COURSE STRUCTURE
AND
DETAILED SYLLABUS

INFORMATION TECHNOLOGY
FOR
B.TECH I Year I-Sem and I Year II-Sem

(Applicable for the batches admitted from 2023 - 2024)

AR -23

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AUTONOMOUS)

Approved by AICTE,

Recognized Under 2(f) & 12(b) of UGC,

Permanently Affiliated to JNTUGV ,Vizianagaram

K.Kotturu, Tekkali, Srikakulam – 532201. Andhra Pradesh.

VISION OF THE INSTITUTE

To evolve into a premier engineering institute in the country by continuously enhancing the range of our competencies, expanding the gamut of our activities and extending the frontiers of our operations.

MISSION OF THE INSTITUTE

Synergizing knowledge, technology and human resource, we impart the best quality education in Technology and Management. In the process, we make education more objective so that efficiency for employability increases on a continued basis.

VISION OF THE DEPARTMENT

Create high-quality engineering professionals through research, innovation and teamwork for Information Technology services with outstanding faculty, facilities and education.

MISSION OF THE DEPARTMENT

M1: Information Technology program dedicates itself to provide students with a set of skills, knowledge and attitude that will permit its graduates to succeed and thrive as successful information technologists.

M2: Enhance overall personality development which includes innovative thinking, teamwork, entrepreneur skills, communication skills, employability skills and ethical conduct.

M3: Ensuring effective teaching–learning process to provide in-depth knowledge of interdisciplinaryareas.

M4: Providing industry interactions through consultancy and sponsored research for the societal needs.

AR – 23: B.Tech - IT

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: Acquire the ability of technical competence in analyzing, designing and developing to create novel products in their field.

PEO2: Attain the skill in pursuing higher education, doing research or resuming entrepreneurial strivings.

PEO3: Possess leadership qualities, nourish ethical responsibilities and cherish with communication skills.

PEO4: Enrich lifelong learning with technical savvy and promote the progressive societal needs.

PROGRAM OUTCOMES (POs):

Engineering Graduates will be able to:

PO1: ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: PROBLEM ANALYSIS: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Aditya Institute of Technology and Management - Tekkali

PO7: ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as amember or leader in diverse teams, and in multidisciplinary settings.

PO10: COMMUNICATION: Communicate effectively on complex engineering activitieswith the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: PROJECT MANAGEMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

By the completion of Information Technology program the student will be able to:

PSO1: Execute the mathematical foundations, algorithmic principles of engineering to identify, formulate, design and investigate the intricate problems of Information Technology.

PSO2: Comprehend the principles and applications of the software and hardware facets of computer systems.

PSO3: Apply knowledge in varies domains to identify research gaps and provide solutions.

ADITYA INSTITUTE OF TECHNOLOGY & MANAGEMENT, TEKKALI – 532201
(An Autonomous Institution)
B.Tech COURSE STRUCTURE (AR – 23)
Department of IT

Category	Code	Theory/Lab	L	T	P	C
		I YEAR I SEMESTER				
MC	23MCS101	Induction Program	3 weeks			0
BH	23BHT101	Communicative English	3	0	0	3
BH	23BHT102	Linear Algebra and Calculus	2	1	0	3
BH	23BHT105	Chemistry	3	0	0	3
ES	23EST105	Introduction to Programming	3	0	0	3
ES	23ESL106	IT Workshop	1	0	4	3
BH	23BHL101	Communicative English Lab	0	0	3	1.5
BH	23BHL104	Chemistry Lab	0	0	3	1.5
ES	23ESL105	Computer Programming Lab	0	0	3	1.5
MC	23MCS103	Health and Wellness, Yoga and Sports	0	0	1	0.5
		Total	**12**	**1**	**14**	**20**

Category	Code	Theory/Lab	L	T	P	C
		I YEAR II SEMESTER				
BH	23BHT103	Differential Equations and Vector Calculus	2	1	0	3
BH	23BHT104	Engineering Physics	3	0	0	3
PC	23CST101	Data Structures	3	0	0	3
ES	23EST102	Basic Electrical and Electronics Engineering	3	0	0	3
ES	23ESL103	Engineering Drawing	1	0	4	3
BH	23BHL102	Engineering Physics Lab	0	0	3	1.5
PC	23CSL101	Data Structures Lab	0	0	3	1.5
PC	23ESL102	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5
MC	23MCS102	NSS/NCC/Scouts &Guides/Community Service	0	0	1	0.5
		Total	**12**	**1**	**14**	**20**

INDUCTION PROGRAMME

S.No.	Course Name	Category	L	T	P	C
1.	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0	0	6	0
2.	Career Counselling	MC	2	0	2	0
3.	Orientation to all branches -- career options, tools, etc.	MC	3	0	0	0
4.	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2	0	3	0
5.	Proficiency Modules & Productivity Tools	ES	2	1	2	0
6.	Assessment on basic aptitude and mathematical skills	MC	2	0	3	0
7.	Remedial Training in Foundation Courses	MC	2	1	2	0
8.	Human Values & Professional Ethics	MC	3	0	0	0
9.	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2	1	2	0
10.	Concepts of Programming	ES	2	0	2	0

	L	T	P	C
Subject Code: 23BHT101	3	0	0	3

Communicative English
(Common to all Branches)

Course Objectives
- To enable students to build vocabulary appropriate to their levels and to make students understand printed texts of different genres
- To enhance basic writing skills of the students in different forms of written communication
- To assist students implicitly synthesize the rules of grammar for the production of accurate sentences
- To aid students to acquire appropriate and adequate letter writing skills
- To get students enhance their essay writing skills and develop reading skills

Course Outcomes
1. Students will be able to comprehend printed texts of different genres easily and they will be able to make appropriate word choice for writing.
2. Students will be able to write short texts efficiently.
3. Students will be able to construct grammatically correct sentences.
4. Students will be able to communicate through letters effectively.
5. Students will be able to write essays and comprehend unfamiliar passages.

Unit – 1

A Power of a Plate of Rice by Ifeoma Okoye

Skimming and Scanning — Capital letters and Punctuation — Spellings —
Parts of speech — Root words — Prefixes and Suffixes — Synonyms and Antonyms

Unit – II

Night of the Scorpion by Nissim Ezekiel

Sequencing — Paragraph writing — Cohesive devices — Articles — Prepositions —
Homonyms, Homographs, homophones

Unit – III

Biography of Steve Jobs

Drawing inferences — Paraphrasing, Summarizing, Note-making — Verbs and Tenses,
Subject-verb agreement — Compound words — Collocations

Unit – IV

The Toys of Peace by Saki

Data interpretation — Official letters and Résumé — Direct and Indirect speech —
Academic reporting verbs — Active and passive voice — Words often confused — Jargon

Unit – V

The Power of Intrapersonal Communication (An Essay)

Reading comprehension — Essay writing — Correcting errors — Technical Jargon

Textbooks:

1. Pathfinder: Communicative   English   for   Undergraduate   Students,
   1st Edition, Orient BlackSwan, 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. Routledge, 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.

Reference Links:

Grammar

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

Vocabulary

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

Linear Algebra and Calculus
(Common to all Branches)

L	T	P	C
2	1	0	3

Course Objectives

To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications as follows.

- Develop proficiency in fundamental algebraic techniques. Apply algebraic concepts to solve engineering problems and practical applications.
- Understand the principles of linear transformations. Explore the concept of orthogonal transformations. Apply these transformations in engineering contexts and problem-solving.
- Gain a deep understanding of calculus concepts. Apply calculus to analyze and solve real-world problems. Explore the applications of calculus in engineering and related fields.
- Understand the concept of functions with multiple variables. Explore optimization techniques using functions of several variables. Apply these concepts in engineering optimization problems
- Learn the concepts of double integrals in two dimensions. Understand triple integrals in three dimensions. Apply integration techniques for calculating areas and volumes in engineering applications.

Course Outcomes

At the end of the course, the student will be able to
1. Develop matrix algebra techniques that are needed by engineers for practical applications.
2. To find the eigen values and eigen vectors and solve the problems by using linear transformation
3. Learn important tools of calculus in higher dimensions.
4. Familiarize with functions of several variables which is useful in optimization.
5. Familiarize with double and triple integrals of functions of several variables in two and three dimensions.

Unit – 1 Matrices

Rank of a matrix by echelon form, normal form. Inverseof Non- singular matrices by Gauss-Jordan method.

System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

Unit – 2 Linear Transformation and Orthogonal Transformation:

Eigen values, Eigen vectors and their properties(without Proof), Diagonalization of a matrix, Cayley Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

Unit – 3 Calculus:

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

Unit- 4 Partial differentiation and Applications (Multi variable calculus) :

Partial derivatives, total derivatives, chain rule, change of variables, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Unit – 5 Multiple Integrals (Multi variable Calculus):

Duble integrals - change of variables (Cartesian and Polar coordinates), Change of order of integration, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Text books:

1. B.S.Grewal,HigherEngineeringMathematics,44/e,Khanna Publishers,2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e,John Wiley & Sons, 2018.

Reference Books:

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 5/e, Alpha ScienceInternational Ltd.,2021 (9th reprint).
2. George B. Thomas, Maurice D.Weir and Joel Hass, Thomas Calculus,14/e, PearsonPublishers, 2018.
3. Glyn James, Advanced Modern Engineering Mathematics, 5/e, Pearson publishers, 2018.
4. Michael Greenberg, Advanced Engineering Mathematics, 9thedition, Pearson edn
5. H. K Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand,2021.

Chemistry
(Common to CSE/IT/CSM/CSD/ECE/EEE)

L	T	P	C
3	0	0	3

Subject Code: 23BHT105

Course Objectives

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods and spectroscopic techniques.

Course Outcomes

At the end of the course, the students will be able to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.

2. Summarize the concepts of Instrumental methods and distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques

3. Compare the materials of construction for battery and electrochemical sensors.

4. Demonstrate the preparation, properties, and applications of thermoplastics, thermosetting, elastomers, conducting polymers and bio-degradable polymers.

5. Apply the principle of Band diagrams in the application of conductors and semiconductors.

Unit – 1 Structure and Bonding Models:

Types of Hybridisations - valency shell electron pair repulsion theory (VSEPR), molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of N_2, O_2, CO and NO. π-molecular orbitals of butadiene and benzene, calculation of bond order.

Unit - 2 Instrumental Methods and Applications:

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, Instrumentation, electronic transition, Definition of Chromophore – Definition of Auxochrome – Absorption and Intensity Shifts, IR spectroscopies, Instrumentation fundamental modes and Fingerprint Region. NMR – Principle - Equivalent and Non-Equivalent Protons - Chemical Shift- Splitting – Coupling Constant.

Unit – 3 Electrochemistry and Applications:

Electrochemical cell, Nernst equation, cell potential (EMF) calculations and numerical problems (EMF), potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations). Electrochemical sensors (definition and working principle), reference electrodes – calomel electrode – NHE (or) SHE.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

Unit – 4 Polymer Chemistry:

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of addition polymerization.

Plastics –Thermoplastics and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, Polyester resin(PET).

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications.

Bio-Degradable polymers - Polyhydroxy alkanoates (PHA), Polyl Lactic Acid (PLA).

Unit – 5 Modern Engineering materials:

Semiconductors – Introduction**,** Basic concepts (Salient features of band theory- Definition semiconductor- Elemental semiconductors **-**intrinsic semiconductor and extrinsic semiconductors), applications.

Super conductors – Introduction- Basic Concept (Preparation of $YBa_2Cu_3O_{7-y}$ by ceramic method), Properties- applications.

Supercapacitors: Introduction, Principle & Mechanism of Supercapacitors - Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

Introduction to Programming

(Common to all Branches)

L	T	P	C
3	0	0	3

Subject Code: 23EST105

Course Objectives
- To impart adequate knowledge on the need of programming languages and problem-solving techniques and develop programming skills.

Course Outcomes
1. Understand the fundamentals of Computers and C programming
2. Develop programs using control structures and Arrays to store and manipulate data
3. Design modular programs using functions and storage classes
4. Use structures and pointers to manipulate record based data
5. Implement and manipulate files on secondary storage media

Unit – I

Introduction to Programming: Introduction to components of Computer system, Algorithm, Flow chart, Program development steps, C Tokens, Data Types, Operator precedence and associativitiy, Structure of C program, simple programs using Basic I/O statements.

Unit – II

Control Structures: Decision statements: if, if-else, nested if, if-else-if ladder, and switch

Iterative statements: while loop, do-while loop, for loop, nested loops

Branching: Break, continue

Arrays: Definition, Types: Single Dimensional arrays, Multi Dimensional arrays, declaration, initialization, accessing elements, Matrix operations and String Handling

Unit – III

Functions: Definition, Declaration, Types of Functions, Parameter passing, Call byvalue and call by reference, Passing Arrays to functions, Recursion, Scope and lifetime of variables, Command line arguments, Storage classes.

Pointers: Definition, Declaration, Initialization, Pointer arithmetic, functions and pointers, Pointer to pointer, Uses of Pointers, arrays and pointers.

Unit – IV

Structures: Definition, Declaration, Accessing the structure elements, Array of structures, Arrays with in structures, pointer to structure, Self referential structure, passing structure to function, nested structures and unions, Dynamic memory allocation.

Unit–V

File Handling: Introduction, Types of files, Defining and Opening a File, Closing a File, Input/Output operations on Files, Error Handling during I/O operations, Random Access to Files.

Text Books

1. B. W Kernighan, Dennis M. Ritchie. The C – Programming Language. 2nd Edition, PHI.

2. Behrouz A. Forouzan, "A Structured Approach Using C" Richard F. Gilberg 3rd Edition

References

    1. Yashwant Kantikar. 2012. Let Us C, 8th Ed. PBP Publications.

    2. E. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.

Web Links:

    1. https://www.tutorialspoint.com › C programming › C – Home

    2. https://www.programiz.com/c-programming

IT Workshop
(Common to CSE/IT/CSM/CSD)

L	T	P	C
1	0	4	3

Course Objectives:
The objective of this course is to
- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables.
- Demonstrate basic command line interface commands on Linux.
- Teach the usage of Internet for productivity and self-paced lifelong learning.
- Demonstrate the web page creation.
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools.

Course Outcomes:
Students should be able to:
- Gain knowledge of computer systems such as system units, input devices, and Output devices connected to the computer. Students gain knowledge to understand the booting process that includes switching on the system and being familiar with all the commands of an operating system.
- Able to explain and execute basic Linux commands.
- Gain knowledge to understand the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers and search engines etc.
- Create a static webpage using HTML.
- Get familiarized with parts office tools like Ms-Word, Excel, and PowerPoint.

Computer Hardware:
Experiment 1:
    Identification of peripherals of a PC: Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports, and interfaces. A practice on disassembling the components of a PC and assembling them to working condition (optional task).

Operating Systems:
.**Experiment 2:** Operating System installation:
     Installing an Operating System Windowson a PC

Experiment 3: Operating System installation:
     Installing an Operating System Linux operating system on a PC.

Experiment 4: Linux Operating System commands:
    Basic Linux commands like mkdir, rmdir, cat, touch, mv, cp, rm, cd, pwd, echo, date, cal, bc, and ls.

Experiment 5:Networking and Internet:
    Networking Commands:Introduction of network models (TCP/IP protocol suite) and basic vocabulary and protocols useful in working with the internet.

Experiment 6: Internet Services:
- Web Browser usage and advanced settings like security, cookies, extensions/ plugins
- Email creation and usage.
- ChatGPT

Experiment 7:Basic Webpage Creation:

Basic HTML tags,Introduction to HTML5 and its tags, Introduction to CSS3 and its properties.

Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Experiment 8: MS – Word

Word Orientation: Describe the Importance of MS- Word

Task 1: Using MS Word to create a project certificate. Features to be covered:-Formatting Fonts in Word, Drop Cap in Word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time options in Word.

Task 2: Creating project abstract for using MS-WORD: Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets, and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, and Paragraphs.

Task 3: Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, and Paragraphs.

Task 4: Creating a Feedback form - Features to be covered- Forms, Text Fields, Inserting objects, Mail Merge in Word.

Experiment 9: MS-Excel

Excel Orientation: The mentor needs to tell the importance of MS/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel –Accessing, overview of toolbars, saving excel files, Using help and resources

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 2: Creating Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

Task 3: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

Task4: Creating Cricket Score Card - Features to be covered:-Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation.

Experiment 10: MS-PowerPoint

Task 1: Students will be working on basic PowerPoint utilities and tools which help them create a basic PowerPoint presentation.
Topic covered during this week includes:- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Tables, and Charts in PowerPoint.

Task 2: Concentrating on the in and out of Microsoft PowerPoint, Helping them learn the best Practices in designing and preparing PowerPointpresentations. Topic covered during this week Includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation,

slide slotter, notes,etc), and Inserting – Background, textures, Design Templates, Hidden slides.

Text Books:
 1. Vikas Gupta ,"Comdex Information Technology course tool kit" , WILEY Dreamtech
 2. Cheryl A Schmidt ,"The Complete Computer upgrade and repair book", 3rd edition, WILEY Dreamtech
 3. "Introduction to Information Technology", ITL Education Solutions limited, Pearson Education.
 4. Kate J. Chase ,"PC Hardware and A+ Handbook" –PHI (Microsoft)
 5. Grannell, Craig, Victor Sumner, and DionysiosSynodinos. The essential guide to HTML5 and CSS3 web design. Friends of ED, 2012.

Reference Books:
 1 Scott. Mueller, 2008, Upgrading and Repairing PCs, 22/e, QUE,
 2 Cheryl A Schmidt ,The Complete Computer upgrade and repair book,3/e , Dreamtech

Communicative English Lab
(Common to all Branches)

Subject Code: 23BHL101

L	T	P	C
0	0	3	1.5

Course Objectives

- To enable students to cultivate proper speech habits
- To enhance the ability of students to make extempore speeches
- To help students master techniques of being successful in debates and group discussions
- To assist students to acquire effective and adequate presentation skills
- To prepare students to face interviews in an assertive manner

Course Outcomes

1. Students will be able to pronounce words accurately.
2. Students will be able to speak spontaneously.
3. Students will be able to participate in debates and group discussions and contribute proactively.
4. Students will be able to present data on select topics using pre-existing slides.
5. Students will be able to face interviews confidently.

Unit – 1

Phonetics — Neutral English Accent

Unit – 2

JAM session — Role play

Unit- 3

Debate — Group Discussion

Unit – 4

Poster Presentation — PPT Presentations

Unit – 5

Cover letter — Résumé — Interview Skills

Suggested Software:

- Walden InfoTech
- Young India Films

Reference Books:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press. 2018.
2. Samson T : Innovate with English, Foundations
3. Grant Taylor: English Conversation Practice, Tata McGraw-Hill Education India, 2016.
4. Jayashree, M Let's Hear them Speak: Developing Listening-Speaking skills in English. Sage Publications.
5. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
6. T. Balasubramanyam, A Textbook of English Phonetics for Indian Students, (3rd Ed.) Trinity Press.

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
12. https://www.linguahouse.com/en-GB
13. https://www.ted.com/watch/ted-ed

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

Chemistry Lab

(Common to CSE/IT/CSM/CSD/ECE/EEE)

Subject Code: 23BHL104

L	T	P	C
0	0	3	1.5

Course Objectives

- Verify the fundamental concepts with experiments.

Course Outcomes

At the end of the course, the students will be able to
1. Determine the cell constant, conductance and potential of solutions.
2. Prepare advanced polymer Bakelite materials.
3. Measure the strength of an acid present in secondary batteries by pH metry.
4. Analyse the sample using spectroscopic techniques.
5. Measure molecular/system properties such as chloride content, hardness of water, dissolved oxygen, of surface tension and viscosity etc

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method.
2. Conduct metric titration of strong acid vs. strong base.
3. Conduct metric titration of weak acid vs. strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometer - determination of redox potentials and emfs.
6. Determination of Strength of an acid in Pb-Acid battery. (pH metry)
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law. (Colorimetric estimation of iron)
9. Wavelength measurement of sample through UV-Visible Spectroscopy.
10. Identification of simple organic compounds by IR.
11. Preparation of nanomaterials by precipitation method.
12. Estimation of Ferrous Iron by Dichrometry.
13. Determination of surface tension and viscosity.
14. Determination of Hardness of water sample by EDTA Method
15. Determination of Dissolved Oxygen present in the given water sample by Modern Winkler's Method.
16. Determination of Chloride content present in given water sample

Text Books
1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

Computer Programming Lab
(Common to all Branches)

L	T	P	C
0	0	3	1.5

Course Objectives
- To gain experience about structured programming
- To help students to understand the implementation of C language
- To understand various features in C

Course Outcomes
1. Solve the given problem using the syntactical structures of C language.
2. Design programs involving decision structures and loops.
3. Apply programming to solve different operations on arrays and strings.
4. Develop modularity concept using functions and write programs for allocating memory dynamically.
5. Construct C program that uses structures and unions and implement file operations on givenapplication.

List of Experiments

1. Write the C programs to calculate the following
   a) Area of triangle when sides are given.
   b) Program for Type Casting.
   c) Interchanging values of two variables.

2. Write the C programs to perform the following
   a) Conversion of Fahrenheit to Celsius and vice versa
   b) Simple interest calculation
   c) Square root of a given number

3. Write the C programs to perform the following
   a) Read lower case character and convert into upper case.
   b) Find maximum of 3 values using conditional operator.
   c) Calculate area and perimeter of circle.

4. Write C programs for the following using decision making statements
   a) Find roots of quadratic equation.
   b) Find the max and min of three numbers using if-else.
   c) Calculate the grades of a student.
   d) Find the given year is a leap year or not.

5. Write the C programs to perform the following
   a) Arithmetical operations using switch-case.
   b) Read a number and display in reverse.
   c) Check for Armstrong number property

6. Write the C programs to perform the following
   a) Find factorial of given number
   b) Check a number is palindrome property
   c) Generate Fibonacci series.
   d) Generate Prime numbers between two numbers.

7. Implement the following using arrays
   a) Largest and smallest from a list of elements.
   b) Program for Linear Search.
   c) Program for Bubble Sort.

8. Implement the following using arrays
   a) Matrix addition.
   b) Matrix Multiplication.
   c) Transpose of a matrix.
   d) Program using string handling functions.

9. Write the C programs to perform the following
   a) Factorial using recursion and non recursion.
   b) GCD using recursion and non recursion.

10. Write the C programs to perform the following
    a) Find the sum and average of list of elements using DMA Functions
    b) Implementation of call by value and call by reference.

11. Write the C programs to perform the following
    a) Implementation of array of structure.
    b) Demonstration of Union.

12. Write the C programs to perform the following
    a) Write a C program to write and read text into a binary file using fread() and fwrite()
    b) Copy the contents of one file into another.
    c) Count the number of characters, words and lines in a file.

Text Books:

1. B. W Kernighan, Dennis M. Ritchie. The C – Programming Language. 2 nd Edition, PHI.
2. Behrouz A. Forouzan, "A Structured Approach Using C" Richard F. Gilberg 3rd Edition

Reference Books:

1. Yashwant Kantikar. 2012. Let Us C, 8th Ed. PBP Publications.
2. E. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.

Web References:

1. https://www.tutorialspoint.com › C programming › C – Home
2. https://www.programiz.com/c-programming

Health and Wellness, Yoga and Sports
(Common to all Branches)

Subject : 23MCS103

L	T	P	C
0	0	1	0.5

Course Objectives:

The main objective of introducing this course is to make the students maintain their mental and physical 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
1. Understand the importance of yoga and sports for Physical fitness and sound health.
2. Demonstrate an understanding of health-related fitness components.
3 Compare and contrast various activities that help enhance their health.
4. Assess current personal fitness levels.
5. 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 and running.

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 Surviving

Anywhere Third Edition, William Morrow Paperbacks, 2014

5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, 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 many as

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 viva voce on the subject.

Differential Equations and Vector Calculus
(Common to all Branches)

Subject Code: 23BHT103

L	T	P	C
2	1	0	3

Course Objectives:
To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications as follows

- To furnish the learners in the concept of first order and first degree differential equations and multivariable calculus.
- To enlighten the learners in the concept of higher order differential equations with constant coefficients.
- To furnish the learners with solution methods for partial differential equations that model physical processes
- To equip knowledge with basic concepts and techniques to interpret the physical meaning of different operators such as gradient, curl and divergence by handling various real-world applications
- To furnish the learners with basic concepts and techniques the work done against a field, circulation and flux using vector calculus by handling various real-world applications.

Course Outcomes:
At the end of the course, the student will be able to:
1. Solve the differential equations related to various engineering fields.
2. Model engineering problems as higher order differential equations and solve analytically.
3. Identify solution methods for partial differential equations that model physical processes.
4. Interpret the physical meaning of different operators such as gradient, curl and divergence.
5. Estimate the work done against a field, circulation and flux using vector calculus.

Unit – 1
Differential equations of first order and first degree Exact equations and equations reducible to exact form. Linear differential equations – Bernoulli's equations. Newton's Law of cooling – Law of natural growth and decay- Electrical circuits

Unit – 2
Linear differential equations of higher order (Constant Coefficients)
Definitions, homogenous and non-homogenous, complimentary function, general particular integral, method of variation of parameters. L-C-R Circuit problems.

Unit – 3
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.

Unit – 4
Vector differentiation Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions - Divergence and Curl, Vector identities.

Unit – 5
Vector integration Line integral- circulation- work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and problems on these theorems.

Textbooks:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e,John Wiley & Sons, 2018.
2. B.S.Grewal,HigherEngineeringMathematics,44/e,Khanna publishers,2017.

Reference Books:
1. Dennis G.Zill and Warren S.Wright, Advanced Engineering Mathematics, Jones andBartlett, 2018.
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
4. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
5. B.V. Ramana, Higher Engineering Mathematics, McGraw Hill Education, 2017

Engineering Physics
(Common to all Branches)
Subject Code: 23BHT104

L	T	P	C
3	0	0	3

Course Objectives

- Bridging the gap between the Physics in school at 10+2 level and UG level engineering courses.
- To identify the importance of the optical phenomenon. interference, diffraction and polarization related to its Engineering applications
- Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of de Broglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals.
- To Understand the Physics of Semiconductors and their working mechanism, Concept utilization of transport phenomenon of charge carriers in semiconductors.

Course Outcomes

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** the applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2).
2. **Classify** various crystal systems (L2). **Identify** different planes in the crystal structure (L3). **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4).
3. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2).
4. **Describe** the dual nature of matter (L1). **Explain** the significance of wave function (L2). **Identify** the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). **Identify** the role of classical and quantum free electron theory in the study of electrical conductivity (L3).
5. **Classify** the crystalline solids (L2). **Outline** the properties of charge carriers insemiconductors(L2). **Identify** the type of semiconductor using Hall effect (L2). **Apply** the concept of effective mass of electron (L3).

Unit – 1

WAVE OPTICS 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: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & Diffraction Grating (Qualitative).

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

Unit Outcomes

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)

- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit – 2

CRYSTALLOGRAPHY Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (h k l) planes. Bragg's law - X-ray Diffractometer – crystal structure determination by Laue method and Powder method.

Unit Outcomes

The students will be able to

- **Classify** various crystal systems (L2)
- **Identify** different planes in the crystal structure (L3)
- **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4)

Unit – 3

DIELECTRIC AND MAGNETIC MATERIALS Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability - Classification of magnetic materials: Dia, Para, Ferro, Antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism (Qualitative) - Hysteresis - soft and hard magnetic materials.

Unit Outcomes

The students will be able to

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence(L2)

Unit – 4

Qantum Mechanics and Free electron theory Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty 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 and its temperature dependence.

Unit Outcomes

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)
- **Interpret** the concepts of classical and quantum free electron theories (L2)

Unit – V: Semiconductors   10 hrs

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

Unit Outcomes

The students will be able to

- **Outline** the properties of charge carriers in semiconductors (L2)
- **Understand** the carrier transportation in semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)

Text Books

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

Reference Books

1. "Fundamentals of Physics" - Halliday, Resnick and Walker, John Wiley &Sons.
2. "Engineering Physics" - M.R. Srinivasan, New Age international publishers (2009).
3. "Engineering Physics" - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
4. "Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
5. "Semiconductor physics and devices:Basic principle" - A. Donald, Neamen, Mc GrawHill.
6. "Engineering Physics" - B.K. Pandey and S. Chaturvedi, Cengage Learning
7. "Solid state physics" – A.J.Dekker ,Pan Macmillan publishers
8. "Introduction to Solid State Physics" - Charles Kittel ,Wiley

Data Structures
(Common to CSE/IT/CSM/CSD)

Subject Code: 23CST101

L	T	P	C
3	0	0	3

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

On completion of this course, the student will be able to:

1. Compute the time and space complexities and calibrate the performance of a given algorithm.
2. Compare the performances of various Searching and Sorting techniques.
3. Demonstrate the advantages of dynamic memory allocation via linked lists.
4. Illustrate the applications of Stacks and Queues.
5. Implement the basic operations, search and traversals on Trees and Graphs.

Unit – I
Introduction: Basic Concepts of Data Structures; Notations of Time & Space Complexity: Performance Analysis of algorithms: Iterative & Recursive Algorithms; Asymptotic Notations (O, Ω, θ, o, ω).

Unit – II
Searching: Linear Search, Binary Search: Algorithm & Analysis;
Hashing: Hash functions, Collision Resolution techniques;
Sorting: Methodology & Performance Analysis: Selection, Bubble, Insertion, Quick, Merge, Heap Sort.

Unit – III
Single Linked List: Comparison with Arrays; Efficient Operations: Creation, Insertion, Deletion, Traversing, Searching;
Doubly and Circular Linked Lists: Efficient Representation Operations: Creation, Insertion, Deletion, Traversing; Applications: Polynomial expressions.

Unit – IV
Stacks: Definition & Efficient operations: Push & Pop; Applications of Stacks: Conversion & Evaluation of expressions.
Queues: Types of Queues: Simple Queue; Circular Queue: Efficient Operations on Queues; Implementation of Stack and Queue using Linked Lists.

Unit–V
Trees: Basic Terminology; Binary Tree Traversals; Binary Search Tree Operations;
Graph: Basic Terminologies and Representations; Traversal algorithms: BFS, DFS; Dijkstra's Algorithm.

Text Books

1. **"Data Structures and Algorithm Analysis",** Mark Allen Weiss , Fourth Edition , Pearson.
2. "**Fundamentals of Data Structures**", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

Reference Books:

1. **"Data Structures and Algorithm Analysis",** Michel T. Goodrich, Roberto Tamassia, David Mount, 2nd Edition, John Wiley & Sons, Inc.
2. **"Data Structure And Algorithms In C++",** Adam. Drozdek , 4th edition, Cengage.

Refrerence Links:

1. https://www.tutorialspoint.com › C programming › C – Home
2. https://www.programiz.com/c-programming

Basic Electrical and Electronics Engineering
(Common to CSE-IT-CSM-CSD-Mech-CE)
Subject Code: 23EST102

L	T	P	C
3	0	0	3

Course Objectives
- To introduce the basic knowledge of electric circuits
- To analyze AC circuits.
- To provide knowledge on Magnetic circuits.
- To understand the working, characteristics of PN Junction diode, Zener diode
- To explain the working, characteristics of transistor (BJT) in different configurations, JFET and MOSFET.

Course Outcomes
1. Able to summarize different electrical circuits.
2. Able to outline the basics of AC circuits.
3. Able to examine DC Generator & DC Motor.
4. Able Describe the working principle of PN Junction diode, Zener diode
5. Able to Describe the working and behavior of transistor (BJT) in different configurations, JFET andMOSFET.

Unit – 1
Introduction to Electric Circuits Basic definitions, Electrical circuit elements (R, L and C), Voltage and current sources Independent and dependent sources, Ohm's Law, Series & Parallel circuits, Source transformation, Kirchhoff's Laws, Faraday's laws of electromagnetic induction, Lenz's law, simple problems.

Unit – 2
AC Circuits Representation of sinusoidal waveforms, peak and rms values, phasor representation, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series only), real power, reactive power, apparent power, power factor, simple problems.

Unit – 3
DC Machines DC Generator Generator-Principle of Operation, Construction, EMF equation, Classification, O.C.C, internal and externalcharacteristics of shunt generator, Applications.
DC Motor Motor-principle of operation, Torque equation, Classification Speed Control Methods, Operation of 3 pointstarter, Applications.

Unit – 4
Diode Characteristics Formation of PN junction diode, V-I Characteristics of Diode, Diode as a switch, ZenerDiode Characteristics, Zener Diode as Voltage Regulator.

Unit – 5
Transistor Characteristics: Bipolar Junction Transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relationship between α, β and γ. Field effect transistors (FET) -Characteristics of JFET, MOSFET (Enhancement and depletion)

Text Books:
1. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand& Co.
2. Integrated Electronics – Jacob Millman, Chritos C. Halkies, Tata Mc-Graw Hill,2009.

Reference Books:
1. Basic Electrical Engineering Dr.K.B.MadhuSahuscitech publications (india) pvt.ltd.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9thEdition,2006.
3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.

Engineering Drawing
(Common to CSE/IT/CSM/CSD/ECE/EEE)

Subject Code: 23ESL103

L	T	P	C
1	0	4	3

Course Objectives

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

Course Outcomes

On completion of course, student should be able to
1. To draw general constructions and conic sections
2. To draw the projection of points and lines with respect to HP & VP
3. To project and draw straight lines, and project plane surfaces with respective to one reference plane
4. Develop the projections for a simple solids and their inclinations with respect to one reference plane.
5. Convert orthographic views into isometric projections and vice-versa.

List of Exercises:

Geometrical Constructions
Drawing Instruments and their uses, Types of Lines and Dimensioning, Line bisecting, Angle bisecting, Line divided into equal number of parts, Construction of Regular Polygons (Pentagon and Hexagon).
Construction of Conics: General method, Oblong method and Concentric circles method.

Simple Projections
Introduction to Orthographic Projections (First Angle Projection only).
Projections of Points: A point situated in I,II,III & IV quadrants.
Projections of Straight Lines: Line parallel to one or both the of the planes, Line contained by one or both the planes, Line perpendicular to one of the planes, Line inclined one plane and parallel to other.
Projections of Planes: Types of planes, Traces of planes, planes parallel to one of the planes and plane inclined to one reference plane.

Projections of Solids
Polyhedra: Types of Solids, Projections of Solids in simple positions, Projections of Solids axis inclined to the V.P. and parallel to the H.P. Projections of Solids axis inclined to the H.P. and parallel to the V.P.
Solids of Revolution: Projections of Solids axis inclined to the V.P. and parallel to the H.P. Projections of Solids axis inclined to the H.P. and parallel to the V.P.

Orthographic-Isometric Projections
Conversion of pictorial view (Isometric views) into orthographic views.
Isometric Projections: Isometric axes, lines & planes. Isometric scale, Isometric drawing, Isometric drawing of plane figures, prisms and pyramids. Conversion of orthographic views into Isometric views.

Text Books:
1. Engineering Drawing, N. D. Bhatt, V. M. Panchal, Charotar Pub.
2. Engineering Drawing, K. L .Narayana, P.Kanniah, Scitech Pub.

Reference Books:
1. Engineering Drawing and Graphics, 2nd ed., K. Venugopal, New Age International Pub.
2. Fundamentals of Engineering Drawing, 11th ed., Luzadder, J. Warren, D.M. Jon, Prentice Hall India Pub.

Engineering Physics Lab
(Common to all Branches)

Subject Code: 23BHL102

L	T	P	C
0	0	3	1.5

Course Objectives:
- To study the concepts of optical phenomenon like interference, diffraction etc., recognize theimportance of energy gap in the study of conductivity and Hall effect in semiconductors andstudy the parameters and applications of dielectric and magnetic materials by conducting experiment..

Course Outcomes: The students will be able to
> 1.Operate optical instruments like travelling microscope and spectrometer.
> 2.Estimate the wavelengths of different colours using diffraction ngrating.
> 3.Discuss the magnetic, electrical and electronic properties of materials.
> 4.Analyze the mechanical and thermal properties of materials.
> 5. Calculate the band gap of a given semiconductor.

List of Experiments
1. Determination of radius of curvature of a given Plano-convexlens by Newton'srings.
2. Determination of wavelengths of different spectrallines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Determination of width of a slit using diffraction phenomenon.
4. Determination of wavelength of Laser light using diffractiongrating.
5. Estimation of Planck's constant using photo cell.
6. To study V-I characteristics of a PN junction diode in forward and reverse biasing conditions.
7. Magnetic field along the axis of a current carrying circularcoilby StewartGee'sMethod.
8. Determination of Hall voltage and Hall coefficient of a given semiconductor using Halleffect.
9. Determination of temperature coefficients of a thermistor.
10. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
11. Determination of rigidity modulus of the material of the given wire using Torsionalpendulum.
12. Sonometer : Verification of laws of stretched string.
13. Determination of Frequency of electrically maintained tuning for k by Melde'sexperiment.
14. Determination of energy bandgap of a given semiconductor
15. Determination of thickness of a thin object using wedge shaped film.
16. Determination of crystal structure and lattice parameter of a given crystal using powder diffraction data.
17. Determination of Young's modulus of the given beam by non-uniform bending.
18. Determination of dielectric constant using resonance method.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experimentsmay be conducted in virtual mode.

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

Reference Links
- www.vlab.co.in
- https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

Data Structures Lab
(Common to CSE/IT/CSM/CSD)
Subject Code: 23CSL101

L	T	P	C
0	0	3	1.5

Course Objectives
Develop skills to design and analyze simple linear and non linear data structures. It strengthen the ability to 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
1. Develop Programs as recursive solutions for common searching and sorting algorithms.
2. Illustrate the use of dynamic memory allocation through linked list operations.
3. Design programs for linear data structures such as Stacks, and Queues.
4. Develop Programs for implementing various operations on Binary Trees and Binary Search Trees.
5. Apply the fundamental graph algorithms to solve problems using Depth-First and Breadth-First Search.

List of Experiments

1. a) Write a C program to Print 1 to 'n' numbers without using any loops.
   b) Write a C program to reverse the digits of a number using recursive function.
   c) Write a C program to solve the Towers of Hanoi problem using recursive function.

2. a) Design & Develop a C program to perform linear search for a key value in a given list.
   b) Design & Develop a C program to perform Binary search for a key value in a given list.

3. Given a File of **N** employee records with a set **K** of Keys(6-digit) which uniquely determine the records in file **F**. Assume that file **F** is maintained in memory by a Hash Table(HT) of **m** memory locations with **L** as the set of memory addresses (2-digit) of locations in HT. Let the keys in **K** and addresses in **L** are Integers.

   Design and develop a Program in C that uses Hash function **H: K→L** as H(**K**)=**K** mod **m** (**remainder** method), and implement hashing technique to map a given key **K** to the address space **L.** Resolve the collision (if any) using **linear probing**.

4. a) Design, Develop and Implement a C program that implement Selection Sort to sort a given list of integers.
   b) Design, Develop and Implement a C program that implement Bubble Sort to sort a given list of integers.

5. a) Design, Develop and Implement C program that implement Quick Sort to sort a given list of integers.
   b) Design, Develop and Implement C program that implement Heap Sort to sort a given list of integers.

6. Design, Develop and Implement a menu driven Program in C to represent polynomials using a single linked list and implement functions Polynomials. Each Node: *[Coefficient, Exponent, Next]*

a. Create Polynomials using **Last Insertion** of nodes, in a decreasing order of exponents.
   Example: Polynomial P: "$7x^3 + 3x^2 + 9x + 6$" has 4 nodes. $\boxed{7,3} \rightarrow \boxed{3,2} \rightarrow \boxed{9,1} \rightarrow \boxed{6,0} \rightarrow$ Null
b. Perform Addition of 2 polynomials. (coeff.s of 2 nodes are added only if exp.s match)
   Example: Let Polynomials P: "$7x^3 + 3x^2 + 9x + 6$" & Q: "$5x^4 + 4x^2 + 6x$".
              Then $P+Q = 5x^4 + 7x^3 + 7x^2 + 15x + 6$".
c. Perform Subtraction of 2 polynomials.
d. Display the Polynomial (nodes) in it.
e. Exit

7. Design, Develop and Implement a menu driven Program in C for the following operations on
   STACK of Integers (Array Implementation of Stack with maximum size **MAX**)
   a. *Push* an Element onto Stack.
   b. *Pop* an Element from Stack.
   c. Demonstrate how Stack can be used to check *Palindrome.*
   d. Display the status (No. of elements, Empty/Full/not) of Stack.
   e. Exit
      Support the program with appropriate functions for each of the above operations

8. Design, Develop and Implement a Program in C for converting an Infix Expression to Postfix
   Expression. Program should support for both parenthesized and free parenthesized expressions
   with the operators: **+, -, *, /, %(Remainder), ^(Power)** and **alphanumeric** operands**.**

9. Design, Develop and Implement a menu driven Program in C for the following operations on
   QUEUE of Characters (Array Implementation of Queue with maximum size **MAX**)
   a. Insert an Element into QUEUE
   b. Delete an Element from QUEUE
   c. Display the status (No. of elements, Empty/Full/not) of QUEUE
   d. Exit
      Support the program with appropriate functions for each of the above operations

10. a) Design, Develop and Implement a C program to implement Binary tree traversals using
    iterative functions.
    b) Design, Develop and Implement a C program to implement Binary tree traversals using
    recursive functions.

11. Design, Develop and Implement a menu driven Program in C for the following operations on
    Binary Search Tree (BST) of Integers
    a. Create a BST of **N** Integers: 89, 38, 24, 40, 95, 76, 57, 11, 59, 18
    b. Traverse the BST in In-order, Pre-order and Post-Order
    c. Search the BST for a given element (**Key**) and report the appropriate message
    e. Exit

12. Design & Develop a Program in C for the following operations on **Graph (G)** of Cities
    a. Create a Graph of **N** cities using Adjacency Matrix.
 b. Print all the nodes **reachable** from a given starting node in a digraph using **DFS or BFS**
    method.
 c. Find the shortest paths to all Cities from a given City using Dijkstra's Algorithm.

   Text Books:
1. "Data Structures and Algorithm Analysis", Mark Allen Weiss , Fourth Edition , Pearson.
2. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, and
   Computer Science Press.

ReferenceBooks:

1. **"Data Structures and Algorithm Analysis",** Michel T. Goodrich, Roberto Tamassia, David Mount, 2nd Edition, John Wiley & Sons, Inc.
      2. **"Classic Data Structures",** Second Edition, Debasis Samanta, PHI, 2012, New Delhi, India.
      3. **"Computer science, A structured programming approach using C",** Third edition, B.A. Forouzan and R.F. Gilberg, 2011, Thomson, New Delhi, India.

Reference Links:

1. https://www.geeksforgeeks.org/data-structures/

Basic Electrical and Electronics Engineering Lab
(Common to CSE-IT-CSM-CSD-Mech-CE)

Subject Code: 23ESL102

L	T	P	C
0	0	3	1.5

Course Objective:

To introduce the student to study different electrical & electronics components and to verify the basic laws related to electrical engineering, analyze the V-I characteristics of P-N diode and transistor characteristics.

Course Outcomes:

Students will be able to
1. Label various types of electrical & electronics components.
2. Demonstrate various basic electrical laws.
3. Determine resistance of the series and parallel connected circuits.
4. Analyze the V-I characteristics of P-N diode.
5. Analyze the Transistor characteristics.

List of Experiments:

1. Study of electrical components.
2. To verify Ohm's law.
3. To verify Kirchhoff's current law
4. To verify Kirchhoff's voltage law.
5. To verify the total resistance of the series and parallel connected circuits.
6. Study of electronics components.
7. PN Junction diode forward and reverse bias characteristics
8. Zener diode characteristics.
9. Transistor CB characteristics (Input and Output)
10. Transistor CE characteristics (Input and Output)

Additional Experiments:

11. Half wave rectifier
12. To find voltage current relationship for series RL circuit and determine power & power factor.

NSS/NCC/Scouts &Guides/Community Service
(Common to all Branches)

Subject Code: 23MCS102

L	T	P	C
0	0	1	0.5

Course Objective
- The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

Course Outcome
After completion of the course the students will be able to
1. Understand the importance of discipline, character and service motto.
2. Solve some societal issues by applying acquired knowledge, facts, and techniques.
3. Explore human relationships by analyzing social problems.
4. Determine to extend their help for the fellow beings and downtrodden people.
5. Develop leadership skills and civic responsibilities.

Unit – 1 Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:
i) Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii) Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

Unit – 2 Nature & Care
Activities:
i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

Unit – 3 Community Service
Activities:
i) Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities- experts-etc.
ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v) Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme
2. Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
3. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
4. Davis M. L. and Cornwell D. A., ―Introduction to Environmental Engineering‖, McGraw Hill, New York 4/e 2008
5. Masters G. M., Joseph K. and Nagendran R. ―Introduction to Environmental Engineering and Science‖, Pearson Education, New Delhi. 2/e 2007
6. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor 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 viva voce on the subject.