COURSE STRUCTURE

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I Year I Semester

S.No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BS	24AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	24ACHE11T	Chemistry	3	0	0	3
3	BS	24AMAT11T	Matrix Theory and Calculus	3	0	0	3
4	ES	24ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	24AMEC11T	Engineering Drawing	1	0	4	3
6	BS	24AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	24ACHE11L	Chemistry Lab	0	0	2	1
8	ES	24ACSE11L	Computational Problem-Solving Lab	0	0	2	1
9	HSM	24ALAN11T	Language Elective	1	0	0	1
						Total credits	**19**

Category	Credits
Basic Science Course	11
Engineering Science Course	07
Humanities and Social Sciences and management course	01
Total Credits	**19**

I Year II Semester

S.No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BS	24APHY21T	Applied Physics	3	0	0	3
2	BS	24AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	24AENG21T	English for Engineers	3	0	0	3
4	ES	24AECE22T	Electronic Devices & Circuits	3	0	3	3
5	ES	24AEEE23T	Network Analysis	3	0	0	3
6	ES	24AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	24APHY21L	Applied Physics Lab	0	0	2	1
8	HSM	24AENG21L	English Language Communication Skills Lab	0	0	2	1
9	ES	24AECE22L	Electronic Devices & Circuits Lab	0	0	2	1
						Total credits	**21**

Category	Credits
Basic Science Course	07
Engineering Science Course	10
Humanities and Social Sciences and management course	04
Total Credits	**21**

II Year I Semester

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PC	24AECE31T	Signals and Systems	3	0	0	3
2	PC	24AECE32T	Switching Theory & Logic Design	3	0	0	3
3	PC	24AECE33T	Analog Circuits	3	0	0	3
4	BS	24AMAT32T	Probability and Random Process	3	0	0	3
5	HSM	24AUHV31T	Universal Human Values-II	3	0	0	3
6	PC	24AECE31L	Signals and Systems Lab	0	0	3	1.5
7	PC	24AECE32L	Switching Theory & Logic Design Lab	0	0	3	1.5
8	PC	24AECE33L	Analog Circuits Lab	0	0	3	1.5
9	SEC	24AECE34L	HDL Programming (Verilog)	1	0	2	2
						Total credits	**21.5**

Category	Credits
Basic Science Course	03
Humanities and Social Sciences and management course	03
Program Core Course	13.5
Skill Enhanced course	02
Total Credits	**21.5**

II Year II Semester

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	ES	24AECE41T	Linear IC applications	3	0	0	3
2	PC	24AECE42T	Analog and Digital Communications	3	0	0	3
3	PC	24AECE43T	Electromagnetic waves and transmission lines	3	0	0	3
4	PC	24AECE44T	Digital System Design Using VHDL	3	0	0	3
5	HSM	24AMBA41T	Managerial Economics & Financial Analysis	3	0	0	3
6	MC	24AENS41T	Environmental Science	2	0	0	0
7	ES	24AECE41L	Linear IC applications Lab	0	0	3	1.5
8	PC	24AECE42L	Analog and Digital Communications Lab	0	0	3	1.5
9	PC	24AECE43L	Digital System Design Using VHDL Lab	0	0	3	1.5
10	SEC	24ACSE46L	Python Programming	1	0	2	2
						Total credits	**21.5**
Internship 2 Months (Mandatory) during summer vacation							

Category	Credits
Engineering Science Course	**4.5**
Program Core Course	**12**
Skill Enhanced course	**02**
Humanities and Social Sciences and management course	**03**
Total Credits	**21.5**

Title of the Course : Basic Electrical and Electronics Engineering
Category : BS
Year : I
Semester : I
Course Code : 24AEEE11T
Branch/es : CE, ME, EEE, ECE, CSE(AI), AI&DS, CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
1. To understand the fundamental laws and circuit elements.
2. To analyze the working of various Machines.
3. To Summarize the different Energy Resources, various Measuring Instruments and importance of Safety Measures.
4. To describe the various Electronic Devices.
5. To Illustrate the concepts of Bipolar Junction transistor and Diode Applications.

Course Outcomes:
At the end of the course, the student will be able to
1. Understand the fundamental laws and circuit elements.
2. Analyze the working of dc and ac machines.
3. Summarize the different energy resources, various measuring instruments and importance of safety measures
4. Analyze basic semiconductor devices
5. Illustrate the concepts of bipolar junction transistor and diode applications.

Unit 1 Fundamental Laws and Electrical Circuits 9

Basic definitions - Voltage, current, power, energy, charge, flux, static and dynamic emf, Faraday's laws of electromagnetic induction, Fleming's right-hand rule, Fleming's left-hand rule, Lenz's law, Corkscrew rule, Right hand thumb rule, Right hand palm rule. Types of elements, Types of sources, ohms law, resistive, inductive, capacitive networks, Series-parallel circuits and Kirchhoff's laws- (Basic Numerical Problems).

Unit 2 DC Machines and Transformers 9

DC Generator: Constructional Details of DC machine, Principle of operation, emf equation, types of generators, applications. (Basic Numerical Problems on EMF equation)
DC Motor: principle of operation, torque equation, types, losses and efficiency, applications, Brake test, Speed control methods. (Basic Numerical Problems).
Transformers: 1-Φ Transformer: Principle of operation, emf equation, losses, efficiency and regulation calculations using OC and SC tests

Unit 3 Energy Resources, Measuring Instruments & Safety Measures 9

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of Hydel, Solar & Wind power generation.
Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments, Multi-meter, CRO, DSO and Function generator
Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

Unit 4 Semiconductor Devices **9**

Energy Band Diagram of Semiconductors (Intrinsic & Extrinsic), PN Diode, V-I Characteristics of PN Junction Diode, Applications of diode- Breakdown Mechanisms in semiconductor diodes, Zener diode characteristics and Zener diode acts as a regulator.

Unit 5 Diode Applications and Introduction to Transistors **9**

Half Wave and Full Wave Rectifiers – General Filter Considerations – Capacitor Filter. Transistor constructions – Types, Transistor operation in CB, CE and CC configurations and their Characteristics.

Prescribed Textbooks:

1. J.B. Gupta, "Fundamental of Electrical Engineering & Electronics" KATSON Books, First Edition 2012.

Reference Books:

1. V.K. Mehta and Rohit Mehta, "Principles of Electrical Engineering & Electronics",S chand and Company Ltd,First Edition,2010.
2. S.K.Bhattacharya, "Basic Electrical & Electronics Engineering" Pearson Education, Second Edition 2017.

Web Resources:

1. https://electricalvani.com
2. https://www.electrical4u.com
3. https://nptel.ac.in/courses/108105053
4. https://nptel.ac.in/courses/108108076

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24AEEE11T.1	2	2	1	1	-	2	-	-	1	-	1
24AEEE11T.2	3	3	2	2	-	2	-	-	2	-	1
24AEEE11T.3	2	2	1	1	-	2	-	-	1	-	1
24AEEE11T.4	3	3	2	2	-	2	-	-	2	-	1
24AEEE11T.5	3	2	1	1	-	2	-	-	2	-	1

Title of the Course : Chemistry
Category : BS
Year : I
Semester : I
Course Code : 24ACHE11T
Branch/es : EEE, ECE, AI&DS, CSE(AI), CSE (ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
The course aims to familiarize students with the fundamentals of engineering chemistry and its practical applications. It provides training on key principles of electrochemistry and polymers, while also introducing students to various instrumental methods. Additionally, the course highlights the importance of green energy and e-waste management, emphasizing their relevance in modern engineering practices.

Course Outcomes:
At the end of the course, the student will be able to
1. Discuss quantum mechanics and molecular orbital theory to interpret bonding, energy levels, and bond order in various molecules.
2. Demonstrate the construction and functionality of various sensors, batteries, and fuel cells through practical examples.
3. Summarize the preparation, characteristics, and applications of various polymers in real-world contexts.
4. Utilize principles of various analytical techniques to evaluate nanomaterials effectively.
5. Analyze sustainable energy solutions and develop strategies for effective e-waste management.

Unit 1 Structure and bonding models **9**

Fundamentals of Quantum mechanics, Schrodinger wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

Unit 2 Electrochemistry and applications **8**

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, types of electrodes - indictor and reference electrodes. Electrochemical sensors – potentiometric and amperometric sensors with examples.
Primary cells – Dry cell, secondary cells – Lithium-ion batteries - working of the batteries including cell reactions; Fuel cells, Hydrogen-Oxygen fuel cell – working of the cell.

Unit 3 Polymer chemistry **8**

Introduction to polymers, functionality of monomers, Thermoplastics and Thermo-setting plastics, properties and applications of PVC and Bakelite.
Fibres - polyesters, mechanical requirements for fibres - crystallinity, stress strain curves. Biodegradable polymers - properties and applications of Poly Glycolic Acid (PGA), Polylactic Acid (PLA).
Elastomers – properties and applications of Buna-S, Buna-N, Thiokol.
Conducting polymers – Polyacetylene – mechanism of conduction and applications.

Unit 4 Nanomaterials and instrumental methods 9

Nanomaterials - Introduction, classification, synthesis of nanomaterial by Sol-gel method, properties and applications of carbon-based nanomaterials - CNT and Graphene.

Electromagnetic spectrum, absorption of radiation: Beer-Lambert's law. UV-Visible spectroscopy, principle, instrumentation and applications, IR spectroscopy – principle, instrumentation and applications, Potentiometry - potentiometric titrations (redox titrations), Conductometric titrations (acid-base titrations).

Unit 5 Alternative energy sources and e-waste management 8

Green Fuels: Introduction, construction and working of photovoltaic cell, applications, generation of green hydrogen energy by electrolysis of water and its advantages.

e-waste management: Introduction, sources of e-waste, composition and health hazards of toxic materials present in electronic and electrical e-waste, need for e-waste management, recycling and recovery; different approaches of recycling, extraction of Gold from e-Waste.

Prescribed Textbooks:

1. Jain, Jain. *Engineering Chemistry*. 16th Ed., Dhanpat Rai, 2013.
2. Atkins, Peter, Julio de Paula, and James Keeler. *Atkins' Physical Chemistry*. 10th Ed., Oxford University Press, 2010.
3. Jing, Dengwei. *Handbook of Hydrogen Energy*. 1st Ed., Wiley-VCH, 2023.
4. Fowler, Bruce A. *Electronic Waste: Toxicology and Public Health Issues*. 1st Ed., Academic Press, 2017.

Reference Books:

1. Skoog, Douglas A., F. James Holler, Stanley R. Crouch. *Principles of Instrumental Analysis*. 7th ed., Cengage Learning, 2016.
2. Lee, J.D. *Concise Inorganic Chemistry*. 5th ed., Wiley-Blackwell, 1999.
3. Billmayer, Fred W. Jr. *Textbook of Polymer Science*. 3rd ed., Wiley, 2007.
4. Sherif, S.A., D. Yogi Goswami, E.K. Stefanakos, A. Steinfeld. *Handbook of Hydrogen Energy*. CRC Press, 2014.

CO-PO Mapping:

Course outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning
24ACHE11T.1	2	2	1	1	-	-	-	-	-	-	1
24ACHE11T.2	3	2	1	2	-	-	-	-	-	-	1
24ACHE11T.3	3	2	1	2	-	-	-	-	-	-	1
24ACHE11T.4	3	2	1	2	-	-	-	-	-	-	1
24ACHE11T.5	3	3	2	2	-	-	-	-	-	-	1

Title of the Course : Matrix Theory and Calculus
Category : BS
Year : I
Semester : I
Course Code : 24AMAT11T
Branch/es : Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
This course aims to familiarize students with matrix theory and its practical applications, equipping them with essential tools for mathematical and engineering problem-solving. It also focuses on imparting knowledge of partial derivatives, mean value theorems, and multiple integrals to effectively address real-world engineering challenges. Additionally, students will develop proficiency in vector differentiation and integration to solve complex engineering problems.

Course Outcomes:
At the end of the course, the student will be able to
1. Understand the methods for solving systems of linear equations
2. Utilize matrix algebra techniques for engineering applications
3. Analyze functions of several variables to optimization techniques
4. Determine the area of solids using multiple integrals
5. Apply vector integral theorems in evaluating double and triple integrals

Unit 1 Matrices **10**
Rank of a matrix by echelon form, normal form, solving system of homogeneous and non-homogeneous linear equations, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem.

Unit 2 Eigen values and Eigen vectors **8**
Eigen values and Eigen vectors and their properties, diagonalization of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical form by orthogonal transformation.

Unit 3 Mean Value Theorems & Multivariable calculus **10**
Taylor's theorem and Maclaurin's theorem for one variable (without proofs) – simple problems.
Partial derivatives, total derivatives, Chain rule, change of variables, Jacobian, Maxima and Minima of functions of two variables, method of Lagrange multipliers for three variables.

Unit 4 Multiple Integrals **8**
Double integrals, change of order of integration, change of variables (Cartesian to polar), areas enclosed by plane curves, evaluation of triple integrals.

Unit 5 Vector Calculus **10**
Vector differentiation: Scalar and Vector point functions, vector operator Del, del applies to scalar point functions-Gradient, directional derivative, del applied to vector point functions-Divergence and Curl.

Vector integration: Line integral - work done, surface integral, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, divergence theorem (without proof) and related problems.

Prescribed Textbooks:

1. E. Kreyszig. *Advanced Engineering Mathematics*. 10th Ed., John Wiley & Sons, 2011.
2. B. S. Grewal. *Higher Engineering Mathematics*, 44th Ed., Khanna Publishers, 2017.

Reference Books:

1. B. V. Ramana. *Higher Engineering Mathematics.* Mc Graw Hill Education
2. G. B. Thomas. *Maurice D. Weir and Joel* Hass. Thomas Calculus, 13th Ed., Pearson Publishers, 2013
3. R.L. Garg Nishu Gupta. *Engineering Mathematics Volumes-I &II.* Pearson Education
4. H. K. Das, Er. Rajnish Verma. *Higher Engineering Mathematics.* S. Chand

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and world	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24AMAT11T.1	2	2	1	1	-	-	-	-	-	-	1
24AMAT11T.2	3	2	1	2	-	-	-	-	-	-	1
24AMAT11T.3	3	3	2	2	-	-	-	-	-	-	1
24AMAT11T.4	2	2	1	1	-	-	-	-	-	-	1
24AMAT11T.5	3	2	1	2	-	-	-	-	-	-	1

Title of the Course : Computational Problem Solving
Category : ES
Year : I
Semester : I
Course Code : 24ACSE11T
Branch/es : Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. Understanding the steps in problem solving and formulation of algorithms to problems.
2. Develop programming skills as a means of implementing an algorithmic solution with appropriate control and data structures.
3. Develop intuition to enable students to come up with creative approaches to problems.
4. Develop programs using pointers, structures and unions.
5. Manipulation of text data using files.

Course Outcomes:

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

1. Demonstrate solutions to problems and represent those using algorithms/flowcharts.
2. Choose proper control statements and use arrays for solving problems.
3. Decompose a problem into modules and use functions to implement the modules.
4. Apply and use allocation of memory for pointers and solve the problems related to manipulation of text data using files and structures.
5. Develop the solutions for problems using c programming language.

Unit 1 Problem Solving and Introduction to C 9

Steps to solve problems, algorithm, Pseudo code, Flowchart with examples, Program Development. Environments. Introduction to programming: Programming languages and generations.
Introduction to C: Introduction, structure of C program, keywords, identifiers, Variables, data types, constants, I/O statements, operators, precedence and associatively

Unit 2 Introduction to decision control statements and Arrays 9

Selective, looping and nested statements, jumping statements.
Arrays: Introduction, declaration of arrays, accessing and storage of array elements, searching (linear and binary search algorithms) and sorting (selection and bubble) algorithms, multidimensional arrays, matrix operations

Unit 3 Strings and Functions 9

Strings: Declaration and Initialization, String Input / Output functions, String manipulation functions.
Functions: Types of functions, recursion, scope of variables and storage classes.
Preprocessor Directives: Types of preprocessor directives, examples

Unit 4 Pointers 9

Pointers: Understanding computer 's memory, introduction to pointers, declaration pointer variables, pointer arithmetic, pointers and strings, array of pointers, function pointers, dynamic memory allocation, advantages and drawbacks of pointers

Unit 5 Structures and Files **9**

Structures: Structure definition, initialization and accessing the members of a structure, nested structures, array of structures, structures and functions, structures and pointers, self-referential structures, unions and enumerated data types.

Files: Introduction to files, file operations, reading and writing data on files, error handling during file operations.

Prescribed Textbooks:

1. C Programming and Data Structures. B.A. Forouzan, R. F.Gilberg, Cengage learning, Indian edition.
2. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill.
3. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.

Reference Books:

1. LET US C, YeswanthKanitkar, Ninth Edition, BPB Publication.
2. Byron Gottfried, Schaum 's‖ Outline of Programming with C‖, McGraw-Hill.
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
4. A K Sharma —Computer Fundamentals and Programming‖, 2nd Edition, University Press, 2018.
5. PradeepDey and Manas Ghosh, —Programming in C‖, Oxford Press, 2ndEdition, 2017.
6. ReemaTharaja —Introduction to C Programming‖, Second Edition, OXFORD Press, 2015.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24ACSE11T.1	3	2	1	2	-	-	-	-	-	-	-
24ACSE11T.2	3	3	2	2	-	-	-	-	-	-	-
24ACSE11T.3	3	3	2	2	-	-	-	-	-	-	3
24ACSE11T.4	3	2	1	2	-	-	-	-	-	-	3
24ACSE11T.5	3	3	3	3	-	-	-	-	-	-	3

Title of the Course : Engineering Drawing
Category : ES
Year : I
Semester : I
Course Code : 24AMEC11T
Branch/es : CE, EEE, ME, ECE, CSE(AI), AI&DS, CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	4	3

Course Objectives:

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

Course Outcomes:

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

1. Apply the appropriate annotations and geometric techniques to draw the conic sections, cycloidal curves and involutes
2. Apply the principles of orthographic projection for engineering problems involving inclined lines to create drawings that represent real-world objects.
3. Apply the principles of orthographic projection for solving engineering problems of planes with respect to both reference planes.
4. Apply the principles of orthographic projection for solving engineering problems of solids.
5. Apply the conversion techniques to solve problems related to orthographic projections and isometric projection views.

Unit 1 **5**

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

Engineering Curves:

Construction of Ellipse, Parabola and Hyperbola by General Method - Normal and tangent
Cycloid & Epicycloid curves (basic problem) - Normal and tangent
Involute of Square, Pentagon - Normal and tangent

Unit 2 **3**

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

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

Unit 3 **5**

Projections of Planes (Square, Circle, Pentagon, Hexagon): A Plane perpendicular to one reference plane and parallel to other, A plane Perpendicular to both reference planes, A plane perpendicular to one reference plane and inclined to the other, A plane inclined to both the reference planes.

Unit 4 **5**

Projections of Solids: Projections of solids (Prism, Pyramid, Cylinder and Cone): Axis perpendicular to Horizontal reference plane and parallel to other, Axis inclined to Horizontal reference plane and parallel to another plane.

Development of Surfaces: Simple Developments of a prism, cylinder, Pyramid and Cone

Unit 5 **5**

Isometric Projections / Conversions: Principles of Isometric Projection – Isometric Scale – Isometric Views of Lines, Planes, Conversion of orthographic views to isometric views (simple problems) and Conversion of isometric views to orthographic views (simple problems)

Prescribed Textbooks:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House
2. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill

Reference Books:

1. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc
2. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering Tool usage	The Engineer and The World	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24AMEC11T.1	3	2	1	2	-	-	1	-	1	-	1
24AMEC11T.2	3	2	1	2	-	-	1	-	1	-	1
24AMEC11T.3	3	2	1	2	-	-	1	-	1	-	1
24AMEC11T.4	3	2	1	2	-	-	1	-	1	-	1
24AMEC11T.5	3	2	1	2	2	-	1	-	1	-	1

Title of the Course : Basic Electrical and Electronics Engineering Lab
Category : BS
Year : I
Semester : I
Course Code : 24AEEE11L
Branch/es : CE, ME, EEE, ECE, CSE(AI), AI&DS, CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To identify the various electrical and electronic components and devices.
2. To impart knowledge and practical exposure on various elements of electrical circuits, operational aspects of various electrical machines and electronic circuits.
3. To analyze the performance of rectifier circuits in practical approach.
4. To observe the characteristics of semiconductor devices.

Course Outcomes:

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

1. Identify the various electrical and electronic components and devices.
2. Analyze various characteristics of electrical circuits, electrical machines and measuring instruments.
3. Analyze the characteristics of various semiconductor devices through practical investigations.
4. Comprehend the usage of electronic devices as half wave and full wave rectifier.

List of Experiments

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes, BJT)
2. Study and operation of
   - Multi-meters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
3. Verification of KCL and KVL
4. Measurement of resistance by using Ammeter and Voltmeter method
5. Measurement of Earth Resistance using Megger
6. Speed control of a DC Shunt Motor
7. Brake Test on DC Shunt Motor
8. OC and SC Test on Single Phase Transformer
9. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias
10. Plot V – I characteristics of Zener Diode
11. Determination of Ripple Factor and Regulation of Half Wave Rectifier with and without capacitive filter
12. Determination of Ripple Factor and Regulation of Full Wave Rectifier with and without capacitive filter
13. Study of Cathode Ray Oscilloscope (CRO)

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24AEEE11L.1	1	1	1	1	-	1	-	2	2	-	1
24AEEE11L.2	3	3	2	2	-	2	-	2	2	-	1
24AEEE11L.3	3	3	2	2	-	2	-	2	2	-	1
24AEEE11L.4	2	2	1	1	-	1	-	2	2	-	1

Title of the Course : Chemistry Lab
Category : BS
Year : I
Semester : I
Course Code : 24ACHE11L
Branch/es : EEE, ECE, AI&DS, CSE(AI), CSE (ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:
The course aims to equip students with practical skills in Conductometry, Potentiometry, and Colorimetry for precise chemical analysis. It also provides hands-on experience in synthesizing polymers and nanomaterials, emphasizing their industrial relevance. Additionally, students are trained in separation techniques and UV-Visible spectroscopy for material identification, while enhancing their ability to perform quantitative chemical analyses, such as metal estimation and battery acid strength determination.

Course Outcomes:
At the end of the course, the student will be able to
1. Determine the strength of an acid present in secondary batteries.
2. Calculate the cell constant and conductance of solutions.
3. Estimate metal ions by using various analytical techniques.
4. Analyse the separation methods used for various organic compounds.
5. Synthesize nanomaterials and polymers.

List of experiments
1. Conductometric titration of strong acid vs. strong base.
2. Determination of cell constant and conductance of solutions.
3. Potentiometry - determination of redox potentials and emfs.
4. Determination of strength of an acid in Pb-acid battery.
5. Preparation of Poly Methyl Methacrylate (PMMA).
6. Preparation of Poly Glycidyl Methacrylate (PGMA).
7. Determination of chromium (VI) in potassium dichromate by Colorimetry.
8. Estimation of Zinc by EDTA titration.
9. Preparation of nanomaterials by precipitation method.
10. Identification of simple organic compounds by IR spectroscopy.
11. Estimation of Ferrous Iron by Dichrometry.
12. Wavelength measurement of sample through UV-Visible Spectroscopy.

Prescribed books:
1. Mendham, J., Denney, R. C., Barnes, J. D., and Sivasankar, B. *Vogel's Quantitative Chemical Analysis.* 6th ed., Pearson Publications, 2009.
2. Anand, Amirtha, and Kumari, Ramesh. *Physical Chemistry Laboratory Manual: An Interdisciplinary Approach.* Dreamtech Press, 2020.

CO-PO Mapping:

Course outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning
24ACHE11L.1	2	2	-	1	1	-	-	1	-	-	3
24ACHE11L.2	2	2	-	1	1	-	-	1	-	-	3
24ACHE11L.3	3	2	-	2	1	-	-	1	-	-	3
24ACHE11L.4	3	3	-	2	1	-	-	1	-	-	3
24ACHE11L.5	3	3	-	2	1	-	-	1	-	-	3

Title of the Course : Computational Problem-Solving Lab
Category : ES
Year : I
Semester : I
Course Code : 24ACSE11L
Branch/es : Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. Setting up programming environment.
2. Develop Programming skills to solve problems.
3. Use of appropriate C programming constructs to implement algorithms.
4. Identification and rectification of coding errors in program
5. Develop applications using a modular programming and Manage data using files

Course Outcomes:

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

1. Identify and setup program development environment
2. Develop the algorithms using c programming language constructs
3. Analyze and rectify the syntax errors and debug program for semantic errors
4. Demonstrate problems in a modular approach using functions
5. Assessing file operations with simple text data

A minimum number of FOUR programs from each exercise is to be done students.

Data Types, Constants, Input and Output and expressions

Exercise 1: Data types, Variables, Constants and Input and Output.
Exercise 2: Operators, Expressions and Type Conversions.

Decision Control Statements and Arrays

Exercise 3: Conditional Statements [two way and multipath].
Exercise 4: Loop Control Statements. [for, while and do-While]
Exercise 5: Unconditioned JUMP Statements- break, continue, goto.
Exercise 6: Declaring Arrays, Referencing Arrays, Array Subscripts. Using for loop for sequential Access.
Exercise 7: Multidimensional Arrays

Strings and Functions

Exercise 8: String Basics, String Library Functions and Array of Strings.
Exercise 9: Simple user defined functions, Parameter passing methods- pass by value, pass by reference.
Exercise 10: Storage classes- Auto, Register, Static and Extern
Exercise 11: Recursive Functions, Preprocessor commands.
Exercise 12: Array Elements as Function Arguments

Pointers

Exercise 13: Pointers, Dynamic memory allocation and error handling

Structures and Files

Exercise 14: Structures
Exercise 15: File handling

Prescribed Textbooks:

1. C Programming and Data Structures. B.A. Forouzan, R. F.Gilberg,Cengage learning, Indian edition
2. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill
3. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education

Reference Books:

1. Let Us C, YeswanthKanitkar, Ninth Edition, BPB Publication
2. A K Sharma —Computer Fundamentals and Programming‖, 2nd Edition, University Press, 2018
3. PradeepDey and Manas Ghosh, —Programming in C‖, Oxford Press, 2ndEdition, 2017
4. ReemaTharaja —Introduction to C Programming‖, Second Edition, OXFORD Press, 2015
5. https://www.cprogramming.com/
6. https://www.mycplus.com/tutorials/c-programming-tutorials

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24ACSE11L.1	3	2	1	2	-	-	-	-	-	-	-
24ACSE11L.2	3	3	3	3	-	-	-	-	-	-	-
24ACSE11L.3	3	3	2	2	-	-	-	-	-	-	3
24ACSE11L.4	3	2	1	2	-	-	-	-	-	-	3
24ACSE11L.5	3	3	2	3	-	-	-	-	-	-	3

Title of the Course : Language Elective
Category : HSM
Year : I
Semester : I
Course Code : 24ALAN11T
Branch/es : Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	0	1

Course Objectives:
The course aims to enhance students' global communication skills through foreign language acquisition while fostering cultural awareness and appreciation of diverse backgrounds. It provides a flexible learning platform with a range of reputable online courses, empowering students to tailor their educational experiences. Additionally, the course allows to focus on career development by equipping students with valuable language skills that enhance their employability.

Course Outcomes:
At the end of the course, the student will be able to
1. Enhance their global communication skills by learning foreign language of their choice.
2. Understand cultural diversity
3. Apply a variety of reputed online courses and enjoy flexible learning
4. Acquire additional language skills to secure suitable job opportunities
5. Analyze the ability in self-paced learning

Guidelines:
1. **Course Selection:** Students can choose from the following languages:
    - German
    - French
    - Spanish
    - Arabic
2. **Approved Platforms:** Courses must be taken from recognized MOOC platforms such as NPTEL, Coursera, Udemy, or edX.
3. List of recommended courses:
    - German: https://www.udemy.com/course/german-course-for-beginners-learn-german
    - French: https://www.udemy.com/course/complete-french-course
    - Spanish: https://www.udemy.com/course/el-metodo-spanish-1
    - Arabic: https://www.udemy.com/course/arabic-a21/
4. Enrolment Verification: Students must submit proof of enrolment in the chosen course to the academic office of I Year at the beginning of the semester.
5. Minimum Course Duration: The selected course should be a minimum of 4 weeks in duration.
6. Progress Reports: Students are encouraged to submit progress reports periodically to their course mentor.
7. Completion Deadline: The course must be completed by the end of the semester.
8. Certificate Submission: Students must submit the certificate of completion issued by the MOOC platform to the Head, First Year Academics.

Policies

1. **Credit Allocation**: Upon successful completion and submission of the certificate, students will be awarded 1 academic credit.
2. **Grading**: The course will be graded on a Pass/Fail basis. A pass grade is awarded upon verification of the completion certificate.
3. **Integrity and Authenticity**: The submitted certificate must be authentic and verifiable. Any attempt to submit falsified documents will result in disciplinary action.
4. **Support**: Students can seek support from language faculty/course mentors if they encounter any difficulties during the course.
5. **Non-Completion**: Failure to complete the course within the stipulated time frame will result in no credit being awarded, and the elective will need to be retaken

A committee shall be formed at the level of the University to evaluate the grades / marks given for a course by external agencies and convert to the equivalent marks / grades. The recommended conversions and appropriate grades / marks are to be approved by the Academic Council of the University.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning
24ALAN11T.1	-	-	-	-	-	-	-	-	2	-	1
24ALAN11T.2	-	-	-	-	-	-	-	-	2	-	1
24ALAN11T.3	-	-	-	-	-	-	-	-	2	-	1
24ALAN11T.4	-	-	-	-	-	-	-	-	2	-	1
24ALAN11T.5	-	-	-	-	-	-	-	-	2	-	1

Title of the Course : Applied Physics
Category : BS
Year : I
Semester : II
Course Code : 24APHY21T
Branch/es : EEE, ECE, AI&DS, CSE(AI), CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
The course aims to provide a strong foundation in the basic concepts of wave optics, lasers, and fiber optics, while also introducing students to crystal structures and X-ray diffraction techniques. It further explains key principles of dielectrics, magnetic materials, semiconductors, and superconductors, highlighting their importance and applications in various engineering fields**.**

Course Outcomes:
At the end of the course, the student will be able to
1. Understand interference, diffraction and polarization in engineering.
2. Explain the types of crystal structures and X-ray diffraction.
3. Analyze various types of polarization of dielectrics and magnetic materials.
4. Apply laser and fiber optics principles in communication field.
5. Describe the properties and behavior of semiconductors and superconductors.

Unit 1 Wave Optics 10

Interference: Introduction – Principle of superposition – Interference of light – Interference in thin films (Reflection Geometry)– Newton's Rings, determination of wavelength – Engineering applications of interference.

Diffraction: Introduction – Fresnel and Fraunhofer diffractions – Fraunhofer diffraction due to single slit, double slit & Diffraction Grating - Grating spectrum – Dispersive power of Grating– Engineering applications of diffraction.

Polarization: Introduction –Types of polarization – Double refraction – Nicol's Prism – Half wave and Quarter wave plates – Engineering applications of polarization.

Unit 2 Crystallography and X-ray diffraction 9

Crystallography: Space lattice, basis, unit cell and lattice parameters – 7 crystal systems- Bravais Lattices – coordination number – packing fraction of SC, Bcc & Fcc – Miller indices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law – X-ray Diffractometer –Laue's method and powder method.

Unit 3 Dielectric and Magnetic Materials 10

Dielectric Materials: Introduction – Dielectric polarization – Dielectric polarizability, susceptibility, dielectric constant and displacement vector – relation between the electric vectors – Types of polarizations– electronic, ionic, orientation (Qualitative) and Space charge (Qualitative) – Frequency dependence of polarization – Lorentz internal field – Clausius-Mossotti equation – Applications of dielectrics.

Magnetic Materials: Introduction – Magnetic dipole moment – Magnetization–Magnetic susceptibility and permeability –Origin of magnetic moments – Classification of magnetic materials: Dia, para, ferro, anti-ferro

& ferri magnetic materials – Hysteresis – soft and hard magnetic materials – Applications of magnetic materials.

Unit 4 LASERs and Fiber Optics 10

LASERs: Introduction – characteristics of lasers – spontaneous and stimulated emission of radiation – Einstein's coefficients – population inversion – pumping mechanism – He-Ne laser – semiconductor laser – Applications of lasers.

Fiber Optics: Introduction - Optical Fiber construction – Working principle (Total Internal Reflection & critical Angle) – Acceptance angle & Numerical Aperture of optical fiber – Classification of fibers based on Refractive index profile & modes (Step index and Graded index optical fibers) – optical fiber losses – Block diagram of fiber optic communication – Medical and Sensor Applications.

Unit 5 Semiconductors and Superconductors 9

Semiconductors: Formation of energy bands – classification of solids on the basis energy band theory- Intrinsic and Extrinsic semiconductors – Drift and diffusion currents – Einstein's equation–Direct and indirect band gap semiconductors- Hall Effect and its applications.

Superconductors: Properties of superconductors– Meissner's effect – Type-1 and Type-2 Superconductors – BCS Theory – Josephson effect (AC & DC) – Applications of superconductors.

Prescribed Textbooks:

1. M. N. Avadhanulu, P. G. Kshirsagar & T. V. S. Arunmurthy. *A Textbook of Engineering Physics.* 11th Ed., S. Chand Publications, 2019
2. K. Thyagarajan. *Applied Physics.* McGraw Hill Education (India) Private Ltd, 2020
3. Neeraj Mehta. *Applied Physics for Engineers.* PHI Learning Private Limited, 2014

Reference Books:

1. K. Palanisamy. *Applied Physics.* Sci. Tech, 2017
2. K. Vijaya Kumar. *A Textbook of Engineering Physics.* S. Chand Publications, 2018
3. Charles Kittel. *Introduction to Solid State Physics.* Wiley Publications, 2011

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and world	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24APHY21T.1	2	2	1	1	-	-	-	-	-	-	1
24APHY21T.2	2	2	1	1	-	-	-	-	-	-	1
24APHY21T.3	3	3	2	2	-	-	-	-	-	-	1
24APHY21T.4	3	2	1	2	-	-	-	-	-	-	1
24APHY21T.5	2	2	1	1	-	-	-	-	-	-	1

Title of the Course : Differential Equations and Transform Techniques
Category : BS
Year : I
Semester : II
Course Code : 24AMAT21T
Branch/es : Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
The course aims to develop proficiency in solving ordinary and partial differential equations, emphasizing their application in engineering and scientific contexts. It will cover Laplace Transforms and their inverses, illustrating their role in solving engineering and real-world problems. Additionally, the course will introduce Fourier Series and Fourier Transforms, focusing on their practical applications for addressing real-life challenges

Course Outcomes:
At the end of the course, the student will be able to
1. Describe the application of higher order differential equations with constant coefficients in modeling dynamic systems.
2. Solve the standard partial differential equations relevant to engineering scenarios.
3. Utilize Laplace transformations to handle various types of functions in engineering context.
4. Analyze ordinary differential equations by employing Laplace transformations for solutions derivation.
5. Apply Fourier series and Fourier transforms in engineering context.

Unit 1 Linear differential equations of higher order with constant Coefficients 10
Basic concepts - general solution-operator D-rules for finding complimentary function-inverse operator-rules for finding particular integral for RHS term of the type $e^{ax}, \sin ax / \cos ax$, polynomials in x, $e^{ax} \sin ax / e^{ax} \cos ax / e^{ax} x^n, x \sin ax / x \cos ax$ -method of variation of parameters

Unit 2 Partial Differential Equations 8
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, non-linear PDEs (Charpit's method), method of separation of variables for second order linear partial differential equations.

Unit 3 Laplace transforms 8
Laplace transforms of standard functions- first shifting theorem - change of scale property - multiplication by t^n - division by t - transforms of derivatives and integrals - Unit step function – second shifting theorem– Laplace transform of periodic functions (without proofs).

Unit 4 Inverse Laplace transforms 8
Inverse Laplace transforms (without proofs) – Convolution theorem (without proof).
Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

Unit 5 Fourier series and Fourier Transforms 10
Fourier series: Dirichlet conditions - functions of any period - odd and even functions - half range series.

Fourier Transforms: Fourier integrals - Fourier cosine and sine integrals - Fourier transform - sine and cosine transform.

Prescribed Textbooks:

1. E. Kreyszig. *Advanced Engineering Mathematics*. 10th Ed., John Wiley & Sons, 2011.
2. B. S. Grewal. *Higher Engineering Mathematics.* 44th Ed., Khanna Publishers, 2017.

Reference Books:

1. B. V. Ramana. *Higher Engineering Mathematics.* Mc Graw Hill Education.
2. G. B. Thomas, Maurice D. Weir and Joel Hass. *Thomas Calculus*. 14th Ed., Pearson Publishers, 2022.
3. D. G. Zill. *Advanced Engineering Mathematics*. 6th Ed., Jones and Bartlett, 2016
4. Glyn James. *Advanced Modern Engineering Mathematics*. 5th Ed., Pearson publishers, 2018.
5. R. K. Jain and S. R. K. Iyengar. *Advanced Engineering Mathematics.* 5th Ed., Alpha Science International Ltd., 2021 (9th reprint).

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and world	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24AMAT21T.1	2	2	1	1	-	-	-	-	-	-	1
24AMAT21T.2	3	2	1	2	-	-	-	-	-	-	1
24AMAT21T.3	3	2	1	2	-	-	-	-	-	-	1
24AMAT21T.4	3	3	2	2	-	-	-	-	-	-	1
24AMAT21T.5	3	2	1	2	-	-	-	-	-	-	1

Title of the Course : English for Engineers
Category : HSM
Year : I
Semester : II
Course Code : 24AENG21T
Branch/es : CE, EEE, ME, ECE, AI&DS, CSE (AI), CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
The course aims to enhance listening, reading, speaking, and writing skills of the students by improving their comprehension abilities and knowledge of grammatical structures and vocabulary. Through targeted instruction, students will develop effective speaking and writing capabilities, fostering a more comprehensive understanding of language use.

Course Outcomes:
At the end of the course, the student will be able to
1. Understand the context, topic, and pieces of specific information from social or transactional details
2. Analyze literary forms, journalistic articles and scientific readings for comprehension and retention
3. Demonstrate effective writing and speaking skills
4. Apply grammatical knowledge in speaking and writing and formulate sentences with grammatical accuracy
5. Produce coherent and unified paragraphs with adequate support and detail

Unit 1
Lesson: A Proposal to Girdle the Earth
Reading: Skimming the text to get main ideas of it; scanning the text to look for specific pieces of information.
Writing: Mechanics of Writing - Capitalization, Spellings, Punctuation
Grammar: Parts of Speech, Content and Structure words, Basic Sentence Structures, Forming Questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words

Unit 2
Lesson: The District School As It Was by One Who Went to It
Reading: Identifying the sequence of ideas; recognizing verbal techniques that help to link ideas in a paragraph together
Writing: Paragraph writing: Structure of a Paragraph, Cohesive devices - linkers
Grammar: Use of Articles and Zero Article; Prepositions
Vocabulary: Homonyms, Homophones, Homographs

Unit 3
Lesson: The Future of Work
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs - Tenses; Subject-verb Agreement
Vocabulary: Compound words, Collocations

Unit 4

Lesson: H. G. Wells and the Uncertainties of Progress

Reading: Studying the use of graphic elements in texts to convey information, revealing trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

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

Vocabulary: Words often confused, Jargon

Unit 5

Lesson: Leaves from the Mental Portfolio of a Eurasian

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

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

Vocabulary: Technical Jargon

Prescribed Textbooks:

1. Prabhavathi Y et al. *English All Round: Communication Skills for Undergraduate Students – 1*. Orient Black Swan, 2022

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. 4th Ed. Cambridge University Press*, 2019.
4. Lewis, Norman. *Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary.* Anchor, 2014.

Web Resources:

GRAMMAR:

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

VOCABULARY

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

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tools	The Eengineer and World	Ethics	Individual and collaborative teamwork	Communication	Project Management and Finance	Life-long Learning
24AENG21T.1	-	-	-	-	-	-	1	-	3	-	1
24AENG21T.2	-	-	-	-	-	-	1	-	3	-	1
24AENG21T.3	-	-	-	-	-	-	1	-	3	-	1
24AENG21T.4	-	-	-	-	-	-	1	-	3	-	1
24AENG21T.5	-	-	-	-	-	-	1	-	3	-	1

Title of the Course : Electronic Devices & Circuits
Category : ES
Year : I
Semester : II
Course Code : 24AECE22T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
1. To understand the concepts of biasing and stabilization in BJT
2. To understand the concepts of FET, MOSFET and their biasing techniques.
3. To analyze the parameters like gain and impedances for single stage amplifier circuits.
4. To understand the small signal analysis of BJT and FET Amplifiers.
5. To understand the working principles of special purpose electronic devices.

Course Outcomes:
At the end of the course, the student will be able to
1. Comprehend the biasing and stabilization conditions of BJT.
2. Comprehend biasing and stabilization conditions of FET.
3. Design the amplifiers circuits under given requirements.
4. Comprehend the small signal model of BJT and FET
5. Discuss the usage of special purpose electronic devices in various applications.

Unit 1 Biasing and Stability **12**

Overview of BJT Configurations, Transistor Amplifying Action – Load Line Analysis of AC & DC – Operating Point. Types of Biasing: Fixed Bias – Emitter Bias – Emitter Feedback Bias - Collector to Base bias – Voltage Divider Bias. Bias Stability: Need for Stabilization – Stabilization Factors (s, s', s'') – Stability Factors for Voltage Divider Bias - Thermal Stability and Thermal Runaway – Heat Sinks.

Unit 2 Field Effect Transistors and its Biasing **12**

Construction of JFETs–Transfer Characteristics–FET Biasing: Fixed Bias Configuration–Self Bias Configuration–Voltage Divider Biasing–Construction and Characteristics of MOSFETs–Depletion type MOSFETs–Enhancement type MOSFETs-Biasing in MOSFETs.

Unit 3 Transistor at Low Frequencies **12**

Graphical Analysis of the CE Configuration, Two port devices and the hybrid model, Transistor hybrid model, the h-parameters, Analysis of a transistor amplifier circuit using h-parameters (Exact Analysis), Illustrative problems

Unit 4 FET Amplifiers **10**

Small signal model of JFET and MOSFET – Common source and common Drain amplifiers using FET

Unit 5 Special Purpose Electronic Devices **10**

LED, Photodiode, Phototransistor, PIN Diode, Tunnel Diode, Varactor diode, SCR, UJT

Prescribed Textbooks:
1. Electronic Devices and Circuits, David A Bell, Fifth Edition, 2008, Oxford University Press.
2. Electronic Devices and Circuits, J. Millman and Halkias, 1991 edition, 2008, TMH.

Reference Books:

1. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, 9th edition,PHI.
2. Principles of Electronics, V. K. Mehta, S. Chand Publications2004
3. Integrated Electronics, Analog and Digital Circuits and Systems, J. Millman and Halkias,TMH.
4. Micro Electronic Circuits, Sedra and Smith, Oxford University Press

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the World	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24AECE22T.1	3	3	1	1	-	-	-	-	-	-	1	3	-
24AECE22T.2	3	3	1	1	-	-	1	-	-	-	1	3	-
24AECE22T.3	2	2	3	3	-	-	1	-	-	-	1	2	-
24AECE22T.4	3	3	2	2	-	-	-	-	-	-	1	2	-
24AECE22T.5	3	3	2	2	-	-	-	-	-	-	1	-	3

Title of the Course : Network Analysis
Category : ES
Year : I
Semester : II
Course Code : 24AEEE23T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
1. To understand the basics of electrical circuits.
2. To understand the fundamentals of AC circuits and resonance.
3. To learn and define the various parameters to characterize two-port networks.
4. To solve electrical circuits using network theorems.
5. To analyze the transient response of RL, RC and RLC series circuits

Course Outcomes:
At the end of the course, the student will be able to
1. Apply fundamental laws to solve electrical circuits.
2. Analyze 1-ϕ ac circuits and resonance.
3. Determine two port network parameters.
4. Apply network theorems to solve complex electrical circuits.
5. Analyze dc transient response of rl, rc and rlc series circuit.

Unit 1 Basic of Electrical Circuits **10**

Basic Electrical Circuits: Network reduction techniques, star & delta transformations, source transformation, nodal & mesh analysis, super node & super mesh concepts – problems (with independent dc sources only).

Unit 2 Fundamentals of AC Circuits & Resonance **10**

Fundamentals of AC Circuits: Advantages of ac supply, types of waveforms, importance of sinusoidal waveforms, cycle, time period, frequency & amplitude, sinusoidal steady state analysis of RL, RC and RLC series circuits, phasors, complex power.
Resonance: Resonant frequency, bandwidth & Q-factor for series and parallel RLC network only.

Unit 3 Two Port Networks **10**

Two Port Networks: Impedance, admittance, hybrid, transmission (ABCD) parameters, conversion of one parameter to another parameter, conditions for reciprocity & symmetry, Inter connection of two port networks in series, parallel and cascaded configurations, problems (with independent dc sources only).

Unit 4 Network Theorems **10**

Network Theorems: Superposition, Thevenin's, Norton's, maximum power transfer, Millman's, reciprocity theorem - problems (with independent dc sources only).

Unit 5 Transient Analysis **10**

Transient Analysis: Transient Response of RL, RC & RLC Series Circuits for dc and sinusoidal excitation using differential equation approach, problems (with independent sources only).

Prescribed Textbooks:

1. A.Sudhakar and Shyammohan S Palli, “Circuits and Networks” McGraw Hill, 2018.
2. A.Chakrabarti, “Circuit Theory-Analysis and Synthesis”, Dhanpat Rai & Co, 2010.

Reference Books:

1. M.E. Van Valkenberg. “Network Analysis”. 3rd edition, Pearson Publications, New Delhi 2006.
2. William H. Hayt& Jack E. Kennedy & Steven M. Durbin. “Engineering Circuit Analysis”. 8th edition, Tata McGraw Hill Company, 2013.
3. J. A. Edminister & M. D. Nahvy. “Theory and Problems of Electric Circuits”. 4th Edition Schaums Outline series, New Delhi Tata McGraw Hill Company, 2004.
4. G. K. Mittal, Ravi Mittal. “Network Analysis”. 14th Edition, Khanna Publishers, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku. “Fundamentals of Electric Circuits”. 5th Edition, Tata McGraw hill Publishing Company Limited, New Delhi, 2012.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24AEEE23T.1	3	2	1	-	-	-	-	-	-	-	-
24AEEE23T.2	2	3	-	2	-	-	-	-	-	-	-
24AEEE23T.3	3	2	-	2	-	-	-	-	-	-	-
24AEEE23T.4	3	2	1	-	-	-	-	-	-	-	-
24AEEE23T.5	2	3	-	2	-	-	-	-	-	-	-

Title of the Course : Engineering & IT Workshop
Category : ES
Year : I
Semester : II
Course Code : 24AMEC22L
Branch/es : CE, ME, EEE, ECE, AI&DS, CSE(AI), CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	4	3

Engineering Workshop Syllabus:

Course Objectives:

This course will enable the student to

1. Make familiar with different types of wooden joints.
2. Make conversant with tools used in sheet metal work.
3. Develop electrical wiring skills.
4. Have practical exposure to metal joining processes.
5. Gain knowledge with tools used in Plumbing and Fitting

Course Outcomes:

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

1. Apply wood working skills to prepare different joints.
2. Develop sheet metal jobs with gi sheet.
3. Apply basic electrical engineering knowledge for house wiring practice.
4. Operate on different metal joining equipment.
5. Apply practical skills in trouble shooting the plumbing systems and various fittings.

Unit 1 Wood Working **6**

Familiarity with different types of woods and tools used in wood working and making following joints.
a) Cross- Lap joint b) Mortise and Tenon joint

Unit 2 Sheet Metal Working **6**

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheet.
a) rectangular tray b) Conical funnel

Unit 3 Electrical Wiring **6**

Familiarity with different types of basic electrical circuits and make the following connections.
a) Series connection and two switches, two bulbs in parallel connection.
b) Staircase connection and tube light connection.

Unit 4 Metal Joining process **9**

Familiarity with different types of tools used in metal joining process and practice on
a) Soldering
b) Brazing (preparation of Butt joint)
c) Arc welding (Preparation of Lap joint)

Unit 5 Demonstration & Practice **3**

Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

a) Tap Connection

(For practice: branches other than civil & mechanical.

For Demonstration: civil & mechanical Branch)

Demonstration and practice of fitting tools.

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

a) Square-Fit

b) Dove-tail Fit

(For practice: civil & mechanical.

For Demonstration: branches other than civil & mechanical.)

Prescribed Textbooks:

1. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 3rd Edn, Scitech publishers.

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.
4. Jeyapoovan T. and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering Tool usage	The Engineer and The World	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24AMEC22L.1	3	3	1	-	-	-	1	2	2	-	2
24AMEC22L.2	3	3	2	-	-	-	1	2	2	-	2
24AMEC22L.3	3	3	1	-	-	-	1	2	2	-	2
24AMEC22L.4	3	3	1	-	-	-	1	2	2	-	2
24AMEC22L.5	3	3	1	-	-	-	1	2	2	-	2

IT Workshop Syllabus

Course Objectives:

This course will enable the student to

1. Demonstrate the disassembling and assembling of a personal computer system.
2. Demonstrate the Installation the operating system and other software required in a personal computer system.
3. Introduce connecting the PC on to the internet from home and work place and effectively usage of the internet, Usage of web browsers, email, news groups and discussion forums.

4. Introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations.
5. To utilize Cloud based productivity enhancement and collaboration tools

Course Outcomes:

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

1. Interpret the peripherals of a computer, perform assembling and disassembling of various components of a computer. L3
2. Illustration of installation and un-installation of Windows and Linux operating systems and also perform troubleshooting of various hardware and software components L3
3. Discuss about Web browsers to access Internet, Search Engines L4
4. Apply and use word processor; spread sheet, presentation and data storage tools L3
5. Analyze and Implement Cloud based productivity enhancement and collaboration tools L4

Task 1 **2**

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

Task 2 **2**

Assembling a computer: Disassemble and assemble the PC back to working condition. Students should record the process of assembling and troubleshooting a computer.

Task 3 **2**

Install Operating System: Student should install Linux on the computer. Students should record the entire installation process.

Task 4 **2**

Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc. should be done by the student. The entire process has to be documented.

Task 5 **2**

Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail accounts and send emails. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search process using different natural languages, and creating e-mail account

Task 6 **2**

Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Task 7 **4**

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

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

Task 8 **4**

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

Task 9 **4**

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

Task 10 **2**

Store, sync, and share files with ease in the cloud-Google Drive
Document creation and editing text documents in your web browser- Google docs

Prescribed Textbooks:

1. Introduction to Information Technology, ITL Education Solutions limited,Pearson Education.
2. Upgrading and Repairing PC's, 22nd Edition, Scott Muller QUE, PearsonEducation
3. Comdex Information Technology Course Kit, Vikas Gupta, WILEYDreamtech
4. MOS 2010 Study Guide for Microsoft Word, Excel, PowerPoint, and Outlook Exams, 1st Edition, Joan Lambert, Joyce Cox, Microsoft Press

Reference Books:

1. IT Essentials PC Hardware and Software Companion Guide, CICSO Networking Academy
2. Network Your Computer & Devices Step by Step 1st Edition, CiprianRusen, Microsoft Press
3. Troubleshooting, Maintaining & Repairing PCs, 5th Edition, Bigelow, TMH
4. Introduction to computers, Peter Norton, 6/e, Mc Graw Hill
5. Cloud computing, productivity and collaboration tools, software and products offered by Google: https://en.wikipedia.org/wiki/G_Suite

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24AMEC22L.1	3	2	1	2	-	-	-	-	-	-	-
24AMEC22L.2	3	2	1	2	-	-	-	-	-	-	-
24AMEC22L.3	3	3	2	2	-	-	-	-	-	-	-
24AMEC22L.4	3	2	1	2	-	-	-	-	-	-	-
24AMEC22L.5	3	3	2	2	-	-	-	-	-	-	-

Title of the Course : Applied Physics Lab
Category : BS
Year : I
Semester : II
Course Code : 24APHY21L
Branch/es : EEE, ECE, AI&DS, CSE(AI), CSE(ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

This course aims to provide a comprehensive understanding of interference and diffraction, including their practical applications and the significance of optical fiber parameters in communication. It emphasizes the role of energy gaps in semiconductor conductivity and the Hall effect, explores the applications of magnetic and dielectric materials, and applies semiconductor principles to various electronic devices.

Course Outcomes:

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

1. Operate various optical instruments to measure optical parameters.
2. Determine the magnetic and dielectric parameters by various methods.
3. Evaluate various parameters of semiconductors by different methods.
4. Estimate general parameters of materials.

List of Experiments

1. Determination of the thickness of the wire using wedge method.
2. Determination of the radius of curvature of the lens by Newton's ring method.
3. Determination of wavelength of light radiation using plane diffraction grating by spectrometer.
4. Determination of Dispersive power of a diffraction grating.
5. Determination of Particle size using laser.
6. Determination of dielectric constant by bridge resonance method.
7. Determination of Magnetic field along the axis of a circular coil carrying current by stewart-Gee's method.
8. Determination of Wavelength of laser by using Diffraction grating.
9. Determination of Hysteresis loss of ferro magnetic material by tracing B-H curve.
10. Determination of the numerical aperture and acceptance angle of an optical fiber.
11. Deterrmination of the rigidity modulus of metal wire by using torsional pendulum.
12. Determination of Hall coefficient and carrier concentration of a given semiconductor using Hall effect.
13. Determination of the resistivity of semiconductor by Four probe method.
14. Determination of the energy gap of a semiconductor by using P-N Junction diode.
15. Determination of resistance with varying temperature using thermister

Reference Books:

1. S. Balasubramanian, M.N. Srinivasan. *A Textbook of Practical Physics.* S Chand Publishers, 2017
2. C.V. Madhusudan Rao, V. Vasanth kumar. *Engineering Physics laboratory.* SciTech publications, 2010

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and world	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24APHY21L.1	3	2	1	2	3	-	-	-	-	-	3
24APHY21L.2	3	2	1	2	3	-	-	-	-	-	3
24APHY21L.3	3	3	2	2	3	-	-	-	-	-	3
24APHY21L.4	3	3	2	2	3	-	-	-	-	-	3

Title of the Course : English Language Communication Skills Lab
Category : HSM
Year : I
Semester : II
Course Code : 24AENG21L
Branch/es : CE, EEE, ME, ECE, AI&DS, CSE (ICB)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:
The main objective of introducing this course is to expose the students to a variety of self-instructional, learner-friendly modes of language learning. The students will get trained in basic communication skills.

Course Outcomes:
At the end of the course, the student will be able to
1. Relate and differentiate English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
2. Develop communication skills through various language learning activities
3. Demonstrate professional skills in participating role-plays and descriptions
4. Build effective resonate and equip themselves with employability skills
5. Enhance public speaking skills and deliver oral presentations with clarity and confidence

List of Topics
1. Phonetics: Vowels / Consonants; Accent Rules
2. Just a Minute
3. Role Play / Situational Dialogues
4. Oral Presentation
5. Information Transfer
6. Describing people/Objects/Situations

Suggested Software:
1. Sky Pronunciation Suite
2. Clarity Pronunciation Power – Part I
3. Learning to Speak English - 4 CDs
4. Lose Your Accent in 28 days, CD Rom, Judy Ravin

Reference Books:

1. Meenakshi Raman, Sangeeta-Sharma. *Technical Communication*. Oxford Press, 2018.
2. Grant Taylor. *English Conversation Practice*. Tata McGraw-Hill Education India, 2016.
3. Hewing's, Martin. *Cambridge Academic English* (B2). CUP, 2012.
4. T. Balasubramanyam. *A Textbook of English Phonetics for Indian Students*. 3rd Ed., Trinity Press.

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

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

CO-PO Mapping:

COs	Engineering Knowledge	Problem Analysis	Design/Development t of solutions	Conduct investigations of complex problems	Engineering tools usage	The Eengineer and World	Ethics	Individual and collaborative teamwork	Communication	Project M a n a g e m e n t and Finance	Life-long Learning
24AENG21L.1	-	-	-	-	-	-	1	1	3	-	1
24AENG21L.2	-	-	-	-	-	-	1	1	3	-	1
24AENG21L.3	-	-	-	-	-	-	1	1	3	-	1
24AENG21L.4	-	-	-	-	-	-	1	1	3	-	1
24AENG21L.5	-	-	-	-	-	-	1	1	3	-	1

Title of the Course : Electronic Devices & Circuits Lab
Category : ES
Year : I
Semester : II
Course Code : 24AECE22L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To determine characteristics of JFET, MOSFET, SCR and UJT.
2. To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

Course Outcomes:

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

1. Comprehend the specifications of active electronic devices.
2. Comprehend the bjt input and output characteristics
3. Gain the knowledge and practical usage of jfet, mosfet.
4. Analyse various biasing circuits and electronic circuits as amplifiers.
5. Plot the characteristics of electronic devices.

LIST OF EXPERIMENTS: (Execute any 10 experiments)

1. Identification, Specifications and Testing of Active Devices, Low power JFETs, MOSFETs, Photodiode, Phototransistor, SCR and UJT.
2. Input and Output Characteristics of Transistor CE Characteristics.
3. Input and Output Characteristics of Transistor CB Characteristics.
4. Input and Output Characteristics of Transistor CC Characteristics.
5. JFET Characteristics.
6. MOSFET Characteristics
7. Frequency response of CE Amplifier.
8. Frequency response of CC Amplifier.
9. Frequency response of Common Source FET Amplifier.
10. SCR Characteristics.
11. UJT Characteristics.
12. Photodiode and Phototransistor Characteristics
13. Soldering Practice.
14. RC Coupled Amplifier
15. RC Differentiator and Integrator Circuits

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the World	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24AECE22L.1	3	2	1	2	-	-	1	3	-	-	-	3	-
24AECE22L.2	3	2	1	2	-	-	1	3	-	-	-	3	-
24AECE22L.3	3	2	1	2	-	-	1	3	-	-	2	2	-
24AECE22L.4	3	3	2	3	-	-	1	3	-	-	3	2	-
24AECE22L.5	2	1	1	1	-	-	1	2	-	-	-	-	3

Title of the Course : Signals and Systems
Category : PC
Year : II
Semester : I
Course Code : 24AECE31T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
2. To acquire practical knowledge on various transform techniques in the analysis of signals and systems.
3. To acquire knowledge of LTI Systems and Sampling Concepts.
4. To study the various convolution in communication systems.

Course Outcomes:

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

1. Understand signal representation methods and operations on signals.
2. Have the knowledge to obtain Fourier series and Fourier Transforms
3. Learn LTI Systems and Sampling Concepts.
4. Understand the convolution and correlation of signals.
5. Analyze different transforms (Laplace & Z) and their responses with different types of signals.

Unit 1 Introduction to Signals and Systems 12

Continuous time Signal and Discrete time Signals, Elementary Continuous and Discrete time signals, Basic Operations on Signals, Classification of Signals, Concept of Systems, Representation of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Fourier spectrum, Gibbs Phenomenon, properties of Fourier series.

Unit 2 Fourier Transforms 12

Deriving Fourier transform from Fourier series, Fourier transform of standard signals, properties of Fourier transforms Fourier transform of periodic signals, Introduction to Hilbert Transform.

Unit 3 LTI Systems and Sampling 12

LTI systems, Properties & Transfer function, Filter Characteristics, Distortionless Transmission through a system, signal and system bandwidth ,Ideal filter characteristics ,Causality and Paley-Wiener Criterion, Relationship between Bandwidth and Rise Time.

Sampling theorem–Graphical and analytical proof for Band Limited Signals, effect of under sampling–Aliasing Sampling Techniques, data Reconstruction, Sampling of Bandpass signals.

Unit 4 Convolution and Correlation 12

Convolution: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms.

Correlation: Cross correlation and autocorrelation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between autocorrelation function and energy/power spectral density function. Relation between convolution and correlation.

Unit 5 Laplace Transforms and Z–Transforms 12

Laplace Transforms-Introduction, Region of Convergence, L.T's of some commonly used signals, Properties, Inverse Laplace Transforms.

Z-Transforms-Relation between DTFT and Z-Transform, Region of Convergence, Z- transforms of common sequences, Properties, Inverse Z-Transform.

Prescribed Textbooks:

1. B.P.Lathi -Signals, Systems & Communications–BS Publications, 2003
2. A.V.Oppenheim, A.S.Willsky and S.H.Nawab-Signals and Systems–PHI, 2nd Edition

Reference Books:

1. Simon Haykin and VanVeen, Wiley-Signals & Systems–2nd Edition.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE31T.1	3	1	1	1	-	-	1	-	-	-	1	3	-
24AECE31T.2	1	3	-	2	-	1	-	-	-	-	1	-	-
24AECE31T.3	1	-	2	3	1	-	-	-	1	-	3	-	-
24AECE31T.4	3	1	-	-	2	-	1	1	-	-	3	-	-
24AECE31T.5	1	1	-	2	-	3	1	-	1	-	3	1	-

Title of the Course : Switching Theory & Logic Design
Category : PC
Year : II
Semester : I
Couse Code : 24AECE32T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To get knowledge on Number Systems and codes.
2. To gain the knowledge on Boolean algebra.
3. To acquire knowledge of various circuits in Digital design

Course Outcomes:

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

1. Understand different number systems conversions & Binary codes
2. Simplify Boolean functions& realize them using digital logic gates.
3. Design various combinational circuits and Programmable Logic Devices
4. Design various sequential circuits.
5. Understand the Minimization techniques of Finite State Machine and the elements of ASM chart.

Unit 1 Number systems, Codes & Boolean Algebra 12

Philosophy of number systems – r, (r-1)"s complement, representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.
Boolean algebra: Fundamental postulates of Boolean algebra, Basic theorems and properties, digital logic gates, properties of XOR gate, universal gates.

Unit 2 Switching Functions and their Minimization 12

Switching Functions-Canonical and Standard forms, algebraic simplification using Boolean theorems, two level & Multilevel Realization of Boolean Functions using Universal Gates.
Minimization: K-Map methods, Prime Implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicants chart, simplification rules.

Unit 3 Combinational Logic Design & Programmable Logic Devices 12

Design using conventional logic gates-Binary Adders, Subtractors, Ripple Adder, Magnitude comparator, Encoder, Decoder, Multiplexer, De-Multiplexer, Code converters

Unit 4 Sequential Circuits 12

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic flip-flops, Triggering and excitation tables, flip flop conversions, Steps in synchronous sequential circuit design, Design of modulo-N Synchronous counters – up/down counter

Unit 5 FSM Minimization **12**

Finite state machine- capabilities and limitations, Mealy and Moore models and their conversions, Serial binary adder. Minimization of completely specified sequential machines-Partition techniques. . Salient features of the ASM chart, Simple examples.

Prescribed Textbooks:

1. Morris Mano, Digital Design. Prentice Hall India, 3rdEd
2. ZVI Kohavi and Niraj K. Jha Switching & Finite Automata theory. Tata McGraw Hill, 3 rdEd

Reference Books:

1. Charles H. Roth, Fundamentals of Logic Design. Thomson Publications, 2004, 5thEd
2. Fletcher, an Engineering Approach to Digital Design. Prentice Hall India. Anand Kumar, Switching Theory and Logic Design. Prentice Hall India, 2008

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE32T.1	2	-	2	-	2	-	1	-	-	2	-	3	-
24AECE32T.2	2	2	2	-	-	1	1	-	-	2	-	2	-
24AECE32T.3	2	2	2	-	-	1	1	-	-	2	-	-	-
24AECE32T.4	2	2	2	-	-	1	1	-	-	2	-	-	-
24AECE32T.5	2	2	2	-	-	1	1	-	-	2	-	-	-

Title of the Course : Analog Circuits
Category : PC
Year : II
Semester : I
Couse Code : 24AECE33T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To analyze small signal models and frequency responses, and to design different amplifier types.
2. To analyze feedback amplifiers, oscillators, large signal amplifiers, and wave shaping circuits, and design practical electronic systems.

Course Outcomes:

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

1. Analyze the single stage amplifiers using h-parameter model at low frequencies.
2. Understand and analyze the feedback amplifiers.
3. Understand the working principle and operation of oscillators
4. Analyze the concepts of large signal amplifiers
5. Design and analyze linear and non-linear wave shaping circuits

Unit 1 Small Signal Analysis of Amplifiers 12

Introduction to h-parameter model, Small Signal model of BJT, Analysis of CB, CE and CC configurations using h-parameters– simplified hybrid model – miller's theorem – dual of miller's theorem. Analysis of Cascaded Transistor Amplifiers- RC Coupled amplifier, Frequency response of RC Coupled, Direct-coupled and Transformer coupled amplifiers.

Unit 2 Feedback Amplifiers 12

Concept of Feedback, Classification of feedback amplifiers, Transfer Gain with feedback, General characteristics of negative feedback amplifiers. Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components (Topologies)

Unit 3 Oscillators 11

Condition for oscillations, Oscillator Types, Frequency and amplitude stability of oscillators, LC oscillators- Hartley and Colpitts oscillators, RC-phase shift and Wien bridge oscillators, Crystal Oscillators.

Unit 4 Large Signal Amplifiers 10

Classifications, Class A power Amplifiers- Direct coupled and Transformer Coupled, Class B power Amplifiers- Push-pull and Complementary Symmetry-Transistor power dissipation, Power and Efficiency calculations

Unit 5 Linear Wave Shaping & Non-Linear Wave Shaping 12

Linear Wave Shaping: High pass & low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and Exponential inputs.

Non-Linear Wave Shaping: Diode and Transistor clippers and clampers, clamping circuit theorem.

Prescribed Textbooks:

1. J. Millman and Christos C. Halkias- “Integrated Electronics”, Mc Graw-Hill, 1972.
2. Robert T. Paynter- “Introductory Electronic Devices and Circuits”, Pearson Education, 7th Edition

Reference Books:

1. Robert L. Boylestad and Louis Nashelsky - “Electronic Devices and Circuits Theory”, Pearson/Prentice Hall, 9th Edition, 2006
2. Donald A. Neumann- “Electronic Circuit Analysis and Design”, Mc Graw Hill

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE33T.1	3	3	3	3	3	1	-	2	-	-	-	2	-
24AECE33T.2	3	2	3	2	2	-	-	2	-	-	-	3	-
24AECE33T.3	3	2	3	2	2	1	-	2	-	-	-	2	-
24AECE33T.4	3	3	3	2	2	1	-	2	-	-	-	2	-
24AECE33T.5	3	2	3	-	-	-	-	2	-	-	-	2	-

Title of the Course : Probability and Random Process
Category : BS
Year : II
Semester : I
Couse Code : 24AMAT32T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
The objective of this course is to provide students with a solid foundation in the principles of probability theory and random processes, enabling them to model, analyze, and interpret random phenomena. The course aims to equip students with the analytical tools necessary to apply probabilistic and statistical methods to real-world engineering problems, particularly in the areas of communication systems, signal processing, control systems, and noise analysis

Course Outcomes:
At the end of the course, the student will be able to
1. Understand the concepts of probability.
2. Understand the foundational and advanced concepts of random variables and their distributions.
3. Apply the concepts of multiple random variables, including joint and conditional distributions, statistical independence in signal processing, communication systems
4. Analyze temporal characteristics of random processes such as autocorrelation and cross correlation.
5. Apply power spectral density to describe random processes.

Unit 1 Probability 10
Probability - axioms of probability – addition theorem of probability - conditional probability-multiplication theorem of probability (without proof) - Baye's theorem.

Unit 2 Random Variable 8
The Random Variable Concept, Discrete and continuous Distribution functions, Mean and Variance, Operations on One Random Variable, Expected Value of a Random Variable, Expected Value of a Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, J Chebyshev's Inequality, Markov's Inequality, Characteristic Function, Moment Generating Function, Chernoff's Inequality and Bound, Transformations of a Random Variables, Monotonic Transformation of a Continuous Random Variable.

Unit 3 Multiple Random Variables 12
Vector Random Variables, Joint Distribution and Its Properties, Joint Density and Its Properties, Conditional Distribution and Density, Statistical Independence, Distribution and Density of a Sum of Random Variables, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Characteristic Functions, Jointly Gaussian Random Variables.

Unit 4 Random Processes - Temporal Characteristics: 8

The Random Process Concept, Classification of Processes, Deterministic and Non deterministic Processes, Stationarity and Independence, Distribution and Density Functions, Statistical Independence, First-Order Stationary Processes, II-Second-Order and Wide Sense Stationarity, N^{th}-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Correlation Functions, Autocorrelation Function and Its Properties, cross-Correlation Function and Its Properties, measurement of correlation functions, Gaussian random processes, Poisson random process.

Unit 5 Random Processes - Spectral Characteristics: 10

Power Density Spectrum and Its Properties, Bandwidth of the Power Density Spectrum, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum and Its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Prescribed Textbooks:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH, 2002.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017, 44^{th} Edition

Reference Books:

1. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI, 2002
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India
3. Henry Stark and John W. Woods, "Probability and Random Processes with Application to Signal Processing," 3rd Edition, Pearson Education, 2002.
4. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill publishers.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning
24BMAT32T.1	2	2	1	1	-	-	-	-	-	-	1
24BMAT32T.2	3	2	1	2	-	-	-	-	-	-	1
24BMAT32T.3	3	3	2	2	-	-	-	-	-	-	1
24BMAT32T.4	3	2	1	2	-	-	-	-	-	-	1
24BMAT32T.5	3	2	1	2	-	-	-	-	-	-	1

Title of the Course : Universal Human Values-II
Category : HSM
Year : II
Semester : I
Couse Code : 24AUHV31T
Branch/es : CE, EEE, ECE, AI&DS, CSE(AI), CSE(DS), AI&ML, CSE(AIML)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
The course aims to help students recognize the vital interplay between values and skills, promoting sustained happiness and prosperity. It seeks to foster a holistic perspective on life and profession, encouraging value-based living through a clear understanding of human reality and existence. Additionally, the course emphasizes the ethical implications of such an understanding, fostering trustful behaviour, fulfilling human interactions, and a harmonious relationship with nature.

Course Outcomes:
At the end of the course, the student will be able to
1. Comprehend the terms like Natural Acceptance, Happiness and Prosperity
2. Analyze one's self, and one's surroundings (family, society, nature)
3. Apply human values in enriching human relationships and human society.
4. Analyze the need for universal human values and harmonious existence.
5. Evaluate themselves as socially and ecologically responsible engineers.

Unit 1 Introduction to Value Education 12

Lecture1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture2: Understanding Value Education
Tutorial 1: Practice Session1: Sharing about oneself
Lecture 3: Self-Exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – The Basic Human Aspirations
Tutorial 2: Practice Session2: Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial 3: Practice Session3: Exploring Natural Acceptance

Unit 2 Harmony in the Human Being 8

Lecture 7: Understanding Human being as the co-existence of the self and the body.
Lecture 8: Distinguishing between the needs of the self and the body
Tutorial 4: Practice Session4: Exploring the difference of needs of self and body.
Lecture 9: The body as an instrument of the self
Lecture 10: Understanding harmony in the self
Tutorial 5: Practice Session5: Exploring sources of imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and health
Tutorial 6: Practice Session 6: Exploring harmony of self with the body

Unit 3 Harmony in the Family and Society 8

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session7: Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session 8: Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session9: Exploring systems to fulfil human goal

Unit 4 Harmony in the Nature/Existence 10

Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, Self-Regulation and Mutual Fulfilment among the Four Orders of Nature
Tutorial 10: Practice Session 10: Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session11: Exploring Co-existence in Existence

Unit 5 Implications of the Holistic Understanding – A Look at Professional Ethics 10

Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session 12: Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session13: Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management
Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session14: Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance
Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the Difference of Needs of Self and Body
PS5 Exploring Sources of Imagination in the Self
PS6 Exploring Harmony of Self with the Body
Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal
Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence
Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

Prescribed Textbooks:

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

Reference Books:

1. A. Nagaraj. *Jeevan Vidya: Ek Parichaya.* Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathi. *Human Values.* New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi. *The Story of My Experiments with Truth*
5. E. F Schumacher. *Small is Beautiful*

Web Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3S2%20Respect%20July%2023.pdf
4. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
5. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%202325%20Ethics%20v1.pdf
6. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-humanvalues/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385https://onlinecourses.swayam2.ac.in/aic22_ge23/preview
7. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf

CO-PO Mapping:

Course outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning
24AUHV31T.1	-	-	-	-	-	-	3	-	1	-	2
24AUHV31T.2	-	-	-	-	-	-	3	-	1	-	2
24AUHV31T.3	-	-	-	-	-	-	3	-	1	-	2
24AUHV31T.4	-	-	-	-	-	-	3	-	1	-	3
24AUHV31T.5	-	-	-	-	-	2	3	-	1	-	2

Title of the Course : Signals and Systems Lab
Category : PC
Year : II
Semester : I
Couse Code : 24AECE31L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To analyze the characteristics of various signals and systems using simulation software
2. To enable the students to know about different transforms with respective waveform generations.
3. To acquire knowledge of systems and sampling through simulations.
4. To study the convolution and correlation concepts with the help of experimentation

Course Outcomes:

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

1. Understand fundamentals of Signals and systems and operations through simulation.
2. Understand the transforms on various signals practically.
3. Acquire knowledge on the Systems and sampling concepts.
4. Apply the knowledge of Convolution and Correlation theories with the help of Laboratory simulations.

LIST OF EXPERIMENTS: (Execute any 10 experiments)

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulse, unit step, square, sawtooth, triangular, sinusoidal, ramp, sinc.
3. Observations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal/sequence and real and imaginary parts of signal.
5. Gibbs phenomenon.
6. Finding the Fourier transform Phase spectrum.
7. Sampling theorem verification.
8. Verification of linearity and time invariance properties of a discrete system.
9. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
10. Convolution between signals and sequences.
11. Autocorrelation and cross correlation between signals and sequences.
12. Verification of Wiener-khinchine relations
13. Waveform synthesis using Laplace Transform
14. Locating the zeros and poles and plotting the pole Z-plane for the given transfer function

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE31L.1	3	1	-	2	-	-	-	-	-	-	3	3	-
24AECE31L.2	2	-	3	-	1	-	-	-	-	-	2	3	-
24AECE31L.3	1	2	-	3	-	3	-	-	-	-	2	2	-
24AECE31L.4	2	3	1	-	1	-	-	2	-	2	1	1	-

Title of the Course : Switching Theory & Logic Design Lab
Category : PC
Year : II
Semester : I
Couse Code : 24AECE32L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To design different types of Combinational Logic Circuits.
2. To learn about Flip-Flops and their Conversions.
3. To design Mod-N Synchronous and Shift Register Counters

Course Outcomes:

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

1. Design different types of Combinational Logic Circuits
2. Learn about Various Flip- Flops and their Conversions
3. Design various Mod-N Synchronous and Shift Register Counters.

LIST OF EXPERIMENTS: (Execute any 10 experiments)

1. Logic Gates
2. Realization of AND, OR,NOT,EX-OR,EXNOR functions using universal Gates
3. Applications of logic gates –ADDER,SUBTRACTORS
4. 2-bit Magnitude comparator
5. Decoders
6. Multiplexes
7. Boolean function realization using Decoder and Mux
8. Code converters (Binary to Gray & Gray to Binary)
9. Flip-Flops
10. Flip –Flop Conversions
11. Design of MOD-N synchronous counter
12. Shift register counters (Ring & Twisted Ring Counters)

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of	Conduct Investigations	Engineering	The Engineer and the	Ethics	Individual and	Communicati	Project Management	Life-long	PSO1	PSO2
24AECE32L.1	2	2	2	-	-	1	1	-	-	2	-	-	-
24AECE32L.2	2	2	2	-	-	1	1	-	-	2	-	-	-
24AECE32L.3	2	2	2	-	-	1	1	-	-	2	-	-	-

Title of the Course : Analog Circuits Lab
Category : PC
Year : II
Semester : I
Couse Code : 24AECE33L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To study the characteristics and applications of semiconductor devices in amplifier and oscillator circuits.
2. To design and analyze amplifier, oscillator, and wave shaping circuits through hands-on experiments.

Course Outcomes:

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

1. Understand the characteristics of FET and UJT
2. Analyze and design single and multistage amplifiers and feedback amplifiers.
3. Design different oscillators with different frequencies.
4. Determine the efficiencies of power amplifiers
5. Design wave shaping circuits

LIST OF EXPERIMENTS: (Execute any 10 experiments)

1. UJT Characteristics
2. FET characteristics- Drain and Transfer
3. Common Emitter Amplifier
4. Common Source Amplifier
5. Two stage RC-Coupled amplifier
6. Feedback amplifiers - Current / Voltage Series
7. RC Phase shift oscillator
8. Hartley / Colpitt's oscillator
9. Class A / Class B power amplifier
10. Linear wave shaping- RC High Pass and Low Pass circuits
11. Non-linear wave shaping –Clippers
12. Non-linear wave shaping- Clampers

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE33L.1	2	3	2	2	2	-	-	-	-	-	-	2	-
24AECE33L.2	2	3	2	2	3	-	-	2	-	-	-	2	-
24AECE33L.3	2	3	2	-	3	-	-	2	-	-	-	2	-
24AECE33L.4	2	3	1	-	3	-	-	-	-	-	-	2	-
24AECE33L.5	2	3	3	2	3	-	-	2	-	-	-	2	-

Title of the Course : HDL Programming (Verilog)
Category : SC
Year : II
Semester : I
Couse Code : 24AECE34L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To understand the basics of Verilog
2. To make the students renown to basics, syntax and semantics of new programming language

Course Outcomes:

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

1. Understand, design, simulate and synthesize computer hardware using Verilog HDL
2. Be able to rapidly design combinational and sequential logic
3. Be able to use different Verilog programming constructs in digital system design
4. Gain knowledge in implementing state machines

LIST OF EXPERIMENTS: (Execute any 10 experiments)

1. HDL based Design Flow
2. Language constructs of Verilog HDL
3. Gate Level Modeling
4. Switch Level Modeling
5. Data Flow Modeling
6. Behavioral Modeling
7. User Defined Primitives
8. Functions & Tasks
9. Realization of FSM.
10. SM Charts
11. Design of Multiplier
12. Realization of Dice Game

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of	Engineering Tool	The Engineer and the World	Ethics	Individual and Collaborative Team	Communication	Project Management and	Life-long Learning	PSO1	PSO2
24AECE34L.1	3	3	3	3	3	-	-	3	3	3	1	2	2
24AECE34L.2	3	3	3	3	3	-	-	3	3	3	1	2	2
24AECE34L.3	3	3	3	3	3	-	-	3	3	3	1	2	2
24AECE34L.4	3	3	3	3	2	-	-	3	3	2	1	2	2

Title of the Course : Linear IC Applications
Category : ES
Year : II
Semester : II
Couse Code : 24AECE41T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. This course will provide the student with the ability
2. To understand the Concepts of differential amplifier and OP-Amp
3. To analyze Timers, PLL and converters

Course Outcomes:

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

1. Understand the analysis of differential amplifier and characteristics of OP-Amp.
2. Design Op-Amp circuits for linear applications
3. Design Op-Amp circuits for non-linear applications
4. Understand the applications of 555 timer and PLL.
5. Gain knowledge on data converters.

Unit 1 Introduction to ICs **9**

IC Classifications, IC chip size and Circuit complexity, Operational amplifiers: Basic Information of Op-amp, Ideal op-amp, Internal Circuit, DC & AC Characteristics.

Unit 2 Linear applications of OP-AMP **9**

Inverting and non-inverting summing amplifier, subtractor, adder-subtractor, integrator, differentiator, instrumentation amplifier, V-I & I-V converters..

Unit 3 Non-Linear Applications of OPAMP **9**

Comparators and its applications, Multi vibrators- astable and monostable, Schmitt trigger, Triangular and saw tooth wave generators, Log and antilog amplifiers, precision rectifiers, RC active filters.

Unit 4 Timers and Phase Locked Loops **9**

Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL- Introduction, Block schematic, principles and description of individual blocks, 565 PLL, applications of PLL-Frequency multiplication, frequency translation, AM, FM and FSK demodulators.

Unit 5 D-A and A-D Converters **9**

Introduction, Basic DAC techniques, weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC, monolithic DAC, ADCs- parallel comparator type ADC, counter type ADC, servo tracking ADC, successive approximation ADC, Dual slope ADC, DAC and ADC specifications.

Prescribed Text Books:

1. Ramakanth A. Gayakwad - Op-Amps & Linear ICs, 3rd edition, PHI, 2001.
2. D. Roy Chowdhury - Linear Integrated Circuits, New Age International (p) Ltd, 4th Edition, 2010.

Reference Books:

1. David A. Bell - Operational Amplifiers & Linear ICs, 2nd edition, Oxford University Press, 2010.
2. Sergio Franco - Design with Operational Amplifiers & Analog Integrated Circuits, McGraw Hill, 1988.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE41T.1	3	3	3	3	2	-	-	1	-	-	-	3	2
24AECE41T.2	3	2	2	3	2	-	-	1	-	-	-	2	2
24AECE41T.3	2	3	2	3	2	-	-	1	-	-	-	-	3
24AECE41T.4	1	2	2	3	1	2	2	-	-	-	-	2	-
24AECE41T.5	1	2	2	2	3	-	-	1	-	-	-	3	-

Title of the Course : Analog and Digital Communications
Category : PC
Year : II
Semester : II
Couse Code : 24AECE42T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

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

Course Outcomes:

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

1. Recognize the basic terminology used in analog and digital communication technique for transmission of information/data.
2. Explain the basic operation of different analog and digital communication systems at baseband and passband level.
3. Compute various parameters of baseband and passband transmission schemes by applying basic engineering knowledge.
4. Analyze the performance of different modulation & demodulation techniques to solve complex problems in the presence of noise.
5. Evaluate the performance of all analog and digital modulation techniques to know the merits and demerits of each one of them in terms of bandwidth and power efficiency.

Unit 1 Amplitude Modulation: 12

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

Unit 2 Frequency & Phase Modulation: 12

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

Unit 3 Transmitters: 12

Classification of Transmitters, AM Transmitters, FM Transmitters. Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

Unit 4 Introduction to Noise, Pulse Modulation, Pulse Code Modulation: 10

Types of Noise, Receiver Model, Noise in AM, DSB, SSB, and FM Receivers.: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM. PCM Generation and Reconstruction, Quantization Noise, Non- Uniform Quantization and Companding, Delta Modulation, DPCM, Noise in PCM and DM.

Unit 5 Digital Modulation Techniques 10

Coherent Digital Modulation Schemes – ASK, BPSK, FSK, QPSK, Non-coherent BFSK, DPSK. M-ary Modulation Techniques, Power Spectra, Bandwidth Efficiency.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams

Prescribed Textbooks:

1. Simon Haykin, "Communication Systems", John Wiley & Sons, 4th Edition, 2004.
2. B. P. Lathi, Zhi Ding " Modern Digital and Analog Communication Systems", Oxford press, 2011.

Reference Books:

1. Sam Shanmugam, "Digital and Analog Communication Systems",JohnWiley& Sons, 1999.
2. Taub and Schilling, " Principles of Communication Systems", Tata McGraw Hill, 2007.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE42T.1	3	3	-	-	-	-	-	-	-	-	3	-	-
24AECE42T.2	3	3	-	-	-	-	-	-	-	-	3	-	-
24AECE42T.3	3	3	-	-	-	-	-	-	-	-	3	-	-
24AECE42T.4	3	3	-	-	-	-	-	-	-	-	3	-	-
24AECE42T.5	2	2	-	-	-	-	-	-	-	-	2	-	-

Title of the Course : Electromagnetic Waves and Transmission Lines
Category : PC
Year : II
Semester : II
Couse Code : 24AECE43T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To understand the Concepts of Vectors and Co-ordinate Systems
2. To learn the concepts of Electric and Magnetic Fields with their corresponding equations.
3. To acquire knowledge on wave propagation in different medias and Transmission lines.

Course Outcomes:

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

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

Unit 1 Electrostatics: 12

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

Unit 2 Magneto statics, Maxwell's Equations (Time Varying Fields): 12

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

Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface.

Unit 3 EM Wave Characteristics: 12

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

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

Unit 4 Transmission Lines - I : 10

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

Unit 5 Transmission Lines – II: 10

Input Impedance Relations, Reflection Coefficient, VSWR, Average Power, Shorted Lines, Open Circuited Lines, and Matched Lines, Low loss radio frequency and UHF Transmission lines, UHF Lines as Circuit Elements, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching.

Prescribed Textbooks:

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

Reference Books:

1. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, 2nd Edition,Pearson Education, 2013.
2. Engineering Electromagnetics, William H. Hayt Jr. and John A. Buck, 7th Edition, Tata McGraw Hill, 2006.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE43T.1	3	3	1	1	-	-	-	-	-	-	1	-	-
24AECE43T.2	3	3	1	1	-	-	1	-	-	-	1	-	-
24AECE43T 3	2	2	3	3	-	-	1	-	-	-	1	-	-
24AECE43T.4	3	3	2	2	-	-	-	-	-	-	1	-	-
24AECE43T.5	3	3	2	2	-	-	-	-	-	-	1	-	-

Title of the Course : Digital System Design using VHDL
Category : PC
Year : II
Semester : II
Couse Code : 24AECE44T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To Understand Concept of logic families & the basics of VHDL
2. To design circuits and implement their functionality using VHDL To analyze the parameters like gain and impedances for single stage amplifier circuits.
3. To have a knowledge on synchronous design methodology.

Course Outcomes:

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

1. Understand the theory of logic families &interfacing
2. Understand the basics of VHDL & programming.
3. Be able to know the concepts of VHDL design modeling
4. Be able to design combinational circuits and implementation using VHDL programming.
5. Be able to design Sequential circuits and implementation using VHDL programming.

Unit 1 CMOS & Bipolar Logic 12

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

Unit 2 VHDL Elements & Structural Modeling 10

Introduction to HDL, Design flow, Program structure, Basic language elements- Data Objects, Data types, Operators, Functions and procedures, Packages and Libraries. Structural design elements: Introduction, Component declaration, Component instantiation, Examples.

Unit 3 Dataflow & Behavioral Modeling 14

Data flow design elements: Introduction, Concurrent signal assignment statement, Concurrent versus Sequential signal assignment statement, Conditional signal assignment statement and Selected signal assignment statement, Behavioral design elements: Introduction, Entity declaration, Architecture body, Process statement, Variable assignment statement, Signal assignment statement, Wait statement, If statement, Case statement, Null statement, Loop statement, Exit statement, Next statement, Assertion statement, Report statement, Delay models- Inertial delay model, Transport delay model.

Unit 4 Combinational Logic Design 12

Decoders, Encoders, Three state devices, Multiplexers and Demultiplexers, Code Converters, EX-OR gates and Parity circuits, Comparators, Adders & subtractors, ALUs, Combinational multipliers and their VHDL models. Design examples: Barrel shifter, Comparators, Ones counter

Unit 5 Sequential Logic Design 11

Latches and flip-flops, Counters, Shift register and their VHDL models, Synchronous design methodology, Impediments to synchronous design.

Prescribed Text Books:

1. John F. Wakerly- Digital Design Principles & Practices, PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. J.Bhaskar-VHDL primer, PHI/ Pearson Education Asia, 3rd Ed., 2003

Reference Books:

1. Charles H. Roth Jr- Digital System Design Using VHDL, PWS Publications, 2nd edition, 2008.
2. Kenneth L Short – VHDL for Engineers, Pearson Education 2009.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE44T.1	3	3	3	1	-	-	-	-	-	-	-	3	2
24AECE44T.2	-	-	2	-	3	-	1	-	-	3	-	3	-
24AECE44T.3	-	-	2	-	3	-	1	-	-	3	-	3	-
24AECE44T.4	1	3	3	2	3	-	-	-	-	3	-	3	3
24AECE44T.5	1	3	3	2	3	-	-	-	-	3	-	3	3

Title of the Course : Managerial Economics and Financial Analysis
Category : HSM
Year : II
Semester : II
Couse Code : 24AMBA41T
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
This course aims to familiarize students with the basics of microeconomics, focusing on demand and how it is estimated for different products. It helps them understand the input-output relationship for better production and cost management. Students will also learn about different market structures, pricing methods, and strategies used in business. The course gives an overview of investment appraisal methods to develop skills for planning long-term investments. And provides basic accounting knowledge and explains how to prepare financial statements.

Course Outcomes:
At the end of the course, the student will be able to
1. Summarize the concepts related to Managerial Economics, financial accounting
2. Comprehend the fundamentals of Economics viz., Production, Cost, Revenue
3. Examine the different forms of business & Market structures
4. Analyze how to invest their capital and maximize returns
5. Develop the accounting statements and evaluate the financial performance of business entity

Unit 1 Managerial Economics **12**
Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

Unit 2 Production and Cost Analysis **12**
Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Iso quants and Iso costs, Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

Unit 3 Business Organizations and Markets **12**
Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

Unit 4 Capital Budgeting **12**
Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems).

Unit 5 Financial Accounting and Analysis 12

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

Prescribed Text Books:

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

Reference Books:

1. Ahuja Hl Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

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

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning
24AMBA41T.1	2	1	1	-	1	2	-	1	1	2	1
24AMBA41T.2	2	1	1	1	1	1	1	-	1	1	1
24AMBA41T.3	1	1	-	1	2	1	1	2	1	1	1
24AMBA41T.4	1	1	-	1	1	-	1	1	-	1	1
24AMBA41T.5	-	2	1	1	-	1	-	1	1	-	1

Title of the Course : Environmental Science
Category : MC
Year : II
Semester : II
Couse Code : 24AENS41T
Branch/es : CE, ECE, AI&DS, CSE(AI), CSE(DS), AI&ML

Lecture Hours	Tutorial Hours	Practice Hours	Credits
2	0	0	0

Course Objectives:
This course aims to raise environmental awareness, promote sustainable practices aligned with the Sustainable Development Goals (SDGs), and highlight the significance of ecosystems and biodiversity. It sensitizes students to major pollution issues and related legislative measures, fosters ethical responsibility and problem-solving skills to tackle environmental challenges, and explains the impact of human population growth on the environment and public health. The course also emphasizes the role of education, information technology, and public policy in promoting environmental sustainability.

Course Outcomes:
At the end of the course, the student will be able to
1. explain how natural resources should be utilised with a focus on sustainability.
2. describe the need to protect ecosystems and biodiversity for future generations.
3. comprehend major pollution problems related to ecosystems.
4. Summarize key environmental issues, sustainable practices, and laws supporting environmental protection in the context of sustainable development goals.
5. explain the effects of population growth on environment and health, and the role of education, IT, and welfare programs in managing them.

Unit 1 Natural resources **7**
Natural Resources: Renewable and non-renewable resources – Forest resources: Uses, deforestation – Water resources: Uses, floods, drought – Mineral resources: Uses, environmental effects of extracting mineral resources– Energy resources: Renewable and non-renewable energy sources (overview only).

Unit 2 Ecosystems, Biodiversity and its conservation **6**
Ecosystems: Producers, consumers and decomposers – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and functions of the following ecosystems: Forest ecosystem and lake ecosystem.
Biodiversity and its conservation: Definition – Values of biodiversity – Hot-spots of biodiversity – Threats to biodiversity – Conservation of biodiversity.

Unit 3 Environmental pollution **5**
Definition, causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.
Self-learning: Genetically modified crops

Unit 4 Social issues and the Environment **6**
Sustainable development – Rainwater harvesting – Environmental ethics – Climate change, global warming, acid rain, ozone layer depletion – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Environment Protection Act.

Unit 5 Human population and the Environment **6**

Population explosion – Family welfare programmes – Environment and human health – Value education – Role of information technology in environment and human health, Field work – Visit to a local area to document environmental assets.

Prescribed Textbooks:

1. Kaushik, Anubha, and C. P. Kaushik. *Perspectives in Environmental Studies*. 7th ed., New Age International Publishers, 2022.
2. Chawla, Shashi. *A Textbook of Environmental Studies*. 1st ed., McGraw Hill Education, 2017.

Reference Books:

1. Joseph, Benny. *Environmental Studies*. 3rd ed., McGraw Hill Education India, 2017.
2. Dhinakaran, A., and Sankaran, B. *A Textbook of Environmental Studies*. 1st ed., Himalaya Publishing House, 2023.
3. Basu, Mahua, and Xavier, S. *Fundamentals of Environmental Studies*. 1st ed., Cambridge University Press, 2017.
4. Bharucha, Erach. *Textbook of Environmental Studies for Undergraduate Courses*. 3rd ed., Universities Press (India), 2021.
5. Tiwari, Vijay Kumar. *A Textbook of Environmental Studies*. 1st ed., Himalaya Publishing House, 2024.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning
24AENS41T.1	2	2	-	-	-	-	-	-	-	-	2
24AENS41T.2	2	2	-	-	-	-	-	-	-	-	2
24AENS41T.3	2	2	-	-	-	-	-	-	-	-	2
24AENS41T.4	3	2	-	-	-	-	-	-	-	-	3
24AENS41T.5	2	2	-	-	-	-	-	-	-	-	2

Title of the Course : Linear IC Applications Lab
Category : ES
Year : II
Semester : II
Couse Code : 24AECE41L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To generate different types of non-sinusoidal signals
2. To verify the applications of Op-amp

Course Outcomes:

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

1. Verify Linear applications of Op-Amp
2. Verify the operating modes of IC555 timer
3. Design of Active Filters
4. Verify the PLL applications

List of Experiments

1. Adder using Op-amp
2. Subtractor using Op-amp
3. Active Filter Applications - LPF,HPF(First Order)
4. Function Generator using Op-amps
5. Comparator using IC741
6. Monostable operation using IC-555 timer
7. Astable operation using IC-555 timer
8. Schmitt Trigger
9. 4-Bit DAC using Op-amp
10. PLL Applications (AM & FM)

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE41L.1	2	3	2	2	-	-	2	-	-	-	-	3	-
24AECE41L.2	3	3	2	2	-	-	2	-	-	-	-	3	-
24AECE41L.3	2	2	3	3	-	-	2	-	-	-	-	3	2
24AECE41L.4	2	3	2	2	-	-	2	-	-	-	-	3	-

Title of the Course : Analog & Digital Communications Lab
Category : PC
Year : II
Semester : II
Couse Code : 24AECE42L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To Discuss the basics of analog and digital modulation techniques.
2. To integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
3. To design and implement different modulation and demodulation techniques and their applications.
4. To develop cognitive and behavioral skills for performance analysis of various modulation techniques.

Course Outcomes:

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

1. Describe about the usage of equipment/components used to conduct experiments in analog and digital modulation techniques
2. Conduct the experiment based on the knowledge acquired in the theory about modulation and demodulation schemes
3. Analyze the performance of a given modulation scheme to find the important metrics of the system theoretically.
4. Practice the relevant graphs between important metrics of the system from the observed measurements.

Compare the experimental results with that of theoretical ones and infer the conclusions.

LIST OF EXPERIMENTS: (Execute any 10 experiments)

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

Section-A

1. AM Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. SSB-SC Modulation and Demodulation
4. FM Modulation and Demodulation
5. PAM Modulation and Demodulation
6. PWM Modulation and Demodulation
7. PPM Modulation and Demodulation

Section-B

1. Sampling Theorem
2. Pulse Code Modulation and Demodulation
3. Delta Modulation
4. Time Division Multiplexing
5. FSK Modulation and Demodulation
6. PSK Modulation and Demodulation
7. DPSK Modulation & Demodulation

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE42L.1	2	3	1	-	3	2	-	-	3	-	3	3	-
24AECE42L.2	2	3	1	-	3	2	-	-	3	-	3	3	-
24AECE42L.3	2	3	1	-	3	2	-	-	3	-	3	3	-
24AECE42L.4	2	3	1	-	3	2	-	-	3	-	3	3	-
24AECE42L.5	2	3	1	-	3	2	-	-	3	-	3	3	-

Title of the Course	:	Digital System Design using VHDL Lab
Category	:	PC
Year	:	II
Semester	:	II
Couse Code	:	24AECE43L
Branch/es	:	ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To Understand and develop the test bench code for combinational circuits and sequential circuits
2. To make the students Design combinational and sequential circuits
3. To Learn the simulation with truth table through EDA tool

Course Outcomes:

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

1. Develop the VHDL code for combinational circuits and sequential circuits
2. Be able to use different VHDL programming constructs in the design combinational and sequential circuits
3. Simulate various combinational and sequential logic circuits and verify the simulation with truth table through EDA tool

List of the Experiments

Design and Simulation of following experiments with equivalent simulation software using Data Flow, Structural, Behavioral Models (Minimum eight of the following)

1. Design of Logic gates
2. Design of Half adder, Full Adder and Ripple Carry Adder
3. Design of Half Subtractor, Full Subtractor
4. Design of Encoders
5. Design of Decoders
6. Design Mux and Demux
7. Design of Flip-Flops
8. Design of a Comparators
9. Design of One's Counter.
10. Design of Barrel Shifter

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24AECE43L.1	2	2	-	2	-	2	-	-	2	-	-	2	2
24AECE43L.2	1	2	-	2	-	2	-	-	1	-	-	2	-
24AECE43L.3	2	2	-	2	-	-	1	-	1	-	-	2	2

Title of the Course : Python Programming
Category : SEC
Year : II
Semester : II
Couse Code : 24ACSE46L
Branch/es : ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	2	2

Course Objectives:

1. Introduce core programming concepts of Python programming language
2. Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
3. Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications

Course Outcomes:

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

1. Showcase adept command of Python syntax, deftly utilizing variables, data types, control structures, functions, modules, and exception handling to engineer robust and efficient code solutions.
2. Apply Python programming concepts to solve a variety of computational problems.
3. Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs.
4. Proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas.
5. Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries.

Unit 1 Introduction to Python Programming 10

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

Unit 2 Functions and Strings 10

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments. Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings. Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

Unit 3 Dictionaries 10

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

Unit 4 Files and Object Oriented Programming 10

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

Unit 5 Introduction to Data Science 10

Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

Reference Books:

1. Gowri shankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and the World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-long Learning	PSO1	PSO2
24ACSE46L.1	3	3	2	1	2	-	-	1	1	1	2	-	-
24ACSE46L.2	3	3	3	2	3	-	-	1	1	1	2	-	-
24ACSE46L.3	3	3	3	3	3	-	-	2	1	2	3	-	-
24ACSE46L.4	3	3	3	3	3	2	-	2	1	2	3	-	-
24ACSE46L.5	3	3	3	3	3	2	-	2	2	2	3	-	-