CSE-INTERNET OF THINGS

(For the batches admitted from the academic year 2021-22)

Vision

- To be a recognized Centre in the field of Computer Science and Engineering by imparting quality education and also equipping the students with latest technologies, soft skills and ethical values to face the challenges in industry & society.

Mission

- To provide quality education by imparting state of the art facility in Computer Science and Engineering.
- Enrich the students with innovative and problem-solving skills by establishing continuous Industry Institute interaction.
- To prepare the learners possessing social commitment and ethical values to face the dynamic challenges of industry and society.

Institutional Objectives

- To create a conducive and competitive environment for students through curricular and extra-curricular activities.
- Promote the culture of research among the faculty.
- To promote synergetic alliances with premier Institutions, Industry, CSIR laboratories and various Government organizations for Collaborative Research Projects.
- To promote economic and social enrichment of the society through Skill Development programmes, Entrepreneurship and extension activities.
- To introducedemand driven new UG&PG academic programmes.
- To ensure a high degree of quality in terms of providing infrastructure, research ambience, faculty and staff development.

Core Values

- *Thirst for Quality Education:* The stake holders of the institute particularly management, employees and students of the institution have a consistent thirst for quality improvement of the processes and services in the institution.
- *Lifelong Learning:* In the fast-changing technological world, acquiring a special skill at one point of time will not be enough for ever long survival. Hence to

flourish in the work place and to bring in innovations in the ways of doing, employee, student as well as alumni must be continuous learners and tech savvy.

- *Diversity and Participation:* PBRVITS promotes the involvement of faculty, staff and students from all social, economic, ethnics, cultural and religious backgrounds to get the synergy of combining the diversified agents. The focus is on involving students to exhibit their talent in various curricular and co- curricular activities and strengthening alumni link to share their experiences to the students.
- *Academic Integrity and Accountability:* Management induces accountability in the employees for the career of the students and the academic leadership establishes a mentoring mechanism for realization of responsibilities of students towards their parents and in turn to the society.

Semester II (First year)

S. No	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	Total
				L	T	P	C			
1	BS	21A110102	Mathematical Methods	3	1	0	3	30	70	100
2	BS	21A110110	Probability and Statistics	3	1	0	3	30	70	100
3	ES	21A030301	Engineering Drawing	1	0	4	3	30	70	100
4	ES	21A050304	Advanced Data Structures through C++	3	1	0	3	30	70	100
5	ES	21A020303	Basic Electrical and Electronics Engineering	3	1	0	3	30	70	100
6	HSMC	21A010201	Communicative English Lab	0	0	2	1	30	70	100
7	ES	21A020304	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	30	70	100
8	ES	21A050305	Advanced Data Structures through C++ Lab	0	0	3	1.5	30	70	100
9	MC	21A000001	Environmental Science	2	0	0	0	30	--	--
Total							**19**			**800**

Course Code	MATHEMATICAL METHODS (Common to all branches)		L	T	P	C
21A110102			3	1	0	3
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- This course aims at providing use of matrix algebra techniques for practical applications.
- This course aims at providing the student with the knowledge on Various numerical Methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.

COURSE OUTCOMES:

After completion of the course, student will be able to

CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical applications.

CO2: Understand and solve the roots of equation using Bisection method, Iterative method, Regula-Falsi method, Newton Raphson method and solve the system of algebraic equations.

CO3: Apply concept of interpolation and derive interpolating polynomial using Newton's forward and backward formulae, Lagrange's formulae, Gauss forward and backward formulae.

CO4: Solving initial value problems to ordinary differential equations.

CO5: Determine the process of finding integral equations using Simson's 1/3, Simson's 3/8 Rule and Trapezoidal rule and fitting a best curve using least squares method.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	1	-	-	-	-	-	-	-	-	1	-	-
CO3	3	3	1	1	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	1	2	-	-	-	-	-	-	-	2	1	-	-
CO5	3	2	1	1	-	-	-	-	-	-	-	2	1	-	-

UNIT- I (10 Hrs)

Matrices: Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigenvectors and their Properties, Cayley- Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, Diagonalization of a matrix.

Learning Outcomes: At the end of this unit, students should be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigen values and eigenvectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics (L3)

UNIT - II (10 Hrs)

Solution of Algebraic & Transcendental Equations: Introduction-Bisection method-Iterative method-Regula-Falsi method-Newton Raphson method. System of Algebraic equations: Gauss Jordan Method-Gauss Seidal method.

Learning outcomes: At the end of this unit, students should be able to

- Calculate the roots of equation using Bisection method and Iterative method. (L3)
- Calculate the roots of equation using Regula-Falsi method and Newton Raphson method. (L3)
- Solve the system of algebraic equations using Gauss Jordan method and Gauss Seidal method. (L3)

UNIT - III (10 Hrs)

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

Learning Outcomes: At the end of this unit, students should be able to

- Understand the concept of interpolation. (L2)
- Derive interpolating polynomial using Newton's forward and backward formulae. (L3)
- Derive interpolating polynomial using Lagrange's formulae. (L3)
- Derive interpolating polynomial using Gauss forward and backward formulae. (L3)

UNIT - IV (12 Hrs)

Numerical Solutions of Ordinary Differential Equations: Solution by Taylor's series-Picard'sMethod of successive Approximations- Euler's Method - Modified Euler's Method-Runge-Kutta Methods.

Learning Outcomes: At the end of this unit, students should be able to

- Solve initial value problems to ordinary differential equations using Taylor's method. (L3)
- Solve initial value problems to ordinary differential equations using Euler's method and Runge Kutta methods. (L3)

UNIT - V (12 Hrs)

Numerical Integration & Curve Fitting:

Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule

Fitting of straight line – second degree curve –Exponential curve –Power curve by the method of least squares.

Learning Outcomes: At the end of this unit, students should be able to

- Fit a best curve using method of least squares. (L3)
- Solve integral equations using Simson's 1/3 and Simson's 3/8 rule. (L3)

- Solve integral equations using Trapezoidal rule. (L3)

TEXTBOOKS:

1. "Higher Engineering Mathematics", B.S.Grewal,Khanna publishers.
2. "Advanced Engineering Mathematics", Erwin Kreyszig,Wiley India
3. "Introductory Methods of Numerical Analysis", S.S.Sastry, PHI publishers.

REFERENCE BOOKS:

1. "Higher Engineering Mathematics", B.V.Ramana,Mc Graw Hill publishers.
2. "Advanced Engineering Mathematics", Alan Jeffrey,Elsevier Publishers
3. A Text Book of Engineering Mathematics, T.K.V. Iyengar, B. Krishna Gandhi, Vol – I, S. Chand & Company.

Course Code	PROBABILITY AND STATISTICS		L	T	P	C
21A110110	(Common to ME, CSE, CSE-AI & CSE-IOT)		3	1	0	3
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- To familiarize the students with the foundations of probability and statistical methods.
- To impart probability concepts and statistical methods in various applications Engineering.

COURSE OUTCOMES:

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

CO1: Solve the central tendency, correlation and correlation coefficient and regression

CO2: Understand the terminologies of basic probability, two types of random variables and their probability functions.

CO3: Interpret the behavior of various discrete and continuous probability distributions.

CO4: Apply the concept of hypothesis testing for large samples.

CO5: Apply the statistics for testing the significance of the given small sample data by using t- test, F- test and Chi-square test.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	3	-	-	-	-	-	1	-	-	-	-	-
CO3	3	2	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-

UNIT-1 (12 Hrs)

Statistics Introduction, Measures of Variability (dispersion) Skewness Kurtosis, correlation, correlation coefficient, rank correlation, regression lines, regression coefficients and their properties

Learning Outcomes: At the end of this unit, students should be able to

- summarize the basic concepts of data science and its importance in engineering (L2)
- analyze the data quantitatively or categorically, measure of averages, variability (L4)
- adopt correlation methods and regression analysis (L5)

UNIT-II (11 Hrs)

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties.

Learning Outcomes: At the end of this unit, students should be able to

- Define the terms trial, events, sample space, probability, and laws of probability (L1)
- Make use of probabilities of events in finite sample spaces from experiments (L3)
- Apply Baye's theorem to real time problems (L3)
- Explain the notion of random variable, distribution functions and expected value (L2)

UNIT-III (12 Hrs)

Probability distributions: Discrete distribution - Binomial, Poisson approximation to the binomial distribution and their properties. Continuous distribution: normal distribution and their properties.

Learning Outcomes: At the end of this unit, students should be able to

- Apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies (L3)
- Interpret the properties of normal distribution and its applications (L2)

UNIT-IV (11 Hrs)

Estimation and Testing of hypothesis, large sample tests: Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

Learning Outcomes: At the end of this unit, students should be able to

- Explain the concept of estimation, interval estimation and confidence intervals (L2)
- Apply the concept of hypothesis testing for large samples (L4)

UNIT-V (11 Hrs)

Small sample tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

Learning Outcomes: At the end of this unit, students should be able to

- Apply the concept of testing hypothesis for small samples to draw the inferences (L3)
- Estimate the goodness of fit (L5)

TEXTBOOKS:

1. Probability and Statistics for Engineers, Miller and Freunds, Pearson, 2008, 7/e.
2. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons Publications, 2012, 11/e.

REFERENCE BOOKS:

1. A First Course in Probability, S. Ross, Pearson Education India, 2002.
2. An Introduction to Probability Theory and its Applications, W. Feller, 1/e, Wiley, 1968.
3. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, McGraw Hill Education, 4th Edition, 2001.

Course Code	ENGINEERING DRAWING		L	T	P	C
21A030301	(Common to all branches)		1	0	4	3
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.
- Instruct the utility of drafting & modelling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modelling.
- Instruct graphical representation of machine components.

COURSE OUTCOMES:

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

CO1: Construction of various conic curves, Cycloid curves
CO2: Construction of projections of Points, Lines applied in engineering
CO3: Construction of projections of Planes.
CO4: Construction of projection of solids development of surfaces regular Solids .
CO5: Representation of Ortho and Isometric views of solids.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	2	-	-	2	2	2
CO2	3	1	-	-	-	-	-	-	-	2	-	-	2	2	2
CO3	3	2	2	-	3	-	-	-	-	2	-	2	2	2	2
CO4	3	2	2	-	3	-	-	-	-	2	-	2	2	2	2
CO5	3	2	2	-	3	-	-	-	-	2	-	2	2	2	2

UNIT-I (12 Hrs)

Introduction to Engineering Drawing: Principles of Engineering Drawing and their Significance - Conventions in drawing-lettering - BIS conventions.

a) Conic sections including the rectangular hyperbola- general method only,

b) Cycloid, Epi-cycloid and Hypocycloid - general method only.

Learning Outcomes: At the end of this unit, students should be able to

- Understand the significance of engineering drawing (L2)
- Know the conventions used in the engineering drawing (L1)
- Identify the curves obtained in different conic sections (L2)
- Draw different cycloidal curves. (L3)

UNIT– II (12 Hrs)

Projection of points, lines: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, true angle made by line.

Learning Outcomes: At the end of this unit, students should be able to

- Know how to draw the projections of points, lines (L1)
- Find the true length of the lines. (L2)

UNIT-III (18 Hrs)

Projection of planes: Projections of regular plane inclined to both the planes and also draw the projections of different planes in Computerized drawing.

Learning Outcomes: At the end of this unit, students should be able to

- Understand the procedure to draw projection of planes. (L2)
- Draw the projection of plane inclined to one plane and both the planes. (L3)
- Understand the different commands used in Computerized drawing to draw different planes. (L2)

UNIT- IV (15 Hrs)

Projections of solids: Projections of regular solids inclined to one or both planes by rotational method.

Development of Solids: Development of lateral Surfaces of Right Regular Solids(without section)-Prism, Cylinder, Pyramid, Cone.

Learning Outcomes: At the end of this unit, students should be able to

- Understand the procedure to draw projection of solids. (L2)
- Draw the projection of solid inclined to one plane. (L3)
- Draw the projection of solids inclined to both the planes. (L3)

UNIT–V (18 Hrs)

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views. and also draw the Isometric views using Computerized drawing.

Learning Outcomes: At the end of this unit, students should be able to

- Learn the basics convectional representation of different projections (L1)
- Draw the Orthographic projection of simple solids. (L3)
- Draw the Isometric projection of simple solids. (L3)

TEXTBOOKS:

1. Engineering Drawing, K.L.Narayana & P.Kannaiah, Scitech Publishers, Chennai, 3/e.
2. Engineering Drawing+Autocad , K.Venugopal,V.Prabhuraja ,New Age Publishers.
3. Engineering Drawing, N.D.Bhatt, Charotar Publishers, 2016, 53/e,

REFERENCE BOOKS:

1. Engineering Drawing, Dhanajay A Jolhe, Tata McGraw-Hill, Copy Right, 2009.
2. Engineering Drawing, Basant Agarwal & C.M.Agarwal, Tata McGraw-Hill, Copy Right,
3. Engineering Drawing, Shah and Rana, Pearson Education, 2009, 2/e,

Course Code	ADVANCED DATA STRUCTURES THROUGH C++ (Common to CSE CSE-AI & CSE-IOT)		L	T	P	C
21A050304			3	1	0	3
Pre-requisite	C Programming & Data Structures	Semester	II			

COURSE OBJECTIVES:

- To be familiar with basic techniques of object oriented principles and exception handling using C++
- To be familiar with the concepts like Inheritance, Polymorphism
- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVLTrees, and B Trees.

COURSE OUTCOMES:

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

CO1: Distinguish between procedures and object oriented programming.
CO2: Apply advanced data structure strategies for exploring complex data structures.
CO3: Compare and contrast various data structures and design techniques in the area of Performance.
CO4: Implement data structure algorithms through C++.
CO5: Incorporate data structures into the applications such as binary search trees, AVL and B Trees

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	2	-	-	-	-	-	-	-	-	1	-	3
CO3	3	2	3	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	3	-	-	-	-	-	-	-	-	-	2	3
CO5	3	3	2	2	-	-	-	-	-	-	-	-	-	2	3

UNIT-1 (13 Hrs)

ARRAYS: Abstract Data Types and the C++ Class, An Introduction to C++ Class- Data Abstraction and Encapsulation in C++- Declaring Class Objects and Invoking Member Functions- Special Class Operations- Miscellaneous Topics- ADTs and C++Classes, The Array as an Abstract Data Type, The Polynomial Abstract Data type- Polynomial Representation- Polynomial Addition. Spares Matrices.

Learning Outcomes: At the end of this unit, students should be able to

- Learn about OOPS concepts (L3).
- Learn and Solve about different types of Class Types and Polynomial representation (L3)

UNIT- II (10 Hrs)

STACKS AND QUEUES: Templates in C++, Template Functions- Using Templates to Represent Container Classes, The Stack Abstract Data Type, The Queue Abstract Data Type, Subtyping and Inheritance in C++, Evaluation of Expressions, Expression- Postfix Notation- Infix to Postfix.

Learning Outcomes At the end of this unit, students should be able to

- Translate the given function as Templates in C++ (L3)
- Analyze the behaviour of different types of Classes, ADT and Expressions (L3)

UNIT – III (12 Hrs)

LINKED LISTS – I: Single Linked List and Chains, Representing Chains in C++, Defining a Node in C++- Designing a Chain Class in C++- Pointer manipulation in C++- Chain Manipulation Operations, The Template Class Chain, Implementing Chains with Templates- Chain Iterators- Chain Operations- Reusing a Class, Circular Lists, Available Space Lists, Linked Stacks and Queues, Polynomials,

Learning Outcomes: At the end of this unit, students should be able to

- Learn and implement different types of Linked Lists (L3)
- Acquire the Knowledge of functions of Templates in C++ (L1)
- Implement Chain Iterators and Polynomials (L3)

UNIT – IV (13 Hrs)

LINKED LISTS – II: Polynomial Representation- Adding Polynomials- Circular List Representation of Polynomials, Equivalence Classes, Sparse Matrices, Sparse Matrix Representation- Sparse Matrix Input- Deleting a Sparse Matrix, Doubly Linked Lists, Generalized Lists, Representation of Generalized Lists- Recursive Algorithms for Lists Reference Counts, Shared and Recursive Lists

Learning Outcomes: At the end of this unit, students should be able to

- Evaluate double integrals of functions of several variables using Polynomial Representation (L5)
- Apply Matrix techniques in evaluating different types (L4)
- Evaluating Generalized Lists and Recursive algorithms (L5)

UNIT-5 (12 Hrs)

TREES: Introduction, Terminology, Representation of Trees, Binary Trees, The Abstract Data Type, Properties of Binary Tress, Binary Tree Representations, Binary Tree Traversal and Tree Iterators, Introduction, Inorder Traversal Preorder Traversal, Postorder Traversal, Thread Binary Trees, Threads, Inorder Traversal of a Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree, Heaps, Priority Queues, Definition of a Max Heap, Insertion into a Max Heap,

Deletion from a Max Heap, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree.

Learning Outcomes: At the end of this unit, students should be able to

- Understand Tree functions and its relations (L2)
- Conclude the use of different types of Trees representation (L4)

TEXTBOOKS:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press, Pvt. Ltd.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd.Second, Edition.
3. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.

REFERENCE BOOKS:

1. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
2. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

Course Code	BASIC ELECTRICAL & ELECTRONICS ENGINEERING (Common to ME, CSE, CSE-AI & CSE-IOT)		L	T	P	C
21A020302			3	1	0	3
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- To teach DC and AC electrical circuit analysis
- To explain working principles of transformers and electrical machines
- To impart knowledge on Power system generation, transmission and distribution
- Familiar with the theory, construction, and operation of electronic devices
- Learn about biasing of BJTs and FETs.
- Design and construct amplifiers, understand the concept & principles of logic devices.

COURSE OUTCOMES:

After completion of the course, student will be able to

CO1: Apply concepts of KVL/KCL in solving DC circuits
CO2: Illustrate working principles of DC Motor, Transformer and Induction motors
CO3: Understand the basics of Power generation, Transmission and Distribution
CO4: Explain the theory, construction, operation and working of electronic devices.
CO5: Analyze and design small signal amplifier circuits, logic gate, combinational and sequential circuits

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO2	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO3	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO4	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO5	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-

Part A: Basic Electrical Engineering

UNIT-I (10 Hrs)

DC & AC Circuits: Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms -peak and rms values - phasor representation - real power - reactive power - apparent power – power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits, Resonance.

Learning Outcomes: At the end of this unit, students should be able to

- Recall Kirch off laws (L1)
- Analyze simple electric circuits with DC excitation (L4)

- Apply network theorems to simple circuits (L3)
- Analyze single phase AC circuits consisting of series RL - RC - RLC combinations (L4)

UNIT-II (10 Hrs)

DC & AC Machines: Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator –principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single-Phase Transformer - OC and SC tests on transformer -Principle and operation of 3-phase AC machines [Elementary treatment only]

Learning Outcomes: At the end of this unit, students should be able to

- Explain principle and operation of DC Generator & Motor. (L2)
- Perform speed control of DC Motor (L3)
- Explain operation of transformer and induction motor. (L2)
- Explain construction & working of induction motor - DC motor (L2)

UNIT-III (10 Hrs)

Basics of Power Systems: Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary& Secondary distribution systems.

Learning Outcomes: At the end of this unit, students should be able to

- Understand working operation of various generating stations (L1)
- Explain the types of Transmission and Distribution systems (L2)

TEXTBOOKS:

1. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, "Principles of Power System" – S.Chand – 2018.

REFERENCE BOOKS:

1. L. S. Bobrow - "Fundamentals of Electrical Engineering" - Oxford University Press - 2011.
2. E. Hughes - "Electrical and Electronics Technology" - Pearson - 2010.
3. C.L. Wadhwa – "Generation Distribution and Utilization of Electrical Energy", 3rd Edition, New Age International Publications.

Part 'B'- Electronics Engineering

UNIT-I (10 Hrs)

Diodes and Applications: Semiconductor Diode, Diode as a Switch& Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Operation and Applications of Zener Diode, LED, Photo Diode.

Transistor Characteristics: Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Biasing of Transistor Configuration; Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Concepts of Small Signal Amplifiers –CE & CC Amplifiers.

Learning outcomes: At the end of this unit, students should be able to

- Remember and understand the basic characteristics of semiconductor diode. (L1)
- Understand principle of operation of Zener diode and other special semiconductor diodes (L1)
- Analyze BJT based biasing circuits. (L3)
- Design an amplifier using BJT based on the given specifications. (L4)

UNIT-II (10 Hrs)

Operational Amplifiers and Applications: Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal Op-Amp, Concept of Virtual Ground; Op-Amp Applications - Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.

Learning outcomes: At the end of this unit, students should be able to

- Describe operation of Op-Amp based linear application circuits, converters, amplifiers and non-linear circuits. (L2)
- Analyze Op-Amp based comparator, differentiator and integrator circuits. (L3)

UNIT-III (10 Hrs)

Digital Electronics: Logic Gates, Simple combinational circuits–Half and Full Adders, BCD Adder. Latches and Flip-Flops (S-R, JK and D), Shift Registers and Counters.

Learning outcomes: At the end of this unit, students should be able to

- Explain the functionality of logic gates. (L2)
- Apply basic laws and De Morgan's theorems to simplify Boolean expressions. (L3)
- Analyze standard combinational and sequential circuits. (L4)

TEXTBOOKS:

1. Electronic Devices & Circuit Theory, R.L.Boylestad & Louis Nashlesky, Pearson Education, 2007.
2. Op-Amps & Linear ICs, Ramakanth A. Gayakwad, Pearson, 2017, 4th Edition.
3. Modern Digital Electronics, R. P. Jain, Tata Mcgraw Hill,2003, 3rd Edition.
4. Microcontrollers: Architecture, Programming, Interfacing and System Design, Raj Kamal, Pearson, 2012, 2nd Edition.

REFERENCE BOOKS:

1. Basic Electronics- Devices, Circuits and IT Fundamentals, SantiramKal, Prentice Hall, India,2002.
2. A Text Book of Electronic Devices and Circuits, R. S. Sedha, S.Chand & Co,2010.
3. Introductory Electronic Devices & Circuits –, R. T. Paynter, Conventional Flow Version, Pearson Education, 2009.

Course Code	COMMUNICATIVE ENGLISH LAB		L	T	P	C
21A110201	(Common to all branches)		0	0	2	1
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- To make students communicate their thoughts, opinions and ideas freely in real life situations.
- To improve the language proficiency of students in English with special emphasis on Listening and Speaking skills.
- To equip students with professional skills & soft skills, Develop communication skills in formal and informal situations
- To help students present themselves confidently during Group Discussions and Oral Presentations

COURSE OUTCOMES:

After completion of the course, student will be able to

CO1: Use creativity in listening to formal and informal conversations.
CO2: Analyze the concepts of active listening and barriers to listening.
CO3: Communicate effectively in everyday life using right oral expressions.
CO4: Acquire the confidence to present themselves effectively during academic and professional presentations.
CO5: Acquire basic knowledge of non-verbal communication and its importance.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-

UNIT-I (6 Hrs)

Essentials of Listening: Purpose of Listening, Listening to Conversation (Formal and Informal), Active Listening- an Effective Listening Skill, Barriers to Listening, Listening to Announcements- (railway/ bus stations/ airport /sports announcement/commentaries etc.)

Learning Outcomes: At the end of this unit, students should be able to

- Know the difference between hearing and listening. (L2)
- Understand the purpose of active listening. (L2)
- Follow the announcements through focused listening. (L2)

UNIT-II (6 Hrs)

Listening Comprehension: Academic Listening (Listening to Lectures), Listening to Short Talks and Listening to Presentations, Note Taking Tips

Learning Outcomes: At the end of this unit, students should be able to

- Comprehend different academic lectures. (L3)
- Take notes while listening to short talks and lectures. (L3)
- Improve comprehension skills through listening to short talks and presentations. (L3)

UNIT-III (6 Hrs)

Communicating in everyday life: Asking for and giving information, Offering and responding to offers, Requesting and responding to requests, Congratulating people on their success, Expressing condolences, Asking questions and responding politely, Apologizing and forgiving,

Learning Outcomes: At the end of this unit, students should be able to

- Use appropriate expressions to communicate in everyday life. (L3)
- Communicate effectively in different contexts of conversations. (L3)
- Participate in role plays and situational dialogues with an exposure to social and professional contexts. (L3)

UNIT- IV (6 Hrs)

Presentation Skills: Giving Short Talks, Preparing power point presentation, Greeting and Introducing in presentations, Presenting a paper, Participating in group discussions (dos &don'ts)

Learning Outcomes: At the end of this unit, students should be able to

- Prepare a power point presentation effectively. (L3)
- Present a paper in a seminar. (L3)
- Participate in Group Discussions efficiently. (L3)

UNIT-V (6 Hrs)

Non-verbal Communication: Personal Appearance, Gestures, Postures, Facial Expression, Eye Contact, Body Language (Kinesics), Silence, Tips for Improving Non-Verbal Communication

Learning Outcomes: At the end of this unit, students should be able to

- Know the importance of body language in communication (L2)
- Improve non-verbal communication skills (L3)
- Understand how body language and non-verbal communication affects the personality of an individual in a social and professional set-up. (L2)

TEXTBOOKS:

1. Technical Communication – Principles and Practice, by MEENAKSHI RAMAN, SANGEETA SHARMA, Oxford University Press

REFERENCE BOOKS:

1. A Textbook of English Phonetics for Indian Students – by T. BALASUBRAMANIAN, Mc Millan India Pvt.
2. English Vocabulary in Use – by MIECHEL McCARTHY, Cambridge University Press
3. Strengthen your English – by BHASKARAN, HORSBURGH, Oxford University Press
4. Practical English Usage – by MIECHEL SWAN, Oxford University Press

ONLINE SOURCES:

1. https://learnenglish.britishcouncil.org/skills/listening
2. https://agendaweb.org/listening/comprehension-exercises.html
3. https://www.123listening.com/
4. https://www.linguahouse.com/learning-english/skill-4-learners/listening
5. https://www.talkenglish.com/listening/listen.aspx
6. https://ed.ted.co

Course Code	BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB (Common to ME, CSE, CSE-AI & CSE-IOT)		L	T	P	C
21A020304			0	0	3	1.5
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- To Verify Kirchoff's laws and Superposition theorem
- To learn performance characteristics of DC Machines and 1- Phase Transformer
- To Study the I – V Characteristics of Solar PV Cell
- To analyze the characteristics of Diodes, BJT, MOSFET, UJT
- To design the amplifier circuits from the given specifications.
- Exposed to linear and digital integrated circuits

COURSE OUTCOMES:

After completing the course, the student will be able to

CO1: Understand Kirchoff's Laws & Superposition theorem.

CO2: Analyze the various characteristics on 1-phase transformer andDC Machines by conducting various tests.

CO3: Analyze I – V Characteristics of PV Cell

CO4: Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.

CO5: Construct and analyze the various diode rectifiers, clippers and clampers and other circuits.

CO-PO MAPPING;

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO2	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO3	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO4	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-
CO5	3	2	1	-	1	3	2	-	-	-	-	1	-	-	-

PART A: ELECTRICAL ENGINEERING

LIST OF EXPERIMENTS:

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Magnetization characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Load test on 1-Phase Transformer.
7. I – V Characteristics of Solar PV cell

8. Brake test on DC Shunt Motor.

PART B: ELECTRONICS ENGINEERING

LIST OF EXPERIMENTS:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Full Wave Rectifier with & without filter.
4. Wave Shaping Circuits. (Clippers & Clampers)
5. Input & Output characteristics of Transistor in CB / CE configuration.
6. Frequency response of CE amplifier.
7. Inverting and Non-inverting amplifiers using Op-AMPs.
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
9. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

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

Note: Minimum of Six Experiments to be performed in each section.

Course Code	ADVANCED DATA STRUCTURES THROUGH C++ LAB (Common to CSE, CSE-AI & CSE-IOT)		L	T	P	C
21A050305			0	0	3	1.5
Pre-requisite	C Programming & Data Structures	Semester	II			

COURSE OBJECTIVES:

- To familiarize Advanced data structures using C++.
- To train the students on the sorting techniques
- To introduce Trees & Graphs.

COURSE OUTCOMES:

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

CO1: Solve computational problems, choose appropriate control structure depending on the problem to be solved.
CO2: Design applications in C++ using Graphs and Trees.
CO3: Modularize the problem and also solution.
CO4: Design applications in C++ using Searching Techniques
CO5: Explore various operations on Linked Lists

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	3	-	-	-	-	-	-	-	1	-	-
CO2	2	2	2	1	3	-	-	-	-	-	-	-	1	-	3
CO3	3	3	2	2	3	-	-	-	-	-	-	-	1	-	-
CO4	2	2	2	2	3	-	-	-	-	-	-	-	-	2	3
CO5	3	3	2	2	3	-	-	-	-	-	-	-	-	2	3

LIST OF EXPERIMENTS:

1. To implement functions of Dictionary using Hashing (division method, Multiplication method, Universal hashing)
2. To perform various operations i.e, insertions and deletions on AVL trees
3. To perform various operations i.e., insertions and deletions on 2-3 trees.
4. To implement operations on binary heap.
5. To implement operations on graphs
   i) vertex insertion
   ii) Vertex deletion
   iii) finding vertex
   iv)Edge addition and deletion
6. To implement Depth First Search for a graph non recursively.
7. To implement Breadth First Search for a graph non recursively.
8. To implement Prim's algorithm to generate a min-cost spanning tree.

9. To implement Krushkal's algorithm to generate a min-cost spanning tree.
10. To implement Dijkstra's algorithm to find shortest path in the graph.
11. To implement pattern matching using Boyer-Moore algorithm.
12. To implement Knuth-Morris-Pratt algorithm for pattern matching.

TEXTBOOKS:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press, Pvt. Ltd.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd. Second Edition.
3. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.

REFERENCE BOOKS:

1. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
2. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

Course Code	ENVIRONMENTAL SCIENCE		L	T	P	C
21A000001	(Common to ME, EEE, ECE, CSE, CSE-IOT)		2	0	0	0
Pre-requisite	NIL	Semester	II			

COURSE OBJECTIVES:

- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life
- To save earth from the inventions by the engineers.

COURSE OUTCOMES:

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

CO1: Grasp multidisciplinary nature of environmental studies and various renewable and non-renewable resources.

CO2: Understand flow and bio-geo- chemical cycles and ecologic alpyramids.

CO3: Understand various causes of pollution and solid waste management and related preventive measures.

CO4: About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.

CO5: Casus of population explosion, value education and welfare programmes.

CO-PO MAPPING:

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

UNIT – I (10 Hrs)

Multidisciplinary Nature Of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness.

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

Learning Outcomes: At the end of this unit, students should be able to

- Know the importance of public awareness (L1)
- Know about the various resources (L1)

UNIT–II (10 Hrs)

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

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

Biodiversity And Its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Learning Outcomes: At the end of this unit, students should be able to

- Know about various echo systems and their characteristics (L1)
- Know about the biodiversity and its conservation (L1)

UNIT – III (10 Hrs)

Environmental Pollution: Definition, Cause, effects and control measures of :

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

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

Learning Outcomes: At the end of this unit, students should be able to

- Know about the various sources of pollution. (L1)

- Know about the various sources of solid waste and preventive measures. (L1)
- Know about the different types of disasters and their managerial measures. (L1)

UNIT- IV (10 Hrs)

Social Issues And The Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, water shed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution)Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Learning Outcomes: At the end of this unit, students should be able to

- Know about the social issues related to environment and their protection acts. (L1)
- Know about the various sources of conservation of natural resources. (L1)
- Know about the wild life protection and forest conservation acts. (L1)

UNIT – V (10 Hrs)

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

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

Learning Outcomes: At the end of this unit, students should be able to

- Know about the population explosion and family welfare programmes. (L1)
- Identify the natural assets and related case studies. (L1)

TEXTBOOKS:

1. Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2. "Environmental Studies", Palani swamy, Pearson education
3. "Environmental Studies" , S.Azeem Unnisa, Academic Publishing Company
4. "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", K.Raghavan Nambiar, Scitech Publications (India), Pvt.Ltd.

REFERENCE BOOKS:

1. "Textbook of Environmental Science", Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
2. "Text book of Environmental Sciences and Technology", M.Anji Reddy, BSPublication.
3. Comprehensive Environmental studies, J.P.Sharma, Laxmi publications.
4. "Environmental Sciences and Engineering", J. Glynn Henry and Gary W. Heinke, Prentice hall of India Private limited
5. "A Text Book of Environmental Studies" , G.R.Chatwal, Himalaya Pubilishing House
6. "Introduction to Environmental Engineering and Science, Gilbert M. Masters and Wendell P. Ela, Prentice hall of India Private limited.