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 Communicat on 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	Computat onal 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	Computat onal 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	Dif erent al Equat ons 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 Communicat on 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	Computat onal Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communicat on Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computat onal Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elect ve	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	Dif erent al Equat ons 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	Computat onal 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	Computat onal 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	Dif erent al Equat ons 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 Communicat on Skills Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elect ve	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 Communicat on 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	Computat onal 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	Computat onal 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	Dif erent al Equat ons 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 Communicat on Skills Lab	0	0	2	1
9	ES	26ACSE21L	Data Structures Lab	0	0	2	1
10	HSM	26ALAN21T	Language Elect ve	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 Communicat on 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	Computat onal Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communicat on Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computat onal Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elect ve	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	Dif erent al Equat ons 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	Computat onal Problem Solving	3	0	0	3
5	ES	26AMEC12L	Engineering & IT Workshop	1	0	4	3
6	HSM	26AENG11L	English Language Communicat on Skills Lab	0	0	2	1
7	BS	26APHY11L	Applied Physics Lab	0	0	2	1
8	ES	26ACSE11L	Computat onal Problem Solving Lab	0	0	2	1
9	HSM	26ALAN11T	Language Elect ve	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	Dif erent al Equat ons 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 object ves:	
1.	Understand fundamental electrical laws, quant t es, and circuits.
2.	Understand the principles and applicat ons of DC machines and transformers.
3.	Understand energy resources, measuring instruments, and electrical safety.
4.	Analyze semiconductor devices and their characterist cs.
5.	Analyze diode applicat ons and BJT operat on.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Apply Ohm's and Kirchhof 's laws to analyze basic RLC circuits.
2.	Analyze the construct on, operat on, characterist cs and applicat ons of DC machines and single-phase transformers.
3.	Explain energy resources, power generat on, electrical measuring instruments, equipment and safety measures.
4.	Analyze the characterist cs and applicat ons of PN junct on and Zener diodes, including voltage regulat on.
5.	Analyze diode rect f er and f lter circuits and the operat on and characterist cs of BJT in CE conf gurat on.

Unit 1	**Fundamental Laws and Electrical Circuits**	**9**

Basic def nit ons - Voltage, current, power, energy, charge, f ux, stat c and dynamic emf, Faraday's laws of electromagnet c induct on, Fleming's right-hand rule, Fleming's lef -hand rule, Lenz's law, Corkscrew rule, Right hand thumb rule, Right hand palm rule. Types of elements, Types of sources, ohm's law, resist ve, induct ve, capacit ve networks, Series-parallel circuits and Kirchhof 's laws (basic numerical problems with independent sources up to two loops and dc excitat on).

Unit 2	**DC Machines and Transformers**	**9**

DC Generator: Construct onal Details of DC machine, Principle of operat on, emf equat on, types of generators, applicat ons. (Basic numerical problems on EMF equat on only)

DC Motor: Principle of operat on, torque equat on, types, losses and ef ciency, applicat ons, Brake test, Speed control methods. (Simple numerical problems on calculat on of armature torque only).

Transformers: 1-Φ Transformer: Principle of operat on, e.m.f equat on, losses and ef ciency calculat ons using OC and SC tests (Theory concepts only)

Unit 3	Energy Resources, Measuring Instruments & Safety Measures	9

Energy Resources: Convent onal and non-convent onal energy resources; Layout and operat on of Hydel, Solar & Wind power generat on (Theory concepts only).

Measuring Instruments: Construct on 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 Precaut ons to avoid shock (Theory concepts only).

Unit 4	Semiconductor Devices	9

Energy Band Diagram of Semiconductors (Intrinsic & Extrinsic), PN Diode, V-I Characterist cs of PN Junct on Diode, Applicat ons of diode-Breakdown Mechanisms in semiconductor diodes, Zener diode characterist cs and Zener diode acts as a regulator. (Theory concepts only).

Unit 5	Diode Applications and Introduction to Transistors	9

Half Wave and Full Wave Rect f ers – Dif erent parameters and comparison, General Filter Considerat ons – Capacitor Filter. Transistor construct ons – Types, Transistor operat on in CE conf gurat on and its Characterist cs (Theory concepts only).

Textbook:	
1	J.B. Gupta, Fundamental of Electrical Engineering & Electronics" KATSON Books, First Edit on 2012.

Reference books:	
1.	V.K. Mehta and Rohit Mehta, Principles of Electrical Engineering & Electronics, S Chand and Company Ltd, First Edit on, 2010.
2.	S. K. Bhat acharya, "Basic Electrical & Electronics Engineering" Pearson Educat on, Second Edit on 2017.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:
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 specif c informat on from social or transact onal details
2.	Analyze literary forms, journalist c art cles and scient f c readings for comprehension and retent on
3.	Demonstrate ef ect ve writ ng and speaking skills
4.	Apply grammat cal knowledge in speaking and writ ng and formulate sentences with grammat cal Accuracy
5.	Produce coherent and unif ed paragraphs with adequate support and detail

Unit 1	**Lesson: The Gif of the Magi (Short Story)**	**10**
Reading: Skimming the text to get main ideas of it; scanning the text to look for specif c pieces of information Writ ng: Mechanics of Writ ng-Capitalizat on, Spellings, Punctuation Grammar: Parts of Speech, Content and Structure words, Basic Sentence Structures, Forming Quest ons Vocabulary: Synonyms, Antonyms, Af xes (Pref xes/Suf xes), Root words		

Unit 2	**Lesson: The Brook**	**9**
Reading: Ident fying the sequence of ideas; recognizing verbal techniques that help to link ideas in a paragraph together Writ ng: Paragraph writ ng: Structure of a paragraph, Cohesive devices-linkers Grammar: Use of Art cles and Zero Art cle, Preposit ons Vocabulary: Homonyms, Homophones, Homographs		

Unit 3	Lesson: The Elon Musk	9
Reading: Reading a text in detail by making basic inferences -recognizing and interpret ng specif c 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 informat on, revealing trends/pat erns/relat onships, communicate processes or display complicated data. Writ ng: Let er Writ ng: Of cial Let ers, Resumes Grammar: Report ng verbs, Direct & Indirect speech, Act ve & Passive Voice Vocabulary: Words of en confused, Jargon		

Unit 5	Lesson: The Power of Intrapersonal Communicat on	9
Reading: Reading comprehension. Writ ng: Writ ng structured essays on specif c topics. Grammar: Edit ng short texts – Ident fying and correct ng common errors in grammar and usage (Art cles, Preposit ons, Tenses, Subject-Verb agreement) Vocabulary: Technical Jargon		

Textbook:	
1.	Pathf nder: Communicat ve 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 writ ng: A Handbook for Internat onal 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:

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, dif ract on and polarizat on in engineering.
2.	explain the types of crystal structures and X-ray dif ract on.
3.	analyze various types of polarizat on of dielectrics and magnet c materials.
4.	apply laser and f ber opt cs principles in communicat on f eld.
5.	describe the propert es and behavior of semiconductors and superconductors.

Unit 1	**Wave Opt cs**	**10**

Interference: Introduct on – Principle of superposit on – Interference of light – Interference in thin f lms (Ref ect on Geometry)– Newton's Rings, determinat on of wavelength – Engineering applicat ons of interference.

Dif ract on: Introduct on – Fresnel and Fraunhofer dif ract ons – Intensity distribut on in Fraunhofer dif ract on due to single slit & double slit - Dif ract on Grat ng (Qualitat ve) - Grat ng spectrum – Dispersive power of Grat ng– Engineering applicat ons of dif ract on.

Polarizat on: Introduct on –Types of polarizat on – Double refract on – Nicol's Prism – Half wave and Quarter wave plates – Engineering applicat ons of polarizat on.

Unit 2	**Crystallography and X-ray dif ract on**	**9**

Crystallography: Space lat ce, basis, unit cell and lat ce parameters – 7 crystal systems- Bravais Lat ces – coordinat on number – packing fract on of SC, Bcc & Fcc – Miller indices – separat on between successive (hkl) planes.

X-ray dif ract on: Bragg's law – X-ray Dif ractometer –Laue's method and powder method.

Unit 3	**Dielectric and Magnet c Materials**	**10**

Dielectric Materials: Introduct on – Dielectric polarizat on – Dielectric polarizability, suscept bility, dielectric constant and displacement vector – relat on between the electric vectors – Types of polarizat ons– electronic and ionic (Quant tat ve), orientat on and Space charge (Qualitat ve) – Frequency dependence of polarizat on – Lorentz internal f eld – Clausius-Mossot equat on – Applicat ons of dielectrics.

Magnet c Materials: Introduct on – Magnet c dipole moment – Magnet zat on–Magnet c suscept bility and permeability –Origin of magnet c moments – Classif cat on of magnet c materials: Dia, para, ferro, ant -ferro & ferri magnet c materials – Hysteresis – sof and hard magnet c materials – Applicat ons of magnet c materials.

Unit 4	**LASERs and Fiber Opt cs**	**10**

LASERs: Introduct on – characterist cs of lasers – spontaneous and st mulated emission of radiat on –Einstein's coef cients – populat on inversion – pumping mechanism – He-Ne laser – semiconductor laser – Applicat ons of lasers.

Fiber Opt cs: Introduct on - Opt cal Fiber construct on – Working principle (Total Internal Ref ect on & crit cal Angle) – Acceptance angle & Numerical Aperture of opt cal f ber – Classif cat on of f bers based on Refract ve index prof le & modes (Step index and Graded index opt cal f bers) – opt cal f ber losses – Block diagram of f ber opt c communicat on – Medical and Sensor Applicat ons

Unit 5	**Semiconductors and Superconductors**	**9**

Semiconductors: Format on of energy bands – classif cat on of solids on the basis energy band theory- Intrinsic and Extrinsic semiconductors – Drif and dif usion currents – Einstein's equat on– Direct and indirect band gap semiconductors- Hall Ef ect and its applicat ons.

Superconductors: Propert es of superconductors– Meissner's ef ect – Type-1 and Type-2 Superconductors – BCS Theory – Josephson ef ect (AC & DC) – Applicat ons of superconductors.

Textbook:

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

Reference Books:

1.	K. Thyagarajan. Applied Physics. McGraw Hill Educat on (India) Private Ltd, 2020
2.	K. Palanisamy. Applied Physics. Sci. Tech, 2017
3.	K. Vijaya Kumar. A Textbook of Engineering Physics. S. Chand Publicat ons, 2018
4.	Charles Kit el. Introduct on to Solid State Physics. Wiley Publicat ons, 2011

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:

This course aims to familiarize students with matrix theory and its pract cal applicat ons, equipping them with essent al tools for mathemat cal and engineering problem-solving. It also focuses on impart ng knowledge of part al derivat ves and mult ple integrals to ef ect vely address real-world engineering challenges. Addit onally, students will develop prof ciency in vector dif erent at on and integrat on 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 equat ons
2.	ut lize matrix algebra techniques for engineering applicat ons
3.	analyze funct ons of several variables to opt mizat on techniques
4.	apply mult ple integrals and vector dif erent al operators such as gradient, divergence, and curl in mathemat cal and engineering problems.
5.	apply vector integral theorems in evaluat ng 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 equat ons.

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

Eigen values and Eigen vectors and their propert es, Cayley-Hamilton theorem (without proof), f nding inverse and power of a matrix by Cayley-Hamilton theorem. Diagonalizat on of a matrix.

Unit 3	**Mult variable calculus**	**12**

Part al derivat ves, total derivat ves, Chain rule, change of variables, Jacobian, Maxima and Minima of funct ons of two variables, method of Lagrange mult pliers for three variables.

Unit 4	**Mult ple Integrals & Vector dif erent at on**	**12**

Mult ple Integrals: Evaluat on of double integrals, evaluat on of triple integrals (Cartesian form). Vector dif erent at on: Scalar and Vector point funct ons, vector operator Del, del applies to scalar point funct ons-Gradient, direct onal derivat ve, del applied to vector point funct ons-Divergence and Curl.

Unit 5	**Vector Integrat on**	**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.

Textbook:	
1.	B. S. Grewal. Higher Engineering Mathemat cs, 44th Ed., Khanna Publishers, 2017.

Reference Books:	
1.	E. Kreyszig. Advanced Engineering Mathemat cs. 10th Ed., John Wiley & Sons, 2011.
2.	B. V. Ramana. Higher Engineering Mathemat cs. Mc Graw Hill Educat on
3.	G. B. Thomas. Maurice D. Weir and Joel Hass. Thomas Calculus, 13th Ed., Pearson Publishers, 2013
4.	R.L. Garg Nishu Gupta. Engineering Mathemat cs Volumes-I &II. Pearson Educat on
5.	H. K. Das, Er. Rajnish Verma. Higher Engineering Mathemat cs. S. Chand

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:
The course aims to familiarize students with the fundamentals of engineering chemistry and its pract cal applicat ons. It provides training on key principles of electrochemistry and polymers, while also introducing students to various instrumental methods. Addit onally, the course highlights the importance of green energy and e-waste management, emphasizing their relevance in modern engineering pract ces.

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 construct on and funct onality of various sensors, bat eries, and fuel cells through pract cal examples.
3.	Summarize the preparat on, characterist cs, and applicat ons of various polymers in real-world contexts.
4.	Ut lize principles of various analyt cal techniques to evaluate nanomaterials ef ect vely.
5.	Analyze sustainable energy solut ons and develop strategies for ef ect ve e-waste management.

Unit 1	**Structure and bonding models**	**9**
Fundamentals of Quantum mechanics, Schrodinger wave equat on, signif cance of Ψ and Ψ2, part cle 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, calculat on of bond order		

Unit 2	**Electrochemistry and applicat ons**	**8**
Electrochemical cell, Nernst equat on, cell potent al calculat ons and numerical problems, types of electrodes - indictor and reference electrodes. Electrochemical sensors – potent ometric and amperometric sensors with examples. Primary cells – Dry cell, secondary cells – Lithium-ion bat eries - working of the bat eries including cell react ons; Fuel cells, Hydrogen-Oxygen fuel cell – working of the cell.		

Unit 3	**Polymer chemistry**	**8**
Introduct on to polymers, funct onality of monomers, Thermoplast cs and Thermo-set ng plast cs, propert es and applicat ons of PVC and Bakelite. Fibres - polyesters, mechanical requirements for f bres - crystallinity, stress strain curves. Biodegradable polymers - propert es and applicat ons of		

Poly Glycolic Acid (PGA), Polylact c Acid (PLA). Elastomers – propert es and applicat ons of Buna-S, Buna-N, Thiokol. Conduct ng polymers – Polyacetylene – mechanism of conduct on and applicat ons.

Unit 4	**Nanomaterials and instrumental methods**	**9**
Nanomaterials - Introduct on, classif cat on, synthesis of nanomaterial by Sol-gel method, propert es and applicat ons of carbon-based nanomaterials – Carbon Nano Tubes (CNTs) and Graphene. Electromagnet c spectrum, absorpt on of radiat on: Beer-Lambert's law. UV-Visible spectroscopy, principle, instrumentat on and applicat ons, IR spectroscopy – principle, instrumentat on and applicat ons, Potent ometry - potent ometric t trat ons (redox t trat ons), Conductometric t trat ons (acid-base t trat ons).		

Unit 5	**Alternat ve energy sources and e-waste management**	**8**
Green Fuels: Introduct on, construct on and working of photovoltaic cell, applicat ons, generat on of green hydrogen energy by electrolysis of water and its advantages. e-waste management: Introduct on, sources of e-waste, composit on and health hazards of toxic materials present in electronic and electrical e-waste, need for e-waste management, recycling and recovery; dif erent approaches of recycling, extract on of Gold from e-Waste		

Textbook:	
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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:
The course aims to familiarize students with engineering chemistry and its various applicat ons, providing a solid foundat on for understanding its pract cal relevance. It imparts essent al knowledge on hard water sof ening processes and the standards for drinking water. Students are also trained in electrochemistry, corrosion control, and the propert es and applicat ons of dif erent funct onal materials. Addit onally, 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 solut ons for energy storage and corrosion prevent on
3.	demonstrate an understanding of polymer propert es and fuel technologies through pract cal applicat ons.
4.	dif erent ate the characterist cs and uses of lubricants and building materials across various industries.
5.	analyze the applicat ons of the phase rule in metallurgy and nanomaterials in medicine.

Unit 1	**Water technology**	**9**
Sof and hardwater, est mat on of hardness of water by EDTA method, est mat on of dissolved Oxygen - Boiler troubles – Priming, foaming, scale and sludge, caust c embrit lement, industrial water treatment – specif cat ons for drinking water, Bureau of Indian Standards (BIS) and World Health Organizat on (WHO) standards, ion-exchange processes - desalinat on of brackish water, reverse osmosis (RO) and electrodialysis		

Unit 2	**Electrochemistry and corrosion**	**8**
Electrodes – electrochemical cell, Nernst equat on, cell potent al calculat ons. Primary cells – Zinc-air bat ery, secondary cells – lithium-ion bat eries - working principle of the bat eries including cell react ons; Fuel cells - basic concepts, principle and working of Hydrogen-Oxygen fuel cell. Corrosion: Introduct on to corrosion, dry and electrochemical corrosion, dif erent al aerat on cell corrosion, factors af ect ng the corrosion, corrosion control - cathodic and anodic protect on		

Unit 3	Polymers and fuel chemistry	8
Introduct on to polymers, funct onality of monomers, Thermoplast cs and Thermo-set ng plast cs, propert es and applicat ons of PVC and Bakelite. Fibres - polyesters, mechanical requirements, crystallinity, stress strain curves. Biodegradable polymers - propert es and applicat ons of Poly Glycolic Acid (PGA), Polylact c Acid (PLA). Fuels – types of fuels, calorif c value of fuels, numerical problems based on calorif c value; liquid Fuels, ref ning of petroleum, octane and cetane number, determinat on of calorif c value of solids by Bomb calorimeter		

Unit 4	Modern engineering materials	9
Refractories - classif cat on, propert es, factors af ect ng the refractory materials and applicat ons. Lubricants - classif cat on, funct ons of lubricants, mechanism, propert es of lubricat ng oils – Viscosity index, f ash point, f re point, cloud point, saponif cat on and applicat ons. Building materials - manufacturing of Portland cement, const tuents, set ng and hardening of cement.		

Unit 5	Phase rule and nanomaterials	8
Phase rule - def nit on of terms – phase, components, degree of freedom - derivat on of Gibbs phase rule, signif cance and limitat ons of phase rule. Phase diagrams – one component system – H_2O – two component system – eutect c systems - Pb-Ag system. Nanomaterials – classif cat on, propert es and applicat ons of nanomaterials. Carbon based nanomaterials - Carbon Nano Tubes (CNTs) and Graphene - propert es and applicat ons.		

Textbook:	
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 Publicat ons, 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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:	Computat onal 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 object ves:	
1.	Understanding the steps in problem solving and formulat on 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 creat ve approaches to problems.
4.	Develop programs using pointers, structures and unions.
5.	Develop programs using pointers, structures and unions. Manipulation of text data using f les.

Course outcomes:	
At the end of the course, the student will be able to	
1.	demonstrate solut ons to problems and represent those using algorithms/f owcharts.
2.	choose proper control statements and use arrays for solving problems.
3.	decompose a problem into modules and use funct ons to implement the modules.
4.	apply and use allocat on of memory for pointers and solve the problems related to manipulat on of text data using f les and structures.
5.	develop the solut ons for problems using c programming language.

Unit 1	**Problem Solving and Introduct on to C**	**9**
Steps to solve problems, algorithm, Pseudo code, Flowchart with examples, Program Development. Environments. Introduct on to programming: Programming languages and generations. Introduction to C: Introduction, structure of C program, keywords, identif ers, Variables, data types, constants, I/O statements, operators, precedence and associatively		

Unit 2	**Introduct on 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 (select on, bubble and Select on) algorithms, multidimensional arrays, matrix operations		

Unit 3	**Strings and Funct ons**	**9**
Strings: Declaration and Init alization, String Input / Output functions, String manipulation funct ons. Functions: Types of funct ons, recursion, scope of variables and storage classes. Preprocessor Direct ves: Types of preprocessor directives, examples		

Unit 4	**Pointers**	**9**
Pointers: Understanding computer‘s memory, introduct on to pointers, declarat on pointer variables, pointer arithmet c, pointers and strings, array of pointers, funct on pointers, dynamic memory allocat on, advantages and drawbacks of pointers		

Unit 5	Structures and Files	9
Structures: Structure definit on, initialization and accessing the members of a structure, nested structures, array of structures, structures and funct ons, 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 Edit on,2006.
2.	C and Data Structures, E. Balaguruswamy, Tata McGraw Hill,7th Edit on,2017.

Reference Books:	
1.	LET US C, Yeswanth Kanitkar, BPB Publicat on, 9th Edit on, 2008.
2.	Byron Got ried, Schaum 's Outline of Programming with C, McGraw-Hill, 2nd Edit on,1996.
3.	Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prent ce Hall of India, 2nd Edit on,1988.
4.	A K Sharma —Computer Fundamentals and Programming, University Press, 2nd Edit on, 2018.
5.	Pradeep Dey and Manas Ghosh, Programming in C, Oxford Press, 2ndEdit on, 2017.
6.	ReemaTharaja —Introduct on to C Programming, OXFORD Press, 2nd Edit on, 2015.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
1.	To enable the students with various concepts like dimensioning, convent ons and standards related to Engineering Drawing.
2.	To impart knowledge on the project on of points, lines and plane surfaces
3.	To improve visualizat on skills for bet er understanding of project on of solids
4.	To develop the imaginat ve skills of the students required to understand Sect on of solids and Developments of surfaces
5.	To make the students understand the viewing percept on of a solid object in Isometric and Perspect ve project ons.

Course outcomes:	
At the end of the course, the student will be able to	
1.	apply the appropriate annotat ons and geometric techniques to draw the conic sect ons, cycloidal curves and involutes
2.	apply the principles of orthographic project on for engineering problems involving inclined lines to create drawings that represent real-world objects
3.	apply the principles of orthographic project on for solving engineering problems of planes with respect to both reference planes.
4.	apply the principles of orthographic project on for solving engineering problems of solids
5.	apply the conversion techniques to solve problems related to orthographic project ons and isometric project on views

Unit 1		**5**

Introduct on: Lines, Let ering and Dimensioning, Geometrical Construct ons and Construct ng regular polygons by general method.

Engineering Curves:

Construct on 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 Project ons: Reference plane, importance of reference lines or Planes, Project ons of a point situated in any one of the four quadrants. **Project ons of Straight Lines**: Project ons 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, Project ons of Straight Line Inclined to both the reference planes.		

Unit 3		5
Project ons 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
Project ons of Solids: Project ons 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 Project ons / Conversions: Principles of Isometric Project on – 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)		

Textbook:	
1.	N. D. Bhat , 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 Educat on Inc
3.	Engineering Drawing with an Introduct on to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
This course will enable the student to	
1.	make familiar with dif erent types of wooden joints.
2.	make conversant with tools used in sheet metal work.
3.	develop electrical wiring skills.
4.	have pract cal exposure to metal joining processes.
5.	gain knowledge with tools used in Plumbing and Fit ng

Course outcomes:	
At the end of the course, the student will be able to	
1.	apply wood working skills to prepare dif erent joints
2.	develop sheet metal jobs with GI sheet
3.	apply basic electrical engineering knowledge for house wiring pract ce
4.	operate on dif erent metal joining equipment
5.	apply pract cal skills in trouble shoot ng the plumbing systems and various f t ngs

Trade 1	**Wood Working**	**6**
Familiarity with dif erent types of woods and tools used in wood working and making following joints. a) Cross- Lap joint b) Mort se and Tenon joint		

Trade 2	**Sheet Metal Working**	**6**
Familiarity with dif erent 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 dif erent types of basic electrical circuits and make the following connect ons. a) Series connection and two switches, two bulbs in parallel connection. b) Staircase connect on and tube light connect on.		

Trade 4	Metal Joining process	9
Familiarity with dif erent types of tools used in metal joining process and pract ce on a) Soldering (Preparat on of Touch Sensor & Water Level Buzzer Indicator circuits) b) Brazing (preparat on of But joint) c) Arc welding (Preparat on of Lap joint)		

Trade 5	Plumbing and Fit ng	3
Pract ce of Plumbing tools, Preparat on of Pipe joints with coupling for same diameter and with reducer for dif erent diameters. a) Tap Connect on Pract ce of f t ng tools. Familiarity with dif erent types of tools used in f t ng and do the following f t ng 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 edit on
2.	Workshop Pract ce by H. S. Bawa, Tata-McGraw Hill, 2004.
3.	Wiring Est mat ng, Cost ng and Contract ng; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.
4.	Jeyapoovan T. and Pranitha S., Engineering Pract ces Lab Manual, 3rd Edn. Vikas Pub.2008.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
This course will enable the student to	
1.	Demonstrate the disassembling and assembling of a personal computer system.
2.	Demonstrate the Installat on the operat ng system and other sof ware required in a personal computer system.
3.	Introduce connect ng the PC on to the internet from home and work place and ef ect vely usage of the internet, Usage of web browsers, email, news groups and discussion forums.
4.	Introduce the usage of Product vity tools in craf ing professional word documents, excel spreadsheets and power point presentat ons.
5.	To ut lize Cloud based product vity enhancement and collaborat on 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.	illustrat on of installat on and un-installat on of Windows and Linux operat ng systems and also perform troubleshoot ng of various hardware and sof ware components
3.	discuss about Web browsers to access Internet, Search Engines
4.	apply and use word processor; spread sheet, presentat on and data storage tools
5.	analyze and Implement Cloud based product vity enhancement and collaborat on tools

Task 1		**2**
Learn about Computer: Ident fy the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specif cat ons for each part of a computer including peripherals and specif cat on 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 condit on. Students should be able. Student should Students should record the process of assembling and troubleshoot ng a computer.		

Task 3		**2**
Install Operat ng System: Student should install Linux on the computer. Students should record the ent re installat on process		

Task 4		**2**
Networking: Students should connect two computers directly using a cable or wireless connect vity and share informat on. Students should connect two or more computers using switch/hub and share informat on. Crimpling act vity, logical conf gurat on etc. should be done by the student. The ent re process has to be documented.		

Task 5		**2**
Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required informat on. Students should be able to create e-mail accounts and send emails. They should get acquaintance with applicat ons like Facebook, skype etc. If Intranet mailing facility is available in the organizat on, then students should share the informat on using it. If the operat ng system supports sending messages to mult ple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the informat on about dif erent browsers available, their features, search process using dif erent natural languages, and creat ng e-mail account		

Task 6		2
Ant virus: Students should download freely available Ant virus sof ware, install it and use it to check for threats to the computer being used. Students should submit informat on about the features of the ant virus used, installat on process, about virus def nit ons, 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 insert ng and delet ng the characters, words and lines, Alignment of the lines, insert ng header and Footer, changing the font, changing the color, including images and tables in the word f le, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, format ng 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 applicat on documents and format them as per the requirement. Some of the tasks that may be pract ced are Managing the worksheet environment, creat ng cell data, insert ng and delet ng cell data, format cells, adjust ng the cell size, applying formulas and funct ons, preparing charts, and sort ng cells. Students should submit a user manual of the Spreadsheet applicat on considered		

Task 9		4
Presentat ons: creat ng, opening, saving and running the presentat ons, select ng the style for slides, format ng the slides with dif erent fonts, colors, creat ng charts and tables, insert ng and delet ng text, graphics and animat ons, bullet ng and numbering, hyper linking, running the slide show, set ng the t ming for slide show. Students should submit a user manual of the Presentat on tool considered.		

Task 10		2
Store, sync, and share f les with ease in the cloud-Google Drive Document creat on and edit ng text documents in your web browser- Google docs		

Textbooks:	
1.	Introduct on to Informat on Technology, ITL Educat on Solut ons limited, Pearson Educat on, 2nd edit on, 2012.
2.	Upgrading and Repairing PC ‘s Scot Muller QUE, Pearson Educat on, 22nd edit on, 2015

Reference Books:	
1.	IT Essent als PC Hardware and Sof ware Companion Guide, CICSO Networking Academy, 5th edit on, 2014.
2.	Network Your Computer & Devices Step by Step, Ciprian Rusen, Microsof Press, 1st edit on, 2010.
3.	Troubleshoot ng, Maintaining & Repairing PCs, 5th Edit on, Bigelow, TMH, 2001.
4.	Introduct on to Computers, Peter Norton, 6/e, Mc Graw Hill, 2006.
5.	Cloud comput ng, product vity and collaborat on tools, sof ware and products of ered by Google: ht ps://en.wikipedia.org/wiki/G_Suite .

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	To develop pract cal knowledge of electrical/electronic components, devices, instruments, and laboratory equipment.
2.	To apply electrical laws and measurement techniques for circuit verif cat on and analysis.
3.	To evaluate the characterist cs of DC shunt motors and single-phase transformers through laboratory tests.
4.	To analyze the V–I characterist cs of PN junct on and Zener diodes experimentally.
5.	To evaluate half-wave and full-wave rect f er performance using ripple factor and voltage regulat on.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Ident fy 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 characterist cs of DC shunt motors and single-phase transformers through laboratory tests.
4.	Analyze the V–I characterist cs of PN junct on and Zener diodes through experimental invest gat ons.
5.	Evaluate the performance of half-wave and full-wave rect f ers using ripple factor and voltage regulat on, with and without capacit ve f lters.

List of Experiments	
Any 10 of the following experiments are to be conducted	
1.	Ident f cat on, Specif cat ons, Test ng of R, L, C Components (Color Codes), Potent ometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes, BJT)
2.	Study and operat on of • Mult -meters (Analog and Digital) • Funct on Generator • Regulated Power Supplies
3.	Verif cat on 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 characterist cs of PN Junct on diode A) Forward bias B) Reverse bias
10.	Plot V – I characterist cs of Zener Diode
11.	Determinat on of Ripple Factor and Regulat on of Half Wave Rect f er with and without capacit ve f lter
12.	Determinat on of Ripple Factor and Regulat on of Full Wave Rect f er with and without capacit ve f lter
13.	Study of Cathode Ray Oscilloscope (CRO)

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 Communicat on 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:
The main object ve of introducing this course is to expose the students to a variety of self-instruct onal, learner-friendly modes of language learning. The students will get trained in basic communicat on skills.

Course outcomes:	
At the end of the course, the student will be able to	
1.	relate and dif erent ate English speech sounds, stress, rhythm, intonat on and syllable division for bet er listening and speaking comprehension
2.	develop communicat on skills through various language learning act vit es
3.	demonstrate professional skills in part cipat ng role-plays and descript ons
4.	build ef ect ve resonate and equip themselves with employability skills
5.	enhance public speaking skills and deliver oral presentat ons with clarity and conf dence

List of Topics	
1.	Phonet cs: Vowels / Consonants; Accent Rules
2.	Just a Minute
4.	Role Play / Situat onal Dialogues
5.	Oral Presentat on
6.	Informat on Transfer
7.	Describing people/Objects/Situat ons
Suggested Sof ware	
1.	Sky Pronunciat on Suite
2.	Clarity Pronunciat on 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 Communicat on. Oxford Press, 2018.
2.	Grant Taylor. English Conversat on Pract ce. Tata McGraw-Hill Educat on India, 2016.
3.	Hewing's, Mart n. Cambridge Academic English (B2). CUP, 2012.
4.	T. Balasubramanyam. A Textbook of English Phonet cs for Indian Students. 3rd Ed., Trinity Press.

Web Resources:	
Spoken English	
1.	www.esl-lab.com
2.	www.englishmedialab.com
4.	www.englishinteract ve.net
5.	https://www.britishcouncil.in/english/online
6.	ht p://www.letstalkpodcast.com/
7.	ht ps://www.youtube.com/c/mmmEnglish_Emma/featured
8.	ht ps://www.youtube.com/c/ArnelsEverydayEnglish/featured
9.	ht ps://www.youtube.com/c/engvidAdam/featured
10.	ht ps://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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:
This course aims to provide a comprehensive understanding of interference and dif ract on, including their pract cal applicat ons and the signif cance of opt cal f ber parameters in communicat on. It emphasizes the role of energy gaps in semiconductor conduct vity and the Hall ef ect, explores the applicat ons of magnet c 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 opt cal instruments to measure opt cal parameters.
2.	determine the magnet c and dielectric parameters by various methods.
3.	evaluate various parameters of semiconductors by dif erent methods.
4.	est mate general parameters of materials.

List of Experiments:	
Any 10 of the following experiments are to be conducted	
1.	Determinat on of the thickness of the wire using wedge method.
2.	Determinat on of the radius of curvature of the lens by Newton's ring method.
3.	Determinat on of wavelength of light radiat on using plane dif ract on grat ng by spectrometer
4.	Determinat on of Dispersive power of a dif ract on grat ng.
5.	Determinat on of part cle size using laser
6.	Determinat on of dielectric constant by bridge resonance method.
7.	Determinat on of Magnet c f eld along the axis of a circular coil carrying current by stewart-Gee's method.
8.	Determinat on of Wavelength of laser by using Dif ract on grat ng.
9.	Determinat on of Hysteresis loss of ferro magnet c material by tracing B-H curve.
10.	Determinat on of the numerical aperture and acceptance angle of an opt cal f ber.
11.	Determinat on of the rigidity modulus of metal wire by using torsional pendulum.
12.	Determinat on of Hall coef cient and carrier concentrat on of a given semiconductor using Hall ef ect.
13.	Determinat on of the resist vity of semiconductor by Four probe method.
14.	Determinat on of the energy gap of a semiconductor by using P-N Junct on diode.
15.	Determinat on of resistance with varying temperature using thermister

Reference Books:	
1.	S. Balasubramanian, M.N. Srinivasan. A Textbook of Pract cal Physics. S Chand Publishers, 2017
2.	C.V. Madhusudan Rao, V. Vasanth kumar. Engineering Physics laboratory. SciTech publicat ons, 2010

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:

The course aims to equip students with pract cal skills in Conductometry, Potent ometry, and Colorimetry for precise chemical analysis. It also provides hands-on experience in synthesizing polymers and nanomaterials, emphasizing their industrial relevance. Addit onally, students are trained in separat on techniques and UV-Visible spectroscopy for material ident f cat on, while enhancing their ability to perform quant tat ve chemical analyses, such as metal est mat on and bat ery acid strength determinat on.

Course outcomes:

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

1.	determine the strength of an acid present in secondary bat eries.
2.	calculate the cell constant and conductance of solut ons.
3.	est mate metal ions by using various analyt cal techniques.
4.	analyse the separat on 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 t trat on of strong acid vs. strong base.
2.	Determinat on of cell constant and conductance of solut ons.
3.	Potent ometry - determinat on of redox potent als and emfs.
4.	Determinat on of strength of an acid in Pb-acid bat ery.
5.	Preparat on of Poly Methyl Methacrylate (PMMA).
6.	Preparat on of Poly Glycidyl Methacrylate (PGMA).
7.	Determinat on of chromium (VI) in potassium dichromate by Colorimetry.
8.	Est mat on of Zinc by EDTA t trat on.
9.	Preparat on of nanomaterials by precipitat on method.
10.	Ident f cat on of simple organic compounds by IR spectroscopy.
11.	Est mat on of Ferrous Iron by Dichrometry.
12.	Wavelength measurement of sample through UV-Visible Spectroscopy.
13.	Est mat on of mixture of acids by Conductometric t trat on.
14.	Determinat on of strength of an acid by pH metric method.
15.	Extract on 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 Quant tat ve Chemical Analysis. 6th ed., Pearson Publicat ons, 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:
The course aims to equip students with the skills to perform quant tat ve analysis for determining water hardness, oxygen levels, and metal content in various samples. It provides hands-on experience in the preparat on and characterizat on of synthet c polymers and nanomaterials, along with the applicat on of thermodynamic principles in construct ng phase diagrams and determining the calorif c value of fuels. Addit onally, students will learn to assess material propert es using appropriate instrumentat on and analyt cal techniques.

Course outcomes:	
At the end of the course, the student will be able to	
1.	est mate Iron by colorimetry and volumetric methods.
2.	determine the strength of an acid in secondary bat ery.
3.	analyse the hardness and dissolved oxygen levels of various water samples.
4.	synthesize polymer and nano materials.
5.	evaluate the physical propert es of funct onal materials.

List of Experiments	
Any 10 of the following experiments are to be conducted	
1.	Determinat on of Hardness of a groundwater sample.
2.	Est mat on of Dissolved Oxygen by Winkler's method.
3.	Determinat on of strength of an acid in Pb-acid bat ery.
4.	Preparat on of Poly Methyl Methacrylate (PMMA).
5.	Determinat on of percentage of Iron in cement sample by Colorimetry.
6.	Preparat on of PGMA.
7.	Phase equilibria: Construct on of the phase diagram using cooling curves or ignit on tube method: simple eutect c system.
8.	Est mat on of Ferrous by Dichrometry.
9.	Determinat on of percentage moisture content in a coal sample.
10.	Determinat on of viscosity of lubricat ng oil by Redwood viscometer 1.
11.	Determinat on of calorif c value of solid fuels by Bomb calorimeter.
12.	Preparat on of nanomaterials by precipitat on method.
13.	Est mat on of mixture of acids by Conductometric t trat on.
14.	Est mat on of act ve chlorine content in bleaching powder by Iodometry.
15.	Determinat on 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 Quant tat ve Chemical Analysis. 6th ed., Pearson Publicat ons, 2009.
2.	Anand, Amirtha, and Kumari, Ramesh. Physical Chemistry Laboratory Manual: An Interdisciplinary Approach. Dreamtech Press, 2020.
3.	Fries, Jons August. Invest gat ons 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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:	Computat onal Problem Solving Lab
Category:	ES
Year:	I
Semester:	I
Course Code:	26ACSE11L
Branch/es:	Common to all branches

Lecture Hours	Tutorial Hours	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	Set ing up programming environment.
2.	Develop Programming skills to solve problems.
3.	Use of appropriate C programming constructs to implement algorithms.
4.	Identification and rectif cation 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 rect fy the syntax errors and debug program for semantic errors
4.	Demonstrate problems in a modular approach using funct ons
5.	Assessing file operat ons with simple text data

List of Experiments

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

1. Display student details using dif erent 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 arithmet c operat ons on two numbers.
2. Find the largest of two numbers using relat onal operators.
3. Demonstrate logical operators with condit ons.
4. Convert integer division into f oat ng-point division.

Exercise 3: Condit onal 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 mult plicat on tables.
4. Calculate sum of natural numbers.

Exercise 5: Uncondit oned Jump Statements

1. Demonstrate use of break statement.
2. Demonstrate use of cont nue statement.
3. Print numbers using goto statement.
4. Exit from inf nite 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: Mult dimensional Arrays

1. Matrix addit on.
2. Matrix mult plicat on.
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 Def ned Funct ons

1. Create funct on for addit on of two numbers.
2. Pass values to funct on 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 stat c variable behavior.
4. Demonstrate extern variable usage.

Exercise 11: Recursive Funct ons and Preprocessor Commands

1. Find factorial using recursion.
2. Generate Fibonacci series using recursion.
3. Use macros with #def ne.
4. Demonstrate condit onal compilat on.

Exercise 12: Array Elements as Funct on Arguments

1. Pass array to funct on and f nd sum.
2. Find maximum element using funct on.
3. Reverse array using funct on.
4. Search element in array using funct on.

Exercise 13: Pointers and Dynamic Memory Allocat on

1. Demonstrate pointer basics.
2. Perform pointer arithmet c.
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 funct ons.
4. Demonstrate nested structures.

Exercise 15: File Handling

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

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

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 Elect ve	
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	Pract ce Hours	Credits
1	0	1	1

Course object ves:

The course aims to enhance students' global communicat on skills through foreign language acquisit on while fostering cultural awareness and appreciat on of diverse backgrounds. It provides a f exible learning plat orm with a range of reputable online courses, empowering students to tailor their educat onal experiences. Addit onally, 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 communicat on skills by learning foreign languages of their choice.
2.	Understand cultural diversity
3.	Apply a variety of reputed online courses and enjoy f exible learning
4.	Acquiring addit onal language skills to secure suitable job opportunit es
5.	Analyze the ability in self-paced learning

Guidelines:

1. **Course Select on:** Students can choose from the following languages:
    - German
    - French
    - Spanish
    - Arabic
2. **Approved Plat orms:** Courses must be taken from recognized MOOC plat orms such as NPTEL, Coursera, Udemy, or edX.
3. List of recommended courses:
    - German: ht ps://www.udemy.com/course/german-course-for-beginners-learn-german
    - French: ht ps://www.udemy.com/course/complete-french-course
    - Spanish: ht ps://www.udemy.com/course/el-metodo-spanish-1
    - Arabic: ht ps://www.udemy.com/course/arabic-a21/
4. Enrolment Verif cat on: Students must submit proof of enrolment in the chosen course to the academic of ce of I Year at the beginning of the semester.
5. Minimum Course Durat on: The selected course should be a minimum of 4 weeks in durat on.
6. Progress Reports: Students are encouraged to submit progress reports periodically to their course mentor.
7. Complet on Deadline: The course must be completed by the end of the semester.

Cert f cate Submission: Students must submit the cert f cate of complet on issued by the MOOC plat orm to the Head, First Year Academics.

Policies

1. **Credit Allocat on**: Upon successful complet on and submission of the cert f cate, 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 verif cat on of the complet on cert f cate.
3. **Integrity and Authent city**: The submit ed cert f cate must be authent c and verif able. Any at empt to submit falsif ed documents will result in disciplinary act on.
4. **Support**: Students can seek support from language faculty/course mentors if they encounter any dif cult es during the course.
5. **Non-Complet on**: Failure to complete the course within the st pulated t me frame will result in no credit being awarded, and the elect ve will need to be retaken

A commit ee 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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:	Dif erent al Equat ons 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 object ves:

The course aims to develop prof ciency in solving ordinary and part al dif erent al equat ons, emphasizing their applicat on in engineering and scient f c contexts. It will cover Laplace Transforms and their inverses, illustrat ng their role in solving engineering and real-world problems. Addit onally, the course will introduce Fourier Series and Fourier Transforms, focusing on their pract cal applicat ons for addressing real-life challenges.

Course outcomes:

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

1	describe the applicat on of higher order dif erent al equat ons with constant coef cients in modeling dynamic systems.
2	solve the standard part al dif erent al equat ons relevant to engineering scenarios.
3	ut lize the Laplace transformat ons to handle various types of funct ons in engineering context.
4	analyze ordinary dif erent al equat ons by employing Laplace transformat ons for solut ons derivat on.
5	apply Fourier series and Fourier transforms in engineering context.

Unit 1	**Linear dif erent al equat ons with constant Coef cients**	**12**

Basic concepts - general solut on-operator D-rules for f nding complimentary funct on-inverse operator-rules for f nding part cular 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 variat on of parameters.

Unit 2	**Part al Dif erent al Equat ons**	**12**

Introduct on and format on of Part al Dif erent al Equat ons by eliminat on of arbitrary constants and arbitrary funct ons, solut ons of f rst order linear equat ons using Lagrange's method, method of separat on of variables for f rst and second order equat ons.

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

Laplace transforms of standard funct ons- f rst shif ing theorem - change of scale property - mult plicat on by t^n - division by t - transforms of derivat ves and integrals - Unit step funct on – second shif ing theorem– Laplace transform of periodic funct ons (without proofs). Inverse Laplace transforms (without proofs) – Convolut on 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	Applicat ons of Dif erent al Equat ons	12
Applicat ons of Laplace transforms to ordinary dif erent al equat ons of f rst and second order with constant coef cients. Applicat ons of Fourier transforms to Part al Dif erent al Equat ons.		

Textbook:	
1	B. S. Grewal. Higher Engineering Mathemat cs. 44th Ed., Khanna Publishers, 2017.

Reference Books:	
1.	E. Kreyszig. Advanced Engineering Mathemat cs. 10th Ed., John Wiley & Sons, 2011.
2.	B. V. Ramana. Higher Engineering Mathemat cs. Mc Graw Hill Educat on.
3.	G. B. Thomas, Maurice D. Weir and Joel Hass. Thomas Calculus. 14th Ed., Pearson Publishers, 2022.
4.	D. G. Zill. Advanced Engineering Mathemat cs. 6th Ed., Jones and Bartlet , 2016
5.	Glyn James. Advanced Modern Engineering Mathemat cs. 5th Ed., Pearson publishers, 2018.
6.	R. K. Jain and S. R. K. Iyengar. Advanced Engineering Mathemat cs. 5th Ed., Alpha Science Internat onal Ltd., 2021 (9th reprint).

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
1.	To impart knowledge in basic concepts of Ultrasonics and elast city.
2.	To familiarize the Crystal structures and X-ray dif ract on.
3.	To explain the signif cant concepts of dielectrics, magnet c materials, and types of semiconductors
4.	To describe the lasers and opt cal f bers in the f eld of engineering and their potent al applicat ons.

Course outcomes:	
At the end of the course, the student will be able to	
1.	apply ultrasonic waves and elast c principles in engineering
2.	describe crystal structures and X-ray dif ract on
3.	describe polarizat on of dielectrics and magnet c materials.
4.	apply laser and f ber opt cs principles.
5.	describe the various types of semiconductors in engineering f eld

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

Ultrasonics: Introduct on- Propert es- Product on of ultrasonic waves by magnetostrict on and Inverse piezoelectric methods –Detect on of ultrasonic waves by Kund's tube and Flame methods - Acoust c grat ng -Non-Destruct ve Test ng – medical applicat ons (Sonogram).

Elast city: stress& strain - types of stress and strain- stress & strain curve - Hooke's law- Poisson's rat o-dif erent elast c 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 lat ce, Basis, Unit Cell and lat ce parameters – 7 crystal systems- Bravais Lat ces – coordinat on number – packing fract on of SC, BCC & FCC – Miller indices – separat on between successive (hkl) planes.

X-ray dif ract on: Bragg's law – X-ray Dif ractometer –Laue's method and powder method

Unit 3	**Dielectric and Magnet c Materials**	**9**

Dielectric Materials: Introduct on – Dielectric polarizat on – Dielectric polarizability, Suscept bility, Dielectric constant and Displacement Vector – Relat on between the electric vectors – Types of polarizat ons– Electronic and Ionic (Quant tat ve), Orientat on and Space charge (Qualitat ve) – Frequency dependence of polarizat on – Lorentz internal f eld – Clausius-Mossot equat on – Applicat ons of dielectrics.

Magnet c Materials: Introduct on – Magnet c dipole moment – Magnet zat on–Magnet c suscept bility and permeability –Origin of magnet c moments – Classif cat on of magnet c materials: Dia, Para, Ferro, Ant -ferro & Ferri magnet c materials – Hysteresis – sof and hard magnet c materials – Applicat ons of magnet c materials

Unit 4	**LASERs and Fiber Optics**	**9**

LASERs: Introduct on – characterist cs of lasers – spontaneous and st mulated emission of radiat on – Einstein's coef cients – populat on inversion – pumping mechanism – He-Ne laser – semiconductor laser – Applicat ons of lasers.

Fiber Opt cs: Introduct on - Opt cal Fiber construct on – Working principle (Total Internal Ref ect on & crit cal Angle) – Acceptance angle & Numerical Aperture of opt cal f ber – Classif cat on of f bers based on Refract ve index prof le & modes (Step index and Graded index opt cal f bers) – opt cal f ber losses – Block diagram of f ber opt c communicat on – Medical and Sensor Applicat ons

Unit 5	**Semiconductors and Devices**	**9**

Format on of energy bands – classif cat on of solids on the basis of energy band theory-Intrinsic and Extrinsic semiconductors – Drif and dif usion currents – Einstein's equat on–Direct and indirect band gap semiconductors- Hall Ef ect and its applicat ons. P-N Junct on Diode, Voltage-Ampere Characterist c, LED (Light Emit ng Diode), Photo diode.

Textbook:	
1	M. N. Avadhanulu, P. G. Kshirsagar & T. V. S. Arunmurthy, A Textbook of Engineering Physics, S. Chand Publicat ons,11th edit on, 2019

Reference Books:	
1.	K. Thyagarajan, Applied Physics, McGraw Hill Educat on (India) Private Ltd, 2019
2.	Gerd Keiser, Opt cal Fiber Communicat ons, 4/e, Tata Mc Graw Hill, 2008
3.	Charles Kit el, Introduct on to Solid State Physics, Wiley Publicat ons, 2011
4.	P.K. Palanisamy, Engineering Physics, Scitech Publicat ons, Second edit on, 2010

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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:	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 object ves:	
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 frict on in engineering problems.
3.	To determine centroids, centers of gravity, and moments of inert a for simple and composite sect ons.
4.	To study rect linear and curvilinear mot on, conservat on principles, and energy methods.
5.	To learn stress–strain relat onships, elast c constants, resilience, and applicat ons 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 sect ons and understand the principles of frict on in engineering applicat ons.
3.	Determine the centroid, center of gravity, and moment of inert a for various surfaces and volumes, applying these concepts to engineering problems.
4.	Apply equat ons of mot on, conservat on of energy, and momentum in dynamic systems.
5.	Determine stresses, strains, elast c moduli, and strain energy in structural members.

Unit 1	**Basics of Engineering Mechanics**	**9**
Composit on and resolut on 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 Frict on**	**11**
Analysis of Trusses Introduct on to plane trusses, analysis of plane trusses by method of joints and method of sect ons. Frict on: Laws of frict on, types of frict on, equilibrium of force systems involving frict onal forces, wedge frict on. Free body diagrams involving frict onal forces		

Unit 3	Surfaces, Volumes and Moment of Inert a	12
Surfaces and Volumes: Centroid and center of gravity, derivat on of centroids from f rst moment of area, centroids of composite sect ons, center of gravity - cylinder, cone, sphere, Pappus–Guldin Theorems. Moment of Inert a: Area moment of inert a of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inert a.		

Unit 4	Dynamics	11
Equat ons of mot on for rigid bodies, constant and variable accelerat on, rect linear and curvilinear mot on, mot on under gravity -project le mot on, D'Alembert's principle in rect linear translat on, Ideal Systems: Principle of conservat on of energy, power and linear momentum.		

Unit 5	Stresses and Strains	10
Concept of stress and strain- Principle-Stress and Strain Diagram - Elast city and Plast city–Types of stresses and strains – Hooke's law–stress –strain diagram for mild steel– Working stress –Factor of safety –Lateral strain, Poisson's rat o and volumetric strain –Elast c moduli and the relat onship between them.		

Textbook:	
1.	Engineering Mechanics, RK Bansal, Laxmi publicat ons, 6th Edit on, 2020

Reference Books:	
1.	Engineering Mechanics: Stat cs and Dynamics by E. Nelson, C. Best, and W. McLean, McGraw Hill Publicat ons, 8th Edit on, 2020.
2.	Engineering Mechanics: Stat cs and Dynamics by RC Hibbeler, Pearson publicat ons, 2023

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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:	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 object ves:	
This course will enable the student to	
1.	To understand the importance of civil engineering in infrastructure and nat onal development.
2.	To ident fy structural, geotechnical, transportat on, water resources, and environmental applicat ons.
3.	To classify and study the propert es of stones, t mber, metals, glass, plast cs, and cement.
4.	To learn laboratory and f eld-test ng methods for aggregates, bricks, steel, and cement.
5.	To apply safety, sustainability, and professional responsibility in construct on pract ces

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 construct on 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 nat onal development. Branches of civil engineering – Structural, geotechnical, transportat on, water resources, environmental. Engineering ethics – Safety, sustainability, professional responsibility		

Unit 2	**Building stone & Wood**	**8**
Building stone: classif cat ons, propert es and structural requirements; **Wood and Wood products**: Introduct on to wood macrostructure, sap wood and heart wood, defects and decay of t mber, seasoning and preservat on of t mber, f re resist ng treatment, introduct on to wood products- veneers, plywood's, f bre board, part cle board, block board, bat en boards		

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

Unit 4	Aggregate, Bricks & Lime	10
Aggregate: Classif cat on, Physical and mechanical propert es, thermal propert es of aggregate. **Bricks and Masonry Blocks**: Types, propert es, f eld and laboratory tests to evaluate quality. **Lime**: classif cat on, propert es		

Unit 5	Cement & Flyash	10
Cement: types, Portland cement: chemical composit on of raw material, bogue compounds, hydrat on of cement, role of water in hydrat on, test ng of cements, Fly **ash**: propert es and use in manufacturing of bricks and cement.		

Textbook:	
1.	Basic Civil Engineering, Bhavikat , S. S., New Age Publicat ons,2019.

Reference Books:	
1.	Construct on Technology, Chudley, R., Longman Group, England, 2014.
2.	Basic Civil and Environmental Engineering, C.P. Kausik, New Age publicat on 2010.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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:	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 object ves:	
This course will enable the student	
1.	To analyze the transistor biasing circuits.
2.	To understand the amplif cat on act on of BJT and its h-parameter models.
3.	To understand the operat on and Characterist cs 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 amplif cat on act on of BJT and its h-parameter models.
3.	analyze the operat on and characterist cs 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 Stabilizat on – Stabilizat on Factors (s, s^1, s^{11}) – Types of Biasing-Fixed Bias, Collector to Base bias, Emit er-Stabilized bias, Voltage Divider Bias. Simple numerical problems		

Unit 2	**Single Stage Amplif ers**	**9**
Single Stage Transistor Amplif er- Transistor Amplifying Act on – Pract cal circuit of Transistor Amplif er-Classif cat on of Amplif ers- Amplif er equivalent circuit – Concept of h-parameters – Analysis of CE, CB and CC Amplif ers – Comparisons of CE, CB and CC. Simple numerical problems.		

Unit 3	**Field Ef ect Transistors**	**9**
Construct on of JFETs – Types – Operat on - Characterist cs - Construct on and Characterist cs of MOSFETs - Deplet on type MOSFETs–Enhancement type MOSFET.		

Unit 4	**FET Biasing**	**9**
FET Biasing: Fixed Bias Conf gurat on–Self Bias Conf gurat on–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 applicat ons.		

Textbook:	
1.	Electronic Devices and Circuits, David A Bell, Fif h Edit on, 2008, Oxford University Press.

Reference Books:	
1.	Electronic Devices and Circuits, J. Millman and Halkias, 1991 edit on, 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
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 transformat on–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. Determinat on of Average, R.M.S Values, Peak and Form Factor for square, triangular, sawtooth and sinusoidal waveforms, Phase and Phase Dif erence, j-notat on, Steady State Analysis of R, L and C with Sinusoidal Excitat on, Concept of Reactance, Impedance, Susceptance and Admit ance, Real and React ve 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, Admit ance, Transmission and Hybrid Parameters and Their Relat ons, Condit on for Reciprocity and Symmetry-inter connections–Problems.		

Unit 4	Network Theorems	8
Superposit on, Thevenin 's, Norton 's, Maximum Power Transfer, Millman's, Reciprocity and Tellegen's Theorems for DC and AC excitat ons–Problems.		

Unit 5	Resonance & magnet cally coupled circuits	8
Resonance – Def nit on, Resonant frequency, bandwidth and Q-factor for series and parallel resonant Circuits-Problems. Magnet cally Coupled Circuits: Coupled circuits – self & mutual inductance, Coef cient of coupling- Dot convent on, -Analysis of Coupled Circuits (Series aiding, series opposing, parallel aiding and parallel opposing)–Problems.		

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

Reference Books:	
1.	A. Chakrabart , "Circuit Theory-Analysis and Synthesis", Dhanpat Rai & Co, 2011
2.	M.E. Van Valkenberg. "Network Analysis". 3rd edit on, Pearson Publicat ons, New Delhi 2006.
3.	William H. Hayt& Jack E. Kennedy & Steven M. Durbin. "Engineering Circuit Analysis". 8th edit on, Tata McGraw Hill Company, 2013.
4.	J. A. Edminister & M. D. Nahvy. "Theory and Problems of Electric Circuits". 4th Edit on Schaums Outline series, New Delhi Tata McGraw Hill Company, 2004.
5.	C. K. Alexander and M. N. O. Sadiku. "Fundamentals of Electric Circuits". 5th Edit on, Tata McGraw hill Publishing Company Limited, New Delhi, 2012.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
This course will enable the student to	
1.	understand the concepts of biasing and stabilizat on in BJT
2.	understand the concepts of FET, MOSFET and their biasing techniques.
3.	analyze the parameters like gain and impedances for single stage amplif er circuits.
4.	understand the small signal analysis of BJT and FET Amplif ers.
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 stabilizat on condit ons of BJT.
2.	comprehend biasing and stabilizat on condit ons of FET.
3.	design the amplif ers 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 applicat ons.

Unit 1	**Biasing and Stability**	**12**
Overview of BJT Conf gurat ons, Transistor Amplifying Act on – Load Line Analysis of AC & DC – Operat ng Point. Types of Biasing: Fixed Bias – Emit er Bias – Emit er Feedback Bias - Collector to Base bias – Voltage Divider Bias. Bias Stability: Need for Stabilizat on – Stabilizat on Factors (s,s′, s′′) – Stability Factors for Voltage Divider Bias - Thermal Stability and Thermal Runaway – Heat Sinks.		

Unit 2	**Field Ef ect Transistors and its Biasing**	**12**
Construct on of JFETs–Transfer Characterist cs–FET Biasing: Fixed Bias Conf gurat on–Self Bias Conf gurat on–Voltage Divider Biasing–Construct on and Characterist cs of MOSFETs–Deplet on type MOSFETs–Enhancement type MOSFETs-Biasing in MOSFETs.		

Unit 3	**Transistor at Low Frequencies**	**12**
Graphical Analysis of the CE Conf gurat on, Two port devices and the hybrid model, Transistor hybrid model, the h-parameters, Analysis of a transistor amplif er circuit using h-parameters (Exact Analysis), Illustrat ve problems		

Unit 4	FET Amplif ers	10
Small signal model of JFET and MOSFET – Common source and common Drain amplif ers 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, Fif h Edit on, 2008, Oxford University Press.
2.	Electronic Devices and Circuits, J. Millman and Halkias, 1991 edit on, 2008, TMH.

Reference Books:	
1.	Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, 9th edit on, PHI.
2.	Principles of Electronics, V. K. Mehta, S. Chand Publicat ons2004
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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
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 def ne 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 reduct on techniques, star & delta transformat ons, source transformat on, 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, t me 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, admit ance, hybrid, transmission (ABCD) parameters, conversion of one parameter to another parameter, condit ons for reciprocity & symmetry, Inter connect on of two port networks in series, parallel and cascaded conf gurat ons, problems (with independent dc sources only).		

Unit 4	**Network Theorems**	**9**
Superposit on, 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 excitat on using dif erent al equat on approach, problems (with independent sources only).		

Textbook:	
1.	A. Sudhakar and Shyam Mohan S Palli, “Circuits and Networks” McGraw Hill, 2015.

Reference Books:	
1.	A. Chakrabart , “Circuit Theory-Analysis and Synthesis”, Dhanpat Rai & Co, 2011
2.	M.E. Van Valkenberg. “Network Analysis”. 3rd edit on, Pearson Publicat ons, New Delhi 2006.
3.	William H. Hayt& Jack E. Kennedy & Steven M. Durbin. “Engineering Circuit Analysis”. 8th edit on, Tata McGraw Hill Company, 2013.
4.	J. A. Edminister & M. D. Nahvy. “Theory and Problems of Electric Circuits”. 4th Edit on Schaums Outline series, New Delhi Tata McGraw Hill Company, 2004.
5.	C. K. Alexander and M. N. O. Sadiku. “Fundamentals of Electric Circuits”. 5th Edit on, Tata McGraw hill Publishing Company Limited, New Delhi, 2012.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
This course will enable the student to	
1.	Understand the signif cance of linear data structures in problem-solving and basic t me/space complexity analysis.
2.	Create and manage linked lists to ef ciently organize and manipulate data, emphasizing memory ef ciency.
3.	Implement and apply stacks and queues to manage program f ow and solve problems involving expression evaluat on 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 ef ciently
2.	Apply linked lists for dynamic data storage and understanding of memory allocat on.
3.	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4.	Analyze queue-based algorithms for ef cient task scheduling and breadth-f rst traversal in graphs and dist nguish 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	**Introduct on to Linear Data Structures**	**9**
Introduct on to Linear Data Structures: Def nit on and importance of linear data structures, Abstract data types (ADTs) and their implementat on, Overview of t me and space complexity analysis for linear data structures.		

Unit 2	**Linked Lists**	**9**
Linked Lists: Singly linked lists: representat on and operat ons, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applicat ons of linked lists.		

Unit 3	Stacks, Queues and De-queues	9
Stacks: Introduct on to stacks: propert es and operat ons, implement ng stacks using arrays and linked lists, Applicat ons of stacks. Queues: Introduct on to queues: propert es and operat ons, implement ng queues using arrays and linked lists, Applicat ons of queues. De-queues: Introduct on to De-queues (double-ended queues), Operat ons on De-queues and their applicat ons.		

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

Unit 5	Hashing	9
Hashing: Brief introduct on to hashing and hash funct ons, Collision resolut on techniques: chaining and open addressing, Hash tables: basic implementat on and operat ons, Applicat ons of hashing in unique ident f er generat on, caching, etc.		

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

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

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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 object ves:	
This course will enable the student to	
1.	Understand Python programming fundamentals and control structures.
2.	Apply lists, tuples, dict onaries, sets, and funct ons in Python.
3.	Develop modular Python programs using funct ons and modules.
4.	Implement text-f le processing, string handling, and except on handling.
5.	Design object-oriented programs using classes, inheritance, encapsulat on, and polymorphism.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Interpret computat onal problem solving and basic elements of python programming.
2.	Analyze python programming basics like lists, tuple, dict onaries, and sets
3.	Demonstrate funct ons in python programming.
4.	Evaluate string processing applicat ons and except on handling in python programming
5.	Develop programs using class and object in python programming

Unit 1	**Introduct on to python programming language**	**9**
Introduct on to python programming language, literals, variables and ident f ers, operators, expressions and data types. Control Structures: Boolean expressions, select on control, and iterat ve control.		

Unit 2	**Lists**	**9**
Lists: List structures, lists in python, iterat ng over lists in python, more on python lists. Dict onaries and sets, tuple.		

Unit 3	**Funct ons**	**9**
Funct ons: Program rout nes, more on funct ons, Module Design: Modules, Top-Down design, python modules.		

Unit 4	**Text Files**	**9**
Text Files: Text File, Using Text f les, string processing, except on handling.		

Unit 5	**Introduct on to object-oriented programming**	**9**
Introduct on to Object oriented programming: class, three fundamental features of object-oriented programming, encapsulat on-what is encapsulat on, def ning classes in python. Inheritance: subtypes, def ning subclasses in python, Polymorphism: use of polymorphism.		

Textbook:	
1.	Introduct on to Computer Science Using Python: A Computat onal Problem-Solving Focus, Charles Dierbach, 1st Edit on, 2012.

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

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	To understand the role of Opt cal f ber parameters in engineering applications.
2.	To recognize the signif cance of laser and ultrasonics by studying its characterist cs and its applicat on in f nding the part cle size.
3.	To illustrate the semiconductor, magnet c and dielectric materials applications.
4.	To ident fy 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.	est mate the basic parameters of LASERS and opt cal fiber
3.	est mate the physical parameters of sensors and semiconductors
4.	evaluate the quant t es of magnet c and dielectric materials

List of Experiments	
Any 10 of the following experiments are to be conducted	
1.	Determinat on of wavelength of LASER light using dif ract on grating
2.	Determinat on of part cle size using LASER.
3.	Determinat on of spring constant of springs using Coupled Oscillator
4.	Determinat on of Hall coef cient and carrier concentrat on of a given semiconductor by Hall effect.
5.	Determinat on of Dielectric constant of dielectric material by bridge resonance method.
6.	Determinat on of Magnet c f eld along the axis of a circular coil carrying current by stewrt-Gee ‘s method.
7.	Determinat on of Rigidity modulus of material of a wire-by Torsional pendulum.
8.	Determinat on of hysteresis loss of ferromagnet c material by tracing B-H Curve .
9.	Determinat on of the numerical aperture and acceptance Angle of a given opt cal fiber.
10.	Verif cat on of laws of streched string- sonometer.
11.	Determinat on of frequency of electrically vibrated tuning fork-Melde’s experiment.
12.	Determinat on of pressure variat on using Strain Guage sensor.
13.	Determinat on of the resist vity of semiconductor by Four probe method.
14.	Determinat on of the energy gap of a semiconductor by using P-N Junct on diode.
15.	Determinat on of resistance with varying temperature by using thermister.

Reference Books:	
1.	S. Balasubramanian, M.N. Srinivasan, A Text book of Pract cal Physics, S Chand Publishers, 2017
2.	C.V. Madhusudan Rao, V. Vasanth kumar. Engineering Physics laboratory. SciTech publicat ons, 2010

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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

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

Lecture Hours	Tutorial Hours	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	Verify the Law of Parallelogram and Triangle of Forces.
2.	Determine the coef cients of frict on of Stat c and Rolling frict on and Centre of gravity of dif erent plane Lamina.
3.	Analyze the system of Pulleys and Moment of Inert a 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 frict onal systems.
3.	Determine propert es of surfaces, volumes and moments of inert a.
4.	Analyze kinemat cs and kinet cs 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.	Verif cat on of Law of Parallelogram of Forces.
2.	Verif cat on of Law of Triangle of Forces.
3.	Verif cat on of the Law of polygon for coplanar-concurrent forces act ng on a part cle in equilibrium and to f nd the value of unknown forces considering part cle to be in equilibrium using universal force table.
4.	Determinat on of coef cient of Stat c and Rolling Frict ons.
5.	Determinat on of Centre of Gravity of dif erent shaped Plane Lamina.
6.	Verif cat on of the condit ons of equilibrium of a rigid body under the act on 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 accelerat on due to gravity using a compound pendulum.
9.	Analysis of Pin jointed Trusses.
10.	Determine the Moment of Inert a of a Flywheel.
11.	Verif cat on of Law of Moment using Rotat on Disc Apparatus and Bell Crank Lever.

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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

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	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	To develop pract cal knowledge of semiconductor devices, rect f ers, clippers, and voltage regulators through experimental invest gat on.
2.	To study the characterist cs and operat on of BJT, JFET, MOSFET, photodiode, and phototransistor**.**
3.	To evaluate the frequency response and performance of BJT and FET amplif ers in dif erent conf gurat ons.
4.	To develop pract cal skills in designing transistor biasing circuits and applying transistors as switches and amplif ers**.**
5.	To study the characterist cs, operat on, and applicat ons of SCR and UJT through laboratory experiments.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Analyze the characterist cs and regulat on of Zener diodes, rect f ers, clippers and semiconductor devices.
2.	Analyze the input-output characterist cs of BJT, JFET, MOSFET, photodiode and phototransistor.
3.	Evaluate the frequency response and performance of BJT and FET amplif ers in dif erent conf gurat ons.
4.	Design transistor self-bias circuits and apply transistors as switches and amplif ers.
5.	Analyze the characterist cs and operat on of SCR and UJT devices and their applicat ons.

List of Experiments:	
Any 10 of the following experiments are to be conducted	
1.	Load regulat on and line regulat on of Zener Diode.
2.	Full Wave bridge rect f er with and without filter.
3.	Input and Output Characterist cs of Transistor in CE Configuration.
4.	Input and Output Characterist cs of Transistor in CC Configuration.
5.	Characterist cs 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 solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	To determine characterist cs of JFET, MOSFET, SCR and UJT.
2.	To determine parameters like gain, impedances and band width of BJT and FET amplif er circuits.

Course outcomes:	
At the end of the course, the student will be able to	
1.	Comprehend the specif cat ons of act ve electronic devices.
2.	Comprehend the BJT input and output characterist cs
3	Gain the knowledge and pract cal usage of JFET, MOSFET.
4	Analyse various biasing circuits and electronic circuits as amplif ers.
5	Plot the characterist cs of electronic devices.

List of Experiments:	
Any 10 of the following experiments are to be conducted	
1.	Ident f cat on, Specif cat ons and Test ng of Act ve Devices, Low power JFETs, MOSFETs, Photodiode, Phototransistor, SCR and UJT.
2.	Input and Output Characterist cs of Transistor CE Characterist cs.
3.	Input and Output Characterist cs of Transistor CB Characterist cs.
4.	Input and Output Characterist cs of Transistor CC Characterist cs.
5.	JFET Characterist cs.
6.	MOSFET Characterist cs
7.	Frequency response of CE Amplif er.
8.	Frequency response of CC Amplif er.
9.	Frequency response of Common Source FET Amplif er.
10.	SCR Characterist cs.
11.	UJT Characterist cs.
12.	Photodiode and Phototransistor Characterist cs
13.	Soldering Pract ce.
14.	RC Coupled Amplif er
15.	RC Dif erent ator and Integrator Circuits

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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	Pract ce Hours	Credits
0	0	2	1

Course object ves:	
1.	Ident fy suitable data structures for solving real-world problems.
2.	Implement linked lists, stacks, queues, trees, and hash tables.
3.	Apply data structures to solve pract cal computat onal problems.
4.	Analyze data structure operat ons and their ef ciency.
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 ef ciently
2.	Apply linked lists for dynamic data storage and understanding of memory allocat on.
3.	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4.	Analyze queue-based algorithms for ef cient task scheduling and breadth-f rst traversal in graphs and dist nguish 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 operat ons.

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 insert on, 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 Applicat ons

i) Write a program to evaluate a post ix expression using a stack.

ii) Use a stack to evaluate an inf x expression and convert it to post ix.

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

WEEK 5: Binary Search Tree Implementation:

i) Implement ng BST operat ons 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 resolut on techniques

PART-B

WEEK 1: Python Basics, Condit ons 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 f nd the largest prime factor of a given number.

WEEK 2: Python Lists, Dict onaries, and Tuples

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

WEEK 3: Python Funct ons and Files

i) Write a Python Funct on for f nding Prime Numbers in a range.
ii) Write a Python Funct on to perform matrix mult plicat on.
iii) Write a Python Program to read and Print File Contents.
iv) Write a Python Program to write a user input to a f le.
v) Write a Python Program to append a user input to a f le.

WEEK 4: Single Linked List and Double Linked List Implementation

i) Implement a singly linked list to perform all of its operat ons.
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) Implement ng a BST operations using Linked List.

WEEK 7: Binary Search Tree Traversing:

i) Traversing of BST.

Reference Books:

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

CO-PO Mapping

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solut ons	Conduct invest gat ons of complex problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborat ve 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