



D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY
AUTONOMOUS

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A⁺⁺ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnrcet@gmail.com website: <https://dnrcet.org>

**DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE &
MACHINE LEARNING)**

COURSE STRUCTURE & SYLLABUS

for

B.Tech. - CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

(Applicable for batches admitted from 2024-2025)



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



D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A⁺⁺ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnroet@gmail.com website: <https://dnroet.org>

Vision & Mission of the Institute

Vision of the Institution:

To evolve as a Quality Institution in Teaching, Innovative Research, Entrepreneurship and Consultation in Engineering & Technology, empower rural youth globally competent and self-disciplined technocrats.

Mission of the Institution:

IM₁: Inculcate technical knowledge, soft skills through student centric teaching & learning.

IM₂: Strengthen industry institute interaction; provide solutions to the ever-changing requirements.

IM₃: Implant entrepreneurial attitude and ethical values.

IM₄: Create work culture towards learning, Research & Development.

IM₅: Develop a unique practice that instills responsibility and accountability among the stakeholders

Vision & Mission of the Department

Vision of the Department:

To create a hub of eminent technocrats imparting novel skills suiting the qualities of a leader after showcasing competitive spirit meeting inclusive standards.

Mission of the Department:

DM1: To equip the trainer in providing reasons to all problems there by bringing industry institute closer in the field of Artificial Intelligence and Machine Learning.

DM2: To promulgate leadership qualities amongst technocrats in order to make them as research developers.

DM3: To create work culture towards research and developmental activities.



D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A++ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnroet@gmail.com website: <https://dnroet.org>

Program Educational Objectives

Graduates of the Program will be

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO-1	Apply analytical and problem-solving skills to address real-world challenges in AI and ML, fostering strong industry-institute collaboration.
PEO-2	Exhibit leadership and innovation to excel as research developers and professionals in diverse technological domains.
PEO-3	Engage in lifelong learning and research activities, promoting ethical practices and contributing to inclusive technological development.

Program Outcomes (POs)

After successful completion of the Program, the graduates will be able to

PROGRAM OUTCOMES (POS)		
1	Engineering knowledge:	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem analysis:	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions:	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct investigations of complex problems:	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern tool usage:	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6	The engineer and society:	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.



D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A⁺⁺ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnroet@gmail.com website: <https://dnroet.org>

7	Environment sustainability:	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	Ethics:	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication:	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project management and finance:	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	Lifelong learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

After successful completion of the Program, the graduates will be able to

PROGRAM SPECIFIC OUTCOMES (PSOS)	
PSO-1	Apply core concepts of Artificial Intelligence and Machine Learning to develop innovative and practical solutions for real-world problems.
PSO-2	Demonstrate leadership and research skills in AI and ML projects, promoting a collaborative and ethical work culture.



D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A⁺⁺ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnroet@gmail.com website: <https://dnroet.org>

Mission of the Department – PEOs mapping

PEO Statements	DM1	DM2	DM3
PEO-1: Apply analytical and problem-solving skills to address real-world challenges in AI and ML, fostering strong industry-institute collaboration.	3	2	2
PEO2: Exhibit leadership and innovation to excel as research developers and professionals in diverse technological domains.	2	3	2
PEO3: Engage in lifelong learning and research activities, promoting ethical practices and contributing to inclusive technological development.	2	2	3

Note:

Blooms Taxonomy Knowledge Level	Knowledge Level Representation
6 : Create	L6
5 : Evaluate	L5
4: Analyze	L4
3: Apply	L3
2: Understand	L2
1: Remember	L1

Mapping or Correlation Levels
1: Slight (Low)
2: Moderate (Medium)
3: Substantial (High)



D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A⁺⁺ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnrcet@gmail.com website: <https://dnrcet.org>

PROGRAM STRUCTURE

B.Tech.–I Year I Semester							
S. No.	Course Code	Title	Category	L/D	T	P	Credits
1.	BT24BS1101	Communicative English	BS&H	2	0	0	2
2.	BT24BS1102	Chemistry	BS&H	3	0	0	3
3.	BT24BS1103	Linear Algebra & Calculus	BS&H	3	0	0	3
4.	BT24CE1101	Basic Civil & Mechanical Engineering	Engineering science	3	0	0	3
5.	BT24CS1101	Introduction to Programming	Engineering Science	3	0	0	3
6.	BT24BS1105	Communicative English Lab	BS&H	0	0	2	1
7.	BT24BS1106	Chemistry Lab	BS&H	0	0	2	1
8.	BT24ME1103	Engineering Workshop	Engineering Science	0	0	3	1.5
9.	BT24CS1103	Computer Programming Lab	Engineering Science	0	0	3	1.5
10.	BT24BS1108	Health and wellness, Yoga and Sports	BS&H	-	-	1	0.5
Total				14	00	11	19.5

B.Tech.–I Year II Semester							
S. No.	Course Code	Title	Category	L/D	T	P	Credits
1.	BT24BS1205	Engineering Physics	BS&H	3	0	0	3
2.	BT24BS1204	Differential Equations & Vector Calculus	BS&H	3	0	0	3
3.	BT24EE1201	Basic Electrical and Electronics Engineering	Engineering Science	3	0	0	3
4.	BT24ME1201	Engineering Drawing	Engineering Science	1	0	4	3
5.	BT24CS1202	IT workshop	Engineering Science	0	0	2	1
6.	BT24CS1201	Data Structures	Professional Core Branch specific	3	0	0	3
7.	BT24BS1209	Engineering Physics lab	BS&H	0	0	2	1
8.	BT24EE1204	Electrical and Electronics Engineering Workshop	Engineering Science	0	0	3	1.5
9.	BT24CS1203	Data structures Lab	Professional Core Branch specific	0	0	3	1.5
10.	BT24BS1211	NSS/NCC/Scouts& Guides/Community service	BS&H	-	-	1	0.5
Total				13	00	15	20.5



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

**DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING)**

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 (L2).

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication (L3).

CO3: Build confidence and creative thinking by challenging the hardships in life (L3).

CO4: Discover the peace and amicable relations in human development (L4).

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication (L4).

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms (L3).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	3.00	-	-
CO2	-	-	-	-	-	-	-	-	-	3.00	-	2.00
CO3	-	-	-	-	-	-	-	-	-	3.00	-	-
CO4	-	-	-	-	-	-	-	-	-	3.00	-	-
CO5	-	-	-	-	-	-	-	-	-	3.00	-	-
CO6	-	-	-	-	-	-	-	-	-	3.00	-	3.00
Avg.	-	-	-	-	-	-	-	-	-	3.00	-	2.50

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

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.



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

I Year - I Semester	Course Code: BT24BS1102	L	T	P	C
		3	0	0	3
CHEMISTRY					

(Common to All Branches of 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 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.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	2.00	-	-	-	-	-	-	1.00	-	1.00
CO2	3.00	2.00	2.00	-	-	-	-	-	-	1.00	-	2.00
CO3	2.00	2.00	2.00	-	-	-	-	-	-	1.00	-	2.00
CO4	3.00	2.00	2.00	-	-	-	-	-	-	1.00	-	2.00
CO5	3.00	2.00	2.00	-	-	-	-	-	-	1.00	-	2.00
Avg.	3.00	2.00	2.00	-	-	-	-	-	-	1.00	-	1.80

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
Avg.	-	-

UNIT -I: Structure and Bonding Models

(10Hours)

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , 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, conduct metric 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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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 (L3).

CO2: Solve a given system of linear algebraic equations (L3).

CO3: Find the Characteristic equation, Eigen values & Eigen vectors (L3).

CO4: Utilize mean value theorems to real life problems (L3).

CO5: Apply the concept of the partial differentiation in various engineering fields (L3).

CO6: Evaluate double, triple integrals and their applications (L3).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1.00	3.00	-	-	-	-	-	-	-	-	-	-
CO2	1.00	3.00	-	-	-	-	-	-	-	-	-	-
CO3	1.00	3.00	-	-	-	-	-	-	-	-	-	-
CO4	1.00	3.00	-	-	-	-	-	-	-	-	-	-
CO5	2.00	3.00	-	-	-	-	-	-	-	-	-	-
CO6	2.00	3.00										
Avg.	1.33	3.00	-	-	-	-	-	-	-	-	-	-

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
Co6	-	-
Avg.	-	-

UNIT-I: Matrices

(10 hours)

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 hours)

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 hours)**

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 hours)**

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 hours)**

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, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

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



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

**DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING)**

I Year - I Semester	Course Code: BT24CE1101	L	T	P	C
		3	0	0	3
BASIC CIVIL & 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.

CO/ PO	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

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

CO/ PO	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	-	-	-	-	-	-	-

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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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 (L2).

CO2: Analyse a problem and develop an algorithm 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)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	2.00	3.00	1.00	-	-	-	2.00	-	-	-	2.00
CO2	2.00	3.00	3.00	2.00	-	-	-	2.00	-	-	-	2.00
CO3	2.00	3.00	3.00	2.00	-	-	-	3.00	-	-	-	2.00
CO4	2.00	3.00	2.00	2.00	-	-	-	2.00	-	-	-	2.00
CO5	3.00	3.00	3.00	2.00	-	-	-	3.00	-	-	-	2.00
CO6	2.00	3.00	3.00	3.00	-	-	-	2.00	-	-	-	2.00
Avg.	2.17	2.83	2.83	2.00	-	-	-	2.33	-	-	-	2.00

	PSO1	PSO2
CO1	2.00	2.00
CO2	2.00	-
CO3	2.00	2.00
CO4	2.00	2.00
CO5	3.00	3.00
CO6	2.00	2.00
Avg.	2.17	2.20

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



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

**DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING)**

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 (L4).

CO2: Demonstrate communication skills through various language learning activities (L3)

CO3: Apply the writing skills in e-mail Writing and Resume Writing (L3).

CO4: Appraise and manifest professionalism in participating group discussions and debates (L5).

CO5: Exhibit the effective interpersonal skills in presentations and interviews (L3)

CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills (L2).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	3.00	-	-	-	1.00	1.00	-	-
CO2	-	-	-	-		-	-	-	3.00	3.00	-	1.00
CO3	-	-	-	-	1.00	-	-	-	1.00	2.00	-	2.00
CO4	-	-	-	-		-	-	-	3.00	3.00	-	2.00
CO5	-	-	-	-		-	-	-	3.00	3.00	-	2.00
CO6	-	-	-	-	2.00	-	-	-	-	2.00	-	2.00
Avg.	-	-	-		2.00	-	-	-	2.20	2.33	-	1.80

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

I Year - I Semester	Course Code: BT24BS1106	L	T	P	C
		0	0	2	1
CHEMISTRY LAB					

(Common to All Branches of Engineering)

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.(L4)

CO2: Prepare advanced polymer Bakelite materials.(L6)

CO3: Measure the strength of an acid present in secondary batteries. (L4)

CO4: Analyse the IR spectra of some organic compounds.(L4)

CO5: Calculate strength of acid in Pb-Acid battery.(L5)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	2.00									2.00
CO2	3.00	3.00	2.00									2.00
CO3	3.00	2.00	2.00									2.00
CO4	3.00	3.00	2.00									2.00
CO5	3.00	2.00	2.00									2.00
Avg.	3.00	2.40	2.00									2.00

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
Avg.	-	-

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conduct metric titration of strong acid vs. strong base
3. Conduct metric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. 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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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:

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

CO1: Build carpentry fitting and forging operations in various applications (L6).

CO2: Executing operations of foundry and sheet metal works using various tools (L5).

CO3: Inspect basic electrical engineering knowledge for house wiring practice (L4).

CO4: Develop a lap and butt joint using arc welding (L6).

CO5: Develop pipe joint for different diameter of pipes (L6).

CO6: Demonstrate of repair of two-wheeler vehicle (L2)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00
CO2	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00
CO3	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00
CO4	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00
CO5	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00
CO6	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00
Avg.	3.00	-	3.00	-	3.00	-	-	3.00	-	-	-	1.00

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

SYLLABUS

- Demonstration:** Safety practices and precautions to be observed in workshop.
- Wood Working:** Familiarity with different types of woods and tools used in wood working and make following joints.
 - Half – Lap joint
 - Mortise and Tenon joint
 - Corner Dovetail joint or Bridle joint
- Sheet Metal Working:** Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
 - Tapered tray
 - Conical funnel
 - Elbow pipe
 - Brazing
- Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
 - V-fit
 - Dovetail fit
 - Semi-circular fit
 - 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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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:

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

Course Outcomes:

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

CO1: Read understand and trace the execution of programs written in C language.(L2)

CO2: Select the right control structure for solving the problem.(L2)

CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers. (L3)

CO4: Develop, Debug and execute programs to demonstrate applications of arrays, functions, basic concepts of pointers in C.(L4)

CO5: Develop a program to demonstrate the applications of string operations in C.(L5)

CO6: Develop a program to demonstrate the applications of file operations in C.(L3)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	3.00	-	2.00	-	-	-	-	-	-	-	-
CO2	2.00	3.00	3.00	3.00	-	-	-	-	-	-	-	-
CO3	2.00	3.00	3.00	2.00	3.00	-	-	-	-	-	-	-
CO4	2.00	3.00	3.00	3.00	2.00	-	-	-	-	-	-	-
CO5	2.00	3.00	3.00	2.00	2.00	-	-	-	-	-	-	-
CO6	-	2.00	3.00	2.00	2.00	-	-	-	-	-	-	-
Avg.	2.00	2.83	3.00	2.33	2.25	-	-	-	-	-	-	-

	PSO1	PSO2
CO1	-	2.00
CO2	-	-
CO3	-	-
CO4	2.00	-
CO5	2.00	-
CO6	-	-
Avg.	2.00	2.00

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

- Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- 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

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. $A+B*C+(D*E) + F*G$

$A/B*C-B+A*D/3$

$A+++B---A$

$J= (i++) + (++i)$

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 for 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 on 1D 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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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:

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

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

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.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	2.00	2.00	2.00	-	2.00
CO2	-	-	-	-	-	-	-	2.00	2.00	3.00	-	2.00
CO3	-	-	-	-	-	-	-	3.00	2.00	3.00	-	2.00
CO4	-	-	-	-	-	-	-	3.00	2.00	2.00	-	2.00
CO5	-	-	-	-	-	-	-	2.00	2.00	2.00	-	2.00
Avg.	-	-	-	-	-	-	-	2.40	2.00	2.40	-	2.00

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
Avg.	-	-

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, totaling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

I Year - II Semester	Course Code: BT24BS1205	L	T	P	C
		3	0	0	3
ENGINEERING PHYSICS					

(Common to 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 (L4).

CO2: Examine the crystal structures with the basics of crystals (L3).

CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials (L3).

CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles (L3).

CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids (L3).

CO6: Identify the type of semiconductor using Hall effect (L3).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	2.00	1.00	-	-	-	-	-	-	-	1.00
CO2	3.00	2.00	2.00	1.00	-	-	-	-	-	-	-	1.00
CO3	3.00	2.00	2.00	-	-	-	-	-	-	-	-	1.00
CO4	3.00	2.00	2.00	-	-	-	-	-	-	-	-	1.00
CO5	3.00	2.00	2.00	-	-	-	-	-	-	-	-	1.00
CO6	3.00	2.00	2.00	-	-	-	-	-	-	-	-	1.00
Avg.	3.00	2.00	2.00	1.00	-	-	-	-	-	-	-	1.00

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

UNIT I: Wave Optics

(12 Hours)

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 (10 Hours)

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 (8 Hours)

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 (10 Hours)

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 (8 Hours)

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. Veeranjanyulu, 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 CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

LEARNING,					
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: Discuss linear differential equations with constant coefficients, General solutions (L3).

CO2: Apply the knowledge in simple applications such as Newton's law of cooling and simple electrical circuits (L3).

CO3: Solve the linear ordinary differential equations of second order and higher order and applications related to various Engineering fields (L4).

CO4: Identify solution methods of partial differential equations that model physical processes (L3).

CO5: Interpret the physical meaning of different operators such as gradient, curl and divergence (L3).

CO6: Estimate the work done against a field, circulation and flux using vector calculus (L4).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	3.00	-	-	-	-	-	-	-	-	-	-
CO2	2.00	3.00	-	-	-	-	-	-	-	-	-	-
CO3	1.00	3.00	-	-	-	-	-	-	-	-	-	-
CO4	1.00	3.00	-	-	-	-	-	-	-	-	-	-
CO5	2.00	3.00	-	-	-	-	-	-	-	-	-	-
CO6	2.00	3.00	-	-	-	-	-	-	-	-	-	-
Avg.	1.67	3.00	-	-	-	-	-	-	-	-	-	-

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

UNIT-I: Differential equations of first order and first degree (10 Hours)

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 Hours)

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 Hours)

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 Hours)

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 Hours)

L Without egral-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
5. International Ltd., 2021 5th Edition (9th reprint).
6. Higher Engineering Mathematics, B.V.Ramana, Mc Graw Hill Education,2017



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to All Branches of Engineering)

Course Objectives:

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

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

CO1: Apply the circuit laws for the analysis of simple DC and AC Circuits (L3)

CO2: Apply the basic principles for solving fundamental magnetic circuits (L3).

CO3: Apply the basic principles of electrical wiring and electrical safety measures (L3)

CO4: Analyze various characteristics of semiconductor devices (L4).

CO5: Apply the basic principles for understanding and working of rectifiers and power supplies (L3)

CO6: Explain the working of various logic gates (L2).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	3.00	3.00	2.00	-	1.00	-	-	-	-	-	1.00
CO2	3.00	3.00	2.00	2.00	-	2.00	-	-	-	-	-	1.00
CO3	3.00	2.00	2.00	1.00	-	3.00	-	-	-	-	-	1.00
CO4	2.00	1.00	2.00	1.00	-	3.00	-	-	-	-	-	1.00
CO5	3.00	1.00	2.00	1.00	-	1.00	-	-	-	-	-	1.00
CO6	2.00	2.00	2.00	2.00	-	1.00	-	-	-	-	-	1.00
Avg.	2.67	2.00	2.17	1.50	-	1.83	-	-	-	-	-	1.00

	PSO1	PSO2
CO1	1.00	1.00
CO2	1.00	1.00
CO3	1.00	1.00
CO4	1.00	1.00
CO5	1.00	1.00
CO6	1.00	1.00
Avg.	1.00	1.00

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I: DC & AC Circuits

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

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

UNIT II: Machines and Measuring Instruments

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

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

UNIT III: Energy Resources, Electricity Bill & Safety Measures

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

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

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

Textbooks:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
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

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. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhattacharya, Person Publications, 2018, Second Edition.

Web Resources:

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

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives:

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

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 INSTRUMENTATION

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. 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

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

End examination pattern:

1. Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
2. In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1 mark.
3. In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
4. The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

I Year - II Semester	Course Code: BT24ME1201	L	T	P	C
		1	0	4	3
ENGINEERING DRAWING					

(Common to All Branches of Engineering)

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 (L3).
CO2: Identify the position of points and lines (L3).
CO3: Identify the position of lines when inclined to both the planes (L3).
CO4: Analyze the location and position of plane figures (L4)
CO5: Analyze the location and position of solid bodies (L4).
CO6: Develop an Isometric view and orthographic views (L6).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	3.00	1.00	-	-	-	-	-	1.00	-	2.00
CO2	3.00	2.00	3.00	1.00	-	-	-	-	-	1.00	-	2.00
CO3	3.00	2.00	3.00	1.00	-	-	-	-	-	1.00	-	2.00
CO4	3.00	2.00	3.00	1.00	1.00	-	-	-	1.00	1.00	-	2.00
CO5	3.00	2.00	3.00	1.00	1.00	-	-	-	1.00	1.00	-	2.00
CO6	3.00	2.00	3.00	2.00	1.00	-	-	-	3.00	1.00	1.00	2.00
Avg.	3.00	2.00	3.00	1.17	1.00	-	-	-	1.67	1.00	1.00	2.00

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

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, Involute, 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.



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

**DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING)**

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 spread sheets (L4).
- CO6:** Build various AI Tools – Chartgpt (L6).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	3.00	2.00	2.00	2.00	-	-	-	-	-	-	-
CO2	2.00	3.00	3.00	3.00	-	-	-	-	-	-	-	-
CO3	2.00	3.00	3.00	2.00	3.00	-	-	-	-	-	-	-
CO4	2.00	3.00	3.00	3.00	2.00	-	-	-	-	-	-	-
CO5	2.00	3.00	3.00	2.00	2.00	-	-	-	-	-	-	-
CO6	3.00	2.00	3.00	2.00	2.00	-	-	-	-	-	-	-
Avg.	2.17	2.83	2.83	2.33	2.20	-	-	-	-	-	-	-

	PSO1	PSO2
CO1	-	2.00
CO2	-	-
CO3	-	-
CO4	2.00	-
CO5	2.00	-
CO6	-	-
Avg.	2.00	2.00

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 Anfinson 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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

		LEARNING,			
I Year - II Semester	Course Code: BT24CS1201	L	T	P	C
		3	0	0	3
DATA STRUCTURES					

(Common to All Branches of Engineering)

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 (L2).

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation (L5).

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems (L6).

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between dequeues and priority queues, and apply them appropriately to solve data management challenges (L3).

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees (L6).

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems (L4).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.00	2.00	2.00	2.00	-	-	-	-	-	-	-	2.00
CO2	2.00	2.00	3.00	2.00	-	-	-	-	-	-	-	2.00
CO3	2.00	3.00	3.00	2.00	-	-	-	-	-	-	-	3.00
CO4	2.00	3.00	3.00	2.00	-	-	-	-	-	-	-	2.00
CO5	2.00	3.00	3.00	3.00	-	-	-	-	-	-	-	2.00
CO6	2.00	2.00	3.00	3.00	-	-	-	-	-	-	-	2.00
Avg.	2.00	2.50	2.83	2.33	-	-	-	-	-	-	-	2.17

	PSO1	PSO2
CO1	2.00	2.00
CO2	2.00	2.00
CO3	2.00	3.00
CO4	3.00	2.00
CO5	2.00	2.00
CO6	2.00	2.00
Avg.	2.17	2.17

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.

Deque: Introduction to deque (double-ended queue), Operations on deque 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.



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

LEARNING,					
I Year - II Semester	Course Code: BT24CS1209	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:

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

CO1: Operate optical instruments like travelling microscope and spectrometer (L3).

CO2: Estimate the wavelengths of different colours using diffraction grating (L5).

CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance (L6).

CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively (L5).

CO5: Calculate the band gap of a given semiconductor (L4).

CO6: Identify the type of semiconductor using Hall effect (L4).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	-	-	-	-	-	-	1.00	-	-	-
CO2	3.00	2.00	-	-	-	-	-	-	1.00	-	-	1.00
CO3	3.00	2.00	-	-	-	-	-	-	1.00	-	-	1.00
CO4	3.00	2.00	-	-	-	-	-	-	1.00	-	-	1.00
CO5	3.00	2.00	-	-	-	-	-	-	1.00	-	-	1.00
CO6	3.00	2.00	-	-	-	-	-	-	1.00	-	-	1.00
Avg.	3.00	2.00	-	-	-	-	-	-	1.00	-	-	1.00

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-
Avg.	-	-

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 Hall effect.
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



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

I Year - II Semester	Course Code: BT24EE1203	L	T	P	C
		0	0	3	1.5
ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP LAB					

(Common to All Branches of Engineering)

Course Objectives:

- To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes:

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

- CO1.** Measure voltage, current and power in an electrical circuit. (L3)
- CO2.** Measure of Resistance using Wheat stone bridge (L4)
- CO3.** Discover critical field resistance and critical speed of DC shunt generators. (L4)
- CO4.** Investigate the effect of reactive power and power factor in electrical loads. (L5)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	2.00	-	-	2.00	2.00	-	2.00	1.00	-	1.00
CO2	3.00	3.00	-	1.00	2.00	-	-	-	2.00	2.00	-	1.00
CO3	3.00	1.00	-	1.00	-	1.00	-	-	2.00	2.00	-	1.00
CO4	3.00	2.00	2.00	2.00	2.00	1.00	-	-	2.00	1.00	-	2.00
Avg.	3.00	2.00	2.00	1.33	2.00	1.33	2.00	-	2.00	1.50	-	1.25

	PSO1	PSO2
CO1	2.00	-
CO2	2.00	2.00
CO3	2.00	-
CO4	2.00	2.00
Avg.	2.00	2.00

Activities:

- Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
 - Provide some exercises so that hardware tools and instruments are learned to be used by the students.
- Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
 - Provide some exercises so that measuring instruments are learned to be used by the students.
- Components:
 - Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.

Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc., with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
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

Note: Minimum Six Experiments to be performed.

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

CO1: Identify & testing of various electronic components (L3).

CO2: Understand the usage of electronic measuring instruments (L4).

CO3: Plot and discuss the characteristics of various electron devices (L4).

CO4: Explain the operation of a digital circuit (L5).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	2.00	2.00	-	-	2.00	2.00	-	2.00	1.00	-	1.00
CO2	3.00	3.00	-	1.00	2.00	-	-	-	2.00	2.00	-	1.00
CO3	3.00	1.00	-	1.00	-	1.00	-	-	2.00	2.00	-	1.00
CO4	3.00	2.00	2.00	2.00	2.00	1.00	-	-	2.00	1.00	-	2.00
Avg.	3.00	2.00	2.00	1.33	2.00	1.33	2.00	-	2.00	1.50	-	1.25

	PSO1	PSO2
CO1	2.00	-
CO2	2.00	2.00
CO3	2.00	-
CO4	2.00	2.00
Avg.	2.00	2.00

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.

References:

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: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.



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

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

LEARNING,					
I Year - II Semester	Course Code: BT24CS1203	L	T	P	C
		0	0	3	1.5
DATA STRUCTURES LAB					

(Common to All Branches of Engineering)

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 (L4).

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation (L6).

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems (L6).

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between dequeues and priority queues (L3).

CO5: Apply them appropriately to solve data management challenges (L3).

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems (L4).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3.00	3.00	3.00	3.00	-	-	-	-	-	-	-	3.00
CO2	3.00	3.00	3.00	3.00	-	-	-	-	-	-	-	2.00
CO3	3.00	2.00	3.00	2.00	-	-	-	-	-	-	-	2.00
CO4	3.00	3.00	2.00	2.00	-	-	-	-	-	-	-	2.00
CO5	2.00	3.00	3.00	2.00	-	-	-	-	-	-	-	2.00
CO6	2.00	3.00	3.00	3.00	-	-	-	-	-	-	-	2.00
Avg.	2.67	2.83	2.83	2.50	-	-	-	-	-	-	-	2.17

	PSO1	PSO2
CO1	2.00	2.00
CO2	2.00	3.00
CO3	3.00	2.00
CO4	2.00	2.00
CO5	3.00	3.00
CO6	2.00	2.00
Avg.	2.33	2.33

List of Experiments:

Exercise 1: Array Manipulation

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

Exercise 2: Linked List Implementation

- 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.



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

**DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING)**

I Year - II Semester	Course Code: BT24BS1211	L	T	P	C
		-	-	1	0.5

NSS / NCC / Scouts & Guides / 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 (L2).

CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques (L3).

CO3: Explore human relationships by analyzing social problems (L4).

CO4: Determine to extend their help for the fellow beings and downtrodden people (L5).

CO5: Develop leadership skills and civic responsibilities (L6).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3.00	2.00	2.00	3.00	2.00	-	-
CO2	-	-	-	-	-	3.00	2.00	2.00	3.00	2.00	-	-
CO3	-	-	-	-	-	3.00	2.00	3.00	3.00	2.00	-	-
CO4	-	-	-	-	-	2.00	2.00	2.00	3.00	2.00	-	-
CO5	-	-	-	-	-	2.00	2.00	2.00	3.00	2.00	-	-
Avg.	-	-	-	-	-	2.80	2.00	2.20	3.00	2.00	-	-

	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
Avg.	-	-

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:

Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities- experts-etc.

- i) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
- ii) Conducting consumer Awareness. Explaining various legal provisions etc.
- iii) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
- iv) 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:

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

*** **