COURSE STRUCTURE
DEPARTMENT OF CIVIL ENGINEERING
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	ES	26AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	26ACHE12T	Engineering Chemistry	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC11T	Engineering Drawing	1	0	4	3
6	ES	26AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	26ACHE12L	Engineering Chemistry Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
						Total Credits	**18**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26APHY22T	Engineering Physics	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	26AENG21T	English for Engineers	3	0	0	3
4	ES	26ACIV21T	Engineering Mechanics	3	0	0	3
5	ES	26ACIV22T	Basic Civil Engineering	3	0	0	3
6	ES	26AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	26APHY22L	Engineering Physics Lab	0	0	2	1
8	HSM	26AENG21L	English Language Communication Skills Lab	0	0	2	1
9	ES	26ACIV21L	Engineering Mechanics Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elective	1	0	0	1
						Total Credits	**22**

COURSE STRUCTURE
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	ES	26AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	26ACHE11T	Chemistry	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC11T	Engineering Drawing	1	0	4	3
6	ES	26AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	26ACHE11L	Chemistry Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
						Total Credits	**18**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26APHY21T	Applied Physics	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	26AENG21T	English for Engineers	3	0	0	3
4	ES	26AECE21T	Fundamentals of Electronic Devices & Circuits	3	0	3	3
5	ES	26AEEE22T	Electrical Circuits	3	0	0	3
6	ES	26AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	26APHY21L	Applied Physics Lab	0	0	2	1
8	HSM	26AENG21L	English Language Communication Skills Lab	0		2	1
9	ES	26AECE21L	Fundamentals of Electronic Devices & Circuits Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elective	1	0	0	1
						Total Credits	**22**

COURSE STRUCTURE
DEPARTMENT OF MECHANICAL ENGINEERING
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	ES	26AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	26ACHE12T	Engineering Chemistry	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC11T	Engineering Drawing	1	0	4	3
6	ES	26AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	26ACHE12L	Engineering Chemistry Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
						Total Credits	**18**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26APHY22T	Engineering Physics	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	26AENG21T	English for Engineers	3	0	0	3
4	ES	26ACIV21T	Engineering Mechanics	3	0	0	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	26APHY22L	Engineering Physics Lab	0	0	2	1
8	HSM	26AENG21L	English Language Communication Skills Lab	0	0	2	1
9	ES	26ACIV21L	Engineering Mechanics Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elective	1	0	0	1
						Total Credits	**22**

COURSE STRUCTURE
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	ES	26AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	26ACHE11T	Chemistry	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC11T	Engineering Drawing	1	0	4	3
6	ES	26AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	26ACHE11L	Chemistry Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
						Total Credits	**18**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26APHY21T	Applied Physics	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	26AENG21T	English for Engineers	3	0	0	3
4	ES	26AECE22T	Electronic Devices & Circuits	3	0	3	3
5	ES	26AEEE23T	Network Analysis	3	0	0	3
6	ES	26AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	26APHY21L	Applied Physics Lab	0	0	2	1
8	HSM	26AENG21L	English Language Communication Skills Lab	0	0	2	1
9	ES	26AECE22L	Electronic Devices & Circuits Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elective	1	0	0	1
						Total Credits	**22**

COURSE STRUCTURE
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	HSM	26AENG11T	English for Engineers	3	0	0	3
2	BS	26APHY11T	Applied Physics	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communication Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elective	1	0	0	1
						Total Credits	**19**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26ACHE21T	Chemistry	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	ES	26AEEE21T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	26ACSE21T	Data structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC21T	Engineering Drawing	1	0	4	3
7	BS	26ACHE21L	Chemistry Lab	0	0	2	1
8	ES	26AEEE21L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
						Total Credits	**21**

COURSE STRUCTURE
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	ES	26AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	26ACHE11T	Chemistry	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC11T	Engineering Drawing	1	0	4	3
6	ES	26AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	26ACHE11L	Chemistry Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
						Total Credits	**18**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26APHY21T	Applied Physics	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	26AENG21T	English for Engineers	3	0	0	3
4	ES	26ACSE21T	Data Structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	26APHY21L	Applied Physics Lab	0	0	2	1
8	HSM	26AENG21L	English Language Communication Skills Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elective	1	0	0	1
						Total Credits	**22**

COURSE STRUCTURE
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	HSM	26AENG11T	English for Engineers	3	0	0	3
2	BS	26APHY11T	Applied Physics	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communication Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elective	1	0	0	1
						Total Credits	**19**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26ACHE21T	Chemistry	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	ES	26AEEE21T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	26ACSE21T	Data Structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC21T	Engineering Drawing	1	0	4	3
7	BS	26ACHE21L	Chemistry Lab	0	0	2	1
8	ES	26AEEE21L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
						Total Credits	**21**

COURSE STRUCTURE
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE)
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	ES	26AEEE11T	Basic Electrical and Electronics Engineering	3	0	0	3
2	BS	26ACHE11T	Chemistry	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC11T	Engineering Drawing	1	0	4	3
6	ES	26AEEE11L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
7	BS	26ACHE11L	Chemistry Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
						Total Credits	**18**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26APHY21T	Applied Physics	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	HSM	26AENG21T	English for Engineers	3	0	0	3
4	ES	26ACSE21T	Data Structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC22L	Engineering & IT Workshop	1	0	4	3
7	BS	26APHY21L	Applied Physics Lab	0	0	2	1
8	HSM	26AENG21L	English Language Communication Skills Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elective	1	0	0	1
						Total Credits	**22**

COURSE STRUCTURE
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	HSM	26AENG11T	English for Engineers	3	0	0	3
2	BS	26APHY11T	Applied Physics	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communication Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elective	1	0	0	1
						Total Credits	**19**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26ACHE21T	Chemistry	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	BS	26AEEE21T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	26ACSE21T	Data Structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC21T	Engineering Drawing	1	0	4	3
7	BS	26ACHE21L	Chemistry Lab	0	0	2	1
8	BS	26AEEE21L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
						Total Credits	**21**

COURSE STRUCTURE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	HSM	26AENG11T	English for Engineers	3	0	0	3
2	BS	26APHY11T	Applied Physics	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communication Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elective	1	0	0	1
						Total Credits	**19**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26ACHE21T	Chemistry	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	ES	26AEEE21T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	26ACSE21T	Data structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC21T	Engineering Drawing	1	0	4	3
7	BS	26ACHE21L	Chemistry Lab	0	0	2	1
8	ES	26AEEE21L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
						Total Credits	**21**

COURSE STRUCTURE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (INTERNET OF THINGS AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)

Semester I (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	HSM	26AENG11T	English for Engineers	3	0	0	3
2	BS	26APHY11T	Applied Physics	3	0	0	3
3	BS	26AMAT11T	Matrices and Calculus	3	0	0	3
4	ES	26ACSE11T	Computational Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communication Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computational Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elective	1	0	0	1
						Total Credits	**19**

Semester II (First Year)

Sl. No	Category	Course Code	Course Title	Hours Per Week			Credits
				L	T	P	C
1	BS	26ACHE21T	Chemistry	3	0	0	3
2	BS	26AMAT21T	Differential Equations and Transform Techniques	3	0	0	3
3	ES	26AEEE21T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	26ACSE21T	Data structures	3	0	3	3
5	ES	26ACSE22T	Python Programming	3	0	0	3
6	ES	26AMEC21T	Engineering Drawing	1	0	4	3
7	BS	26ACHE21L	Chemistry Lab	0	0	2	1
8	ES	26AEEE21L	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
						Total Credits	**21**

Title of the Course:	Basic Electrical and Electronics Engineering	
Category:	ES	
Year:	I	
Semester:	I	II
Course Code:	26AEEE11T	26AEEE21T
Branch/es:	CE, EEE, ME, ECE, AI&DS, CSE (AI)	CSE, AI&ML, CSE(AIML), CSE(DS), CSE (IoT & CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
1.	Understand fundamental electrical laws, quantities, and circuits.
2.	Understand the principles and applications of DC machines and transformers.
3.	Understand energy resources, measuring instruments, and electrical safety.
4.	Analyze semiconductor devices and their characteristics.
5.	Analyze diode applications and BJT operation.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Apply Ohm's and Kirchhoff's laws to analyze basic RLC circuits.
2.	Analyze the construction, operation, characteristics and applications of DC machines and single-phase transformers.
3.	Explain energy resources, power generation, electrical measuring instruments, equipment and safety measures.
4.	Analyze the characteristics and applications of PN junction and Zener diodes, including voltage regulation.
5.	Analyze diode rectifier and filter circuits and the operation and characteristics of BJT in CE configuration.

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, ohm's law, resistive, inductive, capacitive networks, Series-parallel circuits and Kirchhoff's laws (basic numerical problems with independent sources up to two loops and dc excitation).		

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 only) **DC Motor:** Principle of operation, torque equation, types, losses and efficiency, applications, Brake test, Speed control methods. (Simple numerical problems on calculation of armature torque only). **Transformers:** 1-Φ Transformer: Principle of operation, e.m.f equation, losses and efficiency calculations using OC and SC tests (Theory concepts only)		

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 (Theory concepts only).

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and CRO (Theory concepts only).

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 (Theory concepts only).

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. (Theory concepts only).

Unit 5	Diode Applications and Introduction to Transistors	9

Half Wave and Full Wave Rectifiers – Different parameters and comparison, General Filter Considerations – Capacitor Filter. Transistor constructions – Types, Transistor operation in CE configuration and its Characteristics (Theory concepts only).

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.

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
26AEEE11T.1	2	2	1	1	-	2	-	-	1	-	1
26AEEE11T.2	3	3	2	2	-	2	-	-	2	-	1
26AEEE11T.3	2	2	1	1	-	2	-	-	1	-	1
26AEEE11T.4	3	3	2	2	-	2	-	-	2	-	1
26AEEE11T.5	3	2	1	1	-	2	-	-	2	-	1

Title of the Course:	English for Engineers	
Category:	HSM	
Year:	I	
Semester:	I	II
Course Code:	26AENG11T	26AENG21T
Branch/es:	CSE, AI&ML, CSE(DS), CSE(AI&ML) & CSE (IoT& CSBCT)	CE, EEE, ME, ECE, AI&DS, CSE (AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	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: The Gift of the Magi (Short Story)**	**10**
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 Brook**	**9**
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 Elon Musk	9
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: The Toys of Peace	9
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: The Power of Intrapersonal Communication	9
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		

Textbooks:	
1.	Pathfinder: Communicative English for Undergraduate Students. 1st Ed., Orient Black Swan, 2023

Reference books:	
1.	Dubey, ShamJi & 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.

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
26AENG11T/21T.1	-	-	-	-	-	-	1	-	3	-	1
26AENG11T/21T.2	-	-	-	-	-	-	1	-	3	-	1
26AENG11T/21T.3	-	-	-	-	-	-	1	-	3	-	1
26AENG11T/21T.4	-	-	-	-	-	-	1	-	3	-	1
26AENG11T/21T.5	-	-	-	-	-	-	1	-	3	-	1

Title of the Course:	Applied Physics	
Category:	BS	
Year:	I	
Semester:	I	II
Course Code:	26APHY11T	26APHY21T
Branch/es:	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE (IoT & CSBCT)	EEE, ECE, AI&DS, CSE(AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	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 – Intensity distribution in Fraunhofer diffraction due to single slit & double slit - Diffraction Grating (Qualitative) - 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 and ionic (Quantitative), orientation 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.

Textbooks:	
1	M. N. Avadhanulu, P. G. Kshirsagar & T. V. S. Arunmurthy. A Textbook of Engineering Physics. 11th Ed., S. Chand Publications, 2019

Reference Books:	
1.	K. Thyagarajan. Applied Physics. McGraw Hill Education (India) Private Ltd, 2020
2.	K. Palanisamy. Applied Physics. Sci. Tech, 2017
3.	K. Vijaya Kumar. A Textbook of Engineering Physics. S. Chand Publications, 2018
4.	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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26APHY11T/21T.1	2	2	1	1	-	-	-	-	-	-	1
26APHY11T/21T.2	2	2	1	1	-	-	-	-	-	-	1
26APHY11T/21T.3	3	3	2	2	-	-	-	-	-	-	1
26APHY11T/21T.4	3	2	1	2	-	-	-	-	-	-	1
26APHY11T/21T.5	2	2	1	1	-	-	-	-	-	-	1

Title of the Course:	Matrices and Calculus
Category:	BS
Year:	I
Semester:	I
Course Code:	26AMAT11T
Branch/es:	Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	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 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.	apply multiple integrals and vector differential operators such as gradient, divergence, and curl in mathematical and engineering problems.
5.	apply vector integral theorems in evaluating double and triple integrals

Unit 1	**Matrices**	**11**

Rank of a matrix by echelon form, Inverse of a matrix by Gauss-Jordan method, solving system of homogeneous and non-homogeneous linear equations.

Unit 2	**Eigen values and Eigen vectors**	**11**

Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem. Diagonalization of a matrix.

Unit 3	**Multivariable calculus**	**12**

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 & Vector differentiation**	**12**

Multiple Integrals: Evaluation of double integrals, evaluation of triple integrals (Cartesian form). 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.

Unit 5	**Vector Integration**	**12**

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.

Textbooks:	
1.	B. S. Grewal. Higher Engineering Mathematics, 44th Ed., Khanna Publishers, 2017.

Reference Books:	
1.	E. Kreyszig. Advanced Engineering Mathematics. 10th Ed., John Wiley & Sons, 2011.
2.	B. V. Ramana. Higher Engineering Mathematics. Mc Graw Hill Education
3.	G. B. Thomas. Maurice D. Weir and Joel Hass. Thomas Calculus, 13th Ed., Pearson Publishers, 2013
4.	R.L. Garg Nishu Gupta. Engineering Mathematics Volumes-I &II. Pearson Education
5.	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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26AMAT11T.1	2	2	1	1	-	-	-	-	-	-	1
26AMAT11T.2	3	2	1	2	-	-	-	-	-	-	1
26AMAT11T.3	3	3	2	2	-	-	-	-	-	-	1
26AMAT11T.4	2	2	1	1	-	-	-	-	-	-	1
26AMAT11T.5	3	2	1	2	-	-	-	-	-	-	1

Title of the Course:	Chemistry	
Category:	BS	
Year:	I	
Semester:	I	II
Course Code:	26ACHE11T	26ACHE21T
Branch/es:	EEE, ECE, AI&DS, CSE(AI)	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE (IoT & CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	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 Ψ2, particle in one-dimensional box, molecular orbital theory – bonding in homo and heteronuclear diatomic molecules – energy level diagrams of O2 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 – Carbon Nano Tubes (CNTs) 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		

Textbooks:	
1	Jain, Jain. Engineering Chemistry. 16th Ed., Dhanpat Rai, 2013.

Reference Books:	
1.	Atkins, Peter, Julio de Paula, and James Keeler. Atkins' Physical Chemistry. 10th Ed., Oxford University Press, 2010.
2.	Skoog, Douglas A., F. James Holler, Stanley R. Crouch. Principles of Instrumental Analysis. 7th ed., Cengage Learning, 2016.
3.	Lee, J.D. Concise Inorganic Chemistry. 5th ed., Wiley-Blackwell, 1999.
4.	Billmayer, Fred W. Jr. Textbook of Polymer Science. 3rd ed., Wiley, 2007.
5.	Sherif, S.A., D. Yogi Goswami, E.K. Stefanakos, A. Steinfeld. Handbook of Hydrogen Energy. CRC Press, 2014.
6.	Jing, Dengwei. Handbook of Hydrogen Energy. 1st Ed., Wiley-VCH, 2023.
7.	Fowler, Bruce A. Electronic Waste: Toxicology and Public Health Issues. 1st Ed., Academic Press, 2017

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
26ACHE11T/21T.1	2	2	1	1	-	-	-	-	-	-	1
26ACHE11T/21T.2	3	2	1	2	-	-	-	-	-	-	1
26ACHE11T/21T.3	3	2	1	2	-	-	-	-	-	-	1
26ACHE11T/21T.4	3	2	1	2	-	-	-	-	-	-	1
26ACHE11T/21T.5	3	3	2	2	-	-	-	-	-	-	1

Title of the Course:	Engineering Chemistry
Category:	BS
Year:	I
Semester:	I
Course Code:	26ACHE12T
Branch/es:	CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:
The course aims to familiarize students with engineering chemistry and its various applications, providing a solid foundation for understanding its practical relevance. It imparts essential knowledge on hard water softening processes and the standards for drinking water. Students are also trained in electrochemistry, corrosion control, and the properties and applications of different functional materials. Additionally, the course emphasizes the importance of phase equilibria in understanding system behavior.

Course outcomes:	
At the end of the course, the student will be able to	
1.	explain water hardness and its treatment methods.
2.	apply electrochemical principles to develop solutions for energy storage and corrosion prevention
3.	demonstrate an understanding of polymer properties and fuel technologies through practical applications.
4.	differentiate the characteristics and uses of lubricants and building materials across various industries.
5.	analyze the applications of the phase rule in metallurgy and nanomaterials in medicine.

Unit 1	**Water technology**	**9**
Soft and hardwater, estimation of hardness of water by EDTA method, estimation of dissolved Oxygen - Boiler troubles – Priming, foaming, scale and sludge, caustic embrittlement, industrial water treatment – specifications for drinking water, Bureau of Indian Standards (BIS) and World Health Organization (WHO) standards, ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis		

Unit 2	**Electrochemistry and corrosion**	**8**
Electrodes – electrochemical cell, Nernst equation, cell potential calculations. Primary cells – Zinc-air battery, secondary cells – lithium-ion batteries - working principle of the batteries including cell reactions; Fuel cells - basic concepts, principle and working of Hydrogen-Oxygen fuel cell. Corrosion: Introduction to corrosion, dry and electrochemical corrosion, differential aeration cell corrosion, factors affecting the corrosion, corrosion control - cathodic and anodic protection		

Unit 3	Polymers and fuel chemistry	8
Introduction to polymers, functionality of monomers, Thermoplastics and Thermo-setting plastics, properties and applications of PVC and Bakelite. Fibres - polyesters, mechanical requirements, crystallinity, stress strain curves. Biodegradable polymers - properties and applications of Poly Glycolic Acid (PGA), Polylactic Acid (PLA). Fuels – types of fuels, calorific value of fuels, numerical problems based on calorific value; liquid Fuels, refining of petroleum, octane and cetane number, determination of calorific value of solids by Bomb calorimeter		

Unit 4	Modern engineering materials	9
Refractories - classification, properties, factors affecting the refractory materials and applications. Lubricants - classification, functions of lubricants, mechanism, properties of lubricating oils – Viscosity index, flash point, fire point, cloud point, saponification and applications. Building materials - manufacturing of Portland cement, constituents, setting and hardening of cement.		

Unit 5	Phase rule and nanomaterials	8
Phase rule - definition of terms – phase, components, degree of freedom - derivation of Gibbs phase rule, significance and limitations of phase rule. Phase diagrams – one component system – H_2O – two component system – eutectic systems - Pb-Ag system. Nanomaterials – classification, properties and applications of nanomaterials. Carbon based nanomaterials - Carbon Nano Tubes (CNTs) and Graphene - properties and applications.		

Textbooks:	
1.	Jain, Jain. Engineering Chemistry. 16th ed., Dhanpat Rai, 2013.

Reference Books:	
1.	Puri, B.R., L.R. Sharma, and M.S. Pathania. Principles of Physical Chemistry. 48th ed., Vishal Publishing Company, 2021.
2.	Taylor, H.F.W. Cement Chemistry. 2nd Ed., Thomas Telford Publications, 1997.
3.	Billmayer, Fred W. Jr. Textbook of Polymer Science. 3rd Ed., Wiley, 2007.
4.	Dara, S.S., and S.S. Umare. A Textbook of Engineering Chemistry. New Ed., S. Chand Publishing, 2004.
5.	Atkins, Peter, Julio de Paula, and James Keeler. Atkins' Physical Chemistry. 10th ed., Oxford University Press, 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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26ACHE12T.1	2	2	1	1	-	-	-	-	-	-	1
26ACHE12T.2	3	2	1	2	-	-	-	-	-	-	1
26ACHE12T.3	3	2	1	2	-	-	-	-	-	-	1
26ACHE12T.4	3	2	1	2	-	-	-	-	-	-	1
26ACHE12T.5	3	3	2	2	-	-	-	-	-	-	1

Title of the Course:	Computational Problem Solving
Category:	ES
Year:	I
Semester:	I
Course Code:	26ACSE11T
Branch/es:	Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	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.	Develop programs using pointers, structures and unions. 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, bubble and Selection) 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.		

Textbooks:	
1.	C Programming and Data Structures. B.A. Forouzan, R. Gilberg, Cengage learning, Indian Edition,2006.
2.	C and Data Structures, E. Balaguruswamy, Tata McGraw Hill,7th Edition,2017.

Reference Books:	
1.	LET US C, Yeswanth Kanitkar, BPB Publication, 9th Edition, 2008.
2.	Byron Gottfried, Schaum 's Outline of Programming with C, McGraw-Hill, 2nd Edition,1996.
3.	Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India, 2nd Edition,1988.
4.	A K Sharma —Computer Fundamentals and Programming, University Press, 2nd Edition, 2018.
5.	Pradeep Dey and Manas Ghosh, Programming in C, Oxford Press, 2ndEdition, 2017.
6.	ReemaTharaja —Introduction to C Programming, OXFORD Press, 2nd Edition, 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
26ACSE11T.1	3	2	1	2	-	-	-	-	-	-	-
26ACSE11T.2	3	3	2	2	-	-	-	-	-	-	-
26ACSE11T.3	3	3	2	2	-	-	-	-	-	-	3
26ACSE11T.4	3	2	1	2	-	-	-	-	-	-	3
26ACSE11T.5	3	3	3	3	-	-	-	-	-	-	3

Title of the Course:	Engineering Drawing	
Category:	ES	
Year:	I	
Semester:	I	II
Course Code:	26AMEC11T	26AMEC21T
Branch/es:	CE, EEE, ME, ECE, AI&DS, CSE(AI)	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE (IoT & CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	-	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)		

Textbooks:	
1.	N. D. Bhatt, Engineering Drawing, Charotar Publishing House

Reference Books:	
1.	Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill
2.	Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc
3.	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 Team work	Communication	Project management and finance	Life-long learning
26AMEC11T/21T.1	3	2	1	2	-	-	1	-	1	-	1
26AMEC11T/21T.2	3	2	1	2	-	-	1	-	1	-	1
26AMEC11T/21T.3	3	2	1	2	-	-	1	-	1	-	1
26AMEC11T/21T.4	3	2	1	2	-	-	1	-	1	-	1
26AMEC11T/21T.5	3	2	1	2	2	-	1	-	1	-	1

Title of the Course:	Engineering & IT Workshop	
Category:	ES	
Year:	I	
Semester:	I	II
Course Code:	26AMEC12L	26AMEC22L
Branch/es:	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE(IoT&CSBCT)	CE, EEE, ME, ECE, AI&DS, CSE(AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	-	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

Trade 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		

Trade 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		

Trade 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.		

Trade 4	Metal Joining process	9
Familiarity with different types of tools used in metal joining process and practice on a) Soldering (Preparation of Touch Sensor & Water Level Buzzer Indicator circuits) b) Brazing (preparation of Butt joint) c) Arc welding (Preparation of Lap joint)		

Trade 5	Plumbing and Fitting	3
Practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters. a) Tap Connection Practice of fitting tools. Familiarity with different types of tools used in fitting and do the following fitting exercise. b) Square-Fit		

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 Team work	Communication	Project management and finance	Life-long learning
26AMEC12L/22L.1	3	3	1	-	-	-	1	2	2	-	2
26AMEC12L/22L.2	3	3	2	-	-	-	1	2	2	-	2
26AMEC12L/22L.3	3	3	1	-	-	-	1	2	2	-	2
26AMEC12L/22L.4	3	3	1	-	-	-	1	2	2	-	2
26AMEC12L/22L.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.
2.	illustration of installation and un-installation of Windows and Linux operating systems and also perform troubleshooting of various hardware and software components
3.	discuss about Web browsers to access Internet, Search Engines
4.	apply and use word processor; spread sheet, presentation and data storage tools
5.	analyze and Implement Cloud based productivity enhancement and collaboration tools

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 be able. Student should 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 color, 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, adjusting the cell size, applying formulas and functions, preparing charts, and 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		

Textbooks:	
1.	Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2nd edition, 2012.
2.	Upgrading and Repairing PC 's, ,Scott Muller QUE, Pearson Education, 22nd edition, 2015

Reference Books:	
1.	IT Essentials PC Hardware and Software Companion Guide, CICSO Networking Academy, 5th edition, 2014.
2.	Network Your Computer & Devices Step by Step, Ciprian Rusen, Microsoft Press, 1st edition, 2010.

3.	Troubleshooting, Maintaining & Repairing PCs, 5th Edition, Bigelow, TMH, 2001.
4.	Introduction to Computers, Peter Norton, 6/e, Mc Graw Hill, 2006.
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
26AMEC12L/22L.1	3	2	1	2	-	-	-	-	-	-	-
26AMEC12L/22L.2	3	2	1	2	-	-	-	-	-	-	-
26AMEC12L/22L.3	3	3	2	2	-	-	-	-	-	-	-
26AMEC12L/22L.4	3	2	1	2	-	-	-	-	-	-	-
26AMEC12L/22L.5	3	3	2	2	-	-	-	-	-	-	-

Title of the Course:	Basic Electrical and Electronics Engineering Lab	
Category:	ES	
Year:	I	
Semester:	I	II
Course Code:	26AEEE11L	26AEEE21L
Branch/es:	CE, EEE, ME, ECE, AI&DS, CSE (AI)	CSE, AI&ML, CSE(DS), CSE(AIML), CSE (IOT&CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course objectives:	
1.	To develop practical knowledge of electrical/electronic components, devices, instruments, and laboratory equipment.
2.	To apply electrical laws and measurement techniques for circuit verification and analysis.
3.	To evaluate the characteristics of DC shunt motors and single-phase transformers through laboratory tests.
4.	To analyze the V–I characteristics of PN junction and Zener diodes experimentally.
5.	To evaluate half-wave and full-wave rectifier performance using ripple factor and voltage regulation.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Identify and test electrical and electronic components, devices, and laboratory instruments.
2.	Apply fundamental electrical laws and measurement techniques to verify and analyze electrical circuits experimentally.
3.	Analyze the performance characteristics of DC shunt motors and single-phase transformers through laboratory tests.
4.	Analyze the V–I characteristics of PN junction and Zener diodes through experimental investigations.
5.	Evaluate the performance of half-wave and full-wave rectifiers using ripple factor and voltage regulation, with and without capacitive filters.

List of Experiments	
Any 10 of the following experiments are to be conducted	
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
26AEEE11L/21L.1	3	2	–	2	3	–	–	2	2	–	–
26AEEE11L/21L.2	3	3	–	3	3	–	–	–	2	–	–
26AEEE11L/21L.3	3	3	–	3	3	–	–	2	2	–	–
26AEEE11L/21L.4	3	3	–	3	3	–	–	–	2	–	–
26AEEE11L/21L.5	3	3	–	3	3	–	–	–	2	–	–

Title of the Course:	English Language Communication Skills Lab	
Category:	HSM	
Year:	I	
Semester:	I	II
Course Code:	26AENG11L	26AENG21L
Branch/es:	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE(IoT&CSBCT)	CE, EEE, ME, ECE, AI&DS, CSE(AI)

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
4.	Role Play / Situational Dialogues
5.	Oral Presentation
6.	Information Transfer
7.	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
4.	www.englishinteractive.net
5.	https://www.britishcouncil.in/english/online
6.	http://www.letstalkpodcast.com/
7.	https://www.youtube.com/c/mmmEnglish_Emma/featured
8.	https://www.youtube.com/c/ArnelsEverydayEnglish/featured
9.	https://www.youtube.com/c/engvidAdam/featured
10.	https://www.youtube.com/c/EnglishClass101/featured
11.	https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
12.	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

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
26AENG11L/21L.1	-	-	-	-	-	-	-	1	3	-	1
26AENG11L/21L.2	-	-	-	-	-	-	-	1	3	-	1
26AENG11L/21L.3	-	-	-	-	-	-	-	1	3	-	1
26AENG11L/21L.4	-	-	-	-	-	-	-	1	3	-	1
26AENG11L/21L.5	-	-	-	-	-	-	-	1	3	-	1

Title of the Course:	Applied Physics Lab	
Category:	BS	
Year:	I	
Semester:	I	II
Course Code:	26APHY11L	26APHY21L
Branch/es:	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE (IoT & CSBCT)	EEE, ECE, AI&DS, CSE(AI)

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:	
Any 10 of the following experiments are to be conducted	
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.	Determination 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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26APHY11L/21L.1	3	2	1	2	3	-	-	-	-	-	3
26APHY11L/21L.2	3	2	1	2	3	-	-	-	-	-	3
26APHY11L/21L.3	3	3	2	2	3	-	-	-	-	-	3
26APHY11L/21L.4	3	3	2	2	3	-	-	-	-	-	3

Title of the Course:	Chemistry Lab	
Category:	BS	
Year:	I	
Semester:	I	II
Course Code:	26ACHE11L	26ACHE21L
Branch/es:	EEE, ECE, AI&DS, CSE(AI)	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE(IoT&CSBCT)

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:

Any 10 of the following experiments are to be conducted

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.
13.	Estimation of mixture of acids by Conductometric titration.
14.	Determination of strength of an acid by pH metric method.
15.	Extraction of copper from e-waste material by acid leaching method.

Reference 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 Team work	Communication	Project management and finance	Life-long learning
26ACHE11L/21L.1	2	2	-	1	1	-	-	1	-	-	3
26ACHE11L/21L.2	2	2	-	1	1	-	-	1	-	-	3
26ACHE11L/21L.3	3	2	-	2	1	-	-	1	-	-	3
26ACHE11L/21L.4	3	3	-	2	1	-	-	1	-	-	3
26ACHE11L/21L.5	3	3	-	2	1	-	-	1	-	-	3

Title of the Course:	Engineering Chemistry Lab
Category:	BS
Year:	I
Semester:	I
Course Code:	26ACHE12L
Branch/es:	CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course objectives:
The course aims to equip students with the skills to perform quantitative analysis for determining water hardness, oxygen levels, and metal content in various samples. It provides hands-on experience in the preparation and characterization of synthetic polymers and nanomaterials, along with the application of thermodynamic principles in constructing phase diagrams and determining the calorific value of fuels. Additionally, students will learn to assess material properties using appropriate instrumentation and analytical techniques.

Course outcomes:	
At the end of the course, the student will be able to	
1.	estimate Iron by colorimetry and volumetric methods.
2.	determine the strength of an acid in secondary battery.
3.	analyse the hardness and dissolved oxygen levels of various water samples.
4.	synthesize polymer and nano materials.
5.	evaluate the physical properties of functional materials.

List of Experiments	
Any 10 of the following experiments are to be conducted	
1.	Determination of Hardness of a groundwater sample.
2.	Estimation of Dissolved Oxygen by Winkler's method.
3.	Determination of strength of an acid in Pb-acid battery.
4.	Preparation of Poly Methyl Methacrylate (PMMA).
5.	Determination of percentage of Iron in cement sample by Colorimetry.
6.	Preparation of PGMA.
7.	Phase equilibria: Construction of the phase diagram using cooling curves or ignition tube method: simple eutectic system.
8.	Estimation of Ferrous by Dichrometry.
9.	Determination of percentage moisture content in a coal sample.
10.	Determination of viscosity of lubricating oil by Redwood viscometer 1.
11.	Determination of calorific value of solid fuels by Bomb calorimeter.
12.	Preparation of nanomaterials by precipitation method.
13.	Estimation of mixture of acids by Conductometric titration.
14.	Estimation of active chlorine content in bleaching powder by Iodometry.
15.	Determination of strength of an acid by pH metric method.

Reference 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.
3.	Fries, Jons August. Investigations in the Use of the Bomb Calorimeter. Vols. 86-100, Nabu Press, 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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26ACHE12L.1	2	2	-	1	1	-	-	1	-	-	3
26ACHE12L.2	3	2	-	2	1	-	-	1	-	-	3
26ACHE12L.3	3	3	-	2	1	-	-	1	-	-	3
26ACHE12L.4	3	3	-	2	1	-	-	1	-	-	3
26ACHE12L.5	3	2	-	2	1	-	-	1	-	-	3

Title of the Course:	Computational Problem Solving Lab
Category:	ES
Year:	I
Semester:	I
Course Code:	26ACSE11L
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 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

List of Experiments

Exercise 1: Data Types, Variables, Constants and Input/Output

1. Display student details using different data types.
2. Calculate area and perimeter of a circle using constants.
3. Read employee salary and display annual salary.
4. Swap two numbers using a temporary variable.

Exercise 2: Operators, Expressions and Type Conversions

1. Perform arithmetic operations on two numbers.
2. Find the largest of two numbers using relational operators.
3. Demonstrate logical operators with conditions.
4. Convert integer division into floating-point division.

Exercise 3: Conditional Statements

1. Check whether the number is even or odd.
2. Find the largest among three numbers.
3. Check whether a year is leap year or not.
4. Display grade based on marks.

Exercise 4: Loop Control Statements

1. Print numbers from 1 to N using loops.
2. Find factorial of a number.
3. Generate multiplication tables.
4. Calculate sum of natural numbers.

Exercise 5: Unconditioned Jump Statements

1. Demonstrate use of break statement.
2. Demonstrate use of continue statement.
3. Print numbers using goto statement.
4. Exit from infinite loop using break.

Exercise 6: Arrays

1. Store and display array elements.
2. Find sum and average of array elements.
3. Find largest and smallest element in array.
4. Reverse array elements.

Exercise 7: Multidimensional Arrays

1. Matrix addition.
2. Matrix multiplication.
3. Find transpose of a matrix.
4. Calculate sum of all matrix elements.

Exercise 8: Strings

1. Find length of a string.
2. Copy one string into another.
3. Concatenate two strings.
4. Store and display array of strings.

Exercise 9: User Defined Functions

1. Create function for addition of two numbers.
2. Pass values to function and display result.
3. Demonstrate pass by value.
4. Demonstrate pass by reference.

Exercise 10: Storage Classes

1. Demonstrate auto storage class.
2. Demonstrate register storage class.
3. Demonstrate static variable behavior.
4. Demonstrate extern variable usage.

Exercise 11: Recursive Functions and Preprocessor Commands

1. Find factorial using recursion.
2. Generate Fibonacci series using recursion.
3. Use macros with #define.
4. Demonstrate conditional compilation.

Exercise 12: Array Elements as Function Arguments

1. Pass array to function and find sum.
2. Find maximum element using function.
3. Reverse array using function.
4. Search element in array using function.

Exercise 13: Pointers and Dynamic Memory Allocation

1. Demonstrate pointer basics.
2. Perform pointer arithmetic.
3. Allocate memory dynamically using malloc ().
4. Modify variable using call by reference.

Exercise 14: Structures

1. Store and display student details using structures.
2. Use array of structures.
3. Pass structure to functions.
4. Demonstrate nested structures.

Exercise 15: File Handling

1. Write data into a file.
2. Read data from a file.
3. Append new data into file.
4. Copy contents from one file to another.

Textbooks:	
1.	C Programming and Data Structures. B.A. Forouzan, R. Gilberg, Cengage learning, Indian Edition,2006.
2.	C and Data Structures, E. Balaguruswamy, Tata McGraw Hill,7th Edition,2017.

Reference Books:	
1.	LET US C, Yeswanth Kanitkar, BPB Publication, 9th Edition, 2008.
2.	A K Sharma —Computer Fundamentals and Programming, University Press, 2nd Edition, 2018.
3.	Pradeep Dey and Manas Ghosh, Programming in C, Oxford Press, 2nd Edition, 2017.

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
26ACSE11L.1	3	2	1	2	-	-	-	-	-	-	-
26ACSE11L.2	3	3	2	2	-	-	-	-	-	-	-
26ACSE11L.3	3	3	2	2	-	-	-	-	-	-	3
26ACSE11L.4	3	2	1	2	-	-	-	-	-	-	3
26ACSE11L.5	3	3	3	3	-	-	-	-	-	-	3

Title of the Course:	Language Elective	
Category:	HSM	
Year:	I	
Semester:	I	II
Course Code:	26ALAN11T	26ALAN21T
Branch/es:	CSE, AI&ML, CSE(DS), CSE(AI&ML), CSE (IoT&CSBCT)	CE, EEE, ME, ECE, AI&DS, CSE(AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	1	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 students 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 languages of their choice.
2.	Understand cultural diversity
3.	Apply a variety of reputed online courses and enjoy flexible learning
4.	Acquiring 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.

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 Team work	Communication	Project management and finance	Life-long learning
26ALAN11T/21T.1	-	-	-	-	-	-	-	-	2	-	1
26ALAN11T/21T.2	-	-	-	-	-	-	-	-	2	-	1
26ALAN11T/21T.3	-	-	-	-	-	-	-	-	2	-	1
26ALAN11T/21T.4	-	-	-	-	-	-	-	-	2	-	1
26ALAN11T/21T.5	-	-	-	-	-	-	-	-	2	-	1

Title of the Course:	Differential Equations and Transform Techniques
Category:	BS
Year:	I
Semester:	II
Course Code:	26AMAT21T
Branch/es:	Common to all branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	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 the 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 with constant Coefficients**	**12**

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**	**12**

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, method of separation of variables for first and second order equations.

Unit 3	**Laplace transforms**	**12**

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). Inverse Laplace transforms (without proofs) – Convolution theorem (without proof).

Unit 4	**Fourier Transforms**	**11**

Fourier Transforms: Fourier integrals - Fourier cosine and sine integrals - Fourier transform - sine and cosine transform, Finite Fourier sine and cosine transforms

Unit 5	Applications of Differential Equations	12
Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients. Applications of Fourier transforms to Partial Differential Equations.		

Textbooks:	
1	B. S. Grewal. Higher Engineering Mathematics. 44th Ed., Khanna Publishers, 2017.

Reference Books:	
1.	E. Kreyszig. Advanced Engineering Mathematics. 10th Ed., John Wiley & Sons, 2011.
2.	B. V. Ramana. Higher Engineering Mathematics. Mc Graw Hill Education.
3.	G. B. Thomas, Maurice D. Weir and Joel Hass. Thomas Calculus. 14th Ed., Pearson Publishers, 2022.
4.	D. G. Zill. Advanced Engineering Mathematics. 6th Ed., Jones and Bartlett, 2016
5.	Glyn James. Advanced Modern Engineering Mathematics. 5th Ed., Pearson publishers, 2018.
6.	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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26AMAT21T.1	2	2	1	1	-	-	-	-	-	-	1
26AMAT21T.2	3	2	1	2	-	-	-	-	-	-	1
26AMAT21T.3	3	2	1	2	-	-	-	-	-	-	1
26AMAT21T.4	3	3	2	2	-	-	-	-	-	-	1
26AMAT21T.5	3	2	1	2	-	-	-	-	-	-	1

Title of the Course:	Engineering Physics
Category:	BS
Year:	I
Semester:	II
Course Code:	26APHY22T
Branch/es:	CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
1.	To impart knowledge in basic concepts of Ultrasonics and elasticity.
2.	To familiarize the Crystal structures and X-ray diffraction.
3.	To explain the significant concepts of dielectrics, magnetic materials, and types of semiconductors
4.	To describe the lasers and optical fibers in the field of engineering and their potential applications.

Course outcomes:	
At the end of the course, the student will be able to	
1.	apply ultrasonic waves and elastic principles in engineering
2.	describe crystal structures and X-ray diffraction
3.	describe polarization of dielectrics and magnetic materials.
4.	apply laser and fiber optics principles.
5.	describe the various types of semiconductors in engineering field

Unit 1	**Ultrasonics and Elasticity**	**9**

Ultrasonics: Introduction- Properties- Production of ultrasonic waves by magnetostriction and Inverse piezoelectric methods –Detection of ultrasonic waves by Kund's tube and Flame methods - Acoustic grating -Non-Destructive Testing – medical applications (Sonogram).

Elasticity: stress& strain - types of stress and strain- stress & strain curve - Hooke's law- Poisson's ratio-different elastic moduli: expression for young's modulus (Y), Bulk modulus (K) and rigidity modulus (η) - strain energy.

Unit 2	**Crystallography and X-ray diffraction**	**10**

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**	**9**

Dielectric Materials: Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors – Types of polarizations– Electronic and Ionic (Quantitative), Orientation 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**	**9**

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 Devices**	**9**

Formation of energy bands – classification of solids on the basis of 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. P-N Junction Diode, Voltage-Ampere Characteristic, LED (Light Emitting Diode), Photo diode.

Textbooks:	
1	M. N. Avadhanulu, P. G. Kshirsagar & T. V. S. Arunmurthy, A Textbook of Engineering Physics, S. Chand Publications,11th edition, 2019

Reference Books:	
1.	K. Thyagarajan, Applied Physics, McGraw Hill Education (India) Private Ltd, 2019
2.	Gerd Keiser, Optical Fiber Communications, 4/e, Tata Mc Graw Hill, 2008
3.	Charles Kittel, Introduction to Solid State Physics, Wiley Publications, 2011
4.	P.K. Palanisamy, Engineering Physics, Scitech Publications, Second edition, 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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26APHY22T.1	3	2	1	2	-	-	-	-	-	-	1
26APHY22T.2	2	2	1	1	-	-	-	-	-	-	1
26APHY22T.3	3	3	2	2	-	-	-	-	-	-	1
26APHY22T.4	3	2	1	2	-	-	-	-	-	-	1
26APHY22T.5	2	2	1	1	-	-	-	-	-	-	1

Title of the Course:	Basic Civil Engineering
Category:	ES
Year:	I
Semester:	II
Course Code:	26ACIV22T
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student to	
1.	To understand the importance of civil engineering in infrastructure and national development.
2.	To identify structural, geotechnical, transportation, water resources, and environmental applications.
3.	To classify and study the properties of stones, timber, metals, glass, plastics, and cement.
4.	To learn laboratory and field-testing methods for aggregates, bricks, steel, and cement.
5.	To apply safety, sustainability, and professional responsibility in construction practices

Course outcomes:	
At the end of the course, the student will be able to	
1.	Understanding fundamental Civil Engineering concepts and building planning basics.
2.	Select appropriate building materials based on structural requirements.
3.	Perform standard tests on steel, cement, aggregates, and masonry blocks.
4.	Recommend sustainable and eco-friendly construction materials.
5.	integrate material science knowledge into safe and durable structural design.

Unit 1	**Scope of Civil Engineering**	**8**
Civil engineering scope – Importance in infrastructure, role in national development. Branches of civil engineering – Structural, geotechnical, transportation, water resources, environmental. Engineering ethics – Safety, sustainability, professional responsibility		

Unit 2	**Building stone & Wood**	**8**
Building stone: classifications, properties and structural requirements; **Wood and Wood products**: Introduction to wood macrostructure, sap wood and heart wood, defects and decay of timber, seasoning and preservation of timber, fire resisting treatment, introduction to wood products- veneers, plywood's, fibre board, particle board, block board, batten boards		

Unit 3	**Metals, Glass & Bitumen**	**8**
Metals: Steel: Important properties and uses of Iron (Cast iron, wroght iron and steel), Important tests on steel rebar, aluminium and copper. **Glass**: types and uses, gypsum: source, properties, uses; plastic: properties and uses, paint: types, distemper, varnish, Adhesive: Types, Bitumen: types, properties and tests.		

Unit 4	Aggregate, Bricks & Lime	10
Aggregate: Classification, Physical and mechanical properties, thermal properties of aggregate. **Bricks and Masonry Blocks**: Types, properties, field and laboratory tests to evaluate quality. **Lime**: classification, properties		

Unit 5	Cement & Flyash	10
Cement: types, Portland cement: chemical composition of raw material, bogue compounds, hydration of cement, role of water in hydration, testing of cements, Fly **ash**: properties and use in manufacturing of bricks and cement.		

Textbooks:	
1.	Basic Civil Engineering, Bhavikatti, S. S., New Age Publications,2019.

Reference Books:	
1.	Construction Technology, Chudley, R., Longman Group, England, 2014.
2.	Basic Civil and Environmental Engineering, C.P. Kausik, New Age publication 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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26ACIV22T.1	3	2	1	2	1	3	1	1	2	1	3
26ACIV22T.2	3	2	2	2	3	2	1	1	2	1	3
26ACIV22T.3	3	3	2	3	3	2	1	2	2	2	3
26ACIV22T.4	3	3	3	2	3	2	2	1	2	2	3
26ACIV22T.5	3	2	3	2	3	2	2	1	2	2	3

Title of the Course:	Engineering Mechanics
Category:	ES
Year:	I
Semester:	II
Course Code:	26ACIV21T
Branch/es:	CE&ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student	
1.	To understand the fundamental principles of force systems, equilibrium, and free body diagrams.
2.	To analyze plane trusses and apply laws of friction in engineering problems.
3.	To determine centroids, centers of gravity, and moments of inertia for simple and composite sections.
4.	To study rectilinear and curvilinear motion, conservation principles, and energy methods.
5.	To learn stress–strain relationships, elastic constants, resilience, and applications in structural members.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Explain force systems, equilibrium, and apply Varignon's theorem in problem solving.
2.	Analyze structures like plane trusses using the method of joints and sections and understand the principles of friction in engineering applications.
3.	Determine the centroid, center of gravity, and moment of inertia for various surfaces and volumes, applying these concepts to engineering problems.
4.	Apply equations of motion, conservation of energy, and momentum in dynamic systems.
5.	Determine stresses, strains, elastic moduli, and strain energy in structural members.

Unit 1	**Basics of Engineering Mechanics**	**9**
Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force and non-coplanar systems.		

Unit 2	**Analysis of Trusses and Friction**	**11**
Analysis of Trusses Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections. Friction: Laws of friction, types of friction, equilibrium of force systems involving frictional forces, wedge friction. Free body diagrams involving frictional forces		

Unit 3	Surfaces, Volumes and Moment of Inertia	12
Surfaces and Volumes: Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity - cylinder, cone, sphere, Pappus–Guldin Theorems. Moment of Inertia: Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia.		

Unit 4	Dynamics	11
Equations of motion for rigid bodies, constant and variable acceleration, rectilinear and curvilinear motion, motion under gravity -projectile motion, D'Alembert's principle in rectilinear translation, Ideal Systems: Principle of conservation of energy, power and linear momentum.		

Unit 5	Stresses and Strains	10
Concept of stress and strain- Principle-Stress and Strain Diagram - Elasticity and Plasticity–Types of stresses and strains – Hooke's law–stress –strain diagram for mild steel– Working stress –Factor of safety –Lateral strain, Poisson's ratio and volumetric strain –Elastic moduli and the relationship between them.		

Textbooks:	
1.	Engineering Mechanics, RK Bansal, Laxmi publications, 6th Edition, 2020

Reference Books:	
1.	Engineering Mechanics: Statics and Dynamics by E. Nelson, C. Best, and W. McLean, McGraw Hill Publications, 8th Edition, 2020.
2.	Engineering Mechanics: Statics and Dynamics by RC Hibbeler, Pearson publications, 2023

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
26ACIV21T.1	3	3	2	1	-	-	-	-	1	1	-
26ACIV21T.2	3	3	2	2	1	-	-	-	2	2	-
26ACIV21T.3	3	2	2	2	-	-	-	-	-	2	-
26ACIV21T.4	3	2	2	2	-	-	-	-	1	1	-
26ACIV21T.5	3	3	2	2	1	-	-	-	1	2	-

Title of the Course:	Fundamentals of Electronic Devices & Circuits
Category:	ES
Year:	I
Semester:	II
Course Code:	26AECE21T
Branch/es:	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student	
1.	To analyze the transistor biasing circuits.
2.	To understand the amplification action of BJT and its h-parameter models.
3.	To understand the operation and Characteristics of FET.
4.	To analyze the FET biasing circuits.
5.	To understand the working principles of special purpose electronic diodes.

Course outcomes:	
At the end of the course, the student will be able to	
1.	analyze the transistor biasing circuits.
2.	describe the amplification action of BJT and its h-parameter models.
3.	analyze the operation and characteristics of FET
4.	analyze the FET biasing circuits.
5.	understand the working principles of special purpose electronic diodes.

Unit 1	**Transistor Biasing**	**9**
Bias Stability - Need for Stabilization – Stabilization Factors (s, s^1, s^{11}) – Types of Biasing-Fixed Bias, Collector to Base bias, Emitter-Stabilized bias, Voltage Divider Bias. Simple numerical problems		

Unit 2	**Single Stage Amplifiers**	**9**
Single Stage Transistor Amplifier- Transistor Amplifying Action – Practical circuit of Transistor Amplifier-Classification of Amplifiers- Amplifier equivalent circuit – Concept of h-parameters – Analysis of CE, CB and CC Amplifiers – Comparisons of CE, CB and CC. Simple numerical problems.		

Unit 3	**Field Effect Transistors**	**9**
Construction of JFETs – Types – Operation - Characteristics - Construction and Characteristics of MOSFETs - Depletion type MOSFETs–Enhancement type MOSFET.		

Unit 4	**FET Biasing**	**9**
FET Biasing: Fixed Bias Configuration–Self Bias Configuration–Voltage Divider Biasing. Simple numerical problems.		

Unit 5	**Special Purpose Electronic Devices**	**9**
LED, Tunnel Diode, PIN Diode, SCR, UJT, Photo diode, Photo transistor, Varactor diode, and their applications.		

Textbooks:	
1.	Electronic Devices and Circuits, David A Bell, Fifth Edition, 2008, Oxford University Press.

Reference Books:	
1.	Electronic Devices and Circuits, J. Millman and Halkias, 1991 edition, 2008, TMH.
2.	Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, 9th edition, PHI.
3.	Principles of Electronics, V. K. Mehta, S. Chand Publications2004
4.	Integrated Electronics, Analog and Digital Circuits and Systems, J. Millman and Halkias, TMH.
5.	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 Team work	Communication	Project management and finance	Life-long learning
26AECE21T.1	-	3	2	-	-	-	-	-	-	1	1
26AECE21T.2	-	3	3	-	1	-	-	-	-	1	1
26AECE21T.3	-	3	2	-	1	-	-	-	-	2	2
26AECE21T.4	-	3	2	-	1	-	-	-	-	2	2
26AECE21T.5	-	3	2	-	1	-	-	-	-	1	1

Title of the Course:	Electrical Circuits
Category:	ES
Year:	I
Semester:	II
Course Code:	26AEEE22T
Branch/es:	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student	
1.	To learn a number of powerful engineering circuit analysis techniques such as nodal analysis, mesh analysis and graph theory
2.	To learn the concepts of reactance and impedance to analyze simple AC circuits and methods to calculate power and power factor.
3.	To analyze two port network parameters.
4.	To solve complex circuits using Network theorems.
5.	To understand frequency response in electrical circuits and clear understanding of the important parameters of coupled circuits.

Course outcomes:	
At the end of the course, the student will be able to	
1.	apply the concepts of mesh and nodal analysis and analyze electrical circuits using graph theory.
2.	explain the basic concepts of 1-phase ac circuits.
3.	determine two port network parameters for electrical circuits.
4.	analyze the electrical circuits using network theorems.
5.	analyze resonant circuits and coupled circuits.

Unit 1	**Network Analysis**	**8**
Star delta conversion–Problems, source transformation–Problems, voltage division and current division, –Problems, Mesh and Super Mesh–Problems, Nodal and Super Node Analysis-Problems, Network Topology– Graph – Tree, Basic Cut-set and Basic Tie-set Matrices for Planar Networks – Problems, Duality & Dual Networks- Problems.		

Unit 2	**Fundamentals of 1-ϕ AC circuits**	**8**
Time period, frequency, Peak value, peak–peak value. Determination of Average, R.M.S Values, Peak and Form Factor for square, triangular, sawtooth and sinusoidal waveforms, Phase and Phase Difference, j-notation, Steady State Analysis of R, L and C with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Real and Reactive Power, Complex Power, Concept of Power Factor. Analysis of Single-Phase AC Circuits (RL, RC and RLC Series circuits)-Problems.		

Unit 3	Two Port Networks	9
Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations, Condition for Reciprocity and Symmetry-inter connections–Problems.		

Unit 4	Network Theorems	8
Superposition, Thevenin 's, Norton 's, Maximum Power Transfer, Millman's, Reciprocity and Tellegen's Theorems for DC and AC excitations–Problems.		

Unit 5	Resonance & magnetically coupled circuits	8
Resonance – Definition, Resonant frequency, bandwidth and Q-factor for series and parallel resonant Circuits-Problems. Magnetically Coupled Circuits: Coupled circuits – self & mutual inductance, Coefficient of coupling- Dot convention, -Analysis of Coupled Circuits (Series aiding, series opposing, parallel aiding and parallel opposing)–Problems.		

Textbooks:	
1.	A. Sudhakar and Shyam Mohan S Palli, "Circuits and Networks" McGraw Hill, 2015.

Reference Books:	
1.	A. Chakrabarti, "Circuit Theory-Analysis and Synthesis", Dhanpat Rai & Co, 2011
2.	M.E. Van Valkenberg. "Network Analysis". 3rd edition, Pearson Publications, New Delhi 2006.
3.	William H. Hayt& Jack E. Kennedy & Steven M. Durbin. "Engineering Circuit Analysis". 8th edition, Tata McGraw Hill Company, 2013.
4.	J. A. Edminister & M. D. Nahvy. "Theory and Problems of Electric Circuits". 4th Edition Schaums Outline series, New Delhi Tata McGraw Hill Company, 2004.
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
26AEEE22T.1	3	3	–	2	–	–	–	–	–	–	–
26AEEE22T.2	3	2	–	2	–	–	–	–	–	–	–
26AEEE22T.3	3	3	–	2	–	–	–	–	–	–	–
26AEEE22T.4	3	3	–	2	–	–	–	–	–	–	–
26AEEE22T.5	3	3	–	2	–	–	–	–	–	–	–

Title of the Course:	Electronic Devices & Circuits
Category:	ES
Year:	I
Semester:	II
Course Code:	26AECE22T
Branch/es:	ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student to	
1.	understand the concepts of biasing and stabilization in BJT
2.	understand the concepts of FET, MOSFET and their biasing techniques.
3.	analyze the parameters like gain and impedances for single stage amplifier circuits.
4.	understand the small signal analysis of BJT and FET Amplifiers.
5.	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		

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 Team work	Communication	Project management and finance	Life-long learning
26AECE22T.1	3	3	1	1	-	-	-	-	-	-	1
26AECE22T.2	3	3	1	1	-	-	1	-	-	-	1
26AECE22T.3	2	2	3	3	-	-	1	-	-	-	1
26AECE22T.4	3	3	2	2	-	-	-	-	-	-	1
26AECE22T.5	3	3	2	2	-	-	-	-	-	-	1

Title of the Course:	Network Analysis
Category:	ES
Year:	I
Semester:	II
Course Code:	26AEEE23T
Branch/es:	ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student	
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	**Basics of Electrical Circuits**	**9**
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**	**9**
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**	**9**
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**	**9**
Superposition, Thevenin‘s, Norton‘s, Maximum Power Transfer, Millman’s, Reciprocity problems (with independent dc sources only).		

Unit 5	Transient Analysis	9
Transient Response of RL, RC & RLC Series Circuits for dc and sinusoidal excitation using differential equation approach, problems (with independent sources only).		

Textbooks:	
1.	A. Sudhakar and Shyam Mohan S Palli, "Circuits and Networks" McGraw Hill, 2015.

Reference Books:	
1.	A. Chakrabarti, "Circuit Theory-Analysis and Synthesis", Dhanpat Rai & Co, 2011
2.	M.E. Van Valkenberg. "Network Analysis". 3rd edition, Pearson Publications, New Delhi 2006.
3.	William H. Hayt& Jack E. Kennedy & Steven M. Durbin. "Engineering Circuit Analysis". 8th edition, Tata McGraw Hill Company, 2013.
4.	J. A. Edminister & M. D. Nahvy. "Theory and Problems of Electric Circuits". 4th Edition Schaums Outline series, New Delhi Tata McGraw Hill Company, 2004.
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
26AEEE23T.1	3	3	–	2	–	–	–	–	–	–	–
26AEEE23T.2	3	3	–	2	–	–	–	–	–	–	–
26AEEE23T.3	3	3	–	2	–	–	–	–	–	–	–
26AEEE23T.4	3	3	–	2	–	–	–	–	–	–	–
26AEEE23T.5	3	3	–	3	–	–	–	–	–	–	–

Title of the Course:	Data Structures
Category:	ES
Year:	I
Semester:	II
Course Code:	26ACSE21T
Branch/es:	CSE, AI&DS, AI&ML, CSE(AI), CSE(DS), CSE(AIML), CSE(IoT&CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student to	
1.	Understand the significance of linear data structures in problem-solving and basic time/space complexity analysis.
2.	Create and manage linked lists to efficiently organize and manipulate data, emphasizing memory efficiency.
3.	Implement and apply stacks and queues to manage program flow and solve problems involving expression evaluation and backtracking.
4.	Understand the importance of non-linear data structures Tress and Graphs.
5.	Explore basic concepts of hashing and apply it to solve problems requiring fast data retrieval and management

Course outcomes:	
At the end of the course, the student will be able to	
1.	Interpret the role of linear data structures in organizing and accessing data efficiently
2.	Apply linked lists for dynamic data storage and understanding of memory allocation.
3.	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4.	Analyze queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between de-queues and priority queues and apply them appropriately to solve data management challenges.
5.	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific Problems.

Unit 1	**Introduction to Linear Data Structures**	**9**
Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures.		

Unit 2	**Linked Lists**	**9**
Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.		

Unit 3	Stacks, Queues and De-queues	9
Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks. Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues. De-queues: Introduction to De-queues (double-ended queues), Operations on De-queues and their applications.		

Unit 4	Introduction to non-linear Data Structures	9
Trees: Introduction to Trees, Binary Trees, creation of binary tree, Operations on Binary Tree. Introduction to Binary Search Tree, Operations on Binary Search Trees, Tree Traversals. Graphs: Defining graph, basic terminology, graph representation.		

Unit 5	Hashing	9
Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.		

Textbooks:	
1	Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition,1997.
2	Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Silicon Press, 2nd Edition, 2008

Reference Books:	
1.	Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders, 1st Edition, 2008.
2.	C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft, 2nd Edition, 1987
3.	Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum, 3rd Edition, 2023.
4.	Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, 4th Edition,2022.
5.	Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms, Robert Sedge wick, 3rd Edition,2001.

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
26ACSE21T.1	3	2	1	2	2	-	-	-	-	-	3
26ACSE21T.2	3	2	1	2	2	-	-	-	-	-	3
26ACSE21T.3	3	3	3	3	2	-	-	-	-	-	3
26ACSE21T.4	3	3	3	3	2	-	-	-	-	-	3
26ACSE21T.5	3	3	3	3	2	-	-	-	-	-	3

Title of the Course:	Python Programming
Category:	ES
Year:	I
Semester:	II
Course Code:	26ACSE22T
Branch/es:	ME, CSE, AI&DS, AI&ML, CSE(AI), CSE(DS), CSE(AIML), CSE(IoT&CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course objectives:	
This course will enable the student to	
1.	Understand Python programming fundamentals and control structures.
2.	Apply lists, tuples, dictionaries, sets, and functions in Python.
3.	Develop modular Python programs using functions and modules.
4.	Implement text-file processing, string handling, and exception handling.
5.	Design object-oriented programs using classes, inheritance, encapsulation, and polymorphism.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Interpret computational problem solving and basic elements of python programming.
2.	Analyze python programming basics like lists, tuple, dictionaries, and sets
3.	Demonstrate functions in python programming.
4.	Evaluate string processing applications and exception handling in python programming
5.	Develop programs using class and object in python programming

Unit 1	**Introduction to python programming language**	**9**
Introduction to python programming language, literals, variables and identifiers, operators, expressions and data types. Control Structures: Boolean expressions, selection control, and iterative control.		

Unit 2	**Lists**	**9**
Lists: List structures, lists in python, iterating over lists in python, more on python lists. Dictionaries and sets, tuple.		

Unit 3	**Functions**	**9**
Functions: Program routines, more on functions, Module Design: Modules, Top-Down design, python modules.		

Unit 4	**Text Files**	**9**
Text Files: Text File, Using Text files, string processing, exception handling.		

Unit 5	**Introduction to object-oriented programming**	**9**
Introduction to Object oriented programming: class, three fundamental features of object-oriented programming, encapsulation-what is encapsulation, defining classes in python. Inheritance: subtypes, defining subclasses in python, Polymorphism: use of polymorphism.		

Textbooks:	
1.	Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, 1st Edition, 2012.

Reference Books:	
1.	Python Programming using problem solving approach, Reema Thareja, Oxford University press, 3rd Edition, 2025.
2.	Python Programming: An Introduction to Computer Science, John Zelle, Franklin, Beedle & Associates Inc.,3rd Edition, 2016.
3.	Think Python: How to think like a computer Scientist, Allen Downey 2nd Edition O'Reilly Publications, 2016.

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
26ACSE22T.1	3	2	1	2	-	-	-	-	-	-	3
26ACSE22T.2	3	3	2	2	-	-	-	-	-	-	3
26ACSE22T.3	3	2	1	2	-	-	-	-	-	-	3
26ACSE22T.4	3	3	2	3	-	-	-	-	-	-	3
26ACSE22T.5	3	3	3	3	-	-	-	-	-	-	3

Title of the Course:	Engineering Physics Lab
Category:	BS
Year:	I
Semester:	II
Course Code:	26APHY22L
Branch/es:	CE &ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course objectives:	
1.	To understand the role of Optical fiber parameters in engineering applications.
2.	To recognize the significance of laser and ultrasonics by studying its characteristics and its application in finding the particle size.
3.	To illustrate the semiconductor, magnetic and dielectric materials applications.
4.	To identify the various sensor applications

Course outcomes:	
At the end of the course, the student will be able to	
1.	evaluate the basic parameters of solid materials
2.	estimate the basic parameters of LASERS and optical fiber
3.	estimate the physical parameters of sensors and semiconductors
4.	evaluate the quantities of magnetic and dielectric materials

List of Experiments	
Any 10 of the following experiments are to be conducted	
1.	Determination of wavelength of LASER light using diffraction grating
2.	Determination of particle size using LASER.
3.	Determination of spring constant of springs using Coupled Oscillator
4.	Determination of Hall coefficient and carrier concentration of a given semiconductor by Hall effect.
5.	Determination of Dielectric constant of dielectric material by bridge resonance method.
6.	Determination of Magnetic field along the axis of a circular coil carrying current by stewrt-Gee ‘s method.
7.	Determination of Rigidity modulus of material of a wire-by Torsional pendulum.
8.	Determination of hysteresis loss of ferromagnetic material by tracing B-H Curve .
9.	Determination of the numerical aperture and acceptance Angle of a given optical fiber.
10.	Verification of laws of streched string- sonometer.
11.	Determination of frequency of electrically vibrated tuning fork-Melde’s experiment.
12.	Determination of pressure variation using Strain Guage sensor.
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 by using thermister.

Reference Books:	
1.	S. Balasubramanian, M.N. Srinivasan, A Text book 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 The World	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
26APHY22L.1	3	3	2	2	3	-	-	-	-	-	3
26APHY22L.2	3	2	1	2	3	-	-	-	-	-	3
26APHY22L.3	3	3	2	2	3	-	-	-	-	-	3
26APHY22L.4	3	2	1	2	3	-	-	-	-	-	3
26APHY22L.1	3	3	2	2	3	-	-	-	-	-	3

Title of the Course:	Engineering Mechanics Lab
Category:	ES
Year:	I
Semester:	II
Course Code:	26ACIV21L
Branch/es:	CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course objectives:	
1.	Verify the Law of Parallelogram and Triangle of Forces.
2.	Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
3.	Analyze the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

Course outcomes	
At the end of the course, the student will be able to	
1.	Understand the fundamental principles of force systems and equilibrium.
2.	Analyze and solve structural problems, including trusses and frictional systems.
3.	Determine properties of surfaces, volumes and moments of inertia.
4.	Analyze kinematics and kinetics of rigid bodies and apply principles of dynamics.
5.	Evaluate the principles of energy, momentum, and impulse in engineering

List of Experiments:	
Any 9 of the following experiments are to be conducted	
1.	Verification of Law of Parallelogram of Forces.
2.	Verification of Law of Triangle of Forces.
3.	Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4.	Determination of coefficient of Static and Rolling Frictions.
5.	Determination of Centre of Gravity of different shaped Plane Lamina.
6.	Verification of the conditions of equilibrium of a rigid body under the action of coplanar non concurrent, parallel force system with the help of a simply supported beam.
7.	Study of the systems of pulleys and draw the free body diagram of the system.
8.	Determine the acceleration due to gravity using a compound pendulum.
9.	Analysis of Pin jointed Trusses.
10.	Determine the Moment of Inertia of a Flywheel.
11.	Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

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
26ACIV21L.1	3	3	1	3	1	1	1	1	1	1	1
26ACIV21L.2	3	3	1	3	3	1	1	1	1	1	1
26ACIV21L.3	3	1	1	3	3	1	1	1	1	1	1
26ACIV21L.4	3	3	1	3	1	1	1	1	1	1	1
26ACIV21L.5	3	3	1	3	3	1	1	1	1	1	1

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Y.S.R District, AP – 516126, INDIA

Title of the Course:	Fundamentals of Electronic Devices & Circuits Lab
Category:	ES
Year:	I
Semester:	II
Course Code:	26AECE21L
Branch/es:	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course objectives:	
1.	To develop practical knowledge of semiconductor devices, rectifiers, clippers, and voltage regulators through experimental investigation.
2.	To study the characteristics and operation of BJT, JFET, MOSFET, photodiode, and phototransistor**.**
3.	To evaluate the frequency response and performance of BJT and FET amplifiers in different configurations.
4.	To develop practical skills in designing transistor biasing circuits and applying transistors as switches and amplifiers**.**
5.	To study the characteristics, operation, and applications of SCR and UJT through laboratory experiments.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Analyze the characteristics and regulation of Zener diodes, rectifiers, clippers and semiconductor devices.
2.	Analyze the input-output characteristics of BJT, JFET, MOSFET, photodiode and phototransistor.
3.	Evaluate the frequency response and performance of BJT and FET amplifiers in different configurations.
4.	Design transistor self-bias circuits and apply transistors as switches and amplifiers.
5.	Analyze the characteristics and operation of SCR and UJT devices and their applications.

List of Experiments:	
Any 10 of the following experiments are to be conducted	
1.	Load regulation and line regulation of Zener Diode.
2.	Full Wave bridge rectifier with and without filter.
3.	Input and Output Characteristics of Transistor in CE Configuration.
4.	Input and Output Characteristics of Transistor in CC Configuration.
5.	Characteristics of photodiode and photo transistor.
6.	JFET and 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.	Design self-bias circuit.
13.	Transistor as a switch.
14.	RC coupled Amplifier
15.	Diode clippers

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
26AECE21L.1	3	3	–	3	3	–	–	–	2	–	–
26AECE21L.2	3	3	–	3	3	–	–	–	2	–	–
26AECE21L.3	3	3	–	3	3	–	–	–	2	–	–
26AECE21L.4	3	3	3	3	3	–	–	–	2	–	–
26AECE21L.5	3	3	–	3	3	–	–	–	2	–	–

Title of the Course:	Electronic Devices & Circuits Lab
Category:	ES
Year:	I
Semester:	II
Course Code:	26AECE22L
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:	
Any 10 of the following experiments are to be conducted	
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 Team work	Communication	Project management and finance	Life-long learning
26AECE22L.1	3	2	1	2	-	-	1	3	-	-	-
26AECE22L.2	3	2	1	2	-	-	1	3	-	-	-
26AECE22L.3	3	2	1	2	-	-	1	3	-	-	2
26AECE22L.4	3	3	2	3	-	-	1	3	-	-	3
26AECE22L.5	2	1	1	1	-	-	1	2	-	-	-

Title of the Course:	Data Structures Lab
Category:	ES
Year:	I
Semester:	II
Course Code:	26ACSE21L
Branch/es:	CSE, AI&DS, AI&ML, CSE(AI), CSE(DS), CSE(AIML), CSE(IoT&CSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course objectives:	
1.	Identify suitable data structures for solving real-world problems.
2.	Implement linked lists, stacks, queues, trees, and hash tables.
3.	Apply data structures to solve practical computational problems.
4.	Analyze data structure operations and their efficiency.
5.	Develop Python programs using appropriate data structures and algorithms.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Interpret the role of linear data structures in organizing and accessing data efficiently
2.	Apply linked lists for dynamic data storage and understanding of memory allocation.
3.	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4.	Analyze queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between de-queues and priority queues and apply them appropriately to solve data management challenges.
5.	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

List of Experiments:

Any 10 of the following experiments are to be conducted

PART-A

WEEK 1: Linked List Implementation

Implement a singly linked list to perform all of its operations.

WEEK 2: Double Linked List Implementation

i) Implement a doubly linked list and perform all of its operations.

ii) Implement a circular linked list and perform insertion, deletion, and traversal.

WEEK 3: Stacks, Queues and De-queues

i) Implement a stack using arrays and linked lists.

ii) Implement a queue using arrays and linked lists.

WEEK 4: Stacks Applications

i) Write a program to evaluate a postfix expression using a stack.

ii) Use a stack to evaluate an infix expression and convert it to postfix.

iii) Implement a program to check for balanced parentheses using a stack.

WEEK 5: Binary Search Tree Implementation:

i) Implementing BST operations using Linked List.

WEEK 6: Binary Search Tree Traversing:

i) Traversing of BST.

WEEK 7: Implementation of Hashing:

i) Implement a hash table with collision resolution techniques

PART-B

WEEK 1: Python Basics, Conditions and Loops

i) Write a Python Program to check if a number is a prime number.
ii) Write a python Program to generate the Fibonacci sequence up to a given number of terms.
iii) Write a python Program to find the largest prime factor of a given number.

WEEK 2: Python Lists, Dictionaries, and Tuples

i) Write a Python Program to manage a To-Do List.
ii) Write a Python Program to create Contact Book Using Dictionaries.
iii) Write a Python Program to demonstrate Tuples.

WEEK 3: Python Functions and Files

i) Write a Python Function for finding Prime Numbers in a range.
ii) Write a Python Function to perform matrix multiplication.
iii) Write a Python Program to read and Print File Contents.
iv) Write a Python Program to write a user input to a file.
v) Write a Python Program to append a user input to a file.

WEEK 4: Single Linked List and Double Linked List Implementation

i) Implement a singly linked list to perform all of its operations.
ii) Implement a doubly linked list and perform all of its operations.

WEEK 5: Stacks, and Queues

i) Implement a stack using arrays and linked lists.
ii) Implement a queue using arrays and linked lists.

WEEK 6: Binary Search Tree Implementation:

i) Implementing a BST operations using Linked List.

WEEK 7: Binary Search Tree Traversing:

i) Traversing of BST.

Textbooks:	
1	Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition,1997.
2	Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Silicon Press, 2nd Edition, 2008.

Reference Books:	
1.	Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders, 1st Edition, 2008.
2.	C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft, 2nd Edition, 1987.
3.	Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum, 3rd Edition, 2023.
4.	Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, 4th Edition,2022.
5.	Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms, Robert Sedge wick, 3rd Edition,2001.

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
26ACSE21L.1	3	2	1	2	2	-	-	-	-	-	3
26ACSE21L.2	3	2	1	2	2	-	-	-	-	-	3
26ACSE21L.3	3	3	3	3	2	-	-	-	-	-	3
26ACSE21L.4	3	3	3	3	2	-	-	-	-	-	3
26ACSE21L.5	3	3	3	3	2	-	-	-	-	-	3