DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

SEMESTER - I

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous)
BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

B.Tech. I Year I Semester (for Group –A Branches - CSE, AID, CSM)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1101	Communicative English	2	0	0	2
2	BS&H	BT24BS1102	Chemistry	3	0	0	3
3	BS&H	BT24BS1103	Linear Algebra & Calculus	3	0	0	3
4	Engineerig Science	BT24CE1101	Basic Civil & Mechanical Engineering	3	0	0	3
5	Engineerig Science	BT24CS1101	Introduction to Programming	3	0	0	3
6	BS&H	BT24BS1105	Communicative English Lab	0	0	2	1
7	BS&H	BT24BS1106	Chemistry Lab	0	0	2	1
8	Engineerig Science	BT24ME1103	Engineering Workshop	0	0	3	1.5
9	Engineerig Science	BT24CS1103	Computer Programming Lab	0	0	3	1.5
10	BS&H	BT24BS1108	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				**14**	**0**	**11**	**19.5**

B.Tech. I Year I Semester (for Group -B Branches - CE, EEE, ME, ECE & IT)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1104	Engineering Physics	3	0	0	3
2	BS&H	BT24BS1103	Linear Algebra & Calculus	3	0	0	3
3	Engineering Science	BT24EE1101	Basic Electrical & Electronics Engineering	3	0	0	3
4	Engineering Science	BT24ME1101/ BT24ME1102	Engineering Graphics / Engineering Drawing	1	0	4	3
5	Engineering Science	BT24CS1101	Introduction to Programming	3	0	0	3
6	Engineering Science	BT24CS1102	IT Workshop	0	0	2	1
7	BS& H	BT24BS1107	Engineering Physics Lab	0	0	2	1
8	Engineering Science	BT24EE1102	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1103	Computer Programming Lab	0	0	3	1.5
10	BS&H	BT24BS1109	NSS & Community Service	-	-	1	0.5
Total				**13**	**0**	**15**	**20.5**

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1101	L	T	P	C
		2	0	0	2
COMMUNICATIVE ENGLISH *(Common to All Branches of Engineering)*					

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.

Course Outcomes:

CO1: Understand the context, theme, and pieces of specific information from social or Transactional dialogues.

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication.

CO3: Build confidence and creative thinking by challenging the hardships in life.

CO4: Discover the peace and amicable relations in human development.

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication.

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

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 structure 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; Compound words, Collocations

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, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

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

Vocabulary: Words often confused, Jargons

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 with Language 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.

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1102	L	T	P	C
		3	0	0	3
CHEMISTRY *(Common to CSE, AIML, AIDS)*					

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:
At the end of the course, the students will be able to:
CO1: Understand the fundamentals of Quantum mechanics and Molecular Orbital Theory)
CO2: Apply the basic principles of semiconductors, super conductors, and nanomaterials in real world applications. .
CO3: Compare the materials for construction of batteries and electrochemical sensors.
CO4: Explain the preparation, properties, and applications of thermoplastics, thermosetting, elastomers and conducting polymers
CO5: Summarize the concepts of Instrumental methods.
CO6: Define the principles of spectrometry, slc in separation of solid and liquid mixtures.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT -I: Structure and Bonding Models (10Hours)

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules– energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT -II: Modern Engineering materials (10Hours)

Semiconductors – Introduction, basic concept, application
Super conductors-Introduction basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT -III: Electrochemistry and Applications (10Hours)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometer- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

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). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

UNIT -IV: Polymer Chemistry (10Hours)

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

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio- Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA).

UNIT -V: Instrumental Methods and Applications (10Hours)

Electromagnetic spectrum, Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopes', fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 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. Text book of Polymer Science, Fred W. Billmayer Jr., 3rd Edition
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 2017

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1103	L	T	P	C
		3	0	0	3
LINEAR ALGEBRA&CALCULUS *(Common to All Branches of Engineering)*					

Course Objectives:
To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Course Outcomes: At the end of the course, the student will be able to
CO1: Describe the basic properties on elementary row and column operations
CO2: Solve a given system of linear algebraic equations.
CO3: Find the Characteristic equation, Eigen values & Eigen vectors.
CO4: Utilize mean value theorems to real life problems.
CO5: Apply the concept of the partial differentiation in various engineering fields.
CO6: Evaluate double, triple integrals and their applications.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO6	2	3	-	-	-	-	-	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT-I Matrices **10 hr**
Rank of a matrix by echelon form, normal form. Cauchy– Binet formulae (without proof). Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations, Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II Eigen values, Eigen vectors and Orthogonal Transformation **10 hr**
Eigen values, Eigen vectors and their properties, 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-III Calculus **8 hr**
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-IV Partial differentiation and Applications (Multivariable calculus) 10 hr

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT-V Multiple Integrals (Multi variable Calculus) 10 hr

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Textbooks:

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

Reference Books:

1. Thomas Calculus, George B.Thomas, Maurice D.Weirand Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd., 20215th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5thEdition.
4. Advanced Engineering Mathematics, Micheael Greenberg,Pearson publishers, 9thedition
5. Higher Engineering Mathematics, H.KDas, Er.RajnishVerma, S.Chand Publications,2014, Third Edition (Reprint 2021)

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DEPARTMENT OF CIVIL ENGINEERING

I Year- I Semester	Course Code: BT24CE1101	L	T	P	C
		3	0	0	3
BASIC CIVIL AND MECHANICAL ENGINEERING *(Common to All branches of Engineering)*					

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:
CO1: Understand the various sub divisions of Civil Engineering and their role in ensuring better society.
CO2: Know the objectives of surveying and understand the measurement of distances, angles and levels through surveying
CO3: Understand the role of Transportation Engineering in Nation's economy and importance of Water Resource Engineering and Environmental Engineering.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

Part A: BASIC CIVIL ENGINEERING

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings- Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

• Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.

• Explain different engineering materials and different manufacturing processes.

• Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to:

CO4: Understand the different manufacturing processes.

CO5:Explain the basics of thermal engineering and its applications and the working of different mechanical power transmission systems and power plants.

CO6:Describe the basics of robotics and its applications

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	2	1	-	-	1	1	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	1	1	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants. Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject.)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A text book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1101	L	T	P	C
		3	0	0	3
INTRODUCTION TO PROGRAMMING *(Common to All branches of Engineering)*					

Course Objectives:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

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

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking (2
CO2: Analyse a problem and develop analgorithm to solve it (L4).
CO3: Implement various algorithms using the C programming language (L4).
CO4: Understand more advanced features of C language (L2).
CO5: Develop problem-solving skills and the ability to debug and optimize the code (L6).
CO6: Apply file input–output operations (L3)

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	1	-	-	-	2	-	-	-	2	2	2
CO2	2	3	3	2	-	-	-	2	-	-	-	2	2	-
CO3	2	3	3	2	-	-	-	3	-	-	-	2	2	2
CO4	2	3	2	2	-	-	-	2	-	-	-	2	2	2
CO5	3	3	3	2	-	-	-	3	-	-	-	2	3	3
CO6	2	3	3	3	-	-	-	2	-	-	-	2	2	2

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I Introduction to Programming and Problem Solving

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting. Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III Arrays and Strings
Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV Pointers & User Defined Data types
Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT V Functions & File Handling
Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling
Note: The syllabus is designed with C Language as the fundamental language of implementation**.**

Textbooks:
1. The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

Reference Books:
1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1105	L	T	P	C
		0	0	2	1
COMMUNICATIVE ENGLISH LAB *(Common to All Branches of Engineering)*					

Course 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. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Distinguish the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension in day to day conversations.
CO2: Demonstrate communication skills through various language learning activities
CO3: Apply the writing skills in e-mail Writing and Resume Writing.
CO4: Appraise and manifest professionalism in participating group discussions and debates.
CO5: Exhibit the effective interpersonal skills in presentations and interviews
CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	3	-	-	-	1	1	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	3	-	1	-	-
CO3	-	-	-	-	1	-	-	-	1	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	2	-	-	-	-	2	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Topics:

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

Suggested Software:

- Walden Infotech
- Young India Films

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed),Kindle, 2013

Web Resources:

Spoken English:

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

https://www.britishcouncil.in/english/online

http://www.letstalkpodcast.com/

https://www.youtube.com/c/mmmEnglish_Emma/featured

https://www.youtube.com/c/ArnelsEverydayEnglish/featured

https://www.youtube.com/c/engvidAdam/featured

https://www.youtube.com/c/EnglishClass101/featured

https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists

https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

https://www.youtube.com/user/letstalkaccent/videos

https://www.youtube.com/c/EngLanguageClub/featured

https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc

https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1106	L	T	P	C
		0	0	2	1
CHEMISTRY LAB *(Common to CSE, AIML, AIDS)*					

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to
CO1: Determine the cell constant and conductance of solutions
CO2: Prepare advanced polymer materials.
CO3: Measure the strength of an acid present in secondary batteries
CO4: Analyze the IR spectra of some organic compounds.
CO5: Calculate strength of acid in Pb-Acid battery.
CO6: Understand the synthesis of Bakelite

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
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

Reference:

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

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1103	L	T	P	C
		0	0	3	1.5
ENGINEERING WORKSHOP *(Common to All branches of Engineering)*					

Course Objectives:
To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:
CO1: Build carpentry fitting and forging operations in various applications.
CO2: Executing operations of foundry and sheet metal works using varies tools.
CO3: Inspect basic electrical engineering knowledge for house wiring practice
CO4: Develop a lap and butt joint using arc welding.
CO5: Develop pipe joint for different diameter of pipes
CO6: Inspect basic repair of two-wheeler vehicle**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO2	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO3	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO4	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO5	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO6	3	-	3	-	2	-	-	3	-	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

SYLLABUS

1. Demonstration: Safety practices and precautions to be observed in workshop.
2. Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4. Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-‘ wheeler tyre
5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light e) Three phase motor f) Soldering of wires
6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.

7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.
9. Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1103	L	T	P	C
		0	0	3	1.5
COMPUTER PROGRAMMING LAB *(Common to All branches of Engineering)*					

Course Objectives:
The course aims to give students hands – on experience and train them on the concepts of the C-programming language.

Course Outcomes:
CO1: Read understand and trace they execution of programs written in C language
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4: Develop, D-Bug and execute programs to demonstrate applications of arrays, functions, basic concepts of pointers in C.
CO5: Develop a programs to demonstrate the applications of string operations in C.
CO6: Develop a programs to demonstrate the applications of file operations in C.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	-	2	-	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	-	2	3	2	2	-	-	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I
WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment
i. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii. Exposure to Turbo C, gcc
iii. Writing simple programs using printf(), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs
i. Sum and average of 3 numbers
ii. Conversion of Fahrenheit to Celsius and vice versa
iii. Simple interest calculation

WEEK 3
Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:
Lab 3: Simple computational problems using arithmetic expressions.
i. Finding the square root of a given number
ii. Finding compound interest
iii. Area of a triangle using heron's formulae
iv. Distance travelled by an object

UNIT II
WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:
Tutorial4: Operators and the precedence and as associativity:
Lab4: Simple computational problems using the operator' precedence and associativity
Evaluate the following expressions.
i. A+B*C+(D*E) + F*G
ii. A/B*C-B+A*D/3
iii. A+++B---A
iv. J= (i++) + (++i)

Find the maximum of three numbers using conditional operator
Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5
Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".
Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 5: Problems involving if-then-else structures.
i. Write a C program to find the max and min of four numbers using if-else.
ii. Write a C program to generate electricity bill.
iii. Find the roots of the quadratic equation.
iv. Write a C program to simulate a calculator using switch case.
v. Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and or loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Lab 6: Iterative problems e.g., the sum of series

i. Find the factorial of given number using any loop.
ii. Find the given number is a prime or not.
iii. Compute sine and cos series
iv. Checking a number palindrome
v. Construct a pyramid of numbers.

UNIT III

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

Lab 7:1D Array manipulation, linear search

i. Find the min and max of a 1-D integer array.
ii. Perform linear search on1D array.
iii. The reverse of a 1D integer array
iv. Find 2's complement of the given binary number.
v. Eliminate duplicate elements in an array.

WEEK 8:

Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:

Tutorial 8: 2 D arrays, sorting and Strings.

Lab 8: Matrix problems, String operations, Bubble sort

i. Addition of two matrices
ii. Multiplication two matrices
iii. Sort array elements using bubble sort
iv. Concatenate two strings without built-in functions
v. Reverse a string using built-in and without built-in string functions

UNIT IV

WEEK 9:

Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.

i. Write a C program to find the sum of a 1D array using malloc()
ii. Write a C program to find the total, average of n students using structures
iii. Enter n students data using calloc() and display failed students list
iv. Read student name and marks from the command line and display the student details along with the total.
v. Write a C program to implement realloc()

WEEK 10:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10 : Bitfields, linked lists
Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i. Create and display a singly linked list using self-referential structure.
ii. Demonstrate the differences between structures and unions using a C program.
iii. Write a C program to shift/rotate using bitfields.
iv. Write a C program to copy one structure variable to another structure of the same type.

UNIT V
WEEK 11:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

i. Write a C function to calculate NCR value.
ii. Write a C function to find the length of a string.
iii. Write a C function to transpose of a matrix.
iv. Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions

i. Write a recursive function to generate Fibonacci series.

ii. Write a recursive function to find the lcm of two numbers.
iii. Write a recursive function to find the factorial of a number.
iv. Write a C Program to implement Ackermann function using recursion.
v. Write a recursive function to find the sum of series.

WEEK 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers
Suggested Experiments/Activities:

Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.
i. Write a C program to swap two numbers using call by reference.
ii. Demonstrate Dangling pointer problem using a C program.
iii. Write a C program to copy one string into another using pointer.
iv. Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
Suggested Experiments/Activities:

Tutorial 14: File handling
Lab 14: File operations
i. Write a C program to write and read text into a file.
ii. Write a C program to write and read text into a binary file using fread() and fwrite()
iii. Copy the contents of one file to another file.
iv. Write a C program to merge two files into the third file using command-line arguments.
v. Find no. of lines, words and characters in a file
vi. Write a C program to print last n characters of a given file.

Textbooks:
1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

Reference Books:
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1108	L	T	P	C
		0	0	1	0.5
HEALTH AND WELLNESS, YOGA AND SPORTS *(Common to All branches of Engineering)*					

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
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.
CO6: Describe the history of sports, Ancient and Modern Olympics

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

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:

1. Evaluated for a total of 100 marks.
2. 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.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1104	L	T	P	C
		3	0	0	3

ENGINEERING PHYSICS
(Common for all branches of Engineering)

Course Objectives: To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, 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:
CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Examine the crystal structures with the basics of crystals..
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles.
CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids.
CO6: Identify the type of semiconductor using Hall effect.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I Wave Optics 12hr

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours 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 & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

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

UNIT II Crystallography and X-ray diffraction 10hr

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 (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III Dielectric and Magnetic Materials 8hr

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.

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 for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron Theory 10hr

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 - Density of states - Fermi energy

UNIT V Semiconductors 8hr

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 – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:

1. Engineering Physics, Dr.D. Tirupathi Naidu and M. Veeranjaneyulu, VGS Publications, 2023.
2. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources:

https://dnrcet.org/web/departments/hs/courses/b-tech/syllabus/

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous)
BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- I Semester	Course Code: BT24EE1101	L	T	P	C
		3	0	0	3
BASIC ELECTRICAL & ELECTRONICS ENGINEERING *(Common to All branches of Engineering)*					

Course Objectives: Students will learn
- About the basic principles of Direct Current (DC) & Alternating Current (AC) Circuit analysis
- About the fundamentals of magnetic circuits analysis.
- About Electrical Wiring and Electrical Safety.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply the circuit laws for the analysis of simple DC and AC circuits.
CO2: Apply the basic principles for solving fundamental magnetic circuits**.**
CO3: Apply the basic principles of electrical wiring and electric safety measures**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources.

UNIT II MAGNETIC CIRCUITS

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT III ELECTRICAL WIRING, ELECTRICITY BILL & SAFETY MEASURES

Electrical Wiring: SimpleLamp circuits, stair case wiring scheme, godown wiring scheme, types of service mains, types of electrical wiring, cost estimation of indoor wiring, wiring layout of workshop/ electrical laboratory.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers,etc., Types of 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, Earthing and its types, SafetyPrecautions to avoid shock

PART B: BASIC ELECTRONICS ENGINEERING

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

CO4: Analyze various characteristics of semiconductor devices.

CO5: Apply the basic principles for understanding and working of rectifiers and power Supplies.

CO6: Explain the working of various logic gates**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	1	2	1	-	1	-	-	-	-	1	3	2	-
CO5	3	1	2	1	-	1	-	-	-	-	1	3	2	-
CO6	2	2	2	1	-	1	-	-	-	-	1	3	2	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I SEMI CONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier

UNIT II BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1. Principles of Electrical and Electronics Engineering, V.K. Mehtha, S. Chand Technical Publishers
2. Basic Electrical Engineering, Ritu SahDev, Khanna Publishers, 2018, First Edition.
3. FundamentalsofElectricalCircuits,CharlesK.AlexanderandMathewN.O.Sadiku,McGrawHill Education (India),2013,Fifth Edition
4. Electrical Wiring Estimating and Costing –Dr. S. L. Uppal-Khanna Publishers-198
5. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
6. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019,Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023.
4. BasicElectricalEngineering,D.C.Kulshreshtha,TataMcGrawHill, First Edition, 2019
5. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

E-Resources:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1101	L	T	P	C
		1	0	4	3
ENGINEERING GRAPHICS *(Common to CE and Mechanical Engineering Branches)*					

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 develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:
CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Analyze the location and position of plane figures
CO4: Analyze the location and position of solids
CO5: Explain principles behind development of surfaces
CO6: Develop an Isometric view and orthographic views.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	2	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	-	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	-	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.

Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.

Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1102	L	T	P	C
		1	0	4	3
ENGINEERING DRAWING *(Common to EEE, ECE, CSE, CSE aligned branches and IT)*					

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
- To improve the visualization skills for better understanding of projection of 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:
CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Identify the position of lines when inclined to both the planes.
CO4: Analyze the location and position of plane figures.
CO5: Analyze the location and position of solid bodies.
CO6: Develop an Isometric view and orthographic views.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	1	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

UNIT III

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT IV

Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1102	L	T	P	C
		0	0	2	1
IT WORKSHOP *(Common to all branches of Engineering)*					

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

CO1: Apply knowledge for computer assembling and software installation and solve trouble shooting problems
CO2: Understand hardware components and inter dependencies
CO3: Evaluate the cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks
CO4: Use various Microsoft tools like professional word documents and presentations
CO5: Calculate various excel spreadsheets
CO6: Build various AI Tools – Chartgpt

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	2	2	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	3	2	3	2	2	-	-	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva
Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web
Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.
Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.
Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD
Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.
Task 2: Using La TeX and 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 option in both La TeX and Word.
Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
Task 4: 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, Paragraphs and Mail Merge in word.

EXCEL
Excel Orientation: The mentor needs to tell the importance of MS office or 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: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,
LOOKUP/VLOOKUP
Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT
Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.
Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.
Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT
Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.
• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"
Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas
• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."
Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.
• Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:
1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1107	L	T	P	C
		0	0	2	1
ENGINEERING PHYSICS LAB *(Common to All Branches of Engineering)*					

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
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Halleffect.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO4	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO5	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO6	3	2	-	-	-	-	-	-	1	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:
1. Determination of radius of curvature of a given Plano-convex lens 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 probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Halleffect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.

14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by Non uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

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

References:

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

Web Resources:

1. www.vlab.co.in

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DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- I Semester	Course Code: BT24EE1102	L	T	P	C
		0	0	3	1.5

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To measure various electrical quantities using different types of meters.
- About safety measures used in electrical systems.

Course Outcomes: At the end of the course, the student will be able to
CO1: Study and identification of various electrical circuit components and also measure voltage, current and power electrical circuits.
CO2: Choose and assemble various wiring schemes.
CO3: Solve electrical energy and measure earth resistance for domestic premises.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

PART A: BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Identification of various types of resistors and capacitors and understand the usage of digital multi-meter
2. Study various types of electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and usage.
3. Measurement of Voltage, Current and Power in a DC Circuit
4. Verification of KCL and KVL
5. Measurement of Earth Resistance using Megger
6. Calculation of Electrical Energy for Domestic Premises
7. Staircase wiring scheme
8. Godown wiring scheme

Note: A minimum of six experiments are to be performed.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,WilliamHayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
4. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives: To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

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

CO4: Identify the various electronic components andunderstand the working of components.
CO5: Plot and discuss the characteristics of various electron devices.
CO6: Explain the operation of a digital circuit.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO5	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO6	3	2	2	-	-	-	-	-	-	1	-	3	2	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

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

Reference Books:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1109	L	T	P	C
		0	0	1	0.5
NSS and COMMUNITY SERVICE *(Common to All branches of Engineering)*					

Course Objectives:
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 Outcomes: After completion of the course the students will be able to
CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.
CO6: Participate in activities related to health, hygiene, environment, literacy, disaster management, and gender equity with empathy and commitment.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	-	1	-	2	-	2	-	-
CO3	-	-	-	-	-	-	-	3	-	2	-	2	-	-
CO4	-	-	-	-	-	-	-	2	-	2	-	2	-	-
CO5	-	-	-	-	-	1	3	2	-	2	-	2	-	-
CO6	-	-	-	-	-	2	1	2		2		2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I
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 II
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. Organizing 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 III
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- authoritiesexperts-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 Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. 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:

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

DR24
ENGINEERING CURRICULUM

W.e.f. 2024-25

SEMESTER - II

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

B.Tech. I Year II Semester (for Group –A Branches - CSE, AID, CSM)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1205	Engineering Physics	3	0	0	3
2	BS&H	BT24BS1204	Differential Equations & Vector Calculus	3	0	0	3
3	BS&H	BT24EE1201	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	BT24ME1201	Engineering Drawing	1	0	4	3
5	Engineering Science	BT24CS1202	IT Workshop	0	0	2	1
6	BS&H	BT24CS1201	Data Structures (Branch specific)	3	0	0	3
7	BS&H	BT24BS1209	Engineering Physics Lab	0	0	2	1
8	Engineering Science	BT24EE1204	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1203	Data Structures Lab	0	0	3	1.5
10	BS&H	BT24BS1211	NSS & Community Service	-	-	1	0.5
Total				**13**	**00**	**15**	**20.5**

B.Tech. I Year II Semester (for Group -B Branches - CE, EEE, ME, ECE & IT)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1201	Communicative English	2	0	0	2
2	BS& H	BT24BS1203/ BT24BS1202	Engineering Chemistry / Chemistry	3	0	0	3
3	BS& H	BT24BS1204	Differential Equations & Vector Calculus	3	0	0	3
4	Engineering Science	BT24CE1201	Basic Civil & Mechanical Engineering	3	0	0	3
5	Professional Core	BT24ME1202/ BT24EE1203/ BT24CS1201/ BT24EE1202	Engineering Mechanics / Network Analysis / Data structures / Electrical Circuit Analysis – I (Branch specific)	3	0	0	3
6	BS&H	BT24BS1206	Communicative English Lab	0	0	2	1
7	BS&H	BT24BS1208/ BT24BS1207	Engineering Chemistry Lab/ Chemistry Lab	0	0	2	1
8	Engineering Science	BT24ME1203	Engineering Workshop	0	0	3	1.5
9	Professional Core	BT24CE1202/ BT24ME1204/ BT24EE1206/ BT24CS1202/ BT24EE1205	Engineering Mechanics & Building Practices Lab/ Engineering Mechanics Lab / Network Analysis and Simulation Lab / Data structures Lab/ Electrical Circuits Lab	0	0	3	1.5
10	BS& H	BT24BS1210	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				**14**	**00**	**11**	**19.5**

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1205	L	T	P	C
		3	0	0	3
ENGINEERING PHYSICS *(Common for all branches of Engineering)*					

Course Objectives: To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, 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:
CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Examine the crystal structures with the basics of crystals.
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles.
CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids.
CO6: Identify the type of semiconductor using Halleffect.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I Wave Optics 12hr

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours 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 & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

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

UNIT II Crystallography and X-ray diffraction 10hr

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 (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III Dielectric and Magnetic Materials 8hr

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.

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 for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron Theory 10hr

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 - Density of states - Fermi energy

UNIT V Semiconductors 8hr

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 – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:

1. Engineering Physics, Dr.D. Tirupathi Naidu and M. Veeranjaneyulu, VGS Publications, 2023.
2. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources:

https://dnrcet.org/web/departments/hs/courses/b-tech/syllabus/

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1204	L	T	P	C
		3	0	0	3
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS *(Common to All Branches of Engineering)*					

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 into advanced level by handling various real-world applications.

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

CO1: Solve first-order linear differential equations
CO2: Understand homogeneous and non-homogeneous linear differential equations
CO3: Understand the basic concepts of partial differential equations (PDEs)
CO4: Solve first-order linear partial differential equations using **Lagrange's method.**
CO5: Apply the **Del operator** to scalar point functions to compute **gradients** and **directional derivatives**
CO6: Evaluate **volume integrals** and apply the **Divergence Theorem** (with proof) to relate surface and volume integrals in vector fields

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT-I Differential equations of first order and first degree 10 hr

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

UNIT-II Linear differential equations of higher order(Constant Coefficients) 10 hr

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III Partial Differential Equations 10 hr

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-IV Vector differentiation 8 hr

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, vector identities.

UNIT-V Vector integration 10 hr

LWithoutegral-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 related problems.

Textbooks:

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

Reference Books:

1.Thomas Calculus, George B.Thomas, MauriceD.Weir and JoelHass, Pearson Publishers, 2018, 14th Edition.
2.Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3.Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4.Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5.Higher Engineering Mathematics, B.V.Ramana, Mc Graw Hill Education,2017

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1201	L	T	P	C
		3	0	0	3

BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to All branches of Engineering)

Course Objectives: Students will learn

- About the basic principles of Direct Current (DC) & Alternating Current (AC) Circuit analysis
- About the fundamentals of magnetic circuits analysis.
- About Electrical Wiring and Electrical Safety.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply the circuit laws for the analysis of simple DC and AC circuits.
CO2: Apply the basic principles for solving fundamental magnetic circuits**.**
CO3: Apply the basic principles of electrical wiring and electric safety measures**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources.

UNIT II MAGNETIC CIRCUITS

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT III ELECTRICAL WIRING, ELECTRICITY BILL & SAFETY MEASURES

Electrical Wiring: SimpleLamp circuits, stair case wiring scheme, godown wiring scheme, types of service mains, types of electrical wiring, cost estimation of indoor wiring, wiring layout of workshop/ electrical laboratory.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printersetc., Types of 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, Earthing and its types, SafetyPrecautions to avoid shock

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives: Students will learn

- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

Course Outcomes: At the end of the course, the student will be able to
CO4: Analyze various characteristics of semiconductor devices.
CO5: Apply the basic principles for understanding and working of rectifiers and power Supplies.
CO6: Explain the working of various logic gates**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	1	2	1	-	1	-	-	-	-	1	3	2	-
CO5	3	1	2	1	-	1	-	-	-	-	1	3	2	-
CO6	2	2	2	1	-	1	-	-	-	-	1	3	2	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I : **SEMICONDUCTOR DEVICES**

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier

UNIT II: **BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION**

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III :DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1. Principles of Electrical and Electronics Engineering, V.K. Mehtha, S. Chand Technical Publishers
2. Basic Electrical Engineering, Ritu SahDev, Khanna Publishers, 2018, First Edition.
3. FundamentalsofElectricalCircuits,CharlesK.AlexanderandMathewN.O.Sadiku,McGrawHill Education (India),2013,Fifth Edition
4. Electrical Wiring Estimating and Costing –Dr. S. L. Uppal-Khanna Publishers-198
5. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
6. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019,Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023.
4. BasicElectricalEngineering,D.C.Kulshreshtha,TataMcGrawHill, First Edition, 2019
5. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

E-Resources:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

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DEPARTMENT OF MECHANICAL ENEGINEERING

I Year- II Semester	Course Code: BT24ME1201	L	T	P	C
		1	0	4	3
ENGINEERING DRAWING *(Common to EEE, ECE, CSE, CSE aligned branches and IT)*					

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
- To improve the visualization skills for better understanding of projection of 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:

CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Identify the position of lines when inclined to both the planes.
CO4: Analyze the location and position of plane figures**.**
CO5: Analyze the location and position of solid bodies.
CO6: Develop an Isometric view and orthographic views

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	1	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

UNIT III

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT IV

Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1202	L	T	P	C
		0	0	2	1
IT WORKSHOP *(Common to all branches of Engineering)*					

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

CO1: Apply knowledge for computer assembling and software installation and solve trouble shooting problems (L3)
CO2: Understand hardware components and inter dependencies (L2).
CO3: Evaluate the cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks (L5).
CO4: Use various Microsoft tools like professional word documents and presentations (L2).
CO5: Calculate various excel spreadsheets (L4).
CO6: Build various AI Tools – Chartgpt (L6).

. **Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	2	2	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	3	2	3	2	2	-	-	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and 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 option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: 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, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or 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: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

• Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1201	L	T	P	C
		3	0	0	3
DATA STRUCTURES *(Common to CSE and IT)*					

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.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	2
CO2	2	2	3	2	-	-	-	-	-	-	-	2	2	2
CO3	2	3	3	2	-	-	-	-	-	-	-	3	2	3
CO4	2	3	3	2	-	-	-	-	-	-	-	2	3	2
CO5	2	3	3	3	-	-	-	-	-	-	-	2	2	2
CO6	2	2	3	3	-	-	-	-	-	-	-	2	2	2

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort

UNIT II

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

UNIT III

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

UNIT IV

Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

Deques: Introduction to deques (double-ended queues), Operations on deques and their applications.

UNIT V

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal

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

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
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

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1209	L	T	P	C
		0	0	2	1
ENGINEERING PHYSICS LAB *(Common to All Branches of Engineering)*					

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
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Halleffect.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO4	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO5	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO6	3	2	-	-	-	-	-	-	1	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:
1. Determination of radius of curvature of a given Plano-convex lens 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 probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Halleffect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.

14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by nonuniformbending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

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

References:

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

Web Resources:

1. www.vlab.co.in

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DEPARTMENT OF ELECTRICAL & ELCTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1204	L	T	P	C
		0	0	3	1.5

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To measure various electrical quantities using different types of meters.
- About safety measures used in electrical systems.

Course Outcomes: At the end of the course, the student will be able to
CO1: Study and identification of various electrical circuit components and also measure voltage, current and power electrical circuits.
CO2: Choose and assemble various wiring schemes.
CO3: Solve electrical energy and measure earth resistance for domestic premises.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

PART –A: BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Identification of various types of resistors and capacitors and understand the usage of digital multi-meter
2. Study various types of electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and usage.
3. Measurement of Voltage, Current and Power in a DC Circuit
4. Verification of KCL and KVL
5. Measurement of Earth Resistance using Megger
6. Calculation of Electrical Energy for Domestic Premises
7. Staircase wiring scheme
8. Godown wiring scheme

Note: A minimum of six experiments are to be performed.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,WilliamHayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
4. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.

PART-B: ELECTRONICS ENGINEERING LAB

Course Objectives: To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

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

CO4: Identify the various electronic components andunderstand the working of components.
CO5: Plot and discuss the characteristics of various electron devices.
CO6: Explain the operation of a digital circuit.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO5	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO6	3	2	2	-	-	-	-	-	-	1	-	3	2	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

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

Reference Books:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

Note: A minimum of six experiments are to be performed. All the experiments shall be implemented using both Hardware and Software

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1203	L	T	P	C
		0	0	3	1.5
DATA STRUCTURES LAB *(Common to CSE and IT)*					

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

CO5: Apply the map propriately to solve data management challenges

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

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	2	2
CO2	3	3	3	3	-	-	-	-	-	-	-	2	2	3
CO3	3	2	3	2	-	-	-	-	-	-	-	2	3	2
CO4	3	3	2	2	-	-	-	-	-	-	-	2	2	2
CO5	2	3	3	2	-	-	-	-	-	-	-	2	3	3
CO6	2	3	3	3	-	-	-	-	-	-	-	2	2	2

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

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: 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 3: 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 4: Double Linked List Implementation

i. Implement a doubly linked list and perform various operations to understand its properties and applications.
ii. Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise 5: 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 6: 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 7: 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 8: Binary Search Tree

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

Exercise 9: Hashing

i. Implement a hash table with collision resolution techniques.
ii. Write a program to implement a simple cache using hashing.

Textbooks:

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

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1211	L	T	P	C
		0	0	1	0.5
NSS and COMMUNITY SERVICE *(Common to All branches of Engineering)*					

Course Objectives:
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 Outcomes: After completion of the course the students will be able to
CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.
CO6: Participate in activities related to health, hygiene, environment, literacy, disaster management, and gender equity with empathy and commitment.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	-	1	-	2	-	2	-	-
CO3	-	-	-	-	-	-	-	3	-	2	-	2	-	-
CO4	-	-	-	-	-	-	-	2	-	2	-	2	-	-
CO5	-	-	-	-	-	1	3	2	-	2	-	2	-	-
CO6	-	-	-	-	-	2	1	2		2		2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I
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 II
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. Organizing 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 III
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- authoritiesexperts-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 Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. 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:

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

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1201	L	T	P	C
		2	0	0	2
COMMUNICATIVE ENGLISH (Common to All Branches of Engineering)					

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.

Course Outcomes:

CO1: Understand the context, theme, and pieces of specific information from social or Transactional dialogues.

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication.

CO3: Build confidence and creative thinking by challenging the hardships in life.

CO4: Discover the peace and amicable relations in human development.

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication.

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

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 structure 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; Compound words, Collocations

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, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

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

Vocabulary: Words often confused, Jargons

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 with Language 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.

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1203	L	T	P	C
		3	0	0	3
ENGINEERING CHEMISTRY *(Common to Civil and Mechanical Engineering)*					

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:
At the end of the course, the students will be able to:
CO1: Understand the boiler troubles and different water treatment methods
CO2: Distinguish between batteries ,and fuel cells
CO3: Explain the properties and applications of plastics, elastomers and fuels.
CO4: Apply Composites, refractories, lubricants and cement materials in the field of engineering
CO5: Summarize the concepts of colloids ,micelle ,and Nano-materials
CO6: Describe the corrosion revention methods

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	1		1	-	-
CO2	3	2	2	-	-	-	-	-	-	1		2	-	-
CO3	2	2	2	-	-	-	-	-	-	1		2	-	-
CO4	3	2	2	-	-	-	-	-	-	1		2	-	-
CO5	3	2	2	-	-	-	-	-	-	1		2	-	-
CO6	3	2	2	-	-	-	-	-	-	1		2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT – I Water Technology
Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Ion- exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT – II Electrochemistry and Applications
Electrodes –electrochemical cell, Nernst equation, cell potential calculations. Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell. Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bed worth ratios and uses, Factors affecting the corrosion, cathode and anodic protection, electroplating and electro less plating (Nickel and Copper).

UNIT – III Polymers and Fuel Chemistry

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization. Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite. Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers. Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

UNIT – IV Modern Engineering Materials

Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites, properties and Engineering applications Refractories- Classification, Properties, Factors affecting the refractory materials and Applications. Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications. Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT – V Surface Chemistry and Nanomaterials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Textbooks:

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

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition
3. J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 2017.

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1202	L	T	P	C
		3	0	0	3
CHEMISTRY *(Common to ECE, EEE and IT)*					

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:
At the end of the course, the students will be able to:
CO1: Understand the fundamentals of Quantum mechanics and Molecular Orbital Theory.
CO2: Apply the basic principles of semiconductors, super conductors, and nanomaterials in real world applications.
CO3: Compare the materials for construction of batteries and electrochemical sensors.
CO4: Explain the preparation, properties, and applications of thermoplastics thermosetting, elastomers and conducting polymers.
CO5: Summarize the concepts of Instrumental methods.
CO6: Define the principles of spectrometry, slc in separation of solid and liquid mixtures.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I Structure and Bonding Models:
Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules– energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II Modern Engineering materials
Semiconductors – Introduction, basic concept, application
Super conductors-Introduction basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT III Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometer- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

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). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

UNIT IV Polymer Chemistry

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

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio- Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA).

UNIT V Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopes', fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 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. Text book of Polymer Science, Fred W. Billmayer Jr., 3rd Edition
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 201

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DEPARTMENT OF CIVIL ENGINEERING

I Year- II Semester	Course Code: BT24CE1201	L	T	P	C
		3	0	0	3
BASIC CIVIL AND MECHANICAL ENGINEERING (Common to All branches of Engineering)					

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:
CO1: Understand the various sub divisions of Civil Engineering and their role in ensuring better society.
CO2: Know the objectives of surveying and understand the measurement of distances, angles and levels through surveying
CO3: Understand the role of Transportation Engineering in Nation's economy and importance of Water Resource Engineering and Environmental Engineering.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

Part A: BASIC CIVIL ENGINEERING

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings- Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to:

CO4: Understand the different manufacturing processes.

CO5:Explain the basics of thermal engineering and its applications and the working of different mechanical power transmission systems and power plants.

CO6:Describe the basics of robotics and its applications

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	2	1	-	-	1	1	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	1	1	-	-	-	-	-	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants. Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject.)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A text book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1202	L	T	P	C
		3	0	0	3
ENGINEERING MECHANICS (Common to CE and ME)					

Course Objectives:

- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work-Energy method to particle motion.
- To understand the kinematics and kinetics of translational and rotational motion of rigid bodies.

Course Outcomes: On Completion of the course, the student should be able to
CO1: Understand the fundamental concepts in mechanics and determine thefrictional forces for bodies in contact.
CO2: Analyze different force systems such as concurrent, coplanar and spatial systemsand calculate their resultant forces and moments.
CO3: Calculate the centroids, center of gravity and moment of inertia of differentgeometrical shapes.
CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
CO5: Solve the problems involving the translational and rotational motion of rigid bodies.
CO6: Calculate the equilibrium of systems using work-Energy method

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	1	-	2	-	-
CO2	3	2	1	-	-	1	-	-	-	1	-	2	-	-
CO3	3	3	2	1	-	-	-	-	-	1	-	2	-	-
CO4	3	3	2	1	-	-	-	-	-	1	-	2	-	-
CO5	3	1	1	1	-	-	-	-	-	1	-	2	-	-
CO6	2	3	2	1	-	-	-	-	-	1	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I

Introduction to Engineering Mechanics – Basic Concepts. Scope and Applications
Systems of Forces: Coplanar Concurrent Forces– Components in Space–Resultant–Moment of Force and its Application –Couples and Resultant of Force Systems.
Friction: Introduction, limiting friction and impending motion, Coulomb'slaws of dryfriction, coefficient of friction, Cone of Static friction.

UNIT II

Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorm, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses, Principle of virtual work with simple examples.

UNIT III

Centroid: Centroids of simple figures (from basic principles)–Centroids of Composite Figures.

Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

Area Moments of Inertia: Definition– Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, Mass Moment of Inertia of composite bodies.

UNIT IV

Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion-Impulse Momentum method.

UNIT V

Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:

1. Engineering Mechanics, S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., , McGraw Hill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , University press. 2020. First Edition.
3. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international publications 2018. 4th Edition.

Reference Books:

1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education. 2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., PHI, 2002. 4th Edition.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., John Wiley, 2008. 6th Edition.
4. Introduction to Statics and Dynamics, Basudev Battachatia, Oxford University Press, 2014. Second Edition
5. Engineering Mechanics: Statics and Dynamics, Hibbeler R.C., Pearson Education, Inc., New Delhi, 2022, 14th Edition

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DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1203	L	T	P	C
		3	0	0	3
NETWORK ANALYSIS (ECE & allied branches)					

Course Objectives: Students will learn

- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
- To impart knowledge on applying appropriate theorem for electrical circuit analysis
- To explain the transient behavior of circuits in time and frequency domains and teach concepts of resonance
- To teach concepts of resonance and introduce open circuit, short circuit, transmission, hybrid parameters, and their interrelationship.

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

CO1: Identify basic electrical circuits with nodal and mesh analysis and Apply network theorems for the analysis of AC and DC networks
CO2: Analyze transient response and Steady state response of network.
CO3: Apply nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).
CO4: Apply steady state response, different circuit topologies (with R, L and C components).
CO5: Analyze the resonant circuits and draw the locus diagrams.
CO6: Develop the parameters of a two-port network.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO2	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO3	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO4	3	2	2	1	1	-	-	-	-	-	-	2	-	2
CO5	3	2	2	2	1	-	-	-	-	-	-	2	-	2
CO6	3	3	2	2	2	-	-	-	-	-	-	2	-	2

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I ELECTRICAL CIRCUITS & NETWORK THEOREMS

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples. Network Theorems: Thevenin's, Norton's, Millman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, and Tellegens-problem solving using dependent sources also

UNIT II TRANSIENTS & LAPLACE TRANSFORM APPLICATIONS

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations,

homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

UNIT III SINGLE PHASE AC SYSTEMS

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, and problem solving using Laplace transforms also.

UNIT IV MAGNETIC CIRCUITS & RESONANCE

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies. Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V TWO PORT NETWORKS

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also. Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

Textbooks:

1. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, and 9th Edition 2020.
2. Network lines and Fields by John. D. Ryder 2nd Edition, PHI
3. Network Analysis – ME Van Valkenberg, Prentice Hall of India, revised 3rd Edition, 2019.
4. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

Reference Books:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.
3. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series,7 th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017

E-Resources:

1. https://nptel.ac.in/courses/108105159
2. https://nptel.ac.in/courses/117106108

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous)
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DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1202	L	T	P	C
		3	0	0	3
ELECTRICAL CIRCUIT ANALYSIS-I (EEE & allied branches)					

Course Objectives: Students will learn
- About various techniques of circuit analysis using resistive circuits and the fundamentals of AC circuit analysis
- About magnetically coupled and 3 – phase circuits and the resonance phenomenon in Electrical circuits.
- About various theorems in Electrical Circuits.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply nodal and mesh networks, series and parallel circuits, steady-state response, and different circuit topologies (with R, L and C components)
CO2: Analyze the resonant circuits and draw the locus diagrams.
CO3: Apply network theorems for the analysis of DC networks.
CO4: Apply network theorems for the analysis of AC networks.
CO5: Analyze three-phase balanced circuits
CO6: Analyze three-phase unbalanced circuits

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	1	-	-	-	-	-	1	1	1
CO2	3	3	2	2	-	2	-	-	-	-	-	1	1	1
CO3	3	2	2	1	-	2	-	-	-	-	-	1	1	1
CO4	2	2	2	2	-	2	-	-	-	-	-	1	1	1
CO5	3	2	2	1	-	1	-	-	-	-	-	1	1	1
CO6	2	2	2	2	-	1	-	-	-	-	-	1	1	1

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

UNIT I SINGLE PHASE A.C SYSTEMS

Periodic waveforms - average value, rms value, peak factor and form factor, concept of phasor, phase angle and phase difference, phasor diagrams for lagging, leading networks, complex and polar forms of representations. node and mesh analysis.-Steady state analysis of R, L and C circuits, power factor and its significance, real, reactive and apparent power, waveform of instantaneous power and complex power **.**

UNIT II RESONANCE AND LOCUS DIAGRAMS

Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth. Locus diagram: RL, RC, RLC with R, L and C variables.

UNIT III NETWORK THEOREMS (DC & AC EXCITATION)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem

UNIT IV BALANCED THREE-PHASE CIRCUITS

Phase sequence, star and delta connection of sources and loads, relation between line and phase voltages and currents, analysis of balanced three phase circuits, measurement of active and reactive power.

UNIT V UNBALANCED THREE-PHASE CIRCUITS

Loop method, Star-Delta transformation technique, two wattmeter method for measurement of three phase power.

Textbooks:

1. Network Analysis, M.E.Van Valkenberg, Pearson Education, 2019, Revised Third Edition.
2. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin

Reference Books:

1. Fundamentals of Electrical Circuits, Charles K Alexander and Mathew N.O Sadiku,Mc Graw Hill Education (India), 2022, 7th Edition.
2. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.
3. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.
4. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023
5. Schaum's Outline of Electric Circuits, by Mahmood Nahvi, Joseph Edminister, McGraw Hill; 7th edition (31 December 2017).

E-Resources:

1. https://nptel.ac.in/courses/108105159
2. https://nptel.ac.in/courses/117106108

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1206	L	T	P	C
		0	0	2	1
COMMUNICATIVE ENGLISH LAB (Common to All Branches of Engineering)					

Course 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. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Distinguish the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension in day to day conversations.
CO2: Demonstrate communication skills through various language learning activities
CO3: Apply the writing skills in e-mail Writing and Resume Writing.
CO4: Appraise and manifest professionalism in participating group discussions and debates.
CO5: Exhibit the effective interpersonal skills in presentations and interviews
CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	3	-	-	-	1	1	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	3	-	1	-	-
CO3	-	-	-	-	1	-	-	-	1	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	2	-	-	-	-	2	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Topics:

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

Suggested Software:

- Walden Infotech
- Young India Films

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed),Kindle, 2013

Web Resources:

Spoken English:

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

https://www.britishcouncil.in/english/online

http://www.letstalkpodcast.com/

https://www.youtube.com/c/mmmEnglish_Emma/featured

https://www.youtube.com/c/ArnelsEverydayEnglish/featured

https://www.youtube.com/c/engvidAdam/featured

https://www.youtube.com/c/EnglishClass101/featured

https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists

https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

https://www.youtube.com/user/letstalkaccent/videos

https://www.youtube.com/c/EngLanguageClub/featured

https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc

https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1208	L	T	P	C
		0	0	2	1
ENGINEERING CHEMISTRY LAB *(Common to Civil and Mechanical Engineering)*					

Course Objectives:

- To verify the fundamental concepts with experiments

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

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement.
CO5: Calculate the hardness of water.
CO6: Understand the synthesis of Bakelite

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in portland Cement
7. Preparation of nanomaterial by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter

Reference:

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

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1207	L	T	P	C
		0	0	2	1
CHEMISTRY LAB *(Common to ECE, EEE and IT)*					

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to
CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement
CO5: Calculate the hardness of water.
CO6: Preparation of a polymer (Bakelite)

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO2	3	2	3	3	3	1	2	1	2	2	2	3	-	-
CO3	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO4	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO5	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO6	3	3	2	3	2	1	2	1	2	1	1	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
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

Reference:

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

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1203	L	T	P	C
		0	0	3	1.5
ENGINEERING WORKSHOP (Common to All branches of Engineering)					

Course Objectives:
To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:
CO1: Build carpentry fitting and forging operations in various applications.
CO2: Executing operations of foundry and sheet metal works using varies tools.
CO3: Inspect basic electrical engineering knowledge for house wiring practice
CO4: Develop a lap and butt joint using arc welding.
CO5: Develop pipe joint for different diameter of pipes
CO6: Inspect basic repair of two-wheeler vehicle.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO2	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO3	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO4	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO5	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO6	3	-	3	-	2	-	-	3	-	-	-	1	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

SYLLABUS
1. Demonstration: Safety practices and precautions to be observed in workshop.
2. Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4. Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-‘ wheeler tyre
5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light e) Three phase motor f) Soldering of wires

6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.
9. Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

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DEPARTMENT OF CIVIL ENGINEERING

I Year- II Semester	Course Code: BT24CE1202	L	T	P	C
		0	0	3	1.5

ENGINEERING MECHANICS & BUILDING PRACTICES LAB
(Civil Engineering & allied branches)

Course Objectives: The students completing the course are expected to

- Verify the Law of Parallelogram of Forces and Lami's theorem.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Understand the layout of a building, concepts of Non-Destructive Testing and different Alternative Materials.

Course Outcomes: On completion of the course, the student should be able to:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.

CO2: Verify Law of Parallelogram of forces and Law of Moment using force Polygon and bell crank lever.

CO3: Determine the Centre of gravity different configurations and

CO4: Understand the Quality Testing and Assessment Procedures and Principles of Non-Destructive Testing.

CO5: Exposure to safety practices in the construction industry.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

Students have to perform any 10 of the following Experiments:

1. To study various types of tools used in construction.
2. Forces in Pin Jointed Trusses
3. Experimental Proof of Lami's Theorem
4. Verification of Law of Parallelogram of Forces.
5. Determination of Center of Gravity of different shaped Plane Lamina.
6. Determination of coefficient of Static and Rolling Friction.
7. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever
8. Study of Alternative Materials like M-sand, Flyash, Sea Sandetc.
9. Field-Visit to understand the Quality Testing- report.
10. Safety Practices in Construction industry
11. Demonstration of Non-Destructive Testing- using Rebound Hammer &UPV
12. Study of Plumbing in buildings.

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1204	L	T	P	C
		0	0	3	1.5
ENGINEERING MECHANICS LAB (Mechanical Engineering & allied branches)					

Course Objectives: The students completing the course are expected to:

- Verify the Law of Parallelogram and Triangle of Forces.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

Course Outcomes:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
CO2: Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
CO3: Determine the Centre of gravity and Moment of Inertia of different configurations.
CO4: Verify the equilibrium conditions of a rigid body under the action of different force systems.
CO5: Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
CO6: Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO2	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO3	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO4	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO5	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO6	3	3	-	2	-	-	-	-	-	-	-	1	3	3

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

Students have to perform any 10 of the following Experiments:
List of Experiments:

1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar nonconcurrent, parallel force system with the help of a simply supported beam.

7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass.
10. Determine the Moment of Inertia of a Flywheel.
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

References:

1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022.

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DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1206	L	T	P	C
		0	0	3	1.5

NETWORK ANALYSIS AND SIMULATION LABORATORY
(ECE & allied branches)

Course Objectives: Students will learn

- To gain hands on experience in verifying Kirchhoff's laws and network theorems.
- To analyze transient behavior of circuits
- To study resonance characteristics
- To determine 2-port network parameters

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

CO1: Solve Kirchhoff's laws for the given circuits
CO2: Analyze the given Network by applying various Network Theorems.
CO3: Measure the frequency response of RL & RC circuits.
CO4: Analyze the behavior of RL, RC and RLC circuit for different cases.
CO5: Develop the resonant circuit for given specifications.
CO6: Analyze and model the network in terms of all network parameters.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	1	-	-	-	1	-	-	1	1	2
CO2	3	3	2	2	1	-	-	-	1	-	-	1	1	2
CO3	3	3	2	3	1	-	-	-	1	-	-	1	1	2
CO4	2	3	3	3	2	-	-	-	1	-	-	1	2	3
CO5	3	3	3	3	2	-	-	-	1	-	-	1	2	3
CO6	2	2	3	3	1	-	-	-	1	-	-	1	2	2

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

List of Experiments:

1. Study of components of a circuit and verification of KCL and KVL.
2. Verification of mesh and nodal analysis for DC circuits
3. Verification of Superposition theorem for DC circuits
4. Verification of Thevenin's & Norton theorems for DC circuits
5. Verification of maximum power transfer theorem for DC circuits
6. Determination of open circuit (Z) and short circuit (Y) parameters
7. Determination of hybrid (H) and transmission (ABCD) parameters
8. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
9. Simulation and analysis of DC transients in RL, RC and RLC circuits.
10. Study frequency response of various 1st order RL & RC networks
11. Verification of Reciprocity theorem using simulation tools.
12. Verification of Compensation theorem using simulation tools.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Network Analysis, M.E.VanValkenburg, Pearson Education, 2019, Revised Third Edition.
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous)
BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1205	L	T	P	C
		0	0	3	1.5
ELECTRICAL CIRCUITS LAB (EEE & allied branches)					

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To verify the theorems of electrical circuits.
- The concept of self, mutual inductance phenomenon and measure parameters of iron cored inductor.
- About the resonance phenomenon for series/parallel RLC circuits

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

CO1: Solve the given Electrical Network by using Mesh and Nodal Analysis
CO2: Analyze the given Network by applying various Network Theorems
CO3: Draw locus diagrams of RL, RC series circuits and verify network theorems theoretically and practically
CO4: Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil
CO5: Calculate the power consumed by 3-ϕ balanced and unbalanced loads
CO6: Calculate cold, hot resistance and choke coil parameters of electric lamps

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	2	2	-	2	1	-	1	2	-
CO2	3	3	-	1	2	1	-	-	2	2	-	1	2	2
CO3	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO4	3	2	2	2	2	1	-	-	2	1	-	2	2	2
CO5	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO6	3	1	-	-	1	1	-	-	1	2	-	1	1	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

Experiments:

1. Verification of network reduction techniques.
2. Verification of node and mesh analysis.
3. Determination of cold and hot resistance of an electric lamp
4. Determination of Parameters of a choke coil.
5. Determination of self, mutual inductances, and coefficient of coupling
6. Series resonance
7. Locus diagrams of R-L(L Variable) and R-C (C Variable)series circuits
8. Verification of Superposition theorem
9. Verification of Thevenin's and Norton's Theorems
10. Verification of Maximum power transfer theorem
11. Verification of Compensation theorem

12. Verification of Reciprocity and Millman's Theorems
13. Measurement of 3-phase power by two-wattmeter method for balanced loads
14. Measurement of 3-phase power by two-wattmeter method for unbalanced loads

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Network Analysis, M.E.VanValkenburg, Pearson Education, 2019, Revised Third Edition.
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1210	L	T	P	C
		0	0	1	0.5
HEALTH AND WELLNESS, YOGA AND SPORTS (Common to All branches of Engineering)					

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

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.

CO6: Describe the history of sports, Ancient and Modern Olympics

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

CO-PO/PSO MATRIX: (Level of Mapping- 3: High; 2: Moderate; 1-Low; -: Not mapped)

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:

1. Evaluated for a total of 100 marks.
2. 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.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject

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