



St. Johns College of Engineering & Technology (Autonomous)

(Accredited by NAAC, Approved by AICTE, Recognized by UGC under 2(f) & 12(B) An ISO 9001:2015
Certified Institution and Affiliated to JNTUA, Ananthapuramu)

Yerrakota, Yemmiganur-518360, Kurnool (Dist), Andhra Pradesh, India.

B.Tech (Regular-Full time)

(Effective for the students admitted into I-Year from the Academic Year
2024-25 onwards & Lateral Entry Students Admitted from the Academic
Year **2025-26** onwards)

CSE – Artificial Intelligence & Machine Learning I & II YEAR COURSE STRUCTURE AND SYLLABUS



St. John's College of Engineering and Technology

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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

B.TECH. –CSE- CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING - COURSE STRUCTURE & SYLLABUS – R24

(Applicable from the academic year 2025-26 onwards)

INDUCTION PROGRAMME

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



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B.TECH. – I YEAR COURSE STRUCTURE & SYLLABI

B.Tech.–I Year I Semester

S.No.	Course code	Title	L	T	P	Credits
1	24G3A56101T	Engineering Physics	3	0	0	3
2	24G3A54101	Linear Algebra & Calculus	3	0	0	3
3	24G3A02101T	Basic Electrical & Electronics Engineering	3	0	0	3
4	24G3A03101T	Engineering Graphics	1	0	4	3
5	24G3A05101T	Introduction to Programming	3	0	0	3
6	24G3A05102	IT Workshop	0	0	2	1
7	24G3A56101P	Engineering Physics Lab	0	0	2	1
8	24G3A02101P	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	24G3A05101P	Computer Programming Lab	0	0	3	1.5
10	24G3A99101	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
Total			13	00	15	20.5

B.Tech. I Year II Semester

S.No.	Course code	Title	L	T	P	Credits
1	24G3A52201T	Communicative English	2	0	0	2
2	24G3A51202T	Chemistry	3	0	0	3
3	24G3A54201	Differential Equations & Vector Calculus	3	0	0	3
4	24G3A01201T	Basic Civil & Mechanical Engineering	3	0	0	3
5	24G3A05201T	Data Structures	3	0	0	3
6	24G3A52201P	Communicative English Lab	0	0	2	1
7	24G3A51202P	Chemistry Lab	0	0	2	1
8	24G3A03201	Engineering Workshop	0	0	3	1.5
9	24G3A05201P	Data Structures Lab	0	0	3	1.5
10	24G3A99201	Health and wellness, Yoga and Sports	-	-	1	0.5
Total			14	00	11	19.5

B.Tech. II Year I Semester

B.Tech. II Year II Semester

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ENGINEERING PHYSICS

I B.Tech– I Semester						SJ CET-R24		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A56101T	BS&H	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

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:

After the completion of the course students will be able to

CO1:	Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2:	Familiarize with the basics of crystals and their structures.
CO3:	Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4:	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles and the band theory of solids.
CO5:	Identify the type of semiconductor using Hall effect.

UNIT-I: Wave Optics

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

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

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

UNIT-III: Dielectric and Magnetic Materials

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

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization- Magnetic susceptibility and permeability – Atomic origin of magnetism -



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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

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

Semiconductors: 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. M. N. Avadhanulu, P.G. Kshirsagar & T.V.S.Arun Murthy, A Textbook of Engineering Physics, S Chand Publications, Eleventh Edition, 2019.
2. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 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).

Online Learning Resources:

<https://www.youtube.com/watch?v=2XOQXgj18Qk>

https://www.youtube.com/watch?v=UXqWixel_f8

<https://www.youtube.com/watch?v=DocyilQj8yE>

https://www.youtube.com/watch?v=GzE7_dxxAU&list=PLDVC8J0Twuc9DCeiUaM0PRakAqalYwmP&index=2

<https://www.youtube.com/watch?v=3WW60S48f-s>



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

LINEAR ALGEBRA & CALCULUS

(Common to All Branches of Engineering)

I B.Tech- I Semester							SJ CET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A54101	BS&H	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

Course Outcomes:

After the completion of the course students will be able to

CO1:	Develop and use of matrix algebra techniques that are needed by engineers for the practical applications
CO2:	Utilize mean value theorems to real life problems
CO3:	Familiarize with functions of several variables which is useful in optimization
CO4:	Learn important tools of calculus in higher dimensions.
CO5:	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT-I: Matrices

Rank of a matrix by echelon 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 by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II: Eigen values, Eigenvectors and Orthogonal Transformation

Eigen values, Eigenvectors of Real Matrices 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

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 (Multi variable calculus)

Functions of several variables: Limit, Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, 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)

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).



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Textbooks:

1. Advanced Engineering Mathematics, Micheael Greenberg,, Pearson publishers, 9 thedition.
2. Higher Engineering Mathematics, H. K Das, Er. RajnishVerma, S. Chand Publications, 2014, Third Edition (Reprint 2021)

Reference Books:

1. Higher Engineering Mathematics, B.S.Grewal,KhannaPublishers,2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.
3. Thomas Calculus, George B.Thomas, MauriceD. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
4. Advanced Engineering Mathematics, R.K. Jainand, S.R.K.Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Advanced Modern Engineering Mathematics, GlynJames, Pearson publishers, 2018 5 th Edition.



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BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to All branches of Engineering)

I B.Tech– I Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A02101T	ES	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

PART-A: BASIC ELECTRICAL ENGINEERING

Course Outcomes:

After the completion of the course students will be able to

CO1:	Analyze the behavior of DC and AC circuits using fundamental laws and theorems, including the application of phasor diagrams and impedance concepts.
CO2:	Evaluate the performance and applications of various electrical machines and measuring instruments by understanding their construction and operating principles.
CO3:	Apply knowledge of energy resources, electricity billing, and safety measures to solve real-world electrical engineering problems related to power generation and household electrical safety.

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



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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. 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>



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PART-B: BASIC ELECTRONICS ENGINEERING

Course Outcomes:

After the completion of the course students will be able to

CO1:	Apply the concept of science and mathematics to understand the working of diodes, transistors.
CO2:	Understand the operation of electronic circuits such as Rectifiers, power supplies, and Electronic Instrumentation
CO3:	Familiarize with the number systems, codes, Boolean algebra and logic gates and understand the working mechanism of different combinational, sequential circuits and their role in the digital systems.

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 Adder, 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 McGrawHill, 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.



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

ENGINEERING GRAPHICS

(Common to all branches of Engineering)

I Year B. Tech (CE, ME, ECE, CSD, AIML)–I Semester I Year B. Tech (EEE, CSE, CAI) – II Semester

I B.Tech– I Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A03101T	ES	L	T	P	C	CIA	SEE	Total
		1	0	4	3	30	70	100

Course Outcomes:

After the completion of the course students will be able to

CO1:	Understand the principles of engineering drawing, including engineering curves Including cycloids and involutes
CO2:	Draw and interpret orthographic projections of points, lines in front, top views.
CO3:	Understand and draw projection of planes and solids in various positions in first quadrant.
CO4:	Explain principles of sections of solids
CO5:	Prepare isometric and development of simple solids.

UNIT-I: Introduction to Engineering Drawing:

Principles of Engineering Drawing and its significance Conventions in drawing- lettering - BIS conventions. a) Conic sections-using Eccentricity method, oblong method, concentric circle method including the rectangular hyperbola b) Cycloid, epicycloids and hypocycloid c) Involute.

UNIT-II: Projections of Points and Projections of Lines

Projections of Points: Projections of Points in all the quadrants.

Projections of Lines: Projections of Straight Lines-Parallel to one and inclined to other plane, inclined to planes, determination of true lengths, angle of inclinations.

UNIT-III: Projections of Planes and Projections of Solids

Projections of Planes: Regular Planes, Plane Perpendicular to one plane and Parallel to another Reference plane, Plane inclined to one of the principal plane and perpendicular to the other Plane. Plane inclined to both the planes.

Projections of Solids: Prisms, Pyramids, Cones and Cylinders with the axis perpendicular to one plane and parallel to the reference plane, Plane inclined to one reference Plane and parallel to other.

UNIT-IV: Sections of solids

Sections of solids: Sectioning of prism, pyramid, cone and cylinder– sectional view– true shape.

Section of plane parallel to one principal plane, Section of plane Inclined to one principal plane and perpendicular to other. Section of plane perpendicular to both H.P and V.P.

UNIT-V: Development of surface of solids and Conversion of Views

Development of surface of solids: Development of surfaces of right regular solids and their sections - prism, pyramid, cylinder and cone.

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



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Textbooks:

1. Engineering Drawing. K.L Narayana, P. Kannaiah, Scitech Publications, 2011
2. Engineering Drawing by N.D.Bhatt, Chariot Publications, 2014

Reference Books:

1. K. Venugopal, Engineering Drawing and Graphics with Auto CAD, Fourth Edition, 2001, New Age International (P) Limited, Publishers, New Delhi, 2001.
2. Dhananjay A Jolhe, Engineering Drawing with an introduction to Auto CAD, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2008.
3. M.B.Shaw & B.C.Rana, Engineering Drawing, Second Edition Pearson Education, New Delhi, 2009.
4. Engineering Drawing, B.V.R Gupta, J.K. Publishers, 2008
5. K.V.Natarajan,, A text book of Engineering Graphics", Dhanalakshmi publishers, Chennai, 2006.

Additional Sources:

<https://archive.nptel.ac.in/courses/112/102/112102304/><https://www.youtube.com/watch?v=p62LPzFqGQw&list=PLp6ek2hDcoNCjoRLQ4rjpCozisCACBxKA>



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

INTRODUCTION TO PROGRAMMING

(Common to All branches of Engineering)

I B.Tech- I Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A05101T	ES	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

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.
CO2:	Apply appropriate Control structures to solve problems.
CO3:	Describe the concept of Arrays and Strings
CO4:	Write User defined functions and performing operations on Files
CO5:	Describe the concept of Pointers and Structures.

UNIT-1: 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: 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
Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, Recursion, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling
UNIT-V: Functions & File Handling
Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.



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Note: The syllabus is designed with C Language as the fundamental language of implementation.

Textbooks:

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

Reference Books:

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



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IT WORKSHOP

(Common to all branches of Engineering)

I B.Tech- I Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A05102	ES	L	T	P	C	CIA	SEE	Total
		0	0	2	1	30	70	100

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:	Perform Hardware troubleshooting.
CO2:	Understand Hardware components and inter dependencies.
CO3:	Safeguard computer systems from viruses/worms.
CO4:	Document/ Presentation preparation.
CO5:	Perform calculations using spreadsheets.

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



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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 TeX and 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,



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Video, Objects, Tables and Charts.

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

AI TOOLS – ChatGPT

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

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

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story

or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

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

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

Ex:

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

Reference Books:

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



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

ENGINEERING PHYSICS LAB

I B.Tech- I Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A56101P	BS&H	L	T	P	C	CIA	SEE	Total
		0	0	2	1	30	70	100

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:

After the completion of the course students will be able to

CO1:	Measurement of Optical parameters using optical instruments.
CO2:	Able to measure magnetic, dielectric parameters by various methods.
CO3:	Analyzing the basic properties of Semiconductors.
CO4:	Student Able estimate the various material properties.

List of Experiments

S.No.	Title of the Experiment
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	Determination of dispersive power of a prism using spectrometer.
8	Determination of the resistivity of semiconductors by four probe methods.
9	Determination of the resistivity of semiconductors by four probe methods
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.



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17	Determination of young's modulus for the given material of wooden scale by nonuniform bending (or double cantilever) method.
18	Determination of Frequency of electrically maintained tuning fork by Melde's experiment.
Note: Any 10 from the above experiments, out of which two may be conducted through virtual labs.	
Virtual Lab Experiments	
1.	To find the resolving power of prism: https://vlab.amrita.edu/index.php?sub=1&brch=281&sim=1524&cnt=1
2.	To determine Energy Band Gap of Semiconductor. https://bop-iitk.vlabs.ac.in/exp/energy-band-gap/
3.	Determination of refractive index of liquid using newton's rings experiment. https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=1520&cnt=1

Reference Books/Lab Manuals:

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

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



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

(Common to All branches of Engineering)

I B.Tech- I Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A02101P	ES	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100

Activities:

1. 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.

2. 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.

3. 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

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

CO1:	Apply fundamental circuit laws such as Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL) to verify the behavior of electrical circuits through practical experiments.
CO2:	Analyze and interpret the results of experiments involving the measurement of resistance, power, and power factor using instruments like the Wheatstone bridge and single-phase wattmeter.
CO3:	Evaluate the performance characteristics of electrical machines, such as DC shunt generators and single-phase transformers, by conducting load tests and magnetization characteristic experiments.
List of experiments:	
1. Verification of KCL and KVL	
2. Verification of Superposition theorem	



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

CO1:	Identify & testing of various electronic components.
CO2:	Understand the usage of electronic measuring instruments.
CO3:	Plot and discuss the characteristics of various electron devices.

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.



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

COMPUTER PROGRAMMING LAB

(Common to All branches of Engineering)

I B.Tech- I Semester							SJ CET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A05101P	ES	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100

Course Objectives:

The course aims to give students hands – on experience and train them on the concepts of the

C- Programming language.

Course Outcomes:

CO1:	Read, understand, and trace the execution of programs written in C language.
CO2:	Select the right control structure for solving the problem.
CO3:	Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4:	Develop Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

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
- Writing simple programs using printf(), scanf()



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WEEK 2

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

Suggested Experiments /Activities:

Tutorial 2: Problem-solving using Algorithms and Flow charts.

Lab 1: Converting algorithms/flow charts into C Source code. Developing the algorithms/flowcharts for the following sample programs

- i) Sum and average of 3 numbers
- ii) Conversion of Fahrenheit to Celsius and vice versa
- iii) Simple interest calculation

WEEK 3

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

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.

- i) Finding the square root of a given number
- ii) Finding compound interest
- iii) Area of a triangle using heron's formulae
- iv) Distance travelled by an object

UNIT II

WEEK 4

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

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

Lab4: Simple computational problems using the operator' precedence and associativity



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i) Evaluate the following expressions.

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

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

c. $A+++B---A$

d. $J= (i++) + (++i)$

ii) Find the maximum of three numbers using conditional operator

iii) 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



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- 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 dereferences.

- 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



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Suggested Experiments/Activities:

Tutorial 13: Call by reference, dangling pointers

Lab 13: Simple functions using Call by reference, Dangling pointers.

- i) Write a C program to swap two numbers using call by reference.
- ii) Demonstrate Dangling pointer problem using a C program.
- iii) Write a C program to copy one string into another using pointer.
- iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:

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

Suggested Experiments/Activities:

Tutorial 14: File handling

Lab 14: File operations

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

Textbooks:

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

Reference Books:

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



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

(Common to All branches of Engineering)

I B.Tech- I Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A99101	BS&H	L	T	P	C	CIA	SEE	Total
		0	0	1	0.5	-	-	100

Course Objectives:

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

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

CO1:	Understand the importance of discipline, character and service motto.
CO2:	Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3:	Explore human relationships by analyzing social problems.
CO4:	Determine to extend their help for the fellow beings and downtrodden people.
CO5:	Develop leadership skills and civic responsibilities.

UNIT I: Orientation

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

Activities:

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

UNIT II: Nature & Care

Activities:

- Best out of waste competition.
- Poster and signs making competition to spread environmental awareness.
- Recycling and environmental pollution article writing competition.
- Organizing Zero-waste day.



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v) Digital Environmental awareness activity via various social media platforms. vi) Virtual demonstration of different eco-friendly approaches for sustainable living.

vii) Write a summary on any book related to environmental issues.

UNIT III: Community Service

Activities:

- i) Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities-experts-etc.
- ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS, iii) Conducting consumer Awareness. Explaining various legal provisions etc.
- iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.

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.



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COMMUNICATIVE ENGLISH

I B.Tech- II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A52201T	BS&H	L	T	P	C	CIA	SEE	Total
		2	0	0	2	30	70	100

Course Outcomes:

After the completion of the course students will be able to

CO1:	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
CO2:	Apply grammatical structures to formulate sentences and correct word forms.
CO3:	Analyze discourse markers to speak clearly on a specific topic in formal and informal discussions.
CO4:	Evaluate reading / listening text sand to write summaries based on global –Comprehension of these texts.
CO5:	Create a coherent paragraph, essay, and resume.

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.



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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.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014

Web Resources:



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GRAMMAR:

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

VOCABULARY

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



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

CHEMISTRY

(Common to EEE, ECE, CSE, IT & allied branches)

I B.Tech- II Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A51202T	BS&H	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electro chemistry and polymers
- To introduce instrumental methods, molecular machines and switches.

Course Outcomes:

After the completion of the course students will be able to

CO1:	Compare the materials of construction for battery and electro chemical sensors.
CO2:	Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
CO3:	Explain the principles of spectrometry, slcinseparation of solid and liquid mixtures.
CO4:	ApplytheprincipleofBanddiagramsintheapplicationofconductorsandsemiconductors.
CO5:	Summarize the concepts of Instrumental methods.

UNIT-I: Structure and Bonding Models:

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 orbital's of butadiene and benzene, calculation of bond order.

UNIT-II: Modern Engineering materials

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

UNIT-III: Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conduct metric titrations (acid-base titrations). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples. Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell- working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).



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UNIT-IV: Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation. Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres. Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT-V: Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, 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, Juliode Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition



St. John's College of Engineering and Technology

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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to All Branches of Engineering)

I B.Tech- II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A54201	BS&H	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

Course Outcomes:

After the completion of the course students will be able to

CO1:	Solve the differential equations related to various engineering fields.
CO2:	Identify solution methods for partial differential equations that model physical processes
CO3:	Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO4:	Estimate the work done against a field, circulation and flux using vector calculus

UNIT-I: Differential equations of first order and first degree

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 with Constant Coefficients

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

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

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

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Gauss Divergence theorem (without proof) and related problems.

Textbooks:

- Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
- Higher Engineering Mathematics, B. V. Ramana, McGraw Hill Education, 2017



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

Reference Books:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition.
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.
3. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
4. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
5. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

BASICS OF CIVIL AND MECHANICAL ENGINEERING

(Common to All branches of Engineering)

I B.Tech- II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A01201T	ES	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

PART A: BASICS OF CIVIL ENGINEERING

Course Outcomes:

After the completion of the course students will be able to

CO1:	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
CO2:	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying..
CO3:	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
CO4:	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
CO5:	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

UNIT-I

Basics of Civil Engineering: Role of Civil Engineers in Society-Variou s 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-Cementconcrete-Steel. Introduction to Prefabricated construction Techniques.

UNIT-II

Surveying: Objectives of Surveying-HorizontalMeasurements-AngularMeasurements-Introduction to Bearings Leveling instruments used for leveling -Simple problems on leveling 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 Harbor, 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.



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

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.FifthEdition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi.2016
3. Irrigation Engineering and Hydraulic Structures-Santosh Kumar Garg, Khanna Publishers, Delhi2023. 38thEdition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10thEdition.
5. IndianStandardDRINKINGWATER—SPECIFICATIONIS10500-2012

PART B: BASIC MECHANICAL ENGINEERING

Course Outcomes:

After the completion of the course students will be able to

CO1:	Understand the different manufacturing processes.
CO2:	Explain the basics of thermal engineering and its applications.
CO3:	Describe the working of different mechanical power transmission systems and power plants.
CO4:	Describe the basics of robotics and its applications.
CO5:	Acquiring knowledge of materials and their properties for engineering applications

UNIT-I: Introduction to Mechanical Engineering and Engineering Materials

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, Composite Materials.

UNIT-II: Manufacturing Processes and Thermal Engineering

Manufacturing Processes: Sand Casting, Arc and Gas welding, Conventional Machining Process: Lathe, Milling, Non- Conventional Machining Process: Abrasive Jet, Laser Beam, 3D printing.

Thermal Engineering – 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, Mechanical Power Transmission and Robotics

Power plants–working principle of Steam, Diesel, Hydro, Nuclear power plants.

Mechanical Power Transmission-Belt Drives, Chain Drives and their Applications, Gear Drives and their applications.

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



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robotics.

Textbooks:

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

Additional Sources:

https://onlinecourses.nptel.ac.in/noc24_me104/preview<https://www.youtube.com/watch?v=FCF8QMV31H8&list=PLFW6lRTa1g83TjuxZs9VH4Yh3Ri6EbPps>



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

DATA STRUCTURES

(Common to CSE, IT & allied branches)

I B.Tech- II Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A05201T	ES	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100

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 this course students will demonstrate the ability to

CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between dequeues and priority queues, and apply them appropriately to solve data management challenges.
CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.
CO6	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

UNIT-I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) 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



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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 queues), 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



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

COMMUNICATIVE ENGLISH LAB

I B.Tech- II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A52201P	BH&S	L	T	P	C	CIA	SEE	Total
		0	0	2	1	30	70	100

Course Outcomes:

After the completion of the course students will be able to

CO1:	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO2:	Apply communication skills through various language learning activities.
CO3:	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4:	Evaluate and exhibit professionalism in participating in debates and group discussions.
CO5:	Create effective Course Objectives:

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
11. Describing (Persons, places, Things and Events)
12. Paraphrasing

Suggested Software:

- Walden Info tech
- K-Van Solutions

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.



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4. J.Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2ndEd), Kindle,2013

Web Resources:

Spoken English:

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

Voice & Accent:

1. <https://www.youtube.com/user/letstalkaccent/videos>
 2. <https://www.youtube.com/c/EngLanguageClub/featured>
 3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
- https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

CHEMISTRY LAB

(Common to EEE, ECE, CSE, IT & allied branches)

I B.Tech- II Semester								SJCET-R24
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
24G3A51202P	BH&S	0	0	2	1	30	70	100

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes:

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

CO1	Determine the cell constant and conductance of solutions.
CO2	Prepare advanced polymer Bakelite materials.
CO3	Measure the strength of an acid present in secondary batteries.
CO4	Analyse the IR spectra of some organic compounds.
CO5	Calculate strength of acid in Pb-Acid battery.

List of Experiments:

1. Measurement of Λ_m^∞ by spectro photo metric method
2. Conduct metric titration of strong acid vs. strong base
3. Conduct metric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometer - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
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:

- "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J.

Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar

**St.Johns College of Engineering and Technology****(AUTONOMOUS)****DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING****ENGINEERING WORKSHOP****(Common to all branches of Engineering)****I Year B. Tech. (EEE, CSE, CAI)–I Semester****I Year B. Tech. (CE, ME, ECE, CSD)–II Semester**

I B.Tech– II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A03201	ES	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100

Course Outcomes:

After the completion of the course students will be able to

CO1:	Identify workshop tools and their operational capabilities.
CO2:	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
CO3:	Apply fitting operations in various applications.
CO4:	Apply basic electrical engineering knowledge for House Wiring Practice
CO5:	Ability to make various basic prototypes in the trade of Tinsmithy such as rectangular tray, and open Cylinder

LIST OF EXPERIMENTS

Introduction to tools and equipment used in each trade

SECTION-I (Carpentry)

1. Dovetail joint
2. Half-lap joint
3. Mortise and Tenon joint

SECTION-II (Sheet Metal Working)

1. Tapered tray
2. Conical funnel
3. Elbow pipe
4. Brazing

SECTION-III (Fitting)

1. V-fitting



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2. Stepped fitting
3. Half round fitting
SECTION-IV (Foundry& Welding)
1. Preparation of mould with single piece pattern.
2. Preparation of mould with split piece pattern.
3. Preparation of Lap Joint using Arc welding
4. Preparation of Butt Joint using Arc welding
SECTION-V (House wiring)
Familiarity with different types of basic electrical circuits and makes the following connections.
1. Parallel and series
2. Two-ways witch
3. Go down lighting
4. Tube light
5. Soldering of wires

Note: In each section a minimum of TWO exercises are to be carried out.

Text books:

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.

References:

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-Mc GrawHill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P. M. & Upadhyay P.A.; Atul Prakashan, 2021-22.



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

DATA STRUCTURES LAB

(Common to CSE, IT & allied branches)

I B.Tech- II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A05201P	ES	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100

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:

CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between dequeues and priority queues and apply them appropriately to solve data management challenges.
CO5	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

List of Experiments:

Exercise 1: Array Manipulation i) Write a program to reverse an array. ii) C Programs to implement the Searching Techniques – Linear & Binary Search iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort
Exercise 2: Linked List Implementation i) Implement a singly linked list and perform insertion and deletion operations. ii) Develop a program to reverse a linked list iteratively and recursively. iii) Solve problems involving linked list traversal and manipulation.
Exercise 3: Linked List Applications i) Create a program to detect and remove duplicates from a linked list. ii) Implement a linked list to represent polynomials and perform addition. iii) Implement a double-ended queue (deque) with essential operations.
Exercise 4: Double Linked List Implementation i) Implement a doubly linked list and perform various operations to understand its properties and applications. ii) Implement a circular linked list and perform insertion, deletion, and traversal.
Exercise 5: Stack Operations i) Implement a stack using arrays and linked lists. ii) Write a program to evaluate a postfix expression using a stack. iii) Implement a program to check for balanced parentheses using a stack.
Exercise 6: Queue Operations i) Implement a queue using arrays and linked lists. ii) Develop a program to simulate a simple printer queue system. iii) Solve problems involving circular queues.
Exercise 7: Stack and Queue Applications i) Use a stack to evaluate an infix expression and convert it to postfix. ii) Create a program to determine whether a given string is a palindrome or not. iii) Implement a stack or queue to perform comparison and check for symmetry.



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Exercise8: 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

References:

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



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DEPARTMENT OF CSE-ARTIFICIAL INTELLIGENCE MACHINE LEARNING

HEALTH AND WELLNESS, YOGA AND SPORTS

(Common to All branches of Engineering)

I B.Tech- II Semester							SJCET-R24	
Course Code	Category	Hours/Week			Credits	Maximum Marks		
24G3A99201	BS&H	L	T	P	C	CIA	SEE	Total
		0	0	1	0.5			100

Course Objectives:

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

Course Outcomes:

After completion of the course the student will be able to

CO1:	Understand the importance of yoga and sports for Physical fitness and sound health.
CO2:	Demonstrate an understanding of health-related fitness components.
CO3:	Compare and contrast various activities that help enhance their health.
CO4:	Assess current personal fitness levels.
CO5:	Develop Positive Personality.

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:

- Organizing health awareness programmes in community
- Preparation of health profile
- 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



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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.
- ii) Practicing general and specific warm up, aerobics ii) Practicing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

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

General Guidelines:

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

Evaluation Guidelines:

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

A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject