze various time domain and frequency domain tools for analysis and design of linear control systems.–
- To represent physical systems in state space form and analyze them.

Course Outcomes:

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

CO 1. Estimate basic components of feedback control systems; formulate mathematical models of physical systems and represent them in block diagrams and signal flow graphs.
CO 2. Discuss the time-domain specifications; Analyze first and second order control systems in time domain.
CO 3. Analyze stability of the system from transfer functions approach and graphical methods.
CO 4. Design controllers, compensators and control system.
CO 5. Determine Stability analysis, Phase margin and Gain margin from frequency analysis

Unit-I

Concepts of Control Systems: Open loop and closed loop control systems-Classification of control systems- Feedback characteristics. Mathematical models of physical systems: Differential equations- transfer functions- Modeling of Electric systems - Translational and rotational mechanical systems. - Block diagram reduction Techniques - Signal flow graph

Unit-II

Time Response analysis: Time response of first order systems, Impulse and Step Response analysis of second order systems- Time domain specifications – Steady state response - Steady state errors–proportional derivative, proportional integral systems.

Unit-III

Concept of stability: Bounded – Input bounded – Output stability- Routh's stability criterion, Relative stability.

Root Locus Technique: The root locus concept - Guidelines for sketching root locus- construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci.

Unit-IV

Frequency response analysis-I: Introduction, Frequency domain specifications – Bode diagrams – Determination of frequency domain specifications – Phase margin and Gain margin – Stability analysis from Bode plots.

Unit-V

Frequency response analysis-II: Introduction to Polar plots, Determination of Phase margin and Gain margin, Stability analysis from Polar plots. Introduction to Nyquist plots, Determination of Phase margin and Gain margin, Stability analysis from Nyquist plots.

Text Books:

1. Automatic Control Systems – B. C. Kuo, John Wiley, Ninth edition (2014).
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International limited Publishers, Sixth edition 2018.
3. Modern Control Engineering –Kotsuhiko Ogata, Prentice Hall of India pvt ltd, 5/e.

Reference Books:

1. Control Systems – A.Anand Kumar, PHI Publications,4/e.
2. Control Systems Engineering – S.Palani,TataMcGraw Hill Publications

Website References:

1. https://nptel.ac.in/courses/107106081
2. https://onlinecourses.nptel.ac.in/noc20_ee90/preview

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem

ANALOG ELECTRONIC CIRCUITS

Subject Code: 23ECT204	L	T	P	C
	3	0	0	3

Course Objectives:

- To identify the types of feedback amplifiers and analyze effect of negative feedback on input and output resistances.
- To introduce concepts in Cascading in BJT and FET amplifier
- To understand the design concept of power amplifier
- To study about the analysis and designing of multivibrators.
- To learn about the time base generators

Course Outcomes:

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

CO 6. Distinguish the types of feedback amplifiers and analyze effect of negative feedback on input and output resistances.
CO 7. Extrapolate BJT and FET amplifier used for cascading stages.
CO 8. Differentiate BJT and FET amplifier as a power amplifier for high voltage applications
CO 9. Design and analysis of multivibrators
CO 10. Analysis of time base generators

.

UNIT – I

Feedback topologies: Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output Resistances.

Oscillators: Concept of stability, Barkhausen criterion, RC oscillators (phase shift and Wienbridge), LC oscillators (Hartley and Colpitts), Crystal Oscillator

UNIT – II

Multi Stage Amplifiers: High frequency transistor models, Miller's Theorem, Concept of Multi Stage Amplifiers: Methods of Inter Stage Coupling, n–Stage Cascaded Amplifiers, Darlington pair, Frequency response of RC Coupled Amplifiers using BJT, Gain Bandwidth Product, JFET amplifiers (only CS).

UNIT – III

Power Amplifiers: Various classes of Power amplifiers: Class A, Class B, Class AB, Class C and Class D, comparison of power amplifiers (A to H), power efficiency, Thermal Cooling, Single Tuned Capacitive Coupled Amplifier, Single Tuned Transformer Coupled or Inductively Coupled Amplifier, double tuned and staggered tuned amplifier.

UNIT – IV

Multivibrators: Transistor as a switch, switching times of a transistor. Analysis of Bistable Multivibrators, commutating capacitors, Triggering binary, Monostable and Astable Multivibrators, Schmitt trigger using transistors.

UNIT – V

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

Text Books:

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill.
2. Pulse, Digital and Switching Waveforms – J. Millman and H. Taub, McGraw-Hill, 1991.
3. Pulse and Digital Circuits – Venkata Rao K., Ramasuda K., Manmadharao G., Pearson Education, 2010.

Reference Books:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9thEdition, 2006.
2. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press, 5/e.

Website References:

1. https://nptel.ac.in/courses/108/102/108102095/
2. http://www.iitg.ac.in/apvajpeyi/ph218/Lec-18.pdf
3. http://www.vidyarthiplus.in/2011/11/electronic-device-and-circuits-edc.html

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem

SIGNALS AND SYSTEMS

Subject Code: 23ECT205	L	T	P	C
	3	0	0	3

Course Objectives:

- To understand mathematical description and representation of continuous and discrete time signals and systems.
- To demonstrate the characteristics of Linear Time Invariant systems and acquire knowledge on convolution.
- To discuss the fundamental concepts of signals in Fourier domain.
- To discuss the importance of Laplace Transforms.
  To explain the importance of Sampling and the ability to analyze the system in Z- domain.

Course Outcomes:

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

CO 1. Understand mathematical description and representation of continuous and discrete time signals.
CO 2. Analyze the characteristics of Linear Time Invariant systems and acquire knowledge on convolution.
CO 3. Compute the Fourier series and Fourier transform of a set of well-defined continuous time signals.
CO 4. Summarize the concepts of Laplace transforms.
CO 5. Explain the importance of Sampling and the ability to analyze the system in Z-domain.

Unit – I

Signals (continuous-time & discrete-time): Signal classification (analog-digital, energy-power, Even-odd, periodic-aperiodic, deterministic-random), standard signals (unit step, unit impulse, ramp, exponential, sinusoids), properties of elementary signals, operations on signals.
Systems (continuous-time & discrete-time): System classification (memory, causal, stable, linear, time-invariant, invertible), Identification of System Properties.

Unit – II

Continuous-time LTI Systems: Impulse response of an LTI system, convolution integral, graphical convolution, system properties from impulse response, interconnection of LTI systems, evaluating impulse response from the step response.
Discrete-time signals and systems: Emphasize similarities and differences with continuous-time counterpart, discrete-time convolution.

Unit – III

Continuous-time Fourier series: Periodic signals and their properties, complex exponential as eigen function of LTI systems, exponential and trigonometric FS representation of periodic signals, convergence of FS, FS of standard periodic signals, salient properties of Fourier series (no derivations required), applications of FS.

Continuous-time Fourier transform: Development of Fourier representation of aperiodic signals, convergence, FT of standard signals, FT of periodic signals, properties of FT, applications of FT.

Unit – IV

Laplace transform: Unilateral and Bilateral transform, ROC, relation between Fourier and Laplace transform, properties, poles and zeros of rational transfer function using LT, frequency response from pole zero locations, Inverse Laplace transforms

Unit – V

Sampling & Reconstruction: Representation of digital signals, The Sampling Theorem, types of sampling, Reconstruction of a signal from its samples using interpolation, Aliasing and its effects.
Z – Transform: Introduction to Z-transform, relation between Fourier and Laplace transform with Z-transform, ROC and its properties, properties of Z- transform, Inverse Z- Transforms.

Text Books:

1. Signals, Systems and Communications – B.P. Lathi, BS Publications, 2008.
2. Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2/e.
3. Signal and Systems – A. Anand Kumar, 3rd Edition, PHI

Reference Books:

1. Signals & Systems – Simon Haykin and Van Veen,Wiley, 2/e.
2. Signals and Systems Using MATLAB – Luis F. Chaparro, Elseiver publications
3. Signals and Systems - A. Nagoor Khani, Tata McGraw Hill Education Private Limited, 2010.

Website References:

1. https://nptel.ac.in/courses/117/104/117104074/

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

PYTHON PROGRAMMING LAB

Subject Code: 23ESL207	L	T	P	C
	0	0	3	1.5

Course Objectives:

- This course will enable students with a comprehensive understanding of Python programming language, including its history, features, and fundamental concepts, enabling them to write Python programs proficiently.

Course Outcomes:

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

CO 1. Able to implement conditional statements and loops to control the flow of their Python programs effectively.
CO 2. To manipulate strings, lists, tuples, dictionaries, and sets using appropriate Python syntax and built-in functions.
CO 3. To perform basic file operations such as creating, opening, reading, writing, appending, and closing files using Python.
CO 4. To import specific attributes from modules, utilize built-in functions provided by modules, and organize modules into packages effectively.
CO 5. Apply OOP concepts and regular expressions in Python to search, match, and manipulate textual data effectively.

Exercise Questions: 1

Ex 1: Write the python programs to implement all Number type operations.
Ex 2: Write the python programs to perform all String operations.

Exercise Questions: 2

Ex 3: Write the python programs to calculate the List datatype operations.
Ex 4: Write the python programs to perform the Dictionary operations.

Exercise Questions: 3

Ex 5: Write the python programs to implement the recursive function.
Ex 6: Write the python programs to perform the file operations.

Exercise Questions: 4

Ex 7: Write the python programs to implement modules and packages.

Exercise Questions: 5

Ex 8: Write the python program to create class, object and its concepts of OOP.
Ex 9: Write a Python program that uses regular expressions to find all occurrences of a specific pattern in a given text and validations.

Text Books

1. Wesley J .C hun "Core Python Applications Programming", 3rd Edition, 2012, Prentice Hall.
2. Brian jones, David Beazley “Python Cookbook ”, 3rd Edition.

References Books

1. Mark Lutz "Programming Python, 4th Edition" O'Reilly Media.
2. Think Python, Allen Downey, Green Tea Press

Web Links

1. https://docs.python.org/3/tutorial/index.html
2. https://pythonprogramminglanguage.com

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ANALOG ELECTRONIC CIRCUITS LAB

Subject Code: 23ECL201	L	T	P	C
	0	0	3	1.5

Course Objectives

- To observe the characteristics of PN junction diode & Zener diode experimentally and to find the ripple factor of half and full wave rectifiers with and without filter.
- To observe the characteristics of BJT in CE configuration and JFET experimentally and design two stage RC coupled amplifier.
- To design Current series feedback amplifier, RC phase shift oscillator using transistors for different frequencies.
- To obtain the conduction angle of Power amplifier.
- To analyze different multivibrators, Schmitt Trigger and Bootstrap Sweep Circuit.

Course Outcomes

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

CO 1. Draw the characteristics of PN Diode and Zener Diode and find the ripple factor of half and full wave rectifiers with and without filter.

CO 2. Compute the BJT and JFET parameters from the characteristics and to obtain frequency response of two stage RC coupled amplifier

CO 3. Design Current series feedback amplifier, RC phase shift oscillator using transistors for different frequencies.

CO 4. Obtain the conduction angle of Power amplifier

CO 5. Examine the operation of Transistor as a switch, Analyze multivibrator, Schmitt Trigger and Bootstrap Sweep Circuit

List of Experiments

1. PN Junction diode forward and reverse bias characteristics (cut-in voltage, static and dynamic resistance) and Zener diode characteristics (breakdown voltage).
2. Rectifier without filter- Half wave & Full wave (ripple factor).
3. Rectifier with Capacitive filter - Half wave & Full wave (ripple factor).
4. Transistor CE configuration input and output characteristics (β and input and output resistance).
5. Drain and Transfer Characteristics of JFET (g_m, μ and r_d).
6. Current series (CE amplifier) feedback amplifier – Frequency response (gain, input and output resistance with and without feedback)
7. RC Phase Shift Oscillator using Transistors - Design for different frequencies
8. Two Stage RC Coupled amplifier – Frequency response
9. Class B Power Amplifier
10. Transistor as a switch.
11. Monostable Multivibrator
12. Schmitt Trigger

Additional Experiments:

13. CC Amplifier-Parameters
14. Push-Pull Class AB Power Amplifier

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

SIMULATION LAB

Subject Code: 23ECL202	L	T	P	C
	0	0	3	1.5

Course Objectives:

- To provide background and fundamentals of MATLAB tool for the analysis and processing of signals and to generate various continuous and discrete time signals.
- To provide an overview of signal transmission through linear systems, convolution and correlation of signals and sampling.
- To design different Oscillator using transistors for different frequencies.
- To design different Power Amplifiers using transistors for different frequencies

Course Outcomes:

CO 1. Analyze the generation Various Signals and Sequences in MATLAB, including the mathematical operations on Signals and Sequences.
CO 2. Analyze the even and odd parts of the signals and also perform different convolution operations on sequences.
CO 3. Apply the autocorrelation and cross correlation on signals and sequences and Verify the Sampling Theorem.
CO 4. Design RC phase shift, Wien bridge and Colpitts Oscillators at different frequencies.
CO 5. Design Class-A, Class-B and Class-C power amplifiers for desired specifications.

List of Programs:

Cycle-I (Simulation Using MATLAB):

1. Develop a program for Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp and sinc signal
2. Develop a program to perform operations like addition, multiplication, scaling, shifting, and folding on signals and sequences and computation of energy and average power.
3. Develop a program for finding the even and odd parts of the signal / sequence and real and imaginary parts of the signal.
4. Develop a program to perform convolution between signals and sequences.
5. Develop a program to perform autocorrelation and cross correlation between signals and sequences
6. Develop a program for Sampling theorem verification

Cycle-II(Simulation Using Pspice):

7. RC Phase Shift Oscillator using Transistors - Design for different frequencies.
8. Wien Bridge Oscillator using Transistors- Design for different frequencies.
9. Colpitts Oscillator using Transistors- Design for different frequencies.
10. Class A Power Amplifier
11. Class B Power Amplifier
12. Class C Power Amplifier

Additional Programs:

1. Develop a program and simulate to perform Noisy signal Analysis using FT.
2. Two Stage RC Coupled amplifier – Frequency response.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ENVIRONMENTAL STUDIES
(Common to all Branches)

Subject Code: 23MCT204	L	T	P	C
	2	0	0	0

Course Objectives:

- Memorize the knowledge of environment and status of different resources on earth.
- Identify the significance, arrangement, causes of annihilation and conservation of ecosystems and biodiversity..
- Discriminate causes, effects of a variety of pollutions and suitable control methods.
- Identify the hurdles of sustainable development; evaluate the different environmental management and legal issues.
- Describe the population growths, health problems and evaluate the environmental assets.

Course Outcomes:
By Studying this Course Student will

CO 1. Recognize and speaks well again on the general issues of environment and know how to conserve resources for better usage.
CO 2. Explain and demonstrate the ecosystems setup, assess. Recognize and conserving of diversity to upkeep.
CO 3. Examine a range of pollution problems along with control and their eco-friendly disposal methods.
CO 4. Translate the sustainable development practice through clean development mechanisms.
CO 5. Evaluate the changing trends of world population and compile the information in order to document the environmental assets.

Unit – I (6 Hours)
Importance of Environmental Studies and Natural Resources: Definition of Environment – Importance - Need for Public Awareness
Forest Resources - Use and over exploitation - deforestation – consequences – casestudy
Water Resources - Use and over utilization - dams - benefits and problems on Tribes and Environment
Food Resources – Food security concept - changes caused by agriculture and overgrazing -effects of modern agriculture – fertilizer - pesticide problems - water logging - salinity – conceptof sustainable agricultural methods - case study
Energy Resources - Non-renewable energy resources – coal – crude oil - natural gas - use of renewable and alternate energy sources

Unit – II (6 Hours)
Ecosystems and Biodiversity and its conservation: Definition – Structure of ecosystem: producers - consumers – decomposers.Functions of ecosystem: Food chains - food webs ecological pyramids - Energy flow – Nutrient cycles (Carbon cycle and Nitrogen cycle). Ecological

succession.

Definition of Biodiversity - Values of biodiversity - Bio-geographical classification of India - Hot Spots of India - Endangered and endemic species of India –Threats to biodiversity - Conservation of biodiversity

Unit – III (6 Hours)

Environmental Pollution: Definition – causes - effects - control measures of Air pollution -Water pollution - Noise pollution – Marine Pollution - Nuclear hazards.

Solid waste Management: Causes - effects - disposal methods of urban waste – biomedical wastes - case studies

Disaster management: floods – earthquakes – cyclones

Unit – IV (6 Hours)

Social Issues and the Environment: Concept of Unsustainable and Sustainable development – Water conservation: Rain water harvesting- Watershed management – Global environmental challenges: climate change - global warming – acid rains - ozone layer depletion -World summits on environment: Stockholm conference – Rio-earth summit – Kyoto protocol – Environment (Protection) Act - Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act - Wildlife (Protection) Act -Forest (Conservation) Act

Unit – V (4 Hours)

Human Population and the Environment: Population growth patterns - variation amongnations - Population problems - control -Environment and human health - Role of informationTechnology in Environment and human health

Text Books:

1. Shashi Chawla. 2015, *A Text book of Environmental Studies*, Revised edition, TMH, New Delhi

2. Bharucha, E. 2005, *Text book of Environmental Studies*, First edition, Universities Press (India) Pvt. Ltd., Hyderabad

3. Suresh K. Dhameja. 2006-07, *Environmental Studies*, Third revised edition, S.K. Kataria & Sons (P) Ltd., New Delhi

4. Benny Joseph. 2015, *Environmental Studies*, Revised edition, TMH, New Delhi

Reference Books:

1. Odum, E.P, *Fundamentals of Ecology*, Third edition, W.B. Saunders & Co (P) Ltd., Philadelphia.

2. P. D. Sharma, *Ecology and Environment*, Revised edition, Rastogi Publications (P) Ltd.

3. Cunningham, W.P., Cunningham, M.A., *Principles of Environmental Science*, TMH, New Delhi.

4. Peavy, Rowe and Tchobanoglous, *Environmental Engineering*, Mc Graw – Hill Internationaledition.

5. Graedel, T.E., Allenby, B.R., *Industrial Ecology and Sustainable Engineering*, Pearson Publications.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

UNIVERSAL HUMAN VALUES
(COMMON TO ALL B.TECH BRANCHES)

Subject Code: 23BHT207	L	T	P	C
	2	0	0	2

COURSE OBJECTIVES:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.
- To Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

COURSE OUTCOMES:

CO 1. Upon completion of this course students can aware of ethical behavior in the work place

CO 2. To shapes the students by the end of this curriculum being harmony himself

CO 3. To understand the human relationship and values

CO 4. To understand the Nature and its existence of connectivity

CO 5. Learn the importance of Human values and universal order

UNIT-I

Introduction: Understanding the need, basic guidelines, content and process for Value Education- Self Exploration - what is it?- Continuous Happiness and Prosperity Morals, Values and Ethics – Integrity – Work Ethics – Service Learning- Respect for others- Caring – Sharing – Honesty – Courage – Value time – Co-operation – Commitment Self-confidence – Spirituality.

UNIT-II

Understanding Harmony in the Human Being: Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'- Understanding the needs of Self ('I') and 'Body'- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

UNIT-III

Understanding Harmony in the Family and Society: Harmony in Human-Human Relationship- Understanding harmony in the Family- the basic unit of human interaction Understanding values in

human-human relationship- Trust (Vishwas) and Respect (Samman) as the foundational values of relationship- Understanding the meaning of Vishwas; Difference between intention and competence -Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship

UNIT- IV

Understanding Harmony in the Nature and Existence: Whole existence as Co-existence- Understanding the harmony in the Nature- Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature- Holistic perception of harmony at all levels of existence

UNIT-V

Implications of the Holistic Understanding of Harmony: Natural acceptance of human values - Definitiveness of Ethical Human Conduct- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Reference Books:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics
2. "Professional Ethics and Human Values" by Prof. D.R. Kiran.
3. "Engineering Ethics & Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
4. A N Tripathy, 2003, Human Values, New Age International Publishers
5. R. Subramanian, Professional Ethics includes Human Values, Oxford Univ. Press
6. M Govindrajan, S Natrajan& V. S Senthilkumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

ANALOG AND DIGITAL COMMUNICATIONS

Subject Code: 23ECT206	L	T	P	C
	3	0	0	3

Course Objectives:

- Explain the representation, generation and demodulation of various forms of amplitude modulation.
- Describe the concepts, generation and detection of frequency and phase modulation schemes.
- To summarize the pulse modulation schemes, digitization techniques and to discuss different digital modulation techniques.
- To describe various types of radio receivers and effect of noise on analogue modulation
- To compute probability of error associated with base band signal receiver

Course Outcomes:

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

CO 1. Analyze continuous wave amplitude modulation and demodulation techniques and various types of amplitude modulation.
CO 2. Explain angle modulation and demodulation techniques.
CO 3. Describe pulse modulation schemes and compare PCM, DPCM, DM and ADM digitization techniques.
CO 4. Discuss ASK, FSK, PSK, DPSK and QPSK digital modulation techniques
CO 5. Explain various radio receivers and analyze matched filter in digital system

Unit – I

Amplitude Modulation: Introduction to communication system, need for modulation, Amplitude modulation: Time and frequency domain description, Power relations in AM wave; Generation of AM Wave- Switching Modulator, Detection of AM wave- Envelope Detector, Frequency domain representation of DSB-SC, SSB and VSB Modulation, Comparison of AM Techniques.

Unit – II

Angle modulation: Basic concepts, Frequency Modulation, relation between FM and PM, Spectrum Analysis of sinusoidal FM Wave, Narrow band FM, Wide band FM, Transmission Bandwidth, Generation of FM - Direct and indirect methods. Detection of FM wave - Balanced slope detector, Phase Discriminator.

Unit – III

Pulse Modulation: Introduction to PAM, PWM, PPM, Time Division Multiplexing
Digitization Techniques: Introduction to digital communication system, Pulse Code Modulation - quantization error, Companding, Differential PCM, Introduction to Delta modulation and adaptive delta modulation.

Unit-IV

Digital Modulation Techniques: Introduction, ASK modulation, FSK modulation, PSK modulation, DPSK modulation, QPSK modulation, Introduction to M-ary systems.

Unit-V

Radio Receivers & Noise in analog modulation: Tuned radio frequency receiver, super heterodyne receiver, FM Receiver, Types of Noise, Noise in AM and FM receivers, Pre-emphasis & de-emphasis.

Data Transmission: Base band signal receiver, optimum filter, matched filter, probability of bit error using matched filter.

Text Books:

1. An Introduction to Analog and Digital Communications - Simon Haykin, John Wiley, 2/e.
2. Digital and Analog Communication Systems – Sam Shanmugam, John Wiley, 2005.

Reference Books:

1. Digital communications - Simon Haykin, John Wiley, 4 th Edition,2013
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH, 2004.
3. R.P. Singh, S.D Sapre, "Communication Systems", 3rd Edition, TMH, 2017.

Website References:

1. https://nptel.ac.in/courses/117/101/117101051/
2. https://nptel.ac.in/courses/117/105/117105143/
3. https://nptel.ac.in/courses/117/102/117102059/

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

DIGITAL ELECTRONICS

Subject Code: 23ECT207	L	T	P	C
	3	0	0	3

Course Objectives:

- To solve atypical number baseconversions and analyze new error coding techniques
- To optimize logic gates for digital circuits using various techniques
- To understand concepts of Adders and Subtractors and to analyze different types of decoders, encoders, code converters, multiplexers and comparators.
- To develop sequential circuits
- To facilitate students in designing a logic circuitusing PLDs**.**

- **Course Outcomes:**

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

CO 1. Classify different number systems and apply to generate various codes.
CO 2. Make use of the Booleanalgebrain minimization of switching functions
CO 3. Design different types of combinational circuits
CO 4. Apply knowledge of flip-flops in designing of shift registers and counters
CO 5. Construct PLDs for the given Switching Functions

Unit– I

Review of Number systems: Number systems, Base conversion methods, Complements of numbers, r's, r – 1's compliment subtraction, BCD, excess-3, 2421, Gray code, Alphanumeric codes, Hamming Codes.

Unit– II

Logic operations: Logic gates, Boolean theorems, Complements and dual of logic expressions, Canonical and standard forms. Minimization of logic functions using theorems. Two level and Multi-level implementation.

Minimization of switching functions: Minimization of switching functions using K–mapup to 4-variables, Prime and Essential implicants, Don't Care map entries.Quine mccluskey Method.

Unit– III

Combinational logic circuits-I: Design of half adder, Full adder, Halfsubtractor, Full subtractor, 4-bit binary adder, 4-bit binary subtractor, BCD adder, Carry look-a-head adder,

Combinational logic circuits-II: Design of decoder, Encoder, Priority encoder, Multiplexer, de-multiplexer, Comparators and LED seven segment display.

Unit– IV

Sequential logic circuits: Flip-flops with truth tables and excitation tables. Conversion of flip-flops. Design of ripple counters, synchronous counters.

Design of shift registers, Buffer shift register, Bi–directional shift register and Universal shift register. Johnson and Ring counters.

Unit–V

MEMORY AND PROGRAMMABLE LOGIC: Introduction, Random access memory, memory decoding, Realization of Switching Functions using PROM, PAL and PLA. Programming Tables of PLA, PAL and PROM, Comparison of PLA, PAL and PROM

Text Books:

1. Switching and Finite automata theory – ZviKohavi, Tata Mcgraw – Hill, 2010, 2/e. Digital Systems: HardwareOrganizationandDesign,3rdEdition-Frederick
2. Switching theory and logic Design – A Anand Kumar 3rd Addition.

Reference Books:

1. Digitaldesign–MorisMano,PHI,2/e.,Pearsonpublication,4thEdition,2009.
2. Fundamentals of Logic Design – Charles H. Roth Jr, Jaico Publishing House; First edition (28September1992).

Website References:

1. https://nptel.ac.in/courses/108/105/108105132/

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

ELECTRO MAGNETIC WAVES & TRANSMISSION LINES

Subject Code: 23ECT208	L	T	P	C
	3	0	0	3

Course Objectives:

- To apply concepts of orthogonal coordinate systems
- To analyze the interaction of electromagnetic fields in different media.
- To demonstrate the completeness of Maxwell's relations for describing electromagnetic fields.
- To describe the propagation of plane electromagnetic waves in lossless and loss media.
- To learn overall concepts of Transmission line theory and to learn different impedance matching of transmission line.

Course Outcomes:

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

CO 1. Understand the concepts of orthogonal coordinate systems and analyze the electrostatic fields.
CO 2. Analyze the interaction of magnetic fields.
CO 3. Discuss the Electromagnetic fields using Maxwell's relations.
CO 4. Discuss the characteristics of uniform plane waves at deferent medium.
CO 5. Interpret the impedance matching transmission lines.

Unit – I

Review of Coordinate Systems, Vector Calculus: Orthogonal Coordinate System, Transformations of coordinate systems; Del operator; Gradient, Divergence, Curl , Laplacian operator.

Electrostatics: Coulomb 's Law, Electric Field Intensity, Charge Distributions, Electric Flux Density, Gauss Law, Electric Potential, Maxwell 's Two Equations for Electrostatic Fields, Dielectric Constant, Continuity Equation, Poisson 's and Laplace 's Equations.

Unit – II

Magneto Statics: Biot-Savart Law, Ampere 's Circuital Law and Applications, Magnetic Flux Density, Maxwell 's Two Equations for Magneto static Fields, Forces due to Magnetic Fields.

Unit – III

Maxwell's Equations for Time Varying fields: Faraday 's Law and emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements.

Boundary Conditions: Dielectric - Dielectric and Dielectric- Conductor Interfaces.

Unit – IV

Time Varying EM Waves: Medium Characterization, Wave Equations for Conducting and Perfect Dielectric Media.

Uniform Plane Waves : Definition, All Relations between E & H Polarization, Poynting Theorem.

Unit – V

Transmission Lines: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines.

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. Low loss radio frequency lines and UHF Transmission lines, Impedance Transformations, λ/8, λ/4 and λ /2 Lines, Single Stub Matching.

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Text Books:

1. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 2006,7/e.
2. Transmission Lines and Networks – UmeshSinha, SatyaPrakashan (Tech. India Publications), New Delhi,2001

Reference Books:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 2001,3/e.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain,PHI, 2000, 2/e.
3. Schaums Outline Series – Electromagnetics – Joseph A Edminister, Tata McgrawHill, 3/e.

Website References:

1. https://nptel.ac.in/courses/117/101/117101056/

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

PULSE CIRCUITS AND IC APPLICATIONS

Subject Code: 23ECT209	L	T	P	C
	3	0	0	3

Course Objectives:

- To introduce Wave shaping concepts of linear and non-linear circuits
- To study about switching characteristics of devices
- To study about the analysis and design of multi vibrators
- To explain the basic building blocks of Op-amp and to understand the linear applications of Op-amp
- To understand the non-linear applications of Op-amp and IC 555 timer

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

CO 1. Construct different linear and non-linear and to determine the transfer characteristics of clippers and clamper circuits
CO 2. Determine Op-Amp Characteristics
CO 3. Understand applications of Op-Amp
CO 4. Construct OP-AMP for Linear circuit applications.
CO 5. Construct OP-AMP circuits for Non-Linear applications and IC555 Timer applications

UNIT-I

Linear and Non-Linear Wave Shaping: Low Pass & High Pass RC Circuits, Response for Step, Pulse and Square Inputs, RC Network as Differentiator and Integrator, Diode Clippers, Clamping Circuits, Clamping Circuit Theorem.

UNIT-II

Operational Amplifier: Block diagram of Op-Amp, equivalent circuit, Op-Amp Characteristics (ideal and practical) - DC and AC Characteristics, open and closed loop configurations- Inverting, Non-Inverting, Differential Amplifier.

UNIT-III

Applications of Op-Amp: Summing, and averaging amplifiers, V-I and I-V converters, Differentiators and Integrators, Comparators, Schmitt Trigger, Oscillators: RC Phase shift and Wien bridge.

UNIT-IV

IC Applications: Active filters: Design of First order active Low-pass and high pass filters, Bandpass, Bandstop and All Pass Filters.
Specialized IC applications: 555 Timer: Block Schematic, Functional Diagram, Introduction to VCO and PLL.

UNIT-V

Data Converters: Basic DAC techniques, Different types of DACs: Weighted resistor DAC, R-2R ladder DAC, Different Types of ADCs: Parallel Comparator Type ADC, Successive Approximation ADC and Dual Slope ADC.

Text Books:

1. Pulse, Digital and Switching Waveforms – J. Millman and H. Taub, McGraw-Hill, 1991.
2. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.

Reference Books:

1. Pulse and Digital Circuits – Venkata Rao K., Ramasuda K., Manmadharao G., Pearson Education, 2010.
2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.

Website References:

1. http://www.iitg.ac.in/apvajpeyi/ph218/Lec-18.pdf
2. https://nptel.ac.in/courses/108108111
3. https://nptel.ac.in/courses/108106069

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II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

COMPETITIVE PROGRAMMING LAB – I

Subject Code: 23ESL208	L	T	P	C
	0	0	3	1.5

Course Objectives:

- This course aim to enhance student proficiency in a particular programming language C++.
- Acknowledge in the value of mathematics and problem solving techniques in programming
- Learning about the optimized solution in solving problems.

Course Outcomes:

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

CO 1. Use programming to find solution of the problems.

CO 2. Create solution based on OOPS concept

CO 3. Choose the right container to arrange data in order to solve problems.

CO 4. Provide problem Solving strategies employing Recursion.

CO 5. Apply mathematics to the problem Analysis.

CO 6. Write data retrieval queries and evaluate the result set

LAB MODULE I:

CPP Essentials: Basic Syntax, Variables, Data types, Operators, Input and output, Conditional Statements ,loops.

Data Type,Conditions: https://codeforces.com/group/MWSDmqGsZm/contest/219158

Loops: https://codeforces.com/group/MWSDmqGsZm/contest/219432

LAB MODULE II:

Arrays, Functions and Strings

Arrays : https://codeforces.com/group/MWSDmqGsZm/contest/219774

Functions : https://codeforces.com/group/MWSDmqGsZm/contest/223205

Strings: https://codeforces.com/group/MWSDmqGsZm/contest/219856

LAB MODULE III:

OOPS

Class: https://www.hackerrank.com/challenges/c-tutorial-class/problem

Classes and Objects: https://www.hackerrank.com/challenges/classes-objects/problem

https://www.hackerrank.com/challenges/box-it/problem

LAB MODULE IV:

Inheritance:

https://www.hackerrank.com/domains/cpp?filters%5Bsubdomains%5D%5B%5D=inheritance

Virtual Functions:

https://www.hackerrank.com/challenges/virtual-functions/problem

Abstract Classes – Polymorphism:

https://www.hackerrank.com/challenges/abstract-classes-polymorphism/problem

LAB MODULE V:

STL - 1: Containers, Container Classes, Vectors, Lists, Iterators,set

Vector: https://www.geeksforgeeks.org/problems/c-stl-set-1-vector/1

https://www.hackerrank.com/challenges/vector-erase/problem?isFullScreen=true

Intersection of Two Arrays:

https://leetcode.com/problems/intersection-of-two-arrays/description

Set: https://www.hackerrank.com/challenges/cpp-sets/problem?isFullScreen=true

Stack:

Next Greater Element I: https://leetcode.com/problems/next-greater-element-i/description/

Valid Parentheses: https://leetcode.com/problems/valid-parentheses/description/

Largest Rectangle in Histogram:

https://leetcode.com/problems/largest-rectangle-in-histogram/description/

LAB MODULE VI:

STL -2: Maps, Bit set, Stack, Queue, De queue, Priority queue

https://www.hackerrank.com/challenges/cpp-maps/problem?isFullScreen=true

Twice counter: https://www.geeksforgeeks.org/problems/twice-counter4236/1

Frequency Game: https://www.geeksforgeeks.org/problems/frequency-game/1

Check if a string is repetition of its substring of k-length: https://www.geeksforgeeks.org/problems/check-if-a-string-is-repetition-of-its-substring-of-k-length3302/1

Dequeue: https://www.hackerrank.com/challenges/deque-stl/problem?isFullScreen=true

LAB MODULE VII:

Problem solving approaches : precomputation, Two pointer

Two Sum II : https://leetcode.com/problems/two-sum-ii-input-array-is-sorted/description/

Rotate Array: https://leetcode.com/problems/rotate-array/description/

Container With Most Water: https://leetcode.com/problems/container-with-most-water/description/

Remove Duplicates from Sorted Array:

https://leetcode.com/problems/remove-duplicates-from-sorted-array/description/

Product of Array Except Self:

https://leetcode.com/problems/product-of-array-except-self/description/

Reverse Words in a String II:

https://leetcode.com/problems/reverse-words-in-a-string-ii/description/

LAB MODULE VIII:

Problem solving approaches:

Sliding Window approach, fixed window approach and varying window approaches

Max Consecutive Ones I:

https://leetcode.com/problems/max-consecutive-ones/description/

Max Consecutive Ones II:

https://leetcode.com/problems/max-consecutive-ones-ii/description/

Longest Substring with At Most Two Distinct Characters:
https://leetcode.com/problems/longest-substring-with-at-most-two-distinct-characters/description/

Longest Substring Without Repeating Characters:
https://leetcode.com/problems/longest-substring-without-repeating-characters/description/

Find All Anagrams in a String:
https://leetcode.com/problems/find-all-anagrams-in-a-string/description/

SQL Part1:

SQL Command, Data Types, Operators and Expressions, DDL statements, DML statements, Functions, Sorting Data, Grouping Data

Practise problems:-

https://www.hackerrank.com/domains/sql?filters%5Bsubdomains%5D%5B%5D=select
https://www.hackerrank.com/domains/sql?filters%5Bsubdomains%5D%5B%5D=aggregation
https://www.sqlzoo.net/wiki/SQL_Tutorial

SQL Part2: Cartesian Product and Inner Join, Self Join, Outer Join, Subquery, Independent Subquery, Correlated Subquery

Practice problems:-

https://www.hackerrank.com/domains/sql?filters%5Bsubdomains%5D%5B%5D=join
https://www.hackerrank.com/domains/sql?filters%5Bsubdomains%5D%5B%5D=advanced-join
https://www.sqlzoo.net/wiki/SQL_Tutorial

Text Books:

1. The Complete Reference C++ by Herbert Schildt ,4th Edition
2. E. Horowitz. et.al., Fundamentals of computer Algorithms, Universities Press, 2008, 2nd Edition.

Reference Books:

1. Competitive Programming 3: The New Lower Bound of Programming Contests Book by Felix Halim and Steven Halim, 423 pages
2. Programming Pearls Book by Jon Bentley, 258 pages.T.H. Cormen et.al. – Introduction to Algorithms – PHI, New Delhi, 2005
3. S.Dasgupta et.al. – Algorithms, TMH, New Delhi – 2007.
4. SQL Quickstart Guide: The Simplified Beginner's Guide to SQL by Clydebank Technology

Resources:

1. https://leetcode.com/problems/
2. https://nptel.ac.in/courses/106106145/
3. https://www.spoj.com/problem

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II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

ANALOG AND DIGITAL COMMUNICATIONS LAB

Subject Code: 23ECL203	L	T	P	C
	0	0	3	1.5

Course Objectives:

To make the students exposed on

- Various analog modulation and demodulation schemes
- Various associated circuits of analog modulation schemes
- Verify sampling theorem
- Know how different Digitizers convert analog signal into digital signal (Binary).
- Study different digital modulation methods and demodulation and to observe waveforms

Course Outcomes:

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

CO 7. Integrate and test AM and FM modulators and demodulators.

CO 8. Illustrate sampling theorem in different conditions.

CO 9. Test associated circuit's pre-emphasis and de-emphasis

CO 10. Examine the digital outputs for given analog signals by using PCM and DPCM techniques

CO 11. Analyze the plots and power density spectrums of FSK, PSK and DPSK Digital Modulation and Demodulation techniques for given input.

List of Experiments (At least ten experiments are to be done) :

1. AM – Modulation and Demodulation.
2. FM - Modulation and Demodulation
3. Pre-emphasis & De-emphasis
4. Sampling Theorem
5. PWM and PPM Modulation
6. Time Division Multiplexing
7. Pulse code modulation
8. Differential pulse code modulation
9. Delta modulation and demodulation
10. Frequency shift keying
11. Phase shift keying
12. Differential phase shift keying.

Note: Any five experiments are to be completed by using MATLAB

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II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

PULSE CIRCUITS AND IC APPLICATIONS LAB

Subject Code: 23ECL204	L	T	P	C
	0	0	3	1.5

Course Objectives:

- To design low pass and high pass circuits for different time constants
- To examine the operation of clippers and clampers
- To Design and Analyze Linear and Non-linear applications using Op-amp.
- To Design and construct waveform generation circuits

Course Outcomes:

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

CO 1. Analyze linear & non-linear wave shaping circuits.
CO 2. Analyze multivibrators using op-amp
CO 3. Construct and verify various Linear and Non-linear applications of IC 741 Op-amp.
CO 4. Generate and verify the output waveforms of multivibrators using IC 555 Timer.
CO 5. Convert digital data to analog data using op-amp.

List of Experiments (at least ten experiments are to be done) :

1. Linear wave shaping.
2. Non-Linear wave shaping – Clippers.
3. Non-Linear wave shaping – Clampers.
4. Astable Multivibrator using op-amp
5. Monostable Multivibrator using op-amp
6. Op-amp Applications – Adder and comparator circuits.
7. Integrator and Differentiator Circuits using IC 741.
8. Monostable Operation Circuit using IC 555 Timer & IC 741
9. Astable Operation Circuit using IC 555 Timer & IC 741
10. Schmitt Trigger Circuits – using IC 555.
11. 4 bit DAC using op-amp

Additional Experiments:

1. Clipping Circuits Using P-Spice Software.
2. IC 741- Astable Multivibrator using P-Spice Software.

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II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem

DESIGN THINKING
(COMMON TO ALL BRANCHES)

Subject Code: 23BHT208	L	T	P	C
	1	0	2	2

Course Objectives:

- Understand the significance of Design Thinking in engineering disciplines and develop empathy-building skills.
- Explore various ideation techniques to generate innovative design solutions.
- Learn to incorporate user feedback into design iterations for continuous improvement.
- Apply Design Thinking principles to real-world engineering problems.
- Collaborate in teams to solve complex engineering problems using Design Thinking principles.

Course Outcomes:

CO 1. Students will be able to explain the importance of Design Thinking in engineering contexts and use empathy-building techniques

CO 2. Students will be able to generate a diverse range of design ideas using creative ideation techniques.

CO 3. Students will demonstrate the ability to iteratively refine design solutions based on user feedback.

CO 4. Students will be able to apply Design Thinking methodologies to solve engineering challenges effectively.

CO 5. Students will effectively collaborate in teams to develop innovative solutions to engineering challenges during workshop activities.

Unit I: Introduction to Design Thinking

Entrepreneurship Challenges and prospects, Design Thinking- definition and Importance, Core principles of Design Thinking, Techniques for empathy building, User research methods,

Unit II: Ideate and Prototype

Creative ideation techniques (Brainstorming, Mind Mapping, SCAMPER, etc.), Prototyping fundamentals and materials, Rapid Prototyping Methods, Iterative Design Processes

Unit III: Test and Iterate

User testing principles and methodologies, Iterative design cycles, Evaluation criteria for design solutions

Unit IV: Design Thinking in Engineering Applications

Case studies of Design Thinking in engineering projects, Applying Design Thinking to product design, process improvement, and problem-solving, Challenges and opportunities in integrating Design Thinking into engineering practice

Unit V: Workshop: Application of Design Thinking

Hands-on workshop sessions to practice empathy building, ideation, prototyping, and iteration, Presentation of workshop outcomes and reflections on the Design Thinking process

References:

1. Lockwood, T. (2010). Design Thinking: Integrating Innovation, Customer Experience, and Brand Value. Allworth Press.
2. Brown, T. (2009). Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. Harper Business.
3. Norman, D. (2013). The Design of Everyday Things (Revised and Expanded Edition). Basic Books.
4. Knapp, J., Zeratsky, J., &Kowitz, B. (2016). Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days. Simon & Schuster.
5. Cross, B. (2018). Design Thinking for Engineers and Technologists. Wiley.
6. Kumar, V. (2012). 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization. Wiley.
7. Kelley, T., & Kelley, D. (2013). Creative Confidence: Unleashing the Creative Potential Within Us All. Crown Business.
8. Mootee, I. (2013). Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School. Wiley.
9. Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown Business.
10. Polaine, A., Løvlie, L., & Reason, B. (2013). Service Design: From Insight to Implementation. Rosenfeld Media.