I B.TECH-II SEMESTER

DIFFERENTIAL EQUATIONS AND VECTORCALCULUS

(Common to All Branches)

Subject Code: 23BS2T01   **L T P C**

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Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them in to advanced level by handling various real-world applications.

Course Outcomes:

At the end of the course, the student will be able to:CO1: Solve the differential equations related to various engineering fields.

CO2: Identify solution methods for partial differential equations that model physical processes.

CO3: Interpret the physical meaning of different operators such as gradient, Curl and divergence.

CO4: Estimate the work done against a field, circulation and flux using vector calculus.

UNITI   Differential Equations of First Order and First Degree

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Orthogonal Trajectories Newton's Law of cooling – Law of natural growth and decay

UNITII   Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, Particular integral, General solution, Wronskian, Method of variation of parameters,

Simultaneous linear equations, Applications to L-C-R Circuit problems.

UNIT III   Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients - Non homogeneous terms of the type e^{ax+by},

$\sin(ax + by)$,

$\cos(ax + by)$

UNITIV   Vector differentiation

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions - Gradient, Directional derivative, del applied to vector point functions- Divergence and Curl, Solenoidal, Irrotational vectors, Scalar Potential Function - Vector identities.

UNITV   Vector Integration

Line integral- circulation – work done, surface integral-flux, Green's theorem in the plane (with out proof), Stoke's theorem (with out proof), volume integral, Divergence theorem (with out proof) and related problems.

Text books:

1. **Higher Engineering Mathematics**, B.S.Grewal, KhannaPublishers,2017,44thEdition
2. **Advanced Engineering Mathematics**, Erwin Kreyszig, John Wiley & Sons, 2018,10thEdition.

Reference Books:

Thomas Calculus, George B.Thomas, Maurice D.Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.

1. **Advanced Engineering Mathematics**, Dennis G.Zill and Warren S.Wright, Jones and Bartlett, 2018.
2. **Advanced Modern Engineering Mathematics**, Glyn James, Pearson publishers, 2018, 5th Edition.
3. **Advanced Engineering Mathematics**, R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd., 2021 5thEdition (9th reprint).

4. **Higher Engineering Mathematics**, B.V.Ramana, McGraw HillEducation,2017

I Year - II Semester	Code: 23CS2T01	L	T	P	C
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DATA STRUCTURES

(Common to CSE and Allied branches)

Course Objectives:

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

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

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in

algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating

understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states,

and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in

graphs and distinguish between deques and priority queues, and apply them appropriately

to solve data management challenges.

CO5: Devise novel solutions to small scale programming challenges involving data structures

such as stacks, queues, Trees.

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for

specific problems.

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs), Overview of time and space complexity analysis for linear data structures algorithms. **Searching Techniques**: Linear Search, Binary Search**, Sorting Techniques**: Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Selection Sort- Heap sort, **Graphs**: Introduction.

UNIT II Stacks:

Introduction to stacks: properties and operations, implementing and representation of stacks using array, applications of stack in expression evaluation, Infix to postfix expression, reversing list, backtracking (Graph Traversals (DFS))

UNIT III Queues:

Introduction to queues: properties and operations, implementing and representation of queues using array, applications of queue in priority queue, round robin algorithm, breadth-first search (Graph Traversals (BFS)), Deques: Introduction to deques (double-ended queues), operations on deques

UNIT IV Linked Lists:

Linked Lists: Introduction, Comparing Arrays and Linked Lists, Singly linked list, representation and operations, Advantages and disadvantages of single linked list, stacks using linked list, queues using linked lists doubly linked lists and circular linked list, Applications of linked lists.

UNIT V Trees:

Introduction to Linear Data Structures: Define Tree, Binary Tree Properties and Types, Representation of Binary Tree using array and linked lists, Binary Tree Traversals (recursive), Binary search tree and properties, BST Operations-searching, insertion, deletion.

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations

Text Books:
1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008.
3. "Expert Data Structures with C" by R.B. Patel, Khanna Book Publishing Company, New Delhi, 4th Edition.

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

COMMUNICATIVE ENGLISH

COURSE CODE:23HM1T01(CE,EE,MEC,ECE)

23HM2T01(CSE,CSE(AIDS),AIML,CSE(AIML))

(Common to all branches)

L	T	P	C
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Introduction

 In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing.

Course Objectives: The main objective of introducing this course, *communicative English,* is to facilitate effective listening, Reading, Speaking and Writing skills among the students.It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary.

This course helps the students to make them effective in speaking and writing skills and to make them industry-ready

LISTENING SKILLS:

Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.

2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.

3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:

Objectives:

1. To make the students aware of the importance of speaking for their personal and professional communication.

2. To enable the students to express themselves fluently and accurately in social and professional success.

3. To help the students describe objects, situations and people.

4. To make the students participate in group activities like role-plays, discussions and debates.

5. To make the students participate in just a minute talks.

READING SKILLS:

Objectives:

1. To enable the students to comprehend a text through silent reading.

2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.

3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:

Objectives:

1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences, paragraphs, e-mails and essays.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students to write coherently and cohesively.

At the end of the Course, Student will be able to:

CO 1: Understand the context, topic and pieces of specific information from social or

transactional dialogues.

CO 2: Apply grammatical structures to formulate sentences and correct word forms.

CO 3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.

CO 4: Evaluate reading/listening texts and to write summaries based on global comprehension of

these texts.

CO 5: Create a coherent paragraph, essay, and resume.

Methodology:

1. The class is to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.

2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.

3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.

4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.

5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT –I

Lesson: **HUMAN VALUES: Gift of Magi (Short Story)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; Introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT –II

Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured

    talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the

    Ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices -linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT –III

Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Reading a text in detail by making basic inferences-recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement;

Vocabulary: Compound words, Collocations

UNIT –IV

Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, and communicate processesor display complicated

Writing: Letter Writing: Official Letters, Resumes

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

Vocabulary: Words often confused

UNIT –V

Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

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

Vocabulary: Technical Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3)
2. Empowering English by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Rout ledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:

GRAMMAR:

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

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos

https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

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ENGINEERINGPHYSICS

(Commonforall branches of Engineering)

**Course Code: 23BS1T02(CIV, MEC, ECE & EEE) ,
23BS2T02   (CSE, AIDS, AIML&CSE(AIML))**

Course Objectives:

To bridgethegapbetweenthePhysicsinschool at 10+2levelandUGlevelengineeringcourses by identifying t h e importanceoftheopticalphenomenonlikeinterference, diffractionetc., enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:

- Analyse the intensity variation of light due to polarization, interference and diffraction.
- Familiarize with the basics of crystals and their structures.
- Summarize various types of polarization of dielectrics and classify the magnetic materials.
- Explain fundamentals of quantum mechanics and apply to one dimensional motion of particles.
- Identify the type of semiconductor using Hall Effect.

UNIT   I Wave Optics   **8hrs**

Interference: Introduction **-** Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications -Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction&Polarisation:

Diffraction:Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating -Dispersive powerand resolving power of Grating (Qualitative).

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

UNIT   IICrystallography and X-ray diffraction   **8hrs**

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC –Millerindices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination byLaue's andpowder methods.

UNIT III Dielectric and Magnetic Materials   **10hrs**

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector –Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation–complex dielectric constant – Frequency dependence of polarization – dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro& Ferri magnetic materials - Domain concept of Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT   IV Quantum Mechanics and Free electron theory   **7hrs**

Quantum Mechanics: Dual nature of matter – Heisenberg'sUncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory –electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

UNIT V Semiconductors: **9hrs**

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

Textbooks:

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

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

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BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to all branches of engineering)

Subject Code: 23ES1T02(CE,MEC,EEE,ECE)

Subject Code: 23ES2T02(CSE,Allied Branches)

Course Objectives

To expose to the field of Electrical & Electronics Engineering, laws and principles of electrical/electronic engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes: After the completion of the course students will be able to

- Understand the basic electrical circuits, AC machines.
- Analyze different electrical circuits, performance of AC machines.
- Explain the theory, construction, and operation of electronic devices.
- Apply the concept of science and mathematics to explain the working of diodes, transistors, and their applications.
- Analyze different number systems and logic gates.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I   DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor(for sine wave), Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT   II   Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) Single Phase Transformer, (ii) Three Phase Induction Motor and (iii) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT   III   Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel & Solar power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthling and its types, Safety Precautions to avoid shock.

Textbooks:
1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

Reference Books:

1. Principles of Power Systems by V.K. Mehta, S.Chand Technical Publishers, 2020.
2. A textbook of Electrical Technology by B.L. Theraja, S. Chand and Company, reprint edition, 2014.
3. S. K. Bhatacharya, Basic Electrical and Electronics Engineering, Second Edition, Person Publications, 2018.

ART B: BASIC ELECTRONICS ENGINEERING

UNIT I Semiconductor Devices

Introduction - Characteristics of PN Junction Diode - Zener Diode and its Characteristics. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics.

UNIT II Basic Electronic Circuits And Instrumentation

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), RC Coupled amplifier.

Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III Digital Electronics

Overview of binary number system, BCD codes, Excess-3 code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and simple Logic Gates including Universal Gates - AND,OR,NOT, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders.

Textbooks:

1. R.L.Boylestad& Louis Nashlesky, Electronic Devices &Circuit Theory, PearsonEducation, 2021.
2. R. P. Jain, Modern Digital Electronics, 4thEdition, Tata Mc Graw Hill, 2009
3. Switching Theory and Logic Design by A.Anand Kumar,PHI Learning, 3rd Edition.

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S.Chand& Co,2010.
2. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall,

   India,2002.

3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version,Pearson Education,2009.

I Year - II Semester	Code: 23CS2L01	L	T	P	C
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DATA STRUCTURES LAB

(Common to CSE and Allied branches)

Course Objectives:

The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

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

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.

CO5: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

List of Experiments:

Exercise 1: Array Manipulation

  i)   Write a program to reverse an array.
  ii) C Programs to implement the Searching Techniques – Linear & Binary Search
  iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Exercise 2: Stack Operations

  i)   Implement a stack using arrays and linked lists.
  ii) Write a program to evaluate a postfix expression using a stack.
  iii) Implement a program to check for balanced parentheses using a stack.

Exercise 3: Queue Operations

    i)   Implement a queue using arrays and linked lists.
    ii) Develop a program to simulate a simple printer queue system.
    iii) Solve problems involving circular queues.

Exercise 4: Stack and Queue Applications

    i)   Use a stack to evaluate an infix expression and convert it to postfix.
    ii) Create a program to determine whether a given string is a palindrome or not.
    iii) Implement a stack or queue to perform comparison and check for symmetry.

Exercise 5: Linked List Implementation

    i)   Implement a singly linked list and perform insertion and deletion operations.
    ii) Develop a program to reverse a linked list iteratively and recursively.
    iii) Solve problems involving linked list traversal and manipulation.

Exercise 6: Linked List Applications

    i)   Create a program to detect and remove duplicates from a linked list.
    ii) Implement a linked list to represent polynomials and perform addition.
    iii) Implement a double-ended queue (deque) with essential operations.

Exercise 7: Double Linked List Implementation

    i)   Implement a doubly linked list and perform various operations to understand its properties and applications.

Exercise 8: Binary Search Tree

    i)   Implementing a BST using Linked List.
    ii) Traversing of BST.

Exercise 9: Hashing

Implement a hash table with collision resolution techniques.

    i)   Write a program to implement a simple cache using hashing.
    ii) Write a program to implement BFS.
    iii) Write a program to implement DFS.

Text Books:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

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

COMMUNICATIVE ENGLISH LAB

(Common to all branches)

COURSE CODE:23HM1L01(CE,EE,MEC,ECE)
23HM2L01(CSE,CSE(AIDS),AIML,CSE(AIML))

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OBJECTIVES

The main objective of introducing this course, *Communicative English Laboratory*, is to expose the students to a variety of self-instructional, learner friendly modes of language learning students will get trained in the basic communication skills and also make them ready to face job interviews.

OUT COMES

CO 1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO 2: Apply communication skills through various language learning activities

CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.

CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.

CO5: Create effective resonate and prepare themselves to face interviews in future.

List of Topic

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practic
5. E-mail Writing
6. Interview skills
7. Resume Writing, Cover letter, SOP
8. Group Discussions-methods & practice
9. Debates- Methods & Practice
10. PPT Presentations/ Poster Presentation

Lab Software: Globarena Technologies Ltd.,

Reference Books:

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

Web Resources:

Spoken English:

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

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

ENGINEERING PHYSICS LAB

(Common to All Branches of Engineering)

Course Code:23BS1L01(CIV, MEC, ECE & EEE)

23BS2L01(CSE, AIDS, AIML& CSE(AIML))

Course Objectives:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to

- **Operate optical instruments like travelling microscope and spectrometer.**
- **Estimate the wavelengths of different colors using diffraction grating.**
- **Plot the intensity of the magnetic field of circular coil carrying current with distance.**
- **Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.**
- **Calculate the band gap of a given semiconductor**
- **Identify the type of semiconductor using Hall Effect.**
- **Identify the different types of semiconductor diodes and their applications.**
- **Analyse the experimental data on Planck's constant and compare it to theoretical predictions.**

List of Experiments:

1. Determination of radius of curvature of a given planoconvexlens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probemethods.
9. Determination of energy gap of as Semiconductor using p-n junction diode.
10. MagneticfieldalongtheaxisofacurrentcarryingcircularcoilbyStewartGee's Method.
11. [DeterminationofHallvoltageandHallcoefficientofagivensemiconductorusingHall](#)Effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination the acceleration due to gravity by using the compound pendulum.
14. Determination of magneticsusptibility byKundt's tube method.
15. Determination of rigidity modulus of thematerial ofthe given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretchedstring.
17. Determination of young's modulus forthegiven material of wooden scale by non- uniform bending (or double cantilever)method.
18. Determination of Frequency of electrically maintained tuning fork by Melde'sexperiment.

Note: Any **TEN** of the listed experiments are to be conducted. Outofwhich any**TWO**experiments may beconducted in virtualmode.

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

*URL:www.*vlab.co.in

ENGINEERING PHYSICS LAB

(Common to All Branches of Engineering)

Course Code:23BS1L01(CIV, MEC, ECE & EEE)

23BS2L01(CSE, AIDS, AIML& CSE(AIML))

Course Objectives:

To study the concepts of optical phenomenon like interference,diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to

- **Operate optical instruments like travelling microscope and spectrometer.**
- **Estimate the wavelengths of different colors using diffraction grating.**
- **Plot the intensity of the magnetic field of circular coil carrying current with distance.**
- **Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.**
- **Calculate the band gap of a given semiconductor**
- **Identify the type of semiconductor using Hall Effect.**
- **Identify the different types of semiconductor diodes and their applications.**
- **Analyse the experimental data on Planck's constant and compare it to theoretical predictions.**

List of Experiments:

1. Determination ofradius of curvatureofagiven planoconvexlens byNewton's rings.
2. Determination ofwavelengthsofdifferentspectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification ofBrewster's law
4. Determination ofdielectric constant using charging and discharging method.
5. Study thevariation ofB versus Hby magnetizingthe magneticmaterial (B-H curve).
6. Determination ofwavelengthof Laser lightusingdiffraction grating.

7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probemethods.
9. Determination ofenergy gap of asSemiconductorusing p-n junction diode.
10. MagneticfieldalongtheaxisofacurrentcarryingcircularcoilbyStewartGee's Method.
11. [DeterminationofHallvoltageandHallcoefficientofagivensemiconductorusingHall](#)Effect.
12. Determination oftemperature coefficients of athermistor.
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HEALTH AND WELLNESS, YOGA AND SPORTS

(Common to All branches of Engineering)

23BS1L04(CE,EEE,MEC,ECE)

23BS2L04((CSE,AIDS,AIML,CSE(AIML))

Course Objectives:

The main objective of introducing this course is to make the students maintain their mental andphysical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.

CO2: Demonstrate an understanding of health-related fitness components. **CO3:** Compare and contrast various activities that help enhance their health. **CO4:** Assess current personal fitness levels.

CO5: Develop Positive Personality

UNIT I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index(BMI) of all age groups.

Activities:

i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.

   Practicing general and specific warm up, aerobics

ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping andrunning.

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning,2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to SurvivingAnywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. HumanKinetics, Inc.2014

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as manyas Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.